

**Navigating Airwaves and Waterways:
An Ethnography of Mobile ICT Use on the “Digital Ship”**

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Abstract

Commercial shipping is a vital part of Canada's economy, moving goods through an intricate network of waterways, lakes, rivers and ports. It is also an industry that is undergoing a remarkable transformation, as new (at least to the industry) digital technologies are taking hold in the wheelhouses and engine rooms of these freighters and tankers. Coupled with the emergence of the "digital ship", sailors now have access to a broad array of mobile information and communication technologies, including cellphones, and satellite-based internet access. In light of this, this thesis considers the experiences of sailors who grapple with these changes, to explore how mobile ICTs challenge, complicate, enhance, and otherwise transform their lives.

This thesis draws on ethnographic research conducted over a month-long, 4,000 nautical mile journey on an articulated tug and barge that transports liquid asphalt and other black oil products through the Great Lakes-St. Lawrence Seaway system. Drawing upon media studies, science and technology studies, and mobilities studies, I seek to understand the physical, representational, and virtual worlds of sailors as an assemblage of devices, people, movements, geographies and histories. To do so, three interconnected narratives emerge. The first is a story of connectivity, as sailors manage the home-work divide. The second story is about the sociotechnical power of mobile ICTs, as expertise and autonomy are being eroded by the use of digital devices. The third story is perhaps in response to mobile ICTs, a story about how, even with all of these digital and automation

technologies now permeating the fabric of sailors' everyday lives, they still, first and foremost, rely on their embodied knowledge to do their jobs. I argue that while the virtual and the representational worlds of the sailor are important, the physical world still holds sway.

Dedication

For Connor & Mae,
Mackenzie & Nathan

Work hard, persist, and hold tight to your dreams.

Acknowledgements

I was once told that the difference between a fairy tale and a sea story is this: One begins, "Once upon a time" and the other begins "This is a no shitter boys!" I am most grateful to the eleven hairy-arsed men of the Victorious for sharing their sea stories with me and showing me what it means to be a sailor. I remain in awe of your knowledge, courage and hard work. Thank you.

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Prologue

In the spring of 2010, after completing my PhD comprehensive exams that focused on technology & culture, mobile communications and Canadian communication policy, I began thinking in earnest about a project for my dissertation. My long-standing academic interest in mobile technology and culture was leading me towards questions of location-aware technologies embedded in cellphones – a topic that was becoming increasingly prevalent in popular and academic literature at the time. I started preparing my dissertation proposal and making inquiries, mostly via Google searches and email communication, with companies that used Location-Based Services as part of their logistical management systems.

Several hundred kilometres away that same spring, my mother had dinner with Margaret, one of her oldest friends, and Margaret’s partner, Saul. They asked how my PhD was going, and my mom told them that I was trying to craft a project for my dissertation on mobile technology. Saul, a chief engineer on an articulated tug and barge, had recently returned from China, where he had overseen the building of a new vessel called Victorious/John J. Carrick. “She should come on the Victorious,” he said to my mom. “It’s a mobile technology if ever I’ve seen one.”

When my mother called to suggest this, quite frankly I couldn’t see it. When I envisioned mobile technologies, I pictured cellphones, laptops, iPads and the like. Indeed a quick Google search for “mobile technology” reveals similar assumptions: images of

cellphones, laptops, tablets and word clouds inundated with the language of wireless networks saturate the internet. Yet, Saul's characterization of ship-as-mobile-technology rang true, and forced me to address my own narrow views. Through email conversations that spring, Saul told me about the marine industry in Canada, how it historically relies on what he called "older and traditional proven technologies" but that in the last 10 years, he had noticed a shift, stating that now "it seems almost impossible to fathom how we did business prior to all this new technology." Saul, with more than 25 years of experience at sea, was keenly interested in the technological shifts in his industry, and I was keenly interested in mobile technology; thus technology quickly became our common denominator.

Two of the most enduring lessons from my university experience are about technology. The first is that technology can never *be*, it can never exist, outside of culture. What I mean by this is that technology and culture are interrelated, or co-determinate; they shape each other. One of the most entertaining examples of this is a skit by the comedian Eddie Izzard. In this skit, he's standing on stage, discussing the National Rifle Association's slogan, "*guns don't kill people, people kill people.*" He looks right into the camera, and says, "yeah, but the gun helps". Then he proceeds, much to the amusement of the audience, to walk around, his hand mimicking a gun, saying, "Bang! Bang!", proving how ineffective shooting someone is, without the gun. But his point is true; we cannot make sense of the gun outside of the user; the technological and the cultural need each other, they produce each other.

The second lesson is that technology is never neutral; it is always imbued with the meanings, values and beliefs of the culture in which it is situated. I had a professor once who dared students to name a technology that was neutral. Someone called out “fork” and the professor proceeded to explain the cultural significance of the fork, connecting it to everything from differentiating humans from other tool users to the ways in which we socially stratify ourselves into groups based upon table manners and the placement of forks at the dinner table. Someone else called out “button” and he proceeded to discuss the significance of buttons on uniforms to signify positions of power in certain military circles. It is an endless game, but the meaning behind it has stayed with me; technologies are not neutral tools, they are sites of struggle, routinized practices, sets of relations between things.

Because I approach technology as a set of relations – that is, my orientation to the world is such that I understand the technological and the social as mutually-shaping and co-constructive practices – I began to think about the socio-technical assemblages (Suchman, 2007; Vannini, 2012) that might form in the context of being at sea, and how they might afford, make possible or even transform the practices and experiences of sailors. For instance, does the emergence of electronic charts change how sailors understand their relationship to the sea? To land? To their boat?¹ How do these technologies shape how sailors practice navigation? Likewise, how have automation technologies in the engine control room shaped the practices of engineers? As Saul told

¹ I use the word “boat” here because this is the common language used on the *Victorious*. While technically *Victorious*/John J. Carrick is an articulated tug and barge (ATB), and thus not a ship, sailors tend to refer to most vessels as boats in their everyday use.

me early on, “we’re changing the breed of engineers.” What does this mean in terms of their day-to-day work? And in how they understand themselves as sailors?

With these questions piquing my curiosity, I stepped onboard Victorious on August 5, 2010, for a month-long, 4,000 nautical mile journey through the St. Lawrence Seaway and out into the North Atlantic. It is impossible to fully relate the experience of being at sea. There’s a vastness to it – to the wide-open spaces of the sea, to the sheer size of the vessel and scope of the ocean. However, because my participants were candid and open to my presence, observations and questions, it is possible to provide a deeply illustrative narrative account of their practices, feelings, experiences, knowledges and sensibilities in such a way that rings true.

Throughout this field study, I lived, worked, laughed and sailed with the eleven men who together form the crew of the Victorious. Over the course of a month, these men trusted me with their hopes and fears, opened their worlds to me and transformed from strangers to friends. These friendships have proven to be enduring, where to this day a running conversation between us carries on, and I will spend a day visiting with them if the chance arises as they transit the Welland Canal. It is these sailors to whom I am indebted and whose stories I tell here.

Chapter I

Introduction: The Steel Holds You

*“There’s nothing—absolutely nothing—
half so much worth doing as simply messing about in boats.”*

— Kenneth Grahame, *The Wind In The Willows*

Leaning against the railing in the wheelhouse, I have been chatting with Igor, the First Mate, about life at sea. It’s a warm, sunny morning, with a cool breeze from the harbour wafting through the open door. We are docked in the Eastern Passage, Nova Scotia, unloading about 70,000 barrels of asphalt. The air hangs heavy with the acrid smell of the cargo, cut with a salty maritime breeze. After being on the move for over a week, I am glad for the stillness and the opportunity to have a conversation - so glad, in fact, that I’d made a note of it in my journal earlier today: “We are in Halifax, and thank merciful God, the ship has stopped moving.”

Igor, a 45-year old sailor who has been sailing for more than twelve years, and who emigrated to Canada from Bulgaria in 2003 with his wife and son, has just recounted his move to Canada, and his attempt to work at other jobs – jobs that had nothing to do with being a sailor. “Why did you come back?” I asked, curious about the tension he obviously felt about being back at sea. He glanced over and smiled, and told me of a Bulgarian phrase that sailors use to make sense of that tension: translating to English, he said, “*The steel holds you.*”

To Igor, there is a life force to the ship, “it’s a force that will always pull you back.”

(Fieldnote, August 12, 2010)

Introduction: Year of the Seafarer

September 23, 2010 marked the 33rd annual celebration of World Maritime Day, an occasion during which time the International Maritime Organization (IMO)² highlights

² The IMO is an agency of the United Nations that is responsible for measures to improve the safety and security of international shipping. The IMO's objectives can be best summed up by its slogan - "Safe,

and celebrates the international marine industry, and identifies key aspects of the industry to which they hope to draw attention. The year 2010, the IMO declared, was the “Year of the Seafarer.” The briefing published by the IMO that announced the Year of the Seafarer points to the centrality of the work that sailors do in terms of world commerce, and yet also hints at how seafaring is an unheralded, unrecognized profession:

Our intention is to pay tribute to you, the world’s 1.5 million seafarers – men and women from all over the globe – for the unique, and all too often over-looked, contribution you make to the wellbeing of all of us....

At IMO, we are ever-conscious of the important role you play in helping us achieve safe, secure and efficient shipping on clean oceans – the goals that we, as the United Nations specialized agency charged with the regulation of international shipping and as a member of the global maritime community, have set ourselves.

And so, we will celebrate next year’s World Maritime Day theme with much pride in your contribution to our objectives, to the facilitation of more than 90% of the world’s trade, and to sustainable human development. (IMO, 2009)

The timing was right, then, that in 2010 I was just finishing my comprehensive exams that focused on mobile technology and was looking for a dissertation project. Through round-about circumstances (detailed in Chapter 3), I was presented with an opportunity to travel onboard a vessel that moves asphalt and other black oil products throughout the Great Lakes – St. Lawrence Seaway system to do an ethnographic study about how sailors are taking up “new” mobile information and communication technologies in their industry. It was an opportunity I could not pass up.

secure and efficient shipping on clean oceans." It was established by means of a convention adopted in Geneva in 1948, and first met in 1959. Based in the United Kingdom, the IMO has 169 member states as of 2010 and three associate members (IMO, 2016).

The vessel is Victorious/John J. Carrick, an articulated tug and barge that is owned by McAsphalt Industries, and managed by McAsphalt Marine Transportation Ltd (Image 1.1). It consists of Victorious, a 5,300 hp tug that is notched into, and “pushes” the barge, John J. Carrick, a double-hulled tanker barge. It was built in China in 2009, and was officially commissioned in June, 2010, two months before my ethnography took place. The geographical context is the Great Lakes – St. Lawrence Seaway System (GLSLS), a 3,700 km water highway (“Highway H₂O”) that connects the heartland of North America to the Atlantic Ocean and the world beyond (Image 1.2). The GLSLS is an interconnected series of waterways whose importance to North American commerce cannot be understated. Recent figures suggest that U.S. and Canadian companies that rely on the GLSLS for shipping of raw materials and finished goods reported upwards of \$30 billion in revenue annually (U.S. Dept. of Homeland Security, 2014). As well, more than 225,000 people in the U.S. and Canada are employed directly or indirectly through the GLSLS (U.S. Dept. of Homeland Security, 2014).



Image 1.1. Victorious/John J. Carrick approaches Lock 2, Welland Canal. Photograph: Heather Maguire, July 12, 2011. Unless otherwise noted, all photographs are taken by the author.



Image 1.2. A map of the Great Lakes – St. Lawrence Seaway System. Canadian Geographic, <https://www.canadiangeographic.ca/article/st-lawrence-seaway-inland-superhighway>

These are interesting times to be a sailor on the Great Lakes. The global recession in the late 2000s led to a reduction in fleet traffic on the GLSLS (Jenish, 2009), and shipping companies are under increasing pressure to improve safety and efficiency of their fleets. More often than not, this means turning to new, digital technologies in the wheelhouses and engine rooms of vessels to reduce manpower, improve safety records, and more efficiently manage crew, equipment, supplies, and logistics. Indeed, the “digital ship” has become a moniker used throughout the industry to capture this shift. How, then, in the Year of the Seafarer, are seafarers grappling with these changes?

Research Question and Assumptions

The research question that guides this thesis is this:

How do mobile information and communication technologies change, disrupt, augment, improve, and otherwise complicate the lives of the sailors who use these new devices?

I arrived at this question after doing a literature search on sailors and new³ or digital technologies, and realizing that there was very little social scientific research in this area (see Talley, 2013). Moreover, the literature that has been written focuses primarily on the “global” sailor⁴ and their experiences with personal communication devices (Sampson, 2013; Gekara et al., 2013; Liang, 2011; Sampson, 2009; Sampson, 2008). Scholarship that focuses on digital technologies in the workplace (i.e., digitization of navigation aids and automation in the engine room) did so from a quantitative, “human factor” perspective, where seemingly value-neutral technologies were simply pressed into service which in turn “impacted” the safety and efficiency of the vessel, and where “human factors” were calculated into equations as if they were somehow outside of, or extraneous to the use of these technologies. Sailors are thus conceived as passive consumers of technology, rather than active participants in how technology comes into being.

I wanted a different perspective. The assumption from which I begin is that technologies are not value-neutral tools that are either good or bad. Rather, technologies are imbued with the norms, beliefs, and values of the context out of which they emerge.

Technologies have long histories where there are no “revolutions”, but rather remediations over time (Robins & Webster, 2004; Bolter & Grusin, 2000; Cragg et al., 2007). Moreover, technologies cannot be bracketed out from their use, context, history,

³ I recognize that “new” is a problematic term in technology studies, and I elaborate on this in Chapters 2 and 3.

⁴ The “global” sailor refers to deep sea sailors, often from the Global South, who are away from home for months or even years at a time. Victorious/John J. Carrick is a Canadian, domestic vessel crewed by Canadians who are away for approx. 6 weeks at a time. See Chapter 3 for more details on the differences between GLSLS and deep sea sailing.

politics or geography. Rather, technologies are a set of relational practices (Vannini et al., 2012; Franklin, 1999; Pacey, 1983; Slack & Wise, 2005). Technologies neither determine, nor are determined by their social use, but rather are a sociotechnical assemblage of devices, practices, users, histories, and geographies. Thus in technological use lies potential – potential to transform, append, complicate, augment and improve social life. Moreover, as Vannini et al. argue, “their ‘being’ is relational, and can only be understood by examining the ecology of the relationships in which they are enmeshed” (2012: 3). Or, as Franklin puts it, “I think it’s important to realize that technology defined as *practice* shows us the deep cultural link of technology, and it saves us from thinking of technology as the icing on the cake. Technology is part of the cake itself” (Franklin, 1990: 9; emphasis original).

From this relational view of technology-practice, I could then turn to the users, in this case the sailors themselves, to consider how they take up mobile information and communication technologies at sea. The second assumption, therefore, is that sailors are active agents of technological change. In Science and Technology Studies (STS), there is a long and vibrant history of the ways in which “users matter” (Oudshoorn and Pinch, 2008: 543), replacing an older view of users as passive recipients of technological innovation with a more complex view of users as active participants in the shaping of technology. Rejecting a technological determinism in which users are imposed upon, STS has fought long and hard to demonstrate how technology is taken up in the context of use, revealing a mutually productive relationship wherein users both shape, and are shaped by their technological practices in everyday life (Oudshoorn and Pinch, 2005,

2008; see also Slack and Wise, 2005). Sailors, then, are active agents who participate in a sociotechnical assemblage that includes mobile ICTs; the vessel itself; the history of the profession; the landscape, seascape and geography; various organizational and institutional systems and regulatory bodies; the infrastructure, and so on.

My third assumption is that I do assume that things have changed in the shipping industry in Canada, particularly in light of developments in mobile ICT innovation and implementation. Life is different on a ship where cellphone service is available and where satellite-based Internet access allows for greater connectivity. Work is different in a wheelhouse with electronic charts as opposed to paper ones, and where technologies afford the possibility of being able to track – and be tracked by – other vessels, and in the engine room where automated systems keep a watch, where once stood an engineer. The “digital ship” is very much a reality, and what that reality looks like for the sailors themselves is the question I found most intriguing as I set out to do my study.

Critical Approach

Conceptually and theoretically, I draw from a combination of Science and Technology Studies (STS), media studies and mobilities studies to help me approach a study of sailors’ lives on the *Victorious*. As stated above, STS is most helpful in recasting the sailor as an active agent of technological change, very much participating in building and shaping their sociotechnical reality. According to Latour (1986), this sociotechnical reality is one of tension – tension between the skipper in the breeze, steering his vessel in rugged circumstance, running on instincts, and the navigator immersed in charts and

paperwork (see also Hutchins, 1995). It is the tension between the physical world of the sailor, and the representational one. Adding to these stressors as digital technologies come to infiltrate life onboard, is the virtual world, a world brought into being through Internet connections and cellphone service. Media theorists Bolter and Grusin (2000) have developed the concept of “remediation” to help bring these three worlds together (see also Graham, 2004; Crang et al., 2007). Remediation theory suggests that there are no longer sharp divides between the physical, representational and virtual worlds in which we live and work. Rather, these worlds co-exist in a “subtle, complex, and continuous interplay” (Crang et al., 2007: 2408). From this starting point, Bolter and Grusin provide a series of considerations for studying this interplay. They include the following: the idea that technologies are not revolutionary but rather evolutionary, with new technologies remediating older ones, not replacing them; the importance of the firm, material infrastructures that support mobile technologies; and the fact that devices are becoming smaller and sometimes almost invisible, where the process of “banalization” renders sociotechnical power invisible (Graham, 2004: 17, see also Bolter and Grusin, 2000; Crang et al., 2007).

I add to these considerations the concept of mobility, and draw from the ‘new mobilities paradigm’ to help develop this aspect. Geographer Tim Cresswell argues that mobility is “socially produced movement” (Cresswell, 2006: 3), infused with meanings, occurring within contexts, imbued with ideologies, and produced within a broader set of power relations (see Cresswell, 2006; Urry, 2007; Cresswell and Merriman, 2011; Adey, 2004, 2010; Sheller & Urry, 2006; Kaufmann, 2002; Blunt, 2007). Cresswell’s central

argument is that mobility is something that is simultaneously produced and productive; we practice mobility as we move through the world and make meaning out of it, while at the same time it is “implicated in the production of mobile practices” (2006: 21).

Cresswell points us to considering three interrelated ideas to better understand sailors’ experiences, through examining their mobility. That is, we can consider the entanglement of movement, representation, and practice that together form a ‘constellation of mobility’ (Cresswell, 2010: 19). This includes the physical journey on the vessel, how this journey is enacted, including its narratives, discourses and stories, and how mobility is practiced through the body.

The ‘new mobilities paradigm’ is useful in capturing the importance of mobility, and this focus on mobility reveals the cracks and fissures in the infrastructure because the *Victorious* constantly moves in and out of cellphone tower reach, and beyond the satellite footprint. However, mobilities literature does not tend well to the critical aspects of technological use. That is, I found myself turning back to media and technology studies to frame how sailors’ lives are increasingly monitored, and clamped down upon as their world becomes increasingly digital.

Meet the Sailors

Before embarking any further into this thesis, I want to take a moment to introduce you to the men whose lives appear in these pages. The crew of the *Victorious* is divided into navigation and engineering, and so I have followed that division here, first introducing

those who are the navigators and deck crew, followed by the engineers. The cook belongs to neither side.

Navigation & Deck Crew

Captain John

John⁵ is 33 years old, which is considered very young for a captain on a Great Lakes vessel. He knew he wanted to be a sailor from a young age (although no-one in his family is a sailor), first as a sea cadet, and then going to Georgian College in Owen Sound, ON to study navigation. He was a cadet for Upper Lakes Shipping in the late 1990s, working his way up over the next 13 years to become an officer. He has been with McAsphalt (which was formerly in partnership with Upper Lakes) for his whole career.⁶ As Captain, John holds primary responsibility for the crew. His rank is the highest position on the vessel. He is easy-going, fun to work with and admired by the crew. Time and time again, crew would tell me about how much they enjoyed having him as a captain, but also how much they respect him. He quickly became a participant central to this study, in that he encouraged others to participate, was the first one to be interviewed, and allowed crew time to be interviewed during their working hours so that they did not have to give up on hours of rest for my study. He is known for his practical jokes and funny stories. He lives in Ottawa, ON with his wife and two school-aged children.

⁵ Pseudonyms are used throughout this dissertation. See Chapter 3 for details.

⁶ McAsphalt Marine Transportation Ltd. was a joint venture between McAsphalt Industries and Upper Lakes Shipping. Upper Lakes sold its interest in MMTL back to McAsphalt Industries in 2011.

Chief Officer (or First Mate) Igor

Igor is 45 years old, and originally from Bulgaria. He is tall and angular, and speaks with a thick accent. Igor sailed “deep sea”⁷ prior to immigrating to Canada, and he has been with McAsphalt for 5 years. His job as Chief Officer means that he is in charge of the deck crew. He manages cargo (loading and unloading), deals with dock personnel, and organizes deck crew scheduling, along with navigational and watchkeeping duties. He answers to the Captain. Igor loves to tell stories, and has a keen memory for details. For example, to this day, I still receive birthday messages from him on my birthday – Igor remembers everyone’s birthday. Igor is in training to be Captain, and hopes that he will soon be promoted.⁸ He lives in the Greater Toronto Area with his wife and 19-year old son.

Second Mate Pierre

Pierre is in his late 40s (he did not disclose his age), and is the only French Canadian onboard. He is known for his bushy black and grey beard and his homemade apple jelly. He seems to be somewhat of a loner onboard, because he does not often sit down to chat with others, preferring the solitude of his cabin when he is not working. Like Igor, Pierre has sailed deep sea, but prefers working on the Great Lakes because it allows him to be home more. Pierre performs navigational and watchkeeping duties and is also the safety officer. He conducts safety audits and holds safety meetings, ensuring that the crew are up-to-date on procedure. He lives in Quebec with his wife.

⁷ Deep sea sailing involves the crossing of oceans, and sailors who sail deep sea are often gone for months at a time. Some can sign up to a year. These crews are often international.

⁸ Indeed, Igor was promoted to Captain in 2016 when John left the company to take a position elsewhere.

Deck Utility Willard

Willard is a slight, red-haired man from Newfoundland, with a fast wit and a faster tongue. At 45 years old, Willard immediately puts you at ease with his laughter and his gentle spirit. He is one of those people who you feel that you've known forever. He works as a deck utility, which is the McAsphalt term for deckhand. He works on deck in locks and at docks on the lines, cleans and paints, and does any other maintenance work that the Chief Officer asks of him. Willard worked in other jobs in Newfoundland, first in the fishery and then in a window factory before taking up sailing about five years ago when other work dried up. At home in Newfoundland he has a wife and two teenage daughters.

Deck Utility Wayne

Wayne is an unassuming man with dark hair and a goatee. He is 40 years old, and like Willard, is from a small town in Newfoundland. He worked in the fishery for many years, and says that he'd go back "in a heartbeat" if the fishery were to open up again. However, financial pressures forced him to move on, and so he started working "on the boats" 10 years ago. He works on deck in the locks and during docking, as well as performing maintenance and cleaning work. Wayne is shy, and while he likes to joke with the crew, he tells only a few stories of his own. He has a wife in Newfoundland and a 25-year old son who works in the oil fields in Alberta.

Engineering Crew

Chief Engineer Saul

Saul is 44 years old, and has been with McAsphalt/Upper Lakes Shipping for his entire working career (23 years). He studied marine engineering at Georgian College in Owen Sound, ON. Saul is a tall man who is always smiling. He likes to laugh, and loves to tell stories. He is well-respected for his depth of knowledge and for his ability and interest in developing the careers of younger engineers. His job as Chief Engineer makes him responsible for everything mechanical on the vessel. He works long hours; as he says, “when my eyes are open, I’m working.” Saul was absolutely critical in gaining me access to the Victorious; had I not known him, I would not have been able to get onboard. He is one of those people who would give you the shirt off his back. He was also very eager to encourage others to participate in my study, and set the tone amongst the engineers to be interviewed. He lives in Central Ontario with his long-term partner, and has a teenage daughter.

Second Engineer Chester

With a shock of grey hair, and a twinkle in his eye, you would be surprised to find out that Chester is only 39 years old. He has worked for McAsphalt/Upper Lakes for his entire working life (21 years), and has worked his way up to second engineer not by formal schooling, but by learning with his hands and writing his tickets along the way.⁹ Chester calls this the “school of hard knocks.” He works under Saul in the engine room,

⁹ To become an officer on a ship, one can either go to college/university to study marine engineering or navigation and then earn sea time, or you can come up through the ranks, which involves getting years of sea-time and then “challenging” the exams. The college/university route is quicker because you get a condensed version of three years of study, whereas the other way you have to work and study at the same time.

and is responsible for keeping all the equipment on the vessel in good working order. He performs repairs and maintenance on a regular basis. Chester is a man of few words. He enjoys being with others, but seems a little bit shy. I interviewed Chester in the middle of the night, and it was by far my hardest interview; he did not have stories to tell, and did not recall many events. He is teased onboard for his fear of vegetables and love of Pepsi. He lives in Newfoundland with his wife and five-year old son.

Third Engineer Homer

Homer is 36 years old, and this is his first shift on the Victorious. He has a degree in Marine Engineering, but had been working in a metal fabrication facility in Newfoundland until his uncle, who works for McAsphalt, convinced him that he should be making better use of his education. He started working on the Everlast¹⁰ two years ago as an engine utility until an officer position opened up here. Homer is a small, health-conscious man with a bald head and a goatee. He is warm and easy to talk to, and enjoyed talking about his experiences at sea. He is from Newfoundland (the same town as Wayne), and has a wife and two school age boys.

Engine Utility Rusty

If there were a stereotypical “sailor” look, Rusty would have it. A stocky man with many tattoos, Rusty sometimes goes by the nickname “bulldog”. I must say I found Rusty a little daunting at first, but once I got to talking with him, I found a truly gentle and generous man. He laughs a lot, makes jokes, and teases others relentlessly. As an engine utility, Rusty helps out the engineers as needed, does repairs and maintenance work in the

¹⁰ The Everlast/Norman McLeod is another ATB owned by McAsphalt.

engine room, and works on deck during locks and docks on the wires.¹¹ Rusty has a cup of tea at 9 p.m. every night, tea that is so strong the spoon must stand straight up, and so I began having tea and chats with him every night. He is 45 years old, and is from Newfoundland, where he worked as a truck driver until about 10 years ago, when he found work as a sailor with better pay. He has a girlfriend with whom he lives, and a 10-year old son who lives with him part-time.

Engine Utility Ryan

Ryan is the youngest member of the crew on the Victorious, in his early 20s. Tall and lanky, Ryan is quiet and reserved. He works as an engine utility, and so, like Rusty, he assists the engineers with work in the engine room and also helps out on deck as required. When we were heading to Halifax, about a week into my journey, there was a particularly stormy day, and Ryan fell into a hatch in the engine room, dislocating his shoulder and knocking out his teeth. He had to wait a day and a half, until we reached port, to go to the hospital, where he was treated and sent home to recover. As a result, I was unable to interview him.

Galley Crew

Bill the Cook

There is only one cook on the Victorious, and it is a job that Bill takes seriously. At 48 years old, he has worked as a chef all his life – first at the casino in Niagara, and now at a restaurant that he owns in southern Ontario. He loves to talk, and is open and willing to

¹¹ Working “on the wires” means handling the wires and winches when the vessel is secured and lets go in locks and at docks.

talk about his experiences at sea. He is not afraid of having an opinion and shares his opinion freely. His cooking is much appreciated, and his soups are renowned on the *Victorious*. He is proud of the work that he does, and he enjoyed sharing recipes with me. He and his wife own a restaurant at a marina, and so he works long hours on the vessel and then longer hours trying to help his wife out from afar. Together, they have two grown daughters.

Summary

This chapter has introduced my thesis topic, research questions and assumptions, as well as the sailors who participated. A note about structure: Many of the chapters herein, including the Introduction, open with short excerpts from my fieldnotes. I did this strategically, because for many of us, it is quite difficult to imagine life on a cargo ship, and I found myself wanting the reader to know some of its strangeness, if you will.

While I recognize that ethnographers continue to problematize the insider/outsider binary, this sailors' world was so deeply unique that I wanted to have the reader see it through my eyes, as a point of orientation. These opening fieldnotes are not meant to privilege my position in any way, but more provide a way in for readers who, like me, might feel a bit out of place.

In the chapters that follow, I develop three interrelated sets of narratives about how mobile ICTs are being taken up at sea. Chapter 2 outlines in detail the literature about sailors and mobile ICT use, media studies and mobilities studies. Chapter 3 details my methodology, and discusses how I did my research. Chapters 4, 5, and 6 are the

narratives that emerged after living and working onboard the *Victorious* for a month, travelling more than 4,000 nautical miles with the 11 men who crewed the vessel. The first of these narratives has to do with *connectivity*. Cellphones and Internet access help sailors to stay connected with their families in a way that is new (at least in their industry). At the same time, sailors tell harrowing stories of not being there, of how having a cellphone and knowing what is happening but being unable to take action is sometimes worse than the silence of not being connected to begin with. The second narrative tells the story of *power and control*. While engineers and navigators do different kinds of work, both are experiencing the influx of mobile ICTs into the workplace. This is a story of struggle over meaning about how these technologies are privileged in particular environments, about expertise and how that expertise is undermined, and about controlling one's ship and one's workload. Long gone are the days of casting off and being "free" – the ties that bind via mobile ICTs have, it seems, an endless reach. The final story is one of *embodied knowledge*. Buttressed against all of this new technology, sailors have an embodied knowledge about their worlds; they know their ships, they feel them. Perhaps it is in response to mobile ICTs, a story about how, even with all of these digital and automation technologies now permeating the fabric of sailors' everyday lives, they still, first and foremost, rely on their embodied knowledge to do their jobs. I argue that while the virtual and the representational worlds of the sailor are important, the physical world still holds sway.

Chapter II

Literature Review

Sailors and New Technologies

The Oxford English Dictionary defines seafaring as “of a person regularly travelling by sea.” From this perspective, seafaring can include a variety of different sailing practices, including the Navy, Coast Guard, competitive and recreational sailing, fishermen, cruise ship workers, and merchant sailors, amongst others. As Wayne, a seasoned sailor on the *Victorious* told me when I asked about when he became a sailor, “I was a fisherman before, so I was one already.” The academic literature on seafaring recognizes this diversity as well. Ethnographic accounts of the practices and experiences of sailors include those of fishermen grappling with work-life balance (Robinson, 2007; Binkley, 2002). While these are compelling, they are set very much in, and tell stories about, the communities that support fishing, from the Bering Sea to Atlantic Canada, as much as they do the stories of the sailors themselves. Other studies have examined naval seafaring, to gauge job satisfaction (Kelty, 2008), the effects of privatization (Jager and Kummel, 2007), and career opportunities (Moskos, 1977). While these types of studies help to illustrate some of the complexities of working at sea, they are situated within the very specific context of the military and its hierarchical organizational structure, rules and protocols. While seafarers such as Wayne do understand themselves as sailors across different contexts — from cargo vessels to fishing boats — the environment does matter.

This thesis is about a specific kind of sailor, that of the merchant seafarer working on a cargo vessel involved in the movement and trade of goods (Fink, 2011). There is a rich history and set of experiences shared by merchant sailors, one that is characterized by hard work in “sweatshops at sea” (Fink, 2011), and one that has endured a certain stigma, despite improved working conditions and wages (Forsyth, 1987, 1990).¹² The community of sailors working on cargo vessels in Canada is tight-knit, and there are several reasons for this. Geographically, there is a division between sailors on the West coast of Canada, and those working on the Great Lakes/Eastern Seaboard, and there is little overlap between regions. Sailors working on the Great Lakes/Eastern Seaboard, where this study takes place, are trained primarily at three facilities offering cadet programs, in Owen Sound, Ontario; St. John’s, Newfoundland; and Rimouski, Quebec. This means that through education and training, sailors often get to know who else is in the field, because they are either in school together, or know someone who was. Likewise, there is a relatively small number of Canadian ship owners who operate on the Great Lakes, with six companies comprising the Canadian Shipowners Association¹³. With only a handful of companies for whom to work, sailors learn of each other through shipboard experience or reputation.

In early 2010, I began corresponding via email with Saul, Chief Engineer on the *Victorious*. We wrote back and forth on a number of occasions, as I attempted to gain a better understanding of his working life as a sailor on a cargo vessel, keeping in mind my own keen interest in mobile information and communication technology (“mobile

¹² Sailors on the *Victorious* attest to the persistence of stigma to this day.

¹³ In September, 2016, the Canadian Shipowners Association merged with the Chamber of Marine Commerce, uniting U.S. and Canadian interests.

ICTs”). Because Saul was at work, email was by far the easiest way to communicate; cellphone service was unavailable on the lakes, and the satellite phone had a strange delay that made conversation awkward and stunted, especially as we did not know one another very well. By email, I was able to ask questions about the industry, the ship, and the life of a sailor, and Saul would respond candidly, often late at night when his shifts were over. During one of these conversations, Saul said something quite telling: “it seems almost impossible to fathom how we did business prior to all this new technology.” To me, this statement is powerful, not only because it alludes to the importance of technology in a sailor’s day-to-day life, but because it hints at what Hesse-Biber (2011: 4) refers to as a “*significant break* in the way individuals, groups and society as a whole conduct their everyday activities [emphasis mine].” There seems to be a ‘before and after’ moment, that somehow something was different now for sailors, because of technological innovation and change.

‘New’ technology is a deceiving term, one that is often bandied about without due consideration not only to the incremental changes that lead to the development of something ‘new’ (Robins and Webster, 2004; Bolter and Grusin, 2000; Graham, 2004), but also due to the fact that most of our so-called ‘new technologies’ are not really all that new. As Molz argues, “most of the technologies encompassed in the term ‘new technologies’ — phones, cameras, wireless communications, computers, global positioning systems and the Internet — can hardly be considered new anymore” (2014: 553; see also Hesse-Biber, 2011 and Chapter 3). She goes on to explain that, “When we talk about new technologies, then, we are in many cases referring not to the technology

itself, but rather to the disruptive effects of technological innovation on the social landscape” (Molz, 2014: 553). When considering the variety of ‘new technologies’ or mobile ICTs now available to sailors, such as cellphones, satellite-based telephony and Internet access, along with a multitude of industry-specific, specialized technologies,¹⁴ there arises an opportunity to critically examine this changing social and cultural landscape and consider the ways in which these technologies are implicated in new knowledge formation, social practices, and sailors’ everyday activities.

Academic scholarship that focuses specifically on merchant seafaring and these mobile ICTs is apparent in a number of forms. The vast majority of this literature is located in technical and professional maritime studies, addressing the science of navigation and engineering. Such technical journals and articles tend to treat technology and users as separate entities, measuring human performance by evaluating the impact of various new and emerging technologies on any number of variables. For instance, Cook et al., (1981; see also Cook et al., 1990) consider watchkeeping performance indicators and collision avoidance as impacted by shipboard automation. Studies such as these measure the mental workload and stress of engineers and navigators in terms of risk and safety, largely in a technologically deterministic manner, wherein these stressors are ‘caused’ by automation technologies (Schuffel et al., 1989; Fee et al., 1980; Norman, 1990). Others have evaluated the technical systems onboard vessels, considering such aspects as validation, verification, and system performance (Grabrowski and Dhami, 2005: 18). These aspects do consider users’ experiences, but remain impact-focused, quantifying experience in terms of the effect of a network or design (Grabowski and Wallace, 1993;

¹⁴ See Appendix A for a full list and description of these technologies.

Hogarth and Einhorn, 1992), thereby reinforcing a causal, binary relationship between sailors and the technologies they use.

More recent studies prioritize maritime safety, something that is of paramount importance in the industry, particularly in relation to the onslaught of new technologies. This research measures and assesses the extent to which mobile ICTs improve safety records onboard. Safety tends to be driven by two variables: groundings and oil pollution. The interrelated factors of the value of cargo, pollution risk, and insurance costs position marine accidents of primary concern (Chauvin, 2011). A key theme related to this discourse of safety concerns the role of new technologies as tools to help improve maritime safety and security (Ou and Zhu, 2008; Hsu et al, 2009; Salinas, 2006; Stitt, 2004). This literature illustrates how technologies such as Automatic Identification System (AIS), a ship-to-ship identification system that allows for the transmission of precise information about position, speed, ID and cargo via a common VHF radio channel, were developed by the International Maritime Organization (IMO) to enhance the safety of vessels, improve navigational efficiency, and improve safety of life at sea (Ou and Zhu, 2008; Tsou, 2010; Norris, 2007; Lapinski & Isenor, 2001, Grabowski & Dhami, 2005; Salinas, 2006). Overwhelmingly, this literature cautions against AIS simply replacing other navigational tools such as RADAR and standing watch, and should be instead used to complement the suite of navigational tools available. As one of the captains I interviewed stated, “a carpenter doesn’t just use a hammer”.

These technical and professional maritime studies are vital to the industry, providing information needed to ensure the smooth functioning of our waterways. They seek to draw correlations between the implementation of new technologies and accident rates, performance levels, safety and security — information crucial to insurers, regulators, government agencies, ship owners, their clients and also to sailors themselves. However, they do not speak to the questions inherent to the newness of technology, namely the ways in which technological innovations and changes disrupt, augment, improve, and complicate the lives of the sailors who use them. Talley (2013) reviewed articles published in maritime transportation journals from 2001 – 2013. He found that the majority of articles examined shipping performance/management, finance, port performance, maritime logistics and port governance. Of the 287 articles he reviewed, only 14 of them focused on the practices and experiences of seafarers themselves (less than 5%). This gap is taken up outside of trade journals, as social scientists recognize the importance experience-based knowledge, practices, and expertise of seafarers within the broader context of the shipping industry.

Social scientists who focus on the experiences of seafarers and mobile ICTs have provided important insights into the technologically-mediated world of the sailor (Peters, 2014; Spence, 2014; Hasty and Peters, 2012). Some of this involves exploring the ways in which sailors’ mobility at the transnational level is enabled by new technology (Bloor et al., 2014; Alderton et al., 2004). These studies are of the “global sailor,”¹⁵ often Filipino or from other regions of the Global South, and they consider the ways in which

¹⁵ Global sailors are also known as deep sea sailors. They are away from for many months at a time, working through ships using flags of convenience. This mobile workforce is underpaid, lack protections that local governments can provide, and are often without the same resources.

communication technologies enable and constrain sailors' work-life balance (Sampson, 2013; Gekara et al., 2013; Liang, 2011; Sampson, 2009; Sampson, 2008; Sampson and Thomas, 2002), and experience the process of going to sea (Mack, 2007). Empirical work has considered how these seafarers navigate “borderless” careers and labour issues (Morris & Wu, 2009, Rugganan, 2011) as well as the regulatory framework of seafaring (Bloor & Sampson, 2009; Klein, 2011; Lillie, 2006). In these instances, mobility — the ability of sailors to move between ports, work, and home — is predicated upon their use of new technologies, and the sailors themselves are positioned as part of a globalized workforce. What this scholarship highlights is not just the mobility of global seafarers, but also the importance of mobile technologies in facilitating this movement.

Compared to Canadian sailors, these global sailors are more likely to experience low wages, poor working conditions, and precarious employment; all of these factors are endured as a result of the unevenness of globalization. Mobile ICTs work to mediate these experiences, enabling sailors to stay in touch with families, send money via mobile devices, and participate in their home lives, while being away from home for upwards of twelve months or more. At the same time, there is very little academic research that explores the experiences of Canadian sailors who do not sail deep sea, are away from home for weeks at a time rather than months or years, and navigate domestic technology infrastructure. Their experiences of mobile ICTs are markedly different and warrant further explorations.

Three Worlds In Tension: Remediation

One of the central tensions that emerges from examinations of merchant sailors and their relationships with technologies has a remarkably long history. Bruno Latour, reviewing Hutchins (1995) book, *Cognition in the Wild*, describes this historic tension:

There is an old and inevitable feud every sailor has lived through, and that is the one that pits the skipper in the breeze, mist and cold of the cockpit against the navigator, down in the cabin, slightly nauseated, looking over the chart and leafing through the Nautical Instructions (1996: 54).

This is the tension between the corporeal, physical world — a world a sailor knows through what he sees and feels; the ruddy knowledge acquired through battling the seas and tides, the wind and weather — and the technological world of representation, where charts provide details that the eye cannot see, and devices such as RADAR (Radio Detection And Ranging) and ECDIS (Electronic Chart Display & Information System) provide digital representations of the outside world. With mobile ICTs becoming more prevalent on ships, these tensions are increasingly pronounced. Knudsen, for example, argues that:

navigation has experienced huge changes since the time of the Argonauts and is no longer at the mercy of wind and weather. But it can hardly ever rely on techné alone and dispense with experience, common sense, professional pride, and practical wisdom (2009: 301).

Research such as this demonstrates a new kind of pressure being experienced by sailors, one in which their tactile knowledge is butting up against digital representations. While the technical and professional maritime studies journals suggest that the implementation of these technological innovations is beneficial, more in-depth studies of sailors'

experiences suggest that caution should be used, and further studies are needed to understand the extent to which these mobile ICTs disrupt and change life at sea.

The tension between the physical world and the representational world is brought into sharp focus when we consider, as well, the 'virtual' worlds that are increasingly theorized in relation to mobile ICTs. Since the early days of the internet, theorists have been working to make sense of the 'virtual' - by examining interactions in online environments (see Rheingold, 1993 and Turkle, 1995 for some of the earliest of these), to consider the ways in which our social worlds are altered through online spaces and co-presence. In media studies and cultural geography, there has emerged a binary relationship between these virtual spaces and "real" ones, where theorists grapple with the fact that virtual communities still require not only a physical infrastructure, but also experience corporeal movements and occupy 'real' physical space (Ito et al., 2009; Slack and Wise, 2006; Rice and Haythornthwaite, 2006; Wellman, 2001; Bakardjieva and Smith, 2001). As geographers Crang et. al, who critique this binary relationship between real and virtual space in relation to urban life, explain, "An all-powerful virtual domain was thus widely portrayed as bringing with it an absolute spatiotemporal shift which, quite literally, 'unglues' previous notions of embodied urban life" (2007: 2406). One of the most significant problems with this approach is that it positions technology and social space as separate, as somehow "out there", rather than spaces that are actually produced through human social interaction and practice.

To bring this somewhat abstract discussion in line with sailors' experiences of mobile ICTs, following this thread in media studies and geography reminds us that in addition to grappling with the competing demands of the physical and representational worlds, sailors are also balancing their virtual worlds. This is a world brought about by on-board internet access, use of cellphones and access to social media. Sampson and Wu (2003), for example, use ethnographic data to consider the role of ICTs in seafaring labour, to reveal how new technologies work to increase isolation and boredom (see also Liang, 2011). They position mobile ICTs as 'pulling' sailors into their virtual worlds, isolating them from each other.¹⁶ The problem with the positioning of these different 'worlds' — the physical, the representational, and the virtual — as somehow separate and in tension with each other is that it implies that these worlds are autonomous and discrete. As Crang et al. argue, "Daily lives do not encounter a great divide of offline and online worlds; rather, each feeds into the other in a subtle, complex, and continuous interplay" (2007: 2408; see also Woolgar, 2002).

Crang et al. use the concept of 'remediation' here, to recognize the complexity of these overlapping worlds. Borrowed from media theorists Bolter and Grusin (2000), remediation recognizes that "new, ICT-based media are seen to be piled atop other, preexisting media and domains of urban and social interaction, but without the loss of, or substitution for, some authentic and 'non virtual' preinformational reality" (2007: 2409). Bolter and Grusin (2000) offer six starting points for analyzing this remediation process, some of which I outline here as helpful in this study. First, remediation is a reminder that

¹⁶ Media studies has examined the ongoing critique that virtual worlds lead to isolation in the 'real' world. See for example Slack and Williams, 2000; Rice and Haythornthwaite, 2006).

there are no “revolutions” with technological change. Rather, the current “information age” is connected to, and remediates previous electronic communication processes, including the telegraph, telephone, and early computing. As Graham argues, “Rather, we are experiencing a complex and infinitely diverse range of transformations where new and old practices and media technologies become mutually linked and fused in an ongoing blizzard of change” (2004: 19). In the case of the shipping industry, this reminds us that all of the so-called new technologies that sailors are grappling with are in fact a part of the social, technical and cultural technologies that preceded them. The electronic chart, for instance, remediates the paper chart. It does not replace it.

Second, Bolter and Grusin (2000) remind us that, while the promise of ICTs and digital communications is of utopian disembodied detachment, we must “excavate” the material infrastructures that bring the virtual sphere into existence (Graham, 2004). The reminder here is that there are what Kaplan (2002) calls “hard industries” that support the “light ones”. The ethereal nature of wireless communication has a weighty infrastructure that is expensive, vast, and “profoundly material” (Graham, 2004: 20). The material infrastructure of mobile ICTs on the Victorious includes paying attention to the functionality of the various wires, servers, routers and computers that enable Internet connectivity onboard, as well as the ways in which sailors access land-based infrastructure, for example cellphone towers and Vessel Traffic Services.

Third, Bolter and Grusin argue that because mobile ICTs are becoming smaller and more embedded into our everyday lives, and have become so normalized that they are no

longer novel, a process of “banalization” is taking place (2000; see also Graham, 2004). When new technologies begin to “produce the ordinary” (Amin and Thrift, 2002: 103), they become invisible or black-boxed – they become *banal*. We stop thinking critically about how they operate in our daily lives; rather, these technologies are taken for granted (so long as they work). How, or even if, this process of banalization is taking place on the *Victorious* is an interesting question. It leads to Bolter and Grusin’s last point, because they argue that this increased invisibility and ubiquity of mobile ICTs leads to the “growing invisibility of socio-technical power” (Graham, 2004: 23). The more ordinary technology becomes, and the more opaque these sociotechnical systems become, the less likely we are to critique and question the power relations at play.

Remediation is helpful in the case of sailors, then, because rather than positioning these multiple worlds as separate and in tension, they are instead approached as fragile layers of intertwined knowledge and experience, where there is no privileging of one particular kind of knowledge or experience over another. Looking at the remediation of life at sea through mobile ICTs, therefore, means examining the “subtle shifts in the spatial, temporal, scalar, and material processes which together help to constitute [...] change” (Crang et al., 2007: 2405). The study of sailors adds a new dimension to the discussion, however, because the vast majority of the studies examine remediation in relation to urban space. The city is the background upon which these analyses unfold — a city with its stable infrastructure and durability. What happens, one wonders, when all aspects of

the network are in flux? When the social worlds are moving, the people are moving, the infrastructure is moving, the ship is moving?

The three worlds of the sailor — the physical, the representational, and the virtual — work together through a process of technological remediation. It is not about pitting the ‘real’ against the virtual or the representative against the physical, it is about understanding that these worlds are intertwined and mutually-productive. The challenge for the researcher, then, is how to make sense of this in such a mobile environment, where digital spaces are not often ubiquitous and quiet, but rather are hard-fought for. Digital technologies on a ship do not simply recede into the background of everyday life. They beep and squeal, they demand attention, and their infrastructure is fragile, shaky, and volatile. And yet there continues to be change afoot, as the ‘digital ship’ becomes positioned as ‘the way forward’, as ‘progress’ and ‘modern’. Will institutions, regulators, insurers, and ship owners realize that there are multiple worlds at play? Will they recognize that we cannot simply overwrite one kind of knowledge and experience at the expense of all others? Moreover, what about the sailors themselves? How can we make sense of their experiences in relation to these mobile ICTs and the technological innovations with which they are contending? I suggest using a mobilities approach — the fragile entanglement of physical movement, representations, and practices (Cresswell, 2006; 2010) — as one way that helps to make sense of sailors’ experiences.

Sailors and Mobility: A Way Forward

Critiquing the so-called “sedentarist” approach of the social sciences that assumes that people and things are static, mobilities can be understood as “both the large-scale movements of people, objects, capital, and information across the world, as well as the more local processes of daily transportation, movement through public space, and the travel of material things within everyday life” (CeMoRe, 2010; see also Hannam et al., 2006). Geographer Tim Cresswell argues that mobility is “socially produced movement” (Cresswell, 2006: 3), infused with meanings, occurring within contexts, imbued with ideologies, and produced within a broader set of power relations. Cresswell’s central argument is that mobility is something that is simultaneously produced and productive; we practice mobility as we move through the world and make meaning out of it, while at the same time it is “implicated in the production of mobile practices” (2006: 21).

According to Vannini:

[T]he mobility turn emphasizes the importance of flows, networks, connections, movements, performances, processes of deterritorialization and reterritorialization, transnational organizations, immobile infrastructures, and even immobile groups. Equally important are mobile culture dynamics such as the emergence of relationships on the move, and the changing meanings of places, times, and social ecologies (2010: 114).

There is a large body of work on mobilities, from across a number of disciplines (Cresswell, 2006; Urry, 2007; Cresswell and Merriman, 2011; Adey, 2004, 2010; Sheller & Urry, 2006; Kaufmann, 2002; Blunt, 2007), where mobility is taken to mean any number of things, from a relational geography (Adey, 2009), to a structure of feeling (Thrift, 1996), amongst others. Most helpful here, having something to offer in terms of what sailors are experiencing, is the work of geographer Tim Cresswell. Cresswell states

that mobility “does not exist in an abstract world of absolute time and space, but a meaningful world of social space and social time” (2006: 5). Above, we traced a thread through literature examining sailors’ experiences with mobile ICTs, considering the multiple worlds of the physical, representational, and virtual, which leads to questions about how mobile ICTs are disrupting, challenging, and otherwise changing sailors’ practices, knowledges, and social worlds. Cresswell points us to considering three interrelated ideas to better understand sailors’ experiences, through examining their mobility. That is, we can consider the entanglement of movement, representation, and practice that together form a ‘constellation of mobility’ (Cresswell, 2010: 19).

Physical movement is what Cresswell (2010: 19) calls the “raw material for the production of mobility.” It is the getting from A to B, the physical journey, the movement of bodies and cargo through time and space. In this way, physical movement is the *raison d’être* of the shipping industry; the industry exists for the sole purpose of moving cargo from one place to another, sometimes at a global scale, and sometimes more locally. Over the past 130 years, merchant shipping has endured as a central system by which to move commodities, people and information on a global scale. By the 1950s, shipping had established itself as a key industry, employing thousands of people between boat and shore (Levinson, 2006). It has been through cycles of development and change; container shipping and self-loaders, which have emerged since the 1960s, made shipping more economical and hence prevalent (Levinson, 2006; Stopford, 2000). Other changes, including trade liberalization, financial deregulation and a massive increase in international trade have also bolstered this kind of physical movement (Stopford, 2000).

Physical movement of ships is also an area that is tied to mobile ICTs, in that it is these technologies that facilitate and enable said movement. In fact, some of the earliest documentation by Marconi, father of the wireless telegraph, discusses the physical movement of ships:

Wireless is now available to shipping for communication by means of long, medium, and short wave telegraphy and telephony, bringing to the ship information regarding time, weather conditions, navigational warnings, and news of happenings in the world at large, as well as facilitating social correspondence for passengers, and keeping shipowners in touch with their ships (as quoted in Hancock, 1950: ix).

Historians have paid attention to the role of wireless communications in the shipping industry (Hancock, 1950, Schroeder, 1967) and economists have examined the political and economic environment of wireless telegraphy that shaped the development of the shipping industry (Lew & Cater, 2006). This history demonstrates that mobile ICTs can help not only facilitate physical movement, but they can also assist in its mapping and measurement. This thesis examines some of the so-called new tools available, including Automatic Information Systems (AIS), Electronic Chart Display and Information Systems (ECDIS), NORIS (engine room automation, control and monitoring), and cellular phones, to consider the ways in which these tools facilitate physical movement. It does so from the perspective of sailors' experiences, and considers the intertwined realities of the physical, representational, and virtual worlds that sailors create and sustain along the journey.

Representation is the second aspect of mobility that Cresswell asks us to consider. For Cresswell and others (for example Shaw and Docherty, 2014), mobility can be represented by those who enact it in any number of ways, from freedom and adventure, to a right or a threat. Representation is one place where the meaning of mobility resides, as it takes shape out of those from whom it is practiced. Representation is the meaning of movement, the “discourses, narratives and stories about the fact of movement” (Cresswell, 2008: 2). Scholars, for example, have examined the ways in which automobility is represented in terms of the liberal subject and discourses of freedom (Clarsen and Veracini, 2012). Here, the term automobility provides for a broader definition of car beyond just a simply a means of transport, to consider the practices, meanings and values attached to, and brought into being with the car as part of a broader assemblage of institutions, organizational practices, laws, emotions, and cultural norms. Others have examined travel writing, to consider the ways in which routes to the Northwest Passage are represented and brought to life by professional sailors (Withers, 2011), visual analyses done through examining how photographs represent place (Pink, 2011), and representations of migration (Fortier, 2014). Representations are powerful, because this is the locus of meaning; it is how subjects themselves talk about their mobile worlds. This asks the researcher to be open to how sailors talk about their own mobility, their experiences of being at sea, and consider what kinds of stories they tell. Considering how sailors represent their experiences provides insight into their technologically mediated lifeworlds. Technological innovation is changing the social lives of sailors, impacting the multiplicity of ways in which they make sense of the world around them, and make meaning within it.

Finally, Cresswell argues that not only is mobility about the movement from place to place, and how we represent those movements and make meaning through them, it is also about the practice of mobility. He argues, “Human mobility is practised mobility that is enacted and experienced through the body. Sometimes we are tired and moving is painful, sometimes we move with hope and a spring in our step” (2010: 20). This embodied process of movement is one of experience, of doing, of being in the mobile world. Moreover, it is an experience that is steeped in technological remediation (Crang et al., 2007). That is, the experiences of movement are mediated through technologies, whether they are cars (Packer, 2008), trains (Bissell, 2010), or planes (Adey, 2009, 2010). The practice of mobility grounds research in the body, and in considering who gets to move through particular spaces and who does not, how bodies are enabled and constrained, and “people’s differential abilities to move” (Cresswell, 2006: 165). It also enables a discussion of the ways in which mobile ICTs participate and help shape that movement. Media scholars have developed a rich body of literature examining the ways in which mobile phones, for example, facilitate certain people to be physically mobile, whether they be Japanese youth (Ito, 2009), the elderly (Crow, Sawchuck et al., 2014; Sawchuk and Crow, 2012), those with prosthetics (Bissell, 2009).

The embodied practice of being a sailor and using mobile ICTs is one that is yet to be explored, and provides a unique opportunity to consider the ways in which mobility is brought to life. How mobility is felt for sailors is very different than other kinds of movement. These journeys are not commutes, nor short flights. These are endless days

of constant movement on a loud, shaking vessel that floats on wavy, windy seas. Sometimes there is a slight nausea, sometimes the vibrations make it difficult to sleep, sometimes moving is monotonous and boring. Part of this is sensory – moving through the sea is a fully somatic experience, filled with sights, smells, rhythms, sounds and tastes. There is an aspect of mobile cultures that is experiential, sensual and emotional (Adey, 2010: 19). Approaching the study of life at sea, therefore, benefits from engaging with the body-in-motion as a way of being in the world (Adey, 2010; Bissell, 2010). Exploring what it feels like to be a sailor, and how these feelings affect them involves considering the sensual, emotional and affective realms.

How it feels to be in motion is a sensory experience; being in motion involves sight, sound, touch, taste and smell. The mobilities literature asserts that the embodied practices of mobility require specific and careful attention (Parr, 2010; Adey, 2010; Cresswell, 2006; Bissell, 2010). The “materiality and sensuality of direct encounter,” Parr argues (2010: 2), plays a significant role in our experiences of everyday life. Much of the experience of being in motion in the world involves personal sensory experiences that become part of the knowledge of mobility. Indeed, Waskul and Waskul (2009) pay close attention to their somatic experiences on a canoe trip, which leads to a particularly rich description of their paddling and portaging. “Technics and techniques of movement are necessarily embodied, and thus, they are produced – made to happen – in acts of somatic work” (Waskul and Waskul, 2009: 36). That embodied sense of motion is important to engaging with techno-cultural mobilities at sea. As this dissertation unfolds, I will show how often the sensory realm is in tension with the technologies of mobility that aid

navigation and engineering. Moreover, while the mobilities literature tends to privilege the sense of sight (Vannini, 2010), shipping is a multi-faceted experience, and will be shown as such. However, the literature takes this sensory experience further, noting that our physical, sensory experiences shape how we perceive the world (Ingold, 2000). This perception is both emotional and affective.

Guilana Bruno (2002), in the *Atlas of Emotion* suggests that voyages are sentient. That is, voyages are highly technical, mediated experiences while at the same time filled with emotion. “Motion, indeed, produces emotion,” Bruno argues (2002:6). Emotions are connected to experience and feeling. As Shouse (2005) argues, feelings are sensations checked against previous experience, and emotion is an expression of that feeling. The mobilities literature is just now coming to terms with the emotional aspects of mobility. In a recent engagement with ‘mobile lives’, Elliot and Urry trace Simone, an academic who travels extensively for work. They argue that her experience of mobility is an ambivalent one, because of her emotions. It is exhilarating and wondrous, while simultaneously full of anxiety and uncertainty (Elliot and Urry, 2010). Indeed, exploring these emotional aspects of mobility are important, particularly in a modern world where emotions are commodified as part of heightening the mobile experience (Thrift, 2000, as quoted in Adey, 2010).

Moreover, the sensory and emotional aspects of mobility are closely related to what is now becoming known as “affective mobilities” – what it feels like to be in motion, and how those feelings affect those in motion (Adey, 2010). Emotion and affect are often

conflated, yet Massumi argues that affect is something quite different. Where emotion is a conscious response to feeling, affect is a “non-conscious intensity” (Massumi, 2002; see also Shouse, 2005). Engaging with affect means thinking about those moments that are not necessarily conscious – the instinctive responses by the body to particular situations, because a body doesn’t just respond to senses, it “infolds contexts” (Massumi, 2002: 30). This “infolding” is, at one level, not quite captured through language. It is the body’s knowledge that exists unto itself. Massumi (2002) calls this “intensity.” While differences persist in how affect is conceptualized (Adey, 2010), what is at stake here is that mobility has a feeling to it, beyond tactile senses. There is an intensity to mobility, that perhaps is in part emotional, in part sensual, and in part technical. Together, this becomes affective mobilities. Engaging with seafaring life necessarily involves exploring this intensity. When being-in-the-world involves being on a vessel which strangely feels tiny when out on the Atlantic ocean, rolling in the deep, there is an intensity – an affective realm – to that experience.

Summary

The aim of this chapter was to provide a review of the literature about sailors and mobile ICTs, and to locate scholarship that helps me to talk about the ways in which technological innovation and change disrupts, augments, improves, and complicates the lives of the sailors who use these new devices. I began by defining what kind of sailor I am focusing on, that being the merchant sailor working on a cargo ship, and I examined what we do know about sailors’ experiences with new and emerging technologies, pointing out that most of these studies are published in professional maritime journals,

and seek to quantify the relationship between sailors and technologies so as to reduce risk. This instrumental view is pervasive in the literature, but it leaves many questions unanswered about sailors' actual day-to-day experiences. The literature produced by social scientists looks specifically at the 'global sailor,' considering the ways in which mobile ICTs are providing these sailors with the ability to keep in contact with home and maintain their social worlds whilst at sea for great swaths of time. Noting that the experience of Canadian sailors is somewhat different, as they are usually away for weeks at a time rather than months, I suggest that there is a gap in the shipping literature about merchant seafarers.

Spreading the net wider, I opened up the discussion beyond these instrumental studies by drawing upon media scholars and geographers to consider what was identified as three worlds in tension: the physical world of the sailor, built upon the knowledge and know-how that comes from standing on the bridge wing, feeling the wind, watching the tides, and determining how to best navigate, juxtaposed against the representational world of the sailor, a world of charts and measured spaces represented in paper and digital forms, pushed up against the virtual world of the sailor, occupying the social worlds of the internet and mobile phone technologies. I found the work of geographers and media theorists particularly helpful, using remediation as a way of bringing together these worlds, positioning them not as in tension, but in a nuanced and fragile assemblage that together form the social world of the sailor. But this, too, raised questions, as most of the work that examines the relationship between mobile ICTs and social life takes place in urban, sedentary spaces. What happens, one wonders, when all aspects of the network

are in flux? When the social worlds are moving, the people are moving, the infrastructure is moving, the ship is moving?

This set of questions led me to others: Will institutions, regulators, insurers, and ship owners realize that there are multiple worlds at play? Will they recognize that we cannot simply overwrite one kind of knowledge and experience at the expense of all others? Moreover, what about the sailors themselves? How can we make sense of their experiences in relation to these mobile ICTs and the technological innovations with which they are contending? To answer these questions, I found the work of geographer Tim Cresswell, situated in the ‘mobilities’ literature, who suggests that we examine the ‘fragile entanglement of physical movement, representation and practice’ to put together what he calls a “constellation of mobility”. This, I argue, involves examining the remediation of sailors and mobile ICTs in relation to the actual movement of the ship, how sailors represent their worlds, and the embodied practice of sailing. This approach, I believe, will help to illustrate and speak to the questions inherent to the newness of technology, namely the ways in which technological innovation and change disrupts, augments, improves, and complicates the lives of the sailors who use these devices.

Chapter III

Research Design

*So the world is on the move and social science more or less reluctantly follows.
John Law (2004: 3)*

John looked up at me across the table after lunch and started talking. Quietly and carefully, he recounted the events of a day when he was first mate on the Everlast [a sister ship to the Victorious], a day when things went terribly wrong. White smoke had been seen coming from the barge stacks, and the Chief Engineer was sent to look into it. Hearing this over the radio, John was curious, and followed to see what was happening. It all happened very quickly, but there was an explosion, and the Chief was very badly burned. With hands and face burned, the Chief had closed many of the vents himself, working in a kind of automaton state, not yet realizing the extent to which his body was wounded. John told me how they had to cut the Chief's coveralls off his body, and how the skin on his kneecaps came off with them. They had to get a helicopter there to take him off the ship, and it took two hours for it to arrive. John said that had the explosion happened just thirty seconds later, he, too, would have been badly hurt.

In that moment, I was not a researcher asking questions about being at sea. I was another human being, witnessing that sense of knowing about how fragile this floating world could be, how quickly things become life threatening, how terrifying it is to be alone out here, how time and happenstance sometimes trump all the planning in the world. I was frozen, seeing the fear and the knowledge in his eyes, holding onto some part of him that is most often put away. "I didn't sleep for four nights because every time I closed my eyes, the world started spinning," he said quietly. I had no response, no questions, and for a brief moment, the silence hung between us.

And then, as quickly as the window opened, it was shut again. Changing the topic, John smiled and asked, "So, is this trip everything you thought it would be?" I didn't know what to say.

(Fieldnote, August 25, 2010)

Introduction

At just after 9:00 pm on a warm August night in 2010, I cleared the security gates at Lock 2 in the Welland Canal, and stood behind the yellow line, watching the Victorious slowly lower in the lock until its deck was even with the cement I was standing on, and a gangway was laid across the gap between ship and shore. Gathering up my belongings and my courage, I waved goodbye to my family who were standing behind the eight-foot security fence, and stepped over the gap and onto the ship. Saul, Chief Engineer on the Victorious, greeted me there, as two deckhands quickly pulled in the gangway and went back to their lines.

The minute I stepped foot on the Victorious, the minute I followed Saul down the rabbit warren of stairways and hallways to my cabin and stood quietly inside those shaking walls, I knew everything was different. Emotion coursed through me, ranging from sadness about leaving my family, to fear about what lay ahead for the next month, excitement about my project and uncertainty about my environment – about being on a ship with eleven or twelve sailors¹⁷ who were mostly unknown to me. At the same time, I stood still, sensing the sheer enormity of the vessel as she rumbled and shook, feeling entirely swallowed up by the technology that carried on regardless of the social worlds that were being enacted with and within her. I wrote in my journal that night of the heartbreak of leaving my children and of the vibrations and noises that rocked my body to its core. Everything was different that night because the world on the Victorious was

¹⁷ At that point, I didn't know how many sailors were onboard.

not stable, clear, singular or defined; it was messy, loud, moving and uncertain. I was, to borrow from Law (2004), dazzled. How on earth did I get to this point?



Image 3.1: The Victorious enters Lock 1, Welland Canal, August 5, 2015, 10:00 pm.

In this chapter, I explain how I got to that point; I describe the research design that I employed in my study of the integration of mobile ICTs into the lives of sailors. I begin by discussing the research rationale that underpins my approach, followed by an overview of my method. I then discuss the research design process, including a discussion of ethnography and its methods of participant-observation and interviewing. Finally, I provide an overview of the data analysis process and its problems.

Research Rationale

There is one research question that works as a guidepost for my research project:

How do mobile information and communication technologies change, disrupt, augment, improve, and otherwise complicate the lives of the sailors who use these new devices?

While I acknowledge that there are many different methods available to researchers who seek answers to that question, I knew from the literature review that in order to implement my project, I needed to be there, to observe sailors as they enacted mobile ICTs in their everyday lives at sea. I sensed that what felt special to me about this project was the fact that there was so much mobility; mobile ICTs were being used in particular ways, the sailors themselves had cellphones in their pockets and potentially internet access at their fingertips, and the ship itself seemed like a wondrous technological achievement of mobility. I wanted to travel with them so as to understand the world from their perspective of being at sea. As Bærenhold et al. (2004: 148) argue, “People do not stay in one place. Hence, research methods need also to be on the move, to simulate this intermittent mobility” (as quoted in Merriman, 2014: 169). My research question demanded a mobile method.

Researchers working in the area of mobilities studies are helpful here, because they have built an extensive œuvre of work predicated upon the researcher being on the move, and they have demonstrated the fruitful research that is generated when employing mobile methods by researchers who move with their participants (Fincham, McGuinness & Murray, 2010; Buscher et al., 2010; Baerenholdt et al., 2004; Urry, 2007). Mobile orientations focus on the embodied practices of being on the move using a variety of

methods including “go-alongs,” ethnography and autoethnography, and videography (Vannini, 2012; Laurier, 2004; Middleton, 2011; Watts, 2008, Cresswell & Merriman, 2011; Bissell, 2007). These researchers demonstrate the kinds of knowledge that can be generated by following mobile subjects and places to consider how we might represent mobile practices and experiences.

At the same time, there is also a keen interest in the technologies and techniques implicated in the production of mobility (Molz, 2014; Vannini et al., 2012; Vergunst, 2011; D’Andrea et al., 2011; Urry, 2007). This happens in several ways. Molz positions new technologies as producing “new sorts of questions, new ways of moving and new kinds of knowledge about the world” (2014: 554). She ties this to the ways in which mobile ICTs are increasingly networked, mobile, and converged. The results, she argues, are that mobile ICTs produce new social realities that ask us to rethink concepts such as togetherness, location, and ‘being there’. Other researchers suggest that mobile ICTs provide not only new sets of questions about the social world, but also provide new ways of researching that world; they are new techniques (Jungnickel, 2014; Molz, 2014; Buscher et al., 2010; Hesse-Biber, 2011). Overall, research suggests that a mobilities lens helps us to consider “the sociotechnical assemblages through which people choose, experience, practice, perceive, negotiate, engage, adapt to, cope with, and struggle over the meanings of mobility and communication” (Vannini et al., 2012: 6). In other words, by bringing together socially-produced mobility with the technologies and techniques of everyday life, researchers have been successful in exploring just what kinds of possibilities, affordances, and materialities can emerge.

However, as Merriman reminds us, this approach is not new; in the humanities, fine arts and social sciences, there is a long history of participatory research involving mobile practices and technologies (Merriman, 2014; see also Schivelbusch, 1980; Goffman, 1971). Moreover, Merriman (2014) and Bissell (2010) point out that researchers must be careful not to over-animate mobile subjects. Merriman, quoting Bissell (2010), states that,

[T]here is a danger that the focus on mobile methods and non-representational approaches to movement, performance, ‘liveliness and the body-in-action’ generates ‘an *overanimated* mobile subject’, highlighting movement, action and dynamism above ‘other ways of experiencing mobilities’. (Merriman, 2014: 11).

Thus a mobile orientation must also attend to the still (Bissell & Fuller, 2011), the slow (Vannini, 2014; Ashmore, 2013), the infrastructure (Merriman, 2016; Parks and Starosielski, 2015; Packer and Wiley, 2013; Graham and Marvin, 2001), and the relational im/mobilities (Adey, 2006), which are simultaneously produced as part of mobilities systems and networks. With these caveats in mind, a mobilities orientation has informed not only how I understand reality and knowledge as socially produced and always moving, but also how my positionality as the researcher is participative in the generation of these things. In other words, orienting towards my responsibility as a researcher to be mobile with my participants shaped my choice of research site in addition to the questions I asked. Because I was asking how mobile ICTs were being integrated into the lives of sailors, I needed a mobile method that would render this a possibility.

The third aspect to consider here is my focus on sailors and sailors' experiences. As noted in Chapter 2, there is very little accounting of the experiences of the sailors who are actually using new technologies in their everyday lives at sea, those whose mobility is at stake. I needed to design a research project that was not only mobile and attentive to the new possibilities brought about by technological change, but also one that privileged the voice of the sailor. These sailors are simultaneously experts and laypersons. Their use of engine room automation technologies and digital aids to navigation renders them experts in their fields, able to process highly complex sets of data in order to make decisions and take courses of action. At the same time, they are laypersons, using cellphones and the internet much in the same way that anyone else would. In Science and Technology Studies (STS), there is a long and vibrant history of the ways in which "users matter" (Oudshoorn and Pinch, 2008: 543), replacing the 'old' view of users as passive recipients of technological innovation with a more complex view of users as active participants in the shaping of technology. Rejecting a technological determinism in which users are imposed upon, STS has fought long and hard to demonstrate how technology is taken up in the context of use, revealing a mutually productive relationship wherein users both shape, and are shaped by their technological practices in everyday life (Oudshoorn and Pinch, 2005, 2008; see also Slack and Wise, 2005). Here, mobile phone use and mobile ICTs have been particularly well represented, from focus groups that examine Canadian youth's experiences with mobile phones in Canada (Shepherd and Shade, 2012), and historical accounts of women's appropriation of mobile devices (Martin, 1991), to stories from the elderly and their use of mobile technologies (Sawchuk and Crow; 2012; Crow and Sawchuk, 2014), to name but a few. Research demonstrates that user-focused

scholarship that takes place in the context of use, helps to illustrate how the creative, productive, and often overlooked realities of those who use technologies matters.

With this rationale in mind, I could begin to design a research project that was mobile, in context, user-focused, and attentive to the potentialities brought about by examining the integration of new technologies into the everyday lives of sailors.

Research Design: Ethnography

Based upon the research rationale provided above, I chose to use ethnography in order to generate knowledge about sailors' experiences with mobile ICTs. Ethnography is defined as "participating, overtly or covertly, in people's daily lives for an extended period of time, watching what happens, listening to what is said, and/or asking questions through informal and formal interview, collecting documents and artefacts" (Hammersley and Atkinson, 2007: 3). Ethnographic research allows me to engage closely with the sailors of the *Victorious*, while at the same time narrating such engagement (Clifford & Marcus, 1986, Marcus, 1995). Social science methods in general have been critiqued for not coping well with movement or flow (Law & Urry, 2004), and ethnography has traditionally been considered a "rooted" approach that focuses on a deep sense of place. However, Marcus has argued that there is a need for multi-sited, mobile ethnographic work (Marcus, 1995). Thus, there has emerged a "mobile ethnography" that is on the move in two ways: (1) that the researcher be "on the move" and thus traveling with the participants, and (2) that researchers are "tuned into the social organization of 'moves'" (Buscher & Urry, 2009: 103). Being mobile, and "following the thing" (Latour &

Woolgar, 1979) has made evident the social, material and discursive realms of the subject under study (Adey, 2010; Buscher & Urry, 2009; Buscher et al., 2011).

While there are multiple kinds of ethnographic mobilities (Jungnickel, 2014)¹⁸, my research tended to fall in line with those who study mobile subjects and places. This kind of ethnography focuses on the journey, not just the destination. As Jungnickel argues, “getting there becomes a way of knowing” (2014: 643). What a mobile ethnography could provide was a deeply illustrative account that is helpful in writing about sailors’ experiences, while at the same time providing an opportunity to be there, thus seeing the world from sailors’ perspectives.

Much of what is new in ethnography over the past twenty years has centred around uprooting traditional ethnographic methods, and addressing the challenges of multi-sited research (Hannerz, 2003; Marcus, 1998), and at first I considered my research to fit into this category of a multi-sited ethnography. After all, I would be travelling over 4,000 nautical miles and stopping in numerous ports. However, after much reflection, I realized that my research is in some ways quite traditional. While I would be always on the move for the better part of a month, I would be on a single site – the *Victorious*. Because my ship was not changing, the site was actually quite stable.¹⁹

¹⁸ Jungnickel (2014) identifies four kinds of ethnographic mobility: (1) ethnographers who make symbolic moves; (2) ethnographers who study mobile subjects and places; (3) ethnographers who follow the people, thing, idea; and (4) ethnographers who pay attention to their journeys to and from field sites.

¹⁹ See below for a detailed description of site selection.

Site selection was a relatively straightforward process. While researchers who want to study deep sea sailing²⁰ are able to purchase passage on deep sea sailing vessels, it is quite difficult to gain passage on a lake boat on the Great Lakes – St. Lawrence Seaway System. In the 1960s and 1970s, lakers were equipped with guest cabins, but these are a thing of the past. There is no evidence available as to why this is the case, but the sailors that I asked speculated that it was due to the risk that companies were unwilling to take, for little reward. The result is that only family and invited guests of the sailors themselves can gain passage.²¹

I gained access to the vessel through a contact connected with the *Victorious*. I knew Saul in passing, as I had met him at summer barbecues at the lake. In April, 2010, I emailed him to make contact, and to let him know that I was very interested on coming onboard to study mobile technologies on the *Victorious*. He said that he would get in touch with his office, and let me know. A week later, I heard back from him, indicating that McAsphalt Marine Transportation Ltd., the marine management side of McAsphalt Industries, had granted permission for me to sail on the *Victorious* to do my study. I did not speak with them directly, but rather worked through Saul as an intermediary. The only stipulation was that I had to sign a waiver once onboard, so that should an accident occur, McAsphalt would not be held responsible. I agreed to their terms. While it is often the case that organizations ask for a report, sharing the results of my study, this was not the case here; McAsphalt asked for nothing from me, beyond signing the waiver. This

²⁰ Deep sea sailing involves the crossing of oceans, and sailors who sail deep sea are often gone for months and months at a time. Some can sign up to a year.

²¹ Even this is changing. Canadian shipping companies are beginning to clamp down on guest access. Desgagnes (one of Canada's oldest shipping companies), now only allows spouses to have access, for up to 15 days per year. Children are not allowed.

worked out favourably as once I was onboard the Victorious, there was some suspicion that I was there to report to the company. I was able to wholly relieve those fears, and thus build trust.

Things happened swiftly from that point. I was invited to come for a trip on the Victorious when she was in the Welland Canal, so that I could meet the crew and get a sense of what I was getting into, and it also provided them with an opportunity to meet me. On May 28, 2010 at 9:00 pm, I boarded the Victorious in Lock 1, and spent three hours onboard, meeting the Captain who would be working during the summer months when my study would take place. I was given a tour of the engine room and the wheelhouse. Because this particular vessel runs six-week work rotations, many of the sailors I met that night would be working again during the summer. It felt important, this late-night meet-and-greet, because I wanted to make a good impression, ask good questions, and leave the sailors feeling that I was trustworthy. I left just after midnight in Lock 3, with an invitation to the Victorious' commissioning two weeks later.

The commissioning was held in Toronto on June 2, 2010. It was a gathering of the ship owners, the builders who had flown in from China, the crew, and the support staff. It was a celebratory day, and the Victorious was dressed up in her flags (Image 3.2). On this day, I arrived early, and found Saul onboard. He introduced me to the owners and Vice President, Transportation of McAsphalt Industries, the general manager of McAsphalt Marine Transportation Limited (who had granted approval for my research), and many support staff. Those whom I met were very interested in my study, asked lots of

questions about my credentials, such as where I went to school, the name of my program, and my degree status, and wished me luck.

I stayed for the day, watched the crew grant many tours, listened to the speeches, watched the slideshow of the making of the vessel in China, and had dinner with two of the crew partners, including my mother's best friend, and the Captain's wife. We talked about what it was like for them, married to sailors, and the challenges they face when their partner is away more than six months of the year. The Captain's wife shared stories of how upset her children are when their dad goes to work, and it sounded heartbreaking. The Chief's partner told funny stories of when the Chief was in China overseeing the new build. He was in China for more than nine months, and she said they would meet on Skype, him with his morning coffee and her with her evening glass of wine. This day also felt significant, as I built rapport with the sailors, some of their family members, and those in power at McAsphalt Industries.



Image 3.2 The Victorious/John J. Carrick at her commissioning. June 2, 2010, Toronto, ON.

After these two meeting opportunities, I discussed next steps with Saul. As my ambassador, it was important that he was onboard when I came to complete my study, and he knew he would be back to work in late July. He also knew that John, the Captain whom I had met twice, would be back to work in early August. Therefore, we decided that I should come onboard during that timeframe. The Victorious normally runs between Sarnia and Montreal, and so we began by discussing a week onboard, travelling through this area, when I could do interviews. However, as late July fast approached, their manifest changed, and they were heading out to the East Coast. My week-long voyage quickly turned into a month.

There are several reasons why the manifest of the *Victorious* is not made public. According to Saul, part of it has to do with the fact that their cargo is deemed hazardous by IMO standards, as they carry heavy fuel and oil-based products.²² Hazardous cargo operations require a greater level of security, and so they keep their manifests under wraps. I sensed, though, that it was also about competition in the industry. They do not want their competitors knowing where they are going, who they are running cargo for, and what their other moves might be. What it meant for me is that I would have to keep a bag packed by the door, and I would get a day's notice or less when I would be going. Surely enough, an email came in on August 4, 2010 from Saul, indicating that they would be in the Welland Canal the next day, and I could join in the evening. I packed my things, and prepared to leave.

The duration of my fieldwork was 28 days, from August 5, 2010 to August 31, 2010, covering over 4,000 nautical miles. We travelled from the Welland Canal, through the St. Lawrence Seaway to the Eastern Passage, NS, St. John, NB, Holyrood, NL, Botwood, NL, and back to the Welland Canal. The month-long duration allowed me to more closely engage with the practices of being at sea. Over this period, I lived and worked with eleven crewmembers, all men, four of whom were from Ontario, one from Quebec, and six from Newfoundland.

Once onboard, I used a variety of ethnographic tools during my study, including participant-observation, semi-structured interviews, fieldnotes and audio/video recording.

²² Tankers of any sort (both tug and barge and ships), which carry oil-based products have a special rating with their insurers and government agencies as hazardous.

I prepared consent forms in advance, after having sought and received ethics approval, and I spent the first two days in the mess room, speaking with sailors when they came in for lunch or break. I introduced myself, explained what my study was about, and asked them to sign a consent form to participate in my study (Appendix C). I informed them of the risks involved (low risk), that I would be using digital recording devices including an audio recorder and a digital camera, and that I would be completing interviews at a later date. Overwhelmingly, I received a warm welcome, and the sailors signed my consent forms. One sailor expressed his desire not to participate, and so I was careful not to include him in my fieldnotes and I did not interview him. I explained that because the name of the vessel would be published, I could not promise anonymity because there are so few people working on the *Victorious*²³, and only one person in each position. So, while I could identify by rank, it would be very easy to ascertain to whom I was referring. I gave sailors the opportunity to choose a pseudonym, but only one asked. The others were fine with me using their real names. That being said, there is no benefit in using their real names here, and so I have used pseudonyms because it does provide a layer of protection for the identity of my participants.²⁴

Throughout my journey, there were others who came onboard from time to time. This included harbour and river pilots²⁵ along the St. Lawrence River, in Montreal, and in the

²³ I had considered using a pseudonym for the vessel, but the Canadian shipping industry is so small, tug and barges are so few, and there are very few recent builds. Therefore, it would be very easy to ascertain which vessel I was on. Moreover, because I wanted to use photographs, anyone with any knowledge of the shipping industry in Canada would be able to tell which vessel I was on.

²⁴ The pseudonyms used here were provided by the sailors. I emailed them, requesting a list of pseudonyms that I could use, and they sent back a list where they chose their own pseudonyms.

²⁵ A pilot is someone who comes onboard in certain waters to guide the ship. They are required in the St. Lawrence River from Montreal to Escoumins, and in the ports. A small boat brings pilots to the ship. If they are onboard for several hours, they are provided with meals and a place to sleep.

harbours of St. John, NB, Halifax, NS, Botwood and Holyrood, NL. In each instance, the Captain introduced me to the pilots, and I asked if they would sign a consent form to participate in my study. Although I did not complete interviews with these pilots, I did include our conversations in my fieldnotes as part of my participant observation. In each instance, consent was granted to use their names and the content of our conversations and my observations. However, again, to protect their identity, I have referred to pilots just as “pilots” herein.

The first method I used was participant-observation, which involves both observing and participating in the subject research (Murchison, 2010, Marshall and Rossman, 1989: 79; see also Kawulich, 2005). This kind of researcher involvement fits well with the rationale for my study, because it mandates that I be present, on the *Victorious*, both making observations and participating in the journey. It requires that the researcher is present, working and living with the subjects of their research. I recognize that as a participant, I am implicated in the research process and the knowledge thus generated. The *active* nature of the participation seems to fit nicely with the mobilities focus. Throughout my study, I used participant observation as the primary research method, in that I observed for almost two weeks before I interviewed anyone. I wanted to understand the sailors’ worlds, and ask questions that mattered to them.

I took hand-written fieldnotes which were recorded in a small notebook, and each night I spent one to two hours typing those notes out, and adding thoughts, reflections, and ideas that I had. Participant observation proved to be very helpful, because it was the first step

in establishing trust. It quickly became an ongoing joke, me carrying around my little notebook wherever I went, writing things during meals, through locks, and out on the open seas. I took to writing out my notes on the stern deck after dinner, sitting on one of the large black bits (Image 3.3).²⁶ Three days into my journey, I went out after dinner to find a folding chair had been placed next to the bit, so I could be more comfortable.²⁷



Image 3.3 This photograph was taken on August 6, 2010 (the second day of my journey). It is a view from the stern deck, looking back down the St. Lawrence River. We were between Kingston and Cornwall, Ontario.

Participant observation was also helpful in shaping my interviews. It is common for ethnographers to change their research questions as they become immersed in the field.

²⁶ A bit is a large steel circular post used for placing ships' mooring lines.

²⁷ To this day, I don't know who put the chair there, but I very much appreciated the gesture.

Prior to stepping on the *Victorious*, I had asked no questions about the physicality of sailing, and the sensory aspects of life at sea. This quickly changed, as my body vibrated and swayed with the engines and the seas. I realized that a big part of life at sea was about embodiment, and so, while I didn't change the research questions I had, I did add to them. This meant that my interview guide changed slightly, as I added questions about the sensory and physical aspects of sailing.

As participant-observation demands, I should fully immerse myself in the work and life of a sailor. To that end, I completed a week-long course that introduced me to sailing on the Great Lakes at the Great Lakes Maritime Research Institute in Toledo, Ohio, in June, 2010. This training allowed me to learn about the structuring and functioning of a ship, learn how to read nautical charts, and spend time in engine room and wheelhouse simulators. However, I could not do the work that sailors do, as I do not have the appropriate certifications. That being said, I worked every day with them, seven days a week, covering both day shifts and night shifts, observing, taking notes, and having conversations. I therefore had access to the bodily experiences of sailing, and witnessed the daily interactions in the work setting. This kind of full participation might be considered autoethnography (see Strathern, 1987; Knutson, 1991; Menzies, 1994), but following Robinson (2007), I argue that the physical demands of being at sea denied me the opportunity for reflection. As Robinson argues, "I could not walk away [...] and record my observations. [...] And when the work was fatiguing, or the weather was horrible, I forgot about the research and focused on surviving just like the others" (2007: 41; see also Kaul, 2004). This became apparent as we crossed the Gulf of St. Lawrence

on our way to Newfoundland, about half way through my voyage. The seas had picked up, and despite Gravol sea-sickness pills, and “Sea-Bands” wrist bands, I was quite sick. I did not eat for three days, as seasickness overcame me.²⁸ The crew were sympathetic; the cook made me dry toast, and the Captain took me up for air, but it meant that for those three days, very little work was done relating to my study. The proximity of living on a ship with a small crew, coupled with the demands of the physicality of being at sea, denied me the opportunity for a more autoethnographic account.

The next method used was semi-structured, open-ended interviews. Again, this is not necessarily a “mobile” method, yet it has been used extensively to help articulate the experiences and lifeworlds of those who are on the move. Rapley argues that semi-structured interviews allow for “rich, deep and textured pictures... through the 'simple' method of producing topic-initiating and follow-up questions” (2001: 315, as quoted in Bissell, 2007). Moreover, according to Hesse-Biber and Leavy, “In-depth interview[ing] uses individuals as the point of departure for the research process and assumes that individuals have unique and important knowledge about the social world that is ascertainable through verbal communication” (2006: 119). From this perspective, the participants are positioned as experts who have valuable knowledge about their worlds. The process of conducting semi-structured interviews involves developing a series of broad topic areas that would be of interest to explore further, and then asking questions that help illuminate these topic areas. Thus the interview guide worked only to identify topic areas that I wanted to ask about, but I did not follow them closely (Berg et al.,

²⁸ By the time I returned to land, 28 days later, I had lost 25 pounds. The impact of a sailor’s lifestyle was evident on my body, and I did not do a particularly good job of earning my “sea legs.”

2004). The highly descriptive conversations that emerged through semi-structured interviews provided a thoughtful, detailed account of the journey at sea, and engaged seafarers closely in the research project. In other words, rather than simply being observed, sailors participated actively in careful conversations about their experiences of being at sea.

In total, ten semi-structured, open-ended interviews were completed throughout the course of my journey. One sailor was injured and sent home before I could interview him, and another declined to participate. The interviews ranged from twenty (20) minutes to three and a half (3.5) hours, with an average interview being approximately forty-five (45) minutes. Each interview was recorded with a digital recorder, and I took interview notes as well. As mentioned above, I did not complete any interviews for the first two weeks of my journey. There were two reasons for this: the first was that it took some time and the use of other methods to determine what I would like to ask about in the interviews, and the second was that seafarers have a very closed and tight culture. It took that long to gain the trust of the sailors such that they felt safe having recorded conversations with me. The questions were developed while “on the move”; as such, I developed my interview guide as I travelled, to focus on points that I wanted to explore more deeply (see Appendix E). Questions were generally about three topics: sailors’ overall history and experience at sea, the sense-driven, emotional and affective aspects of sailing, and the use of information and communication technologies. I provided time at the end for sailors to discuss things that were not otherwise discussed in my questions.

The third method I employed was digital audio and video recording, which has become a particularly useful method to capture movement, because it allows for the unobstructed recording of humans-in-action in a way that most other methods cannot do. Garfinkel (1967) suggests that video recording requires mobility in the form of “anticipatory following” in that the researcher needs to consider where subjects are *going to be* rather than where they are, thus requires thinking ‘on the move’ (Buscher et al., 2011).

Ethnographers have used audio and video recording to allow for greater collaboration between researcher and participant, wherein it can lead to “ethnographically informed participatory design” (Buscher et al., 2011: 9). I departed from other researchers in that I used audio and video recordings not to capture human movement, but rather that of other objects in motion. I used two small recording devices, a digital audio recorder, and a small Nikon Coolpix camera with video capabilities to record the movements and vibrations of the vessel. The audio recorder enabled the recording of the ship vibrations from bow to stern, and the sounds of the vessel moving through the water, therein animating the more-than-human world of being at sea. The video recorder allowed me to show the vessel moving through the water in seas up to three metres. I used both technologies throughout the duration of my journey, downloading the digital files to my laptop on a daily basis. I then was able to review these recordings to help frame and add a voice to some of the non-human actors. For example, engines cannot talk, but by the vibrations they make, it is possible to for engineers to make diagnoses of engine troubles. I also used still photography to capture the experiences at sea. While still photography may not be considered a necessarily “mobile method”, it nevertheless helps to describe and illuminate the experiences of being at sea. As Harper (2003) and others demonstrate,

photography is able to communicate a certain aesthetic sensibility about a journey, and conveys the affective textures of the trip (see also Bissell, 2007; Steiger, 2000). In total, 843 photographs were taken, documenting landscapes, seascapes, sailors, and the many parts of the vessel. These photographs were used to illustrate particular feelings and experiences throughout the journey.

John, the Captain, and Saul, the Chief Engineer, became key participants in my study. Their enthusiasm was encouraging, and because they occupy positions of respect, their responses to what I was doing tended to carry weight. They were the first to complete their interviews, which helped to establish trust and rapport with the crew. There was much joking and laughing about who “had to go first” when it came to interviews, and they teased each other, in front of everyone. At the same time, they both let their respective crews (the deck and engineering crews) be interviewed on-the-job. What I mean by this is sailors’ hours of rest are important, and by allowing sailors to be interviewed during their working hours meant that they would be uninterrupted during their rest.

I have not mentioned gender, but I feel it is important to disclose that I do feel that being a woman on a ship full of men might have afforded me certain advantages. As Rusty, a blustery, stocky sailor from Newfoundland said, “What the fuck were they thinking, sending a woman on here with eleven hairy-arsed men?” First of all, I was unthreatening, and at times I was the focus of many jokes. For example, during the first week, the Captain sent the Chief into my office with a weigh scale, informing me that

they were doing their stability tests, and needed to know my weight in order to complete their testing. My supposed “test” was the source of amusement with the sailors in the mess room that night, and I believe it broke down barriers. I set off the fire alarm on another day, because I’d taken a long, hot shower (apparently this was something only a woman would do), and I was teased relentlessly, and forced to apologize to all those who were sleeping. All in all, I must say that I felt incredibly safe. I walked around on the decks at night, I chatted with sailors during the midnight shift changes, I drank tea and shared stories with them about kids, travel, and life. I felt a sense of belonging.

However, being a woman was not without challenges. One of the main challenges was completing the interviews in a private space so that sailors could feel safe enough to be candid. The only place that is private is the cabin areas, where each sailor has his own room, but I could not be in sailors’ private cabins doing interviews. There are otherwise very few places on a ship that are private enough for an interview, which are not the sailors’ private cabins. Also, the volume of the engines and other equipment was a factor. I settled on conducting most interviews in the mess room, which is a public space but is often quiet in the evenings. Other interview spaces included the wheelhouse, the engine room, and the Chief Engineer’s cabin which doubles as his office.

The socio-demographic characteristics of the sailors were quite similar (see pages 11-17). Ten sailors agreed to participate, ranging in age from twenty-five to forty-six. These sailors were all Canadian, although one had immigrated from an Eastern European country ten years prior. Home for these sailors was in Ontario, Quebec, and

Newfoundland. They occupy middle- to upper-middle class positions, with annual salaries ranging from \$60,000 for a deckhand or cook, to upwards of \$160,000 to \$190,000 for captains and chief engineers. All but two were married or had live-in partners, and all but one had children. Six out of ten were considered 'officer' class, as either deck officers or engineers, and as such they had an educational background from a marine school, and several years of sea time to earn their rankings. Their similar socio-demographic positioning meant that they each brought their own laptops to work, many had video gaming systems too, all had cellphones, and some paid for upgraded satellite television.

Data Analysis

Once I returned to shore, the interviews were transcribed by a professional transcriber who was able to transcribe all but one. Unfortunately, the interview with Pierre, who works in the wheelhouse as Second Mate, was unable to be transcribed because there was too much background noise. This was disappointing, as I had completed two other interviews in that same location without difficulty. I had to rely on my fieldnotes from conversations with Pierre, rather than his interview.

The transcribed interviews, along with the typed fieldnotes were entered into qualitative data analysis software called Dedoose. Dedoose, in 2010, was free, and allowed me to code words, phrases, sentences or entire paragraphs according to categories and themes as I identified them. It also allowed me to make a comparative analysis between documents (interviews) and between different sources (interviews or fieldnotes). By

identifying analytical categories and themes (both those identified by the sailors, and those that I had pre-identified in the literature), I would be able to find linkages and identify commonalities and contradictions.

Using Dedoose, I went through each interview carefully, parsing out phrases and sentences, and tagging these according to an array of different topics (as brought up by the sailors) and responses to the concepts I had identified based upon my own interests. I then went through my fieldnotes with the same kind of tenacity, breaking down each set of fieldnotes according to those same categories. Once I had produced a set of themes from analyzing the interviews and fieldnotes, I exported this into Excel to see what it had produced. The result, it seemed, was an absolute mess. I had so many themes, and could see little in the way of organizational structure or argument. I was able to describe sailors' integration of mobile ICTs into their daily seafaring lives, but what of the other things that were deemed prominent? How do I connect discussions about cellphones and home/life balance, with some really interesting conversations about how important it is to actually walk through an engine room, to smell if something is going wrong? What about all that shaking and rumbling and vibrating that sailors talked about? How do the digital and the corporeal connect? I was lost.

I had this broad idea that mobility mattered, but to sailors mobility was irrelevant. They occupied a position of home or away, and whether they were mobile, and for that matter, where they were seemed to not matter. I knew this was important, but I didn't know why. It meant that to overlay my analysis with a kind of mobilities structure seemed

artificial and not at all in line with the tenets of ethnography. I needed to hear the sailors' voices, and to step back into their words to really listen.

Abandoning my qualitative data analysis software, I returned to my interviews. I listened to the tapes again, heard the noises and beeps and was transported back to my time on the ship. I also read the transcripts of those interviews, and looked for what Bakardjieva-Rizova called the "underlying structure of the narrative" (2000: 134). Granted, this was somewhat artificial because their responses were driven by the kinds of questions I was asking, but there were some common stories that emerged, stories that reveal a great deal about the ways in which mobile ICTs are shaping their daily lives at sea. Importantly, I could see a kind of repetition, or set of recurring stories, told differently, but seeming quite similar.

The first of these narratives has to do with *connectivity*. Prompted by my questions about the use of mobile ICTs, sailors repeated story after story of their attempts to stay connected with their families. The narrative arc of these stories goes like this: cellphones and Internet access help them to stay connected with their families in a way that is new (at least in their industry). At the same time, they tell harrowing stories of not being there, of how having a cellphone and knowing what is happening but being unable to take action is sometimes worse than the silence of not being connected to begin with. However, they feel connected as a crew, as they share stories from home, bringing their private lives to the ship.

The second narrative tells the story of *power and control*. While engineers and navigators do different kinds of work, both are experiencing the influx of mobile ICTs into the workplace. This is a story of struggle over meaning about how these technologies are privileged in particular environments, about expertise and how that expertise is undermined, and about controlling one's ship and one's workload. Long gone are the days of casting off and being "free" – the ties that bind via mobile ICTs have, it seems, an endless reach.

The final story is one of *embodied knowledge*. Buttressed against all of this new technology, sailors have an embodied knowledge about their worlds; they know their ships, they feel them, and when they go home, they turn on fans and run lawnmowers beside the house in order to have enough noise to sleep. I struggled most with this chapter, because I wasn't sure what it has to do with mobile ICTs. Yet, in my interviews, it was the single most important part; it was what stood out. I asked an engineer about how he uses his senses, and his eyes lit up and the stories flowed. So perhaps it is in response to mobile ICTs, a story about how, even with all of these digital and automation technologies now permeating the fabric of sailors' everyday lives, they still, first and foremost, rely on their embodied knowledge to do their jobs. The virtual and the representational worlds of the sailor are important, but the physical world still holds sway.

The process of generating an ethnographic study is collaborative; it is the engaged work of the eleven men on the *Victorious*, the pilots, and me, as the researcher. While I

brought the questions to the table, these discussions were open-ended, and often a short question turned into an hour-long discussion; the sailors thus shaping the discussion. Included herein are stories that resonate with the experiences of the sailors on the *Victorious* about a topic of interest to me: mobile ICTs.

Qualitative research has long been called out in regards to questions of reliability (the ability for research to be replicated) and validity (the measure of whether or not ethnographers have actually found what they claim), and ethnography is not exempt from this critique (LeCompte and Schensul, 1999; LeCompte and Goetz, 1982). The whole process is, after all, subjective, from the site selection to the coding process. It seems entirely contradictory to hold up a scientific standard to a practice that, by its design, resists quantitative measurement. (And, from an STS perspective, quantitative studies are similarly subjective and often problematic.) However, although ethnographic studies may not be replicable or generalizable, this does not mean that there is not truth in what these kinds of studies reveal. Hammersley (2013) is helpful here, stating that we can be confident in the findings of ethnographic studies in several ways. The first is the commitment to truth value. Do those who were under study find the account to be true? I have kept in close contact with many of those whom I studied on the *Victorious*, and I speak with them often. In the two years after my study, I shared each paper that I presented at conferences with them prior to the event, so that they could provide feedback and input. My papers were shared with the crew, and became an interesting topic of conversation when I visited them. Likewise, when I published a fieldnote about the *Victorious* in a geography textbook, I brought them a copy of the textbook (complete

with a photograph of the ship). The second ethnographic commitment is to dependability. This comes from following in the paths of those who have done ethnographies before me. I used methods (participant-observation and interviews) that are well-proven in the social sciences. Having a dependable process, using established methods, and applying the logic of researchers before me helps to ensure dependability of my results.

Summary

Ethnographies have a start and an end point (Murchison, 2010). While I am quite able to make note of the day my ethnography began, and describe to you in detail what that day was like, I am unable to provide an end date to this project. While I stepped off the *Victorious* at 4:30 a.m. on August 31st while raising in Lock 7, I have maintained continuous contact with those onboard. Each conference paper I write, I send to them for comments and feedback. Each chapter of my dissertation was likewise submitted. I then visit the *Victorious* when she is in the canal, or have conversations via Skype or satellite phone to discuss the findings of this project. In other words, the sailors have continued to shape this project, beyond the point of data generation. This is collaborative work. Just as my presence onboard shaped the realities of this research project, the presence of the sailors during the writing process continues to shape and produce the final document.

In this chapter, I have outlined my research rationale, underscoring the rationale for a qualitative, mobile research method to generate data about how mobile ICTs are integrated into the working lives of sailors. From there, I laid out my research design,

justifying my choice of using ethnography and its tools (participant-observation and interviews). I had included video and still photography into my methods, but I found that I did not end up using them as much as I would have liked in the analysis. Coding images is much different from coding text, and the kind of semiotic reading required to facilitate the inclusion of photography and videography did not end up fitting well here. That being said, I have used the photographs I took throughout my voyage throughout this dissertation, to help illustrate a world which, for many, is unique. Finally, I reviewed the collaborative data analysis process.

Chapter IV

Personal Communication: Keeping the Home Fires Burning

We are never more sure that air is good for animals than when we are gasping for breath.
~ George Grant (1969: 141)

We lost our Internet on the 18th of August, as we headed from the Eastern Passage towards the southern tip of Newfoundland. I was told that this was earlier than in previous expeditions; normally we had about another day of access before we fell outside the satellite footprint. Today, eight days later, I learned that the modem has died, “gone Kaput” as the office said, and we will not have Internet until we can pick up a technician in Montreal. The radio waves are silent; no Skype, no Facebook, no email.

Out here, passing Anticosti Island – an island haunted with the ghosts of more than 400 shipwrecks – cellphones are useless. While I had witnessed a steady stream of people heading up to the wheelhouse when we were near Newfoundland, because that’s where the cell signal was strongest, now the staircases are silent, but for the changing of the watch. The only communication is SatC, which allows for the daily message to be transmitted, but that is it. All other communication with the outside world has completely – eerily – ceased.

We are alone.

(fieldnote, August 26, 2010)

Introduction: For better or for worse

“Indulge me for a moment,” said Saul, his chair creaking as he leaned back, fingers looped behind his head. “Imagine not being able to pick up the phone and call home, anytime you wanted to. Imagine kissing your husband goodbye, and not talking to him for two months...three months...maybe more. Imagine your teenage daughter, with all the things that teenagers need you for, and she can’t call you.” He started to laugh, a

deep belly laugh that made his eyes crinkle, “Come to think of it, that sounds pretty good!” And I laughed too. It was August 7, 2010, and we were slowly making our way down the St. Lawrence River, having passed Quebec City that morning. Saul and I were getting to know each other, and I was enjoying his stories of sailing life prior to what he calls, “all of this technology.” Saul is a good storyteller; he has been sailing for more than twenty years, and he is well aware of what it was like to sail on a cargo ship before the influx of mobile ICTs. “It’s a different world, now,” he says, “sometimes for better, sometimes for worse.”

This chapter is about connection; it is about the ways in which mobile ICTs mediate sailors’ experiences of working away from home. These are tales of ingenuity and economics, threaded together by an overarching desire to stay connected with home. In the stories these sailors tell, cellphones and access to the Internet figure prominently; the personal communication that is afforded through their use, connecting sailors to their families, is of paramount importance in their daily lives. Yet, for many, this is a relatively new phenomenon. Most are keenly aware of a time when it just was not possible to stay as connected as they now do. If they have not experienced it themselves, the folklore of sailing serves to remind them. What is noticeable about these stories, too, is that there emerged a networked assemblage of users, devices, movements, techniques and networks that together formed particular sets of meanings about sailing, parenting, location, and time, amongst others. This chapter will explore these interrelated sets of meanings, with the goal of describing and analyzing the ways in which mobile ICTs shape, and are shaped by, the personal communication sailors have with home.

The story begins by exploring what sailing was like prior to mobile ICTs, to provide some context for the narrative. Then, sailors describe the networked assemblage that affords them the connections to home – an assemblage of technical, social, economic and geographic actors that is built up around cellphones and Internet access. Finally, I consider how mobile ICTs are implicated in sailors’ quests to stay connected with their families while away, so as to keep the home fires burning. This chapter illustrates the complexity of sailors’ relationship with mobile ICTs, in that while these devices have afforded them greater connectivity with home, this comes with a cost. They tell harrowing stories of not being there, of how having a cellphone and knowing what is happening but being unable to take action is sometimes worse than the silence of not being connected to begin with. However, they feel connected as a crew, as they share stories from home, bringing their private lives to the ship.

Home matters: Intimations of deprivation

When asking a sailor what the hardest part of his job is, invariably he will answer that it is being away from home. Greater than any physical challenge, eclipsing any fear of the dangerous work being done, leaving one’s family for weeks or months at a time stands out as the most difficult aspect of seafaring.²⁹ Rusty, a burly Newfoundlander with more than ten years of sailing time is a single father raising his son, who is 10. When asked about the hardest part of sailing, he responded:

²⁹ This is not an experience unique to sailors. The military, oil-rig workers, and even construction workers, to name but a few, often work away from home for long periods of time.

Well, I would say to you, ask any sailor and they would always say being away from home, ah, being away from family. I started this when my son was born and he's 10 now and ah, it's just a lot of holidays, a lot of birthdays, a lot of Christmases that you'll never get back. That way, it sucks. It's bad that way. He's 10. I've probably been around for maybe half of his birthdays, you know. Ah, I've missed at least 5 Christmases with him, so, and they're the hardest, when you have to call and say you can't be home, or you know when you're leaving, and they come back here and they say that you're going to miss, you know Easter or whatever. Last year, we went to China and when I left, he was in grade three, and when I come back, he was in grade four. I missed a complete whole summer with him (Rusty, August 16, 2010).

Rusty's words echo the experiences of most of his fellow crew, as they grapple with the challenges of creating and sustaining personal relationships with partners, children and friends while being deprived of the luxury of physical presence for at least half the year.³⁰

Work rotations usually mean that sailors miss every second Christmas, and family birthdays, anniversaries, and graduations regularly pass sailors by.

Yet, as John, the 33-year-old Captain argues, being away reminds him of what he has to look forward to at home. John has a wife and two children aged 11 and 6 at home in Ontario. When I asked John about being away, he said:

If there was a way to transport every night or something like that, but again, I don't know if you would appreciate it as much. I mean, by being away, um, you get a sense of you really want to, long to get back. So from the time you get away, you always want to get back (John, Aug. 15, 2010).

Being deprived of being home every day makes John appreciate what he has, because he is constantly reminded of what he is missing. Being away is thus bittersweet.

³⁰ Binkley's (2002) account of fishing families in Nova Scotia provides an excellent sociological analysis of the ways in which family and friend networks work to support coastal and deep sea fishermen in sustaining their relationships.

Knowing what is missed at home when sailors are away at work, the fortitude required to work away, and the significance of those familial ties matters because it helps to illuminate and understand why mobile ICTs hold such promise in the industry. When Saul asked me to imagine such a world – a world being away from my family and enduring weeks of silence – it felt impossible. Yet, sailors are acutely aware that, until very recently, this was the reality of being at sea.

Chases and races: A time before mobile ICTs

Many of the crew of the *Victorious* have been sailing for a relatively short time, in that mobile ICTs have been available to them during some or all of their working lives onboard. Yet, the lore of sailing life before cellphones and the Internet lingers. Sea stories abound with anecdotes of going weeks or months without being in contact with home, stressing the pivotal role communication technologies have in mediating these relationships. In one autobiographical account of sailing on the Great Lakes in the 1960s and 1970s, a deckhand discusses how walkie-talkies were a “lifeline” for many couples (Hill, 2008: 128; see also Dutton, 1991). He says:

Wives regularly met their husbands’ downbound vessels at the head of the locks with walkie-talkies in hand, telling of the latest happenings about town, who got married or divorced, what activities the kids were into lately. They walked the boat through the locks, then drove down Portage Avenue and Riverside Drive, tracking the ship as far as Sugar Island to have a few moments of conversation with their hubbies (Hill, 2008: 129-130).

This “walkie-talkie chase,” as Hill calls it, was difficult because there was pressure to say as much as possible, as it may be weeks before they could speak again, and yet there was “only so much you could say” (Hill, 2008: 130). As well, conversations were public, and

anyone in the vicinity could hear what was being discussed; privacy was nonexistent and conversations remained only that which were up for public consumption.

While the walkie-talkie was an important communication technology for those times when sailors happened to be within the vicinity of home, the phone booth and the mail boat³¹ stand as icons of the pre-cellphone era. On the Victorious, Saul remembers a time before cellphones. “When I first started sailing, we wrote letters and we did collect calls from payphones ashore” (Saul, August 14, 2010). To this day, while phone booths are disappearing from many public spaces, they remain firmly planted at locks and docks throughout the Great Lakes (Image 4.1). When ships came into port, sailors would trek down to the nearest phone booth to call home. Timing was crucial, as those at home did not know when to expect a call, and arriving in a port could happen any time of the day or night.



Image 4.1 A Bell phone booth is still found at the Government Dock, below Lock 1 in the Welland Canal. Prior to readily available cellphone service, sailors would be seen lining up at these phone booths, taking turns calling home as their ships transited the Welland Canal. Photo: Christine deMerchant, included with permission.

³¹ The J.W. Wescott is the well-known mail boat that runs out of Detroit, delivering mail to ships. It has delivered other things too, including pizzas and even fresh lobsters from Maine, sent by a sailor’s mother for a Christmas feast.

Rusty relied upon the system of phone booths that were scattered along the Seaway system to call home to speak with his girlfriend and his son. He says,

You get to the dock, you race for a phone and if it was on your shift, it would suck because you couldn't go 'til your shift was over. Nine times out of ten, I was working six to twelve, so midnight, everybody's in bed. You wouldn't get to talk to your son. So there was times I went two and three weeks before I finally get a dock that was in the daytime, that I could get a phone and get to talk to him. And he's like, 'Dad, how come you never call,' you know? (Rusty, Aug. 16, 2010).

The precariousness of sailors' ability to communicate with home was the result of a combination of factors, most of which were beyond their control. Arriving in port means work, not rest, for sailors because it is at this point that cargo is loaded and unloaded, and crews work hard to facilitate this process. Going ashore to use the phone is subordinated to the work schedule. Moreover, ships operate on a 24-hour schedule, wherein it matters not what time they arrive in port, work still must be done, day or night. Arriving in port in the middle of the night is a regular occurrence, but not very conducive to communicating with home. Once sailors are able to actually get to a phone booth, they do not necessarily have the luxury of a long conversation. Often, line-ups at the phone booth add pressure to their calls home. Rusty explains the "payphone races":

When I first came to work, when I first came on here, we didn't have Internet and we were gone for 60 days. You know, you were hoping that every dock you got to had a payphone at the dock [...]. There'd be a lineup. It was Catch-22 because you couldn't wait for your turn to get on the phone, then when you get on the phone, you were thinking about the guy who was waiting to get on the phone, okay, you know? Like you could easily spend two hours on the phone but you knew the guy behind you wants to do the same thing. So you had to try to be considerate with them (Aug. 16, 2010).

Payphones were soon augmented with shipboard satellite phones, which are still in place today.³² Satellite phones provided sailors with the ability to make and receive calls, which seemed novel at the time. However, the cost to use satellite phones was prohibitive. Igor, Chief Mate,³³ is originally from Eastern Europe, and has experienced deep-sea sailing early in his career, where sailors travel the globe and are gone for months at a time. Igor shares stories of his deep-sea adventures taking him away from home for up to eleven months at a time. I asked him about how he was able to communicate with his family:

Igor: The longest I went was three months.

Me: Three months without a phone call home?

Igor: Yes. One of the ships that we used [had] the satellite phone but [it] was \$5 a minute.

Me: Oh my goodness, how did that feel?

Igor: Impossible. It felt impossible.
- (Aug. 27, 2010)

Having prohibitively expensive satellite phone service was not something confined to deep-sea sailing. On the Great Lakes, this occurred as well. John (Captain), who has been sailing for thirteen years, reflects on his early experiences with using the satellite phone to keep in touch with his family in 1998:

The first time I sailed I didn't have [a cellphone] at first and I tried – the ship had a satellite phone. What you had to do was slide your credit card across it and you could make your call and it was like \$3.50/minute or something. \$4.00-\$5.00/minute. [...] I remember trying to call one time, and I don't know if it was because the credit card company didn't like it or what, but it wouldn't go through and then I thought about it after and, holy

³² The Victorious has a satellite phone today that allows for unlimited use. Anyone can make calls on it, and there is no time limit. There is no cost to sailors to use the satellite phone.

³³ Chief Mate is the second officer on the navigation side, below Captain.

geez, if I'd ever made the call, it probably would have cost me \$40 or \$50 and at the time, I wasn't making anything. So that would have been expensive. Back then, I would go days without calling and um, it was, we had grown accustomed to it (John, Aug. 15, 2010).

John dealt with this kind of frustration in much the same way that other sailors did; he did not call home very often, which often led to increased anxiety. Over and over, sailors talked about how hard it was to not have that connection to home. Being absent, and being out of contact, made the day's work much more difficult. Rusty explains,

Before we had the cellphones and the Internet, all day when you were working, home was on your mind because you hadn't been talking to them and you're always wondering what they're doing and is everybody okay (Aug. 16, 2010).

Not all sailors agreed with this, and it seems to be tied to where they are in life. Chester is a reserved man with a shock of grey hair, despite being not yet 40. Today he has a wife and son back home in Newfoundland, but when he first started sailing he was a young man and did not call home. When asked about how he used to keep in touch, Chester says,

Payphone. Maybe once a week by payphone. It was not a problem, not at all. [...] At 18, I didn't really have that many people I wanted to call (Aug. 29, 2010).

Chester's family situation seems to make a difference. Sailors with young families at home tended to be more anxious and worried when they were not able to get in contact with home. Others, with less responsibility at home, were less concerned. There is no doubt, however, that they all became "accustomed" to the deprivation. Not being able to call home was simply a fact of life. I asked Igor, the Chief Mate, how he managed not

being able to call his wife for over three months when he was sailing to Argentina and Venezuela, and he responded:

I started to worry but ... listen, you're a sailor. You cannot help her. She cannot help you so forget about this. You worry or not worry. You are far away from her. Whatever happens, happens. She can manage on her own and you are here and you are on your own so forget it. [...] So forget about this because you will get crazy. After a while, it starts, you realize that you are far away and you can do nothing (Igor, Aug. 27, 2010).

Igor's story reveals the brute reality of a mobile life that is brought into evidence through lack of access to communication technology. Their jobs take them a long way from home for extended periods of time. Their mobility is constituted, in part, by who is left behind. Sailors are constantly on the move, yet crucially aware that their families are at home. The distance between them feels vast. Their sense of distance – of being away – is exacerbated by not being able to call home. And, as they all agree, the only choice is to adjust, to become accustomed to not being able to pick up the phone and call.³⁴

Furthermore, sailors are well aware that their onboard relationships were different prior to the influx of mobile ICTs. When sailors were unable to connect regularly with their families at home, the sailors became their family. John, the young Captain from Ontario explores this:

Back in the early days, you know, before communication [technologies], that was the family. That is the family. That's all you had. So what would you do from six o'clock at night until ten o'clock at night? You would have nothing to do. As nice as it is to read every night, people just don't want to read for four hours a night. So you would have to go out and sit in the common area and do something. You used to get guys playing the guitars or you'd get, you know, a little music going, or you'd get, you know, cards going or you get group discussions (August 15, 2010).

³⁴ There are parallels here to those in the military, who are away from home for extended periods of time, with little access to communication networks.

Deprivation from personal communication technology in the not-so-distant past emerges as a complex issue, where sailors experienced a variety of roadblocks, from scheduling and access, to pressure to keep conversations brief as there was always someone waiting in line behind you. Moreover, while many of the sailors on the *Victorious* have never experienced such deprivation to the extent that sailors who were working prior to the advent of cellphones and the Internet did, most are keenly aware of how different it is now, and it makes them appreciate the improvements that have been since made.

New technology in sailors' hands

By the late 1990s and early 2000s, things began to change. Keeping in step with the proliferation of cellphones and Internet access on land, sailors were able to access cellphones and bring them onboard when they began their six-week work rotation, and ships were being retrofitted with satellite-based Internet access that soon became available to the crew. These two technologies – cellphones and Internet access – figure prominently in sailors' discussions of personal communication today.

When cellphones became available to sailors, they were not as accessible as they are by today's standards. Whereas now many sailors, most of whom use Bell Canada's service due to its coverage on the East Coast³⁵, have long distance packages that allow them to call a preselected set of numbers for an unlimited amount of time for a set price as long as

³⁵ In 2010, Bell Canada was the only reliable cell service on the Eastern Seaboard. This has since changed, but to this day, the vast majority of sailors continue to use Bell's network for its reliability in the Atlantic provinces.

they are within reach of a cell signal, they recall a time when cost was prohibitive. This cost was primarily related to phone plans and roaming fees. Rusty tells the story of his enthusiasm for his first cellphone:

[Y]ou talk to your woman on a cellphone for an hour or so, but that got expensive if you done that every night. So you call home every second or third night just to check in and see how everything's going. You couldn't afford that cellphone. If you were going to spend \$400 or \$500 a month on a cellphone, then there was no advantage to be up here, you know (Aug. 16, 2010).

The tension that Rusty is discussing is significant. Every sailor, when asked why he was a sailor said the same thing: they do it for the money. They sacrifice a great deal by working away from home, but the financial compensation made it worth their while. While cellphones held the early promise of easing the distance and the absence, they soon threatened the very reason for being a sailor. As Rusty stated, "there was no advantage to be up here [on the Great Lakes]". This was compounded by the fact that Great Lakes sailors are constantly grappling with U.S. roaming fees, as these vessels traverse the borders between the U.S. and Canada the majority of the time.³⁶

According to John:

Now, at the time I did have a cellphone, but it used to cost a fortune, it seemed like the plans back then were outrageous. [...] And ah, this US roaming and everything, it didn't seem affordable to do (Aug. 14, 2010).

Travelling along the Detroit River, for example, means that cellphone service bounces between U.S. and Canadian towers. I was told stories of how they always check their phones for the "R" to make sure they are not roaming. Moreover, there was frustration as

³⁶ Great Lakes-St. Lawrence Seaway system is a jointly managed U.S.-Canadian project, and ships routinely cross between U.S. and Canadian waters. Cellphones, seeking the nearest cell towers, will often find U.S. towers when in U.S. waters.

sailors, and the rest of the Western world, moved to smartphones. Prior to the smartphone, sailors could lock their cellphones to “home only” to safely avoid roaming fees. Smartphones did not offer the same ability, requiring third party apps that produced limited success. Since these early days of cellphone use, Bell Canada’s plans have become more affordable, with most sailors having unlimited time to call home for a set fee. However, the cost of U.S. roaming charges remains a significant concern.

Cellphones, by their very being, are mobile devices – they facilitate mobility. They enable people to be in communication whilst on the move; that is their *raison d’être*. It is significant, then, that cellphone infrastructure and accessibility was one of the most problematic aspects of cellphone use for sailors. Cellphone service is available most of the time in port, but once the Victorious is a few miles out to sea, once she is *on the move*, cellphone service is spotty at best, and mostly unavailable. Often I witnessed sailors standing outside on the upper decks, trying to get one last phone call in before the signal was lost altogether (Image 4.2). Once we got to the next port, they would be out on the decks, reconnecting (Image 4.3).



Image 4.2. Wayne makes one last phone call before we head out to the Gulf of St. Lawrence, heading to the Eastern Passage, NS. Aug. 9, 2010.



Image 4.3. Two days later, Homer (left) and Bill (right) stand outside, making calls to home once we arrive in port in the Eastern Passage, Nova Scotia. Aug. 9, 2010.

Throughout my journey, I observed countless conversations about where we were in relation to land, because, for these sailors, land means access to cellphone infrastructure.

That the Victorious was always moving brought into sharp focus the materiality of

mobile communication in a way that might be otherwise taken for granted.³⁷ This particular community of cellphone users is very astute at negotiating the limitations of access to the built environment. One tactic often employed was moving to the highest point of the vessel, to find the strongest signal (Image 4.2). I witnessed many sailors come up to the wheelhouse in the evening to call home as the wheelhouse afforded the best reception. The Captain, who is often present for this nightly migration, comments:

People are spending time talking to home, using their cellphones on the highest deck, calling home, trying, you know, standing on one leg with their finger in the air just to get the best reception, so that they can possibly make a scratchy conversation with their family or their friends at home just to check-in to find out what's going on at home. (John, Aug. 14, 2010)

John's description is funny, but it holds a lot of truth; sailors are experts at squeezing out that last moment of service, and their experiences highlight the fractures in cellphone infrastructure that might not be evident from another vantage point.

The other observation that comes into play in relation to access to cellphone infrastructure has to do with location. Location is an important concept, one that has received considerable attention in the literature on mobile technologies (de Souza e Silva and Gordon, 2011; Hemment, 2006; Zeffiro, 2007; Lyon et al., 2005), with the central questions "where am I?" and "where are you?" holding sway (Ellard, 2009; Green, 2002). When I ask sailors if it matters to them where they were, there is a resounding "no." For these men, they seem to operate in a home-work binary; they were either home or at work. Once at work, location does not seem all that important in relation to their

³⁷ This is very different from car travel in Southern Ontario, for example, where one can talk seamlessly from Ottawa to Windsor, cell signals bouncing from tower to tower, and all of this is completely taken for granted by the user.

personal communication practices. The question “where are you?”, a question that has been recognized as significant in cellphone research, does not get posed to sailors. Their wives, children, family, and friends just know that they are away. However, what I observed, and what was said in the interviews shows something different. While there may be indifference to location in terms of being away from home, there was an incredibly precise, astute knowledge about where and when cellphone access would be available. My conversation with Bill, the ship’s cook, is telling. When I asked him about whether or not location mattered, our conversation unfolded:

Bill: For me, I don’t care at all.

Me: You don’t care at all?

Bill: Some days I don’t have a clue where we are. I don’t know where we’re going, or how we’re getting there, whatever. For me, I really could care less. I’m mean, I’m done, it doesn’t change. I have to cook three meals a day ...

Me: Every day...

Bill: ... clean up, and it doesn’t matter what city or port we’re in, I’ve still got to do that.

Me: Yeah.

Bill: So it doesn’t really matter to me. I mean, sometimes if I’ve been on the ship a long time without getting off, I want to know when, you know, where we’re going maybe. Okay, I can get off there and I can go shopping or you know, go get pop or whatever. You know what I mean? (Aug. 18, 2010).

This was true in relation to running his business as well. He is just “away”:

Bill: I get business calls on my cellphone up here.

Me: Do you, eh?

Bill: Oh yeah. I get sales people calling me for my restaurant, you know. So, and I'll just have to remind them I'm on the Lakes. 'Oh, I didn't know that' [would be the response]. So that's kind of funny actually, when I get calls like that. I get calls from my workers, too, at my restaurant, just to ask me questions, you know.

Me: Because they just think you're at the end of the cellphone and they don't really think where that might be, or ...?

Bill: Yeah, no, and it doesn't matter. I tell them absolutely call me if you guys have any problems. Like, they may not, they may need to call, talk to me and not my wife. So I mean, my wife ultimately runs that business but I still have a huge part of that (Aug. 18, 2010).

From Bill's perspective, all that matters is that he is not at home. No matter what the location, his work onboard must be done and his restaurant must continue to function. Bill's cellphone affords him the opportunity to occupy an important position in the running of his restaurant. Yet, the 'whereness' of Bill's situation seems to recede in importance beyond the binary of home and away. Interestingly, when I asked Bill about deprivation of cellphone and Internet access – about when these mobile ICTs would *not* work – he knew exactly where this would be. Bill states:

I mean, there's ah, we will lose contact going from here, which is Halifax, to Newfoundland. We'll lose the signal along the way there, within about 24 hours. So then I won't be able to contact [my wife]. (Aug. 18, 2010)

Here, Bill knew exactly when he would be out of range of both cellphone service and Internet access.³⁸

In another example, Homer, an engineer who is originally from Newfoundland but lives in Halifax with his wife and two young sons, was quite willing to talk about the ways in which he knows about his location without it really mattering. His sons had come

³⁸ I expand on Internet access in the next section.

onboard for a trip between New Brunswick and Nova Scotia. I had asked him if he paid attention to where we were, and he had responded, “not really. It doesn’t really matter.”

Yet, when pressed, he recognized that he knew exactly where we were, based upon cellphone signals:

When we left St. John [NB], I knew we were going to go straight across and go around Yarmouth. When we pick up cell, the boys come in and said we’ve got cellphone service again. I said oh, we’re just off Yarmouth now, right. So just like, kind of little things like that (Homer, Aug. 23, 2010).

Homer’s knowledge is a good illustration of the relationship between cellphone infrastructure and location. He knew exactly where he was, because the cellphone service was back.

This analysis has thus far focused on cellphones, which, according to my interviewees, stands as the most useful mobile ICT available. Another significant change in shipping has been the advent of onboard, satellite-based Internet access.³⁹ The benefits of having onboard Internet access are many, particularly in relation to ship management and navigation (see Chapter 5). There are other benefits, however, one being providing Internet access to crew. A global study of challenges to crewing by Deloitte (2010), identified Internet access as the most significant improvement that shipping companies can make in terms of attracting and securing employees.

³⁹ Today, most ships on the Great Lakes have satellite-based onboard Internet access, but this is still relatively new. New builds are equipped similarly to the *Victorious*, with Internet available wired into the cabins. Many older vessels have skipped the wired-in stage, and moved straight to providing wireless Internet access, but this has occurred only in the last five years. Canada Steamship Lines, Algoma and McAsphalt Marine have installed wireless routers since 2010.

On the Victorious, satellite-based Internet access is provided by Radio Holland⁴⁰, a Netherlands-based company specializing in maritime satellite and communication systems. McAsphalt Marine purchases satellite services via ‘footprints’. Footprints are service areas, and price is dependent on the size of the footprint purchased (Image 4.4). A large dome is installed on the Monkey’s Island⁴¹, along with other communication equipment (Image 4.5). The placement of this dome is quite significant. It is located in front of the port side exhaust stack, at the same height. The result of this placement is that when the Victorious travels in a northeasterly direction, the stack would block the signal, and the satellite-based Internet would kick out. The dome runs to a server room, located between the wheelhouse and the first accommodation deck (Image 4.6). From there, the Internet feed runs to a router in the ship’s office (Image 4.7), where it is then dispersed to the cabins. Wireless Internet is not available, but each room offers wired Internet access, via Ethernet⁴². Sailors are able to plug in their laptops at their desks, and access the Internet (Image 4.8).

⁴⁰ Radio Holland has since been purchased by Imtech Marine.

⁴¹ A “Monkey’s Island” is the nautical term for the open deck above the bridge or wheelhouse which houses all antennae, domes and communication equipment.

⁴² The Victorious installed wireless routers in 2013.

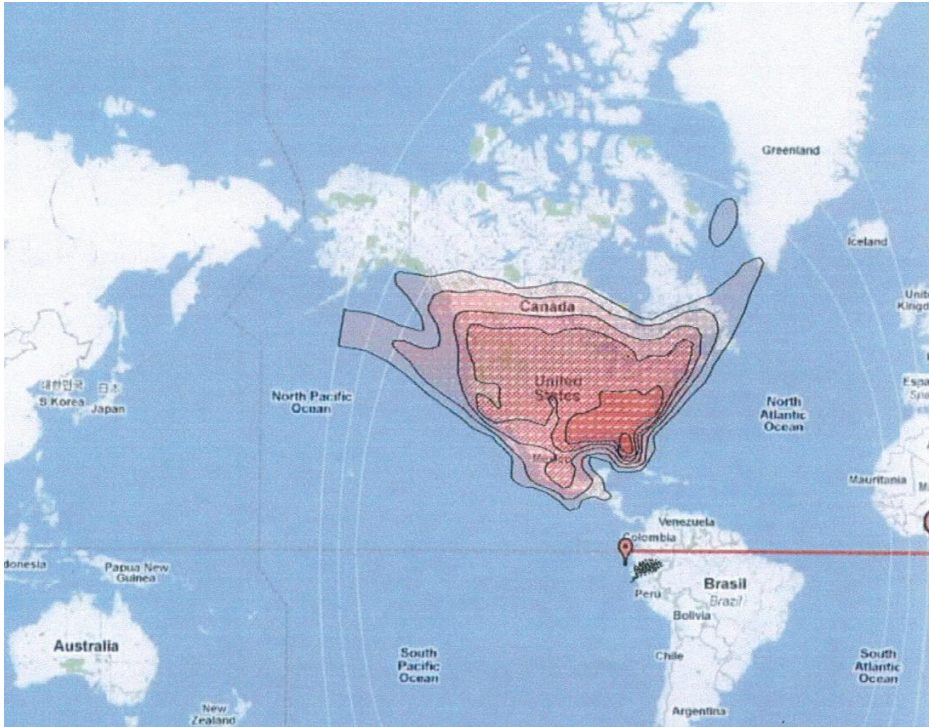


Image 4.4. Radio Holland’s ‘footprints’ available for the North American marine traffic market as of August, 2010. The black lines outline the various service areas available for purchase. As visible here, Newfoundland is not fully covered, and the extremities of the satellite coverage require optimal conditions. Image provided by crew of Victorious.

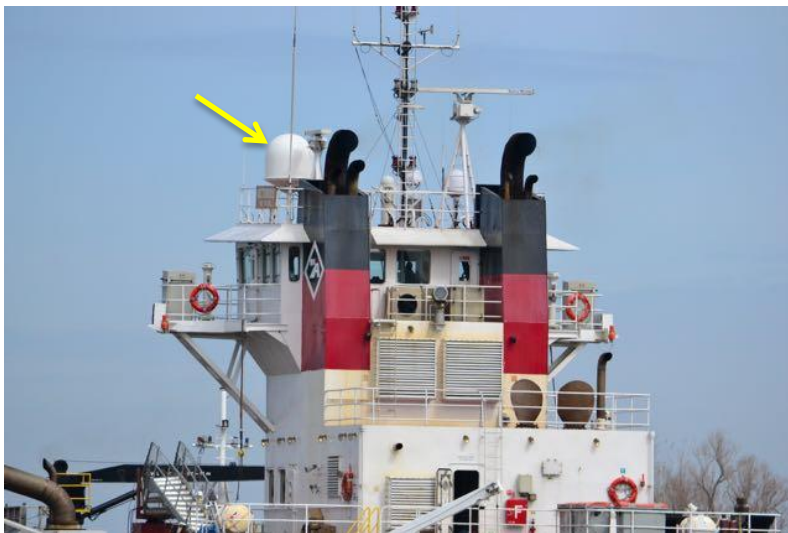


Image 4.5. On the Monkey’s Island, it is possible to see the array of communication equipment, including the Internet dome (see yellow arrow). The placement of the dome in front of the port side stack meant that when the Victorious travelled in a northeasterly direction, they would often lose signal. The dome has since been raised to be higher than the stack. Photo: April 1, 2011.



Image 4.6. The server room of the Victorious, located just below the Wheelhouse. (Image slightly blurry due to moving vessel). Photo: Aug. 17, 2010.



Image 4.7. The ship's office. This room contains a computer, printer, office supplies, and the router that manages Internet access. Photo: Aug. 17, 2010.



Image 4.8. My laptop is connected to the Internet via an Ethernet port. Photo: Aug. 5, 2010.

For the sailors on the *Victorious*, Internet access has been incremental. Saul explained to me that he has had the ability to access the office via email for some years, but the *Victorious* is the first new-build that has provided each crew member with Internet access in their cabins:

But it's changed a lot here just, in a year as well. So, we've had Internet on the...I shouldn't say we've had Internet...We've had email on the ship for many years but we've never had Internet. It was a closed system. I was able to communicate with the office [via email]. [...] But I wasn't able to, to go on and use the web search or Google. It wouldn't do that. This being a new build and with the Union contracts now for crewing and whatnot, all these ah, we have Internet pumped into every cabin. They just plug them in (Saul, Aug. 14, 2010).

Saul points here to an acknowledgement that when the *Victorious* was built in 2009, Internet access was important not just for maintaining connections with the office, but also for personal communication for crew. Many older ships on the Great Lakes do not have Internet access for crew.⁴³

⁴³ I revisited this question with John, the Captain, in 2015. He indicated that ten years ago, in 2005, it was unheard of to have Internet access for crew. However, in the 5 years since my study, most vessels have

Similar to the overall sentiment expressed about cellphones, sailors have embraced Internet access onboard Victorious. The opportunities afforded to them to keep in touch with home using Skype, MSN, Facebook, and email⁴⁴ render such access invaluable. However, it is markedly slow, much slower than the high speed Internet access that is available to most Canadians on land.⁴⁵ Homer describes the “better than nothing” approach that was felt by those onboard:

The Internet is not that good but ...It’s slow but it still works. It works pretty good so it’s better than nothing. It’s better than what we had before. First year when we was on the Everlast, we never had nothing. No Internet, no satellite TV. (Aug. 23, 2010).

In my fieldnotes, I often commented on the slow Internet speed. Logging in to my university’s library and downloading an article would take an hour. Bringing up a website was usually a three to five minute ordeal. Sailors grapple with the incredibly slow Internet access in two ways: some choose to avoid video-based online communication, and others source their own Internet access.

Saul, for instance, used MSN each day to connect with his partner at home. I asked how he communicates with home: “Today would be exclusively through email and MSN, chatting” (Saul, Aug. 14, 2010). This was echoed by others who used the text-based features of the Internet, mostly MSN and Facebook chat, to type back and forth with their

undergone communication upgrades, and now most Great Lakes vessels provide some kind of Internet access. He states that today, companies are seeking ways to regulate and control Internet access, with some companies looking to put in place monthly download caps.

⁴⁴ While other social media are available, such as Twitter and Instagram, these were not identified by sailors in their interviews as something they used.

⁴⁵ There were no figures available as to the actual download and upload speeds. Rather, there was experiential evidence, as one waited patiently for websites like Facebook or Google to open. It took about 3+ minutes for a page to load.

families at home. By avoiding the data-heavy video functionality of Skype or Messenger with webcam, they became proficient at holding text-based conversations. Others avoided video-based Internet communication by just not using the Internet at all.

Willard, a slight man from Newfoundland who works as a deckhand, talked about how much of an impediment Internet-based communication is. I asked him if he used the Internet to talk to his wife and daughters:

No, I'm not a computer-type person. A lot of people likes being on the computer and fooling around but me, maybe if I was on all day and working off all nighttime, I might sit down for an hour, but when I'm going six on, six off, you don't have much time. It's time to get off, get a shower, get something to eat and relax for half an hour, you only get three or four hours sleep, right. And if you get three or four hours sleep, you should get it because the next watch, you might not get it because, you know, something might have happened. You could be busy or could be noise.⁴⁶ (Willard, Aug. 19, 2010)

As a deckhand, Willard works six hours on, six hours off, seven days a week. In his six hours off, he must eat, rest, do laundry, and any number of other things. Getting in touch with his family by sitting down at a computer for hours at a time would mean that the other things he needed to get done would not happen. It was too risky.

Those who still wanted to access video-based Internet access displayed significant ingenuity in how they approached the problem of speed. Two sailors have their own "Wimax" antennas. This is a service that was offered by Bell Canada (since grandfathered out) wherein for a fixed monthly fee⁴⁷ they could access the Internet through a Wimax antenna that they attach to the vessel. They run a wire out of their porthole, attaching it to the antenna (see Image 4.9).

⁴⁶ I explore this "noise" in significant detail in Chapter 6.

⁴⁷ They could replace Wimax with mobile broadband services now, but the cost is significantly higher.



Image 4.9 Chester's Wimax antenna, attached to a railing on the Victorious. August 24, 2010

Rusty and Chester, both Newfoundlanders with young families at home, are proud of the tactics that they use to overcome the slow onboard Internet access:

Rusty: That's what I do every evening. I talk to my son on Skype up until he gets ready to go to bed. [With the ship's Internet access], there's lots of times we can't get the video part to work, because even if sometimes it's really slow and if everyone on the crew is logged in, it slows it down that much more. But I have my own little Internet box ...

Me: What do you mean?

Rusty: Wi-Fi⁴⁸ it's called, and myself and [Chester] have the same thing and you just lay it by your window and it picks up the Internet and you plug it in the same as you would plug in an Internet cord. The only problem with it is it only works while you're stopped. It won't track. So when we're in port, I'm on my own Internet.

Me: You're not on ...?

Rusty: No, it's way faster because I'm on by myself. There's a better signal and I can download anything, where this one, the one on the boat, if I went to download a picture, I could hit download, go and eat my supper and probably take a shower and I'm still, it's probably only 24%. [...] See, with my own Internet, I don't have to worry about that.

Me: And that's just when you're in port you use that?

⁴⁸ Rusty calls it Wi-Fi, but it is actually called Wimax.

Rusty: Well, that's the only time it will work. It won't track. It's set up that it has to be stationary, right [...] And it's only \$22/month to have it. No contract. And it's unlimited, yeah.

Me: Really? Where did you get that from?

Rusty: Bell Canada. Actually, it was what we used on the old barge for Internet out on the barge. It was a wireless Internet basically. What it was designed for was business guys who do stuff from their cars. They can plug this little thing into their laptop in the car and lay it on the dash and have this Internet. And then they just modified it so you could bring it anywhere. (Rusty, Aug. 16, 2010)

The Wimax service which sailors have adapted is one of the earliest attempts at mobile wireless Internet access that, according to Rusty, only works when the businessman is stationary in his car. Sailors have taken up this technology in a different way, duct-taping it to the railing of the ship, to attain faster Internet speeds. Still only available when stationary (in port), it means that sailors can talk to their kids as much as they like, without it being prohibitively expensive. As Chester says, "Like, when I'd be talking to [my son], he'd be wanting to show me something and he'd run off to get it to show me. [...] It's very economical."

Sailors slide on and off the grid, in and out of the network on a regular basis. Their access to cellphone and Wimax service depends on whether they are in or near port; in the middle of a lake, or out on the Atlantic Ocean, no service is available at all. Likewise, satellite-based Internet access is slow and unreliable, wholly dependent upon location, service package limits and bandwidth sharing. Because sailors spend extended periods of time away from home, cellphones and Internet access become critical aspects of how they negotiate the distance between work and home. In other words, sailors are a group whose

reliance upon mobile ICTs to sustain personal and familial relationships positions them as particularly vulnerable to the fragility of communication networks which, by virtue of their constant mobility and movement through spaces that are beyond the reach of signals, are precarious to begin with. This makes sailors' experiences significant, wherein their continuous mobility reveals the cracks and fissures in communication networks; the infrastructure is revealed, often for what it is not.

The stories sailors tell reveal the networked assemblage of people, devices, histories, geographies, economics, and social practices that together build a particular experience of being at sea. They have contextualized the history of personal communication on the Victorious and in the shipping industry more generally. Their stories reveal how vital mobile ICTs have become to maintaining connections with home, detailing two key developments: cellphones and Internet access, outlining what these technologies are, and how they have been deployed by this particular group of sailors. Having established this vital connection between mobile ICTs and personal communication, this story now takes a turn, as sailors explore how these technologies mediate their experiences at sea. Three sets of experiences are explored: the experiences of fatherhood, time, and co-presence.

Fatherhood: Parenting at Sea

It's 10:30 at night. I've just come back to my cabin after completing my third interview. I am wondering how it is that a great big burly man from Newfoundland with tattoos and a beard can make me cry, talking about how on Earth you possibly raise your son while being away at sea. But there we were, both of us with eyes shiny with tears. Amazing. (fieldnote, August 16, 2010)

Every man who was on the *Victorious* during my study is a father. Some have children who have already grown up and left home; others are grappling with the challenges of raising small children and teenagers. Defying national averages, all but two of the men I interviewed are married, and the two who are divorced maintain a very strong presence in their children's lives. All but two sailors had cellphone plans to help maintain their duties and responsibilities as parents; cellphone plans that enable unlimited calls to home make it much more possible to parent from afar. As well, as discussed above, Internet access makes it possible to communicate via Skype (and hence see each other), MSN chat, Facebook, email and other social media. Together, this access, while precarious, nevertheless provides sailors with the capacity to maintain connections with home, and thus participate in the parenting of their children while away. Much like the "remote mothering" that early feminist scholars noted with women's use of cellphones (Rakow & Navarro, 1993), the men on the *Victorious* engage in a form of remote fathering, wherein they use cellphones and Internet access to care for their children.

I asked each sailor what it felt like to parent while at sea. In each instance, I was given tremendously moving accounts of the struggles, hopes, joys and fears of parenting at sea. Being accessible and participating in raising their children while at sea was very important. Cellphones and Internet access made that possible in ways that were not available just ten years ago. Part of this accessibility, according to John, the Captain who has two young children, is simply showing that he cares. John uses various strategies to maintain his connection with them. One strategy that he employs with his six-year-old son is to provide material objects to help sustain their bond. Ever since his son was a

baby, he has slept with one of John's t-shirts – a material representation for when John is away. John also discusses how he uses his cellphone connection to maintain their relationship and to “make it easier for them.” He tells the story of his son's soccer game that was taking place on the day I interviewed him:

Like, today is a big day for the soccer. My son's got a soccer tournament today, so he's got three or four games. So now I've got to make sure that I called throughout the day. [...] I'll call throughout the day and make it, you know, so that it's almost as if I'm half there or attempting to, you know, so that he knows that I do care even though my work is... I'm here, that it's not completely work when I'm here. That yes, the family is still the most important. (John, Aug. 15, 2010)

From John's perspective, the affective sensibility of being connected in terms of his ability to parent is tied to demonstrating care and concern for his children. If he calls, they know he cares; communication shows his children that they matter, and that he is thinking about them. His presence, his being “half there” is brought to life through cellphone calls that show he cares.

In another example, Saul, the Chief Engineer, reveals the tactics he uses to get his daughter a present for her 15th birthday. Because he is reticent to use his credit card to purchase it himself, “I've been compromised before,” he is trying to make alternate arrangements to get her a present. He says,

I'm talking to [Chester, the 2nd Engineer] to see that [his wife] could buy my daughter the camera from Future Shop, have it delivered to where my daughter is and I'll pay [Chester's wife] when we get to Newfoundland. [...] Like I said before, I don't like to do that on a wireless system because of being compromised before, so at the end of the day, that communication is ah, I'm able to actually get something for my daughter on her birthday. So that's pretty cool. Ten years ago, I couldn't. (Saul, Aug. 14, 2010)

Saul uses a multiplicity of strategies and tactics, all of which are brought about through the use of mobile ICTs, to have a gift delivered to his daughter. Access to the Future Shop website, along with Chester's capacity to speak to his wife via cellphone, Wimax and satellite-based Internet facilitated the coordination. At least three people were involved in the communicating, organizing, shopping and delivery of a birthday present. A carefully thought-out plan was made and executed, all brought about because now it was possible to be in contact with family at home. I observed time and time again sailors' concerns with being away from home and worry that their children might assume that their fathers did not care as they were physically not present for large swaths of time. John's t-shirts and regular phone calls and Saul's strategic deployment of the gift by way of a reliance upon communication networks each points to some of the ways that sailors try to negotiate these matters of care. What is important for sailors is to show their caring and they can do so through the use of mobile ICTs.

More than demonstrating their caring through being in touch, sailors use mobile ICTs to participate in the disciplining of children and supporting their spouses in parenting decisions while they are away. The cellphone thus becomes a conduit through which sailors feel a part of the parenting decisions being made, and feel a sense of being able to support their spouses. I asked Homer, the 3rd Engineer about this. Homer is 36, married with two boys aged 13 and 8. He lives in Halifax, NS, where we stopped twice during the duration of my study (Image 4.10). I asked Homer about whether or not he feels more



Image 4.10 Homer and his 8-year-old son visit in the Eastern Passage, NS. August 11, 2010.

involved, being able to call home while at sea. He responded,

Yeah, like, just for example, we were in Port Colborne and ah, was tied up there for a couple of days and my wife had a problem with my eldest. He wouldn't listen to her. So I called him and I gave him a piece of my mind and I told him if I've got to get off this boat and come home today you're going to know it. I say, because if I lose this money because I've got to come home and deal with what you're doing to your mother, just a long story what happened right, and then after that, like, for probably two or three months, he never, he was perfect. It was just little things like, just knowing that, get on the phone, and telling him, like, you've got to listen to your mother, because if I'm home he don't try nothing. [...] He's more aware. (Homer, Aug. 23, 2010)

In this exchange, Homer demonstrates not only that he is participating in parenting remotely through having access to mobile ICTs, but also that he is able to support his wife – to back her up, so to speak. Through this remote participation, his son is aware of Homer's presence, and Homer feels more a part of the family dynamic. This supporting

role in the parenting of the children was echoed with other sailors. Willard, a 45-year-old Newfoundlander, is married with two teenage daughters. I asked him if it was hard to parent from the vessel, and he responded,

Oh it's very hard. The Missus has got to deal with most everything. All I can do is coach her on here, you know, whenever we get the chance to phone, right, talk. (Willard, Aug. 19, 2010)

Willard sees his role even further removed than that of Homer, where rather than co-parenting, he is "coaching" from the sidelines. In this case, Willard is still participating by being able to use the phone to talk with his wife, but he sees his role as significantly diminished as opposed to when he is home.

There appears to be levels of fathering, from involved co-parenting to 'coaching', which are facilitated through the use of mobile ICTs. Overall, sailors see these connections as positive, enabling them to more fully participate in the lives of their children than that which would have been possible just ten years ago. As pointed out early in this chapter, Rusty feels better and worries less, knowing what is happening at home. These are happy moments. However, it can be frustrating to father remotely; sailors have a heightened sense of what they are missing. Sailors told me bittersweet stories of missed birthdays, of watching Christmas presents opened via Skype, of anniversaries gone by. Of these accounts, it was Rusty's telling of getting the phone call when his son was hurt that brought us both to tears. In Rusty's words:

It's very hard, very hard. My kid was three and he burnt his arm. [...] He was standing on the treadmill and as soon as he hit ON, it started to go. He got jammed between the wall and the end of the track and his arms were like that and it pulled the skin off his arms and she had to take him to the children's hospital and they had to do surgery on his arms, and I was away. Well, I didn't hear until the next day when we got in through

Detroit because we were across Lake Erie at the time [...] So as soon as we got into Detroit, actually, she called our head office and told my boss for me to call immediately, first. And I called and she was in the St. John's Hospital. And, you know, he was screeching for me, you know, Daddy, I want Daddy, I want Daddy. That's the days you want to quit and go home. It's not worth it. Check out. Go home. (Aug. 16, 2010)

Rusty did not go home, because his son was recovering by the time he was able to talk to him, and he had only four more days to go in his shift. The frustration, sadness and knowledge that, while he could hear his son calling for him through the phone line, "Daddy, I want Daddy", he was unable to take care of him, resonates. In Rusty's case, hearing his son's cries over the phone while he was thousands of kilometres away proved very difficult to endure, because he could hear him but he could not help him. Rusty's identity as a father was compromised in this situation, because he could not get off the ship to go home; he could only father remotely via the phone.

From looking at sailors' experiences with fathering, it is possible to ascertain how mobile ICTs are mediating life at sea. Sailors are able to participate more fully in their parenting roles, from showing their children that they care, to disciplining from sea. However, sometimes these connections bring with them the painful knowledge of what is being missed, and the crushing guilt of not being able to be home when things go wrong. While being a father stands out as the most important aspect of these sailors' lives at sea, there are further observations about the ways in which connections to home brought about by the use of mobile ICTs shaped their experiences.

The Elasticity of Time

There is a temporality to how sailors experience their lives at sea through the use of mobile ICTs when negotiating the home/work divide. That is to say, there is a relationship between time and connection – sailors’ connections with home enabled them to experience time in different ways. There has been a significant amount of academic engagement with how time is (re)configured through the use of ICTs (Cresswell, 2006; Harvey, 1989; Castells, 1996; Peters, 2003), and the experiences of sailors reveal the elasticity of time. Depending upon where they are, what is going on at home, and whether or not they have access to mobile ICTs, sailors’ sense of time expands and contracts.

The stretching and contracting of time first became evident when I began hearing stories of the trip across the Pacific from China. Eight of the eleven crew who were working during my time aboard the *Victorious* had brought her across the Pacific Ocean on her maiden voyage. Most were gone for more than one hundred days, spending a few weeks in China doing sea trials and preparations prior to bringing her across. When they were in China, the crew stayed in a hotel with high speed Internet, and were able to Skype easily with home. Saul, the Chief Engineer, told me how he would speak to his girlfriend on Skype every morning; he would have his morning coffee, she would be drinking her evening wine. In this regard, most of the crew spoke about how quickly time went when they were in China. The speeding up of time was due in part to the ease of access to communication technologies. Regular connections with home made the days go quickly. Captain John talked about how quickly time went when they were first in China:

The first couple of weeks, three weeks or month, whatever we were then when we had everything, it was very easy. Time truly went by very fast.

[...] But then, coming across, the days became long because all we had was one little computer to send a couple of words by email and you know, you'd get your one letter a day. People would look forward to getting their letter a day and when they didn't get the letter a day it was devastating. You could tell that people, like, we all used to write, "please write back". (John, Aug. 15, 2010)

John connects time going by quickly by having everything, referring to having a plethora of communication technologies available, including high speed Internet access and, specifically, Skype. However, as John reveals, once they began the long, slow journey across the Pacific, communication was limited to one email a day that they could send and receive.

John kept a journal of his journey across the Pacific, and he allowed me to read it and include its contents as part of my ethnography. Throughout the entries, which spanned more than 100 days, he wrote almost daily about his communication with home in relation to time and mobile ICTs. For instance, on Day 46, he wrote:

Email system is starting to go sporadic. I hope this lasts as it is our only communication with home. I wonder how everybody is doing. Even though this is day 46 it seems as though it has been longer. It is definitely because of the lack of voice communication. I miss hearing everybody's voices. It is funny what you take for granted. (John's journal, June 30, 2009)

Here again, the intimations of deprivation seep into the fabric of everyday life crossing the Pacific, slowing down time. Time feels different to John – slower – by not having the kinds of communication such as Skype that was available on land in China. Limited communication to and from home bore heavily upon the sailors. How time is experienced is elastic, expanding and contracting in direct relation to the access to mobile ICTs.

Beyond the exceptional experience of making the voyage from China, the elasticity of time emerged as a key aspect of day-to-day sailing life. In relation to access to mobile ICTs, contradictory experiences were noted. Bill, the cook, reflected a similar experience to that of John during the China crossing. Bill told me that he calls home every day, so long as he has the technical capacity to do so. I asked how important those calls are to him, and Bill responded:

Bill: I think they're very important. I like to talk to my wife. You know, I miss her, so, she misses me. So ah, and we just talk about our day and what we did [...]

Me: So does it make it feel less like you're away?

Bill: Oh yeah, absolutely. I mean when... the days that I can't call here are the longer days, you know. That's when we feel like we're not there. [...] I go to my room, and I can't talk to my wife, yeah I feel like that's when you feel like you're away from home. (Bill, Aug. 18, 2010)

Bill connects his ability to be in communication with his wife as in direct relation to time; time feels slower when he cannot get in contact with her, and he feels like he is away from home. Lack of communication brings more readily into focus the boundaries between work and home, making it clear that he is away, and therefore making time feel slower.

Interestingly, as easily as time could expand, stretching out in the vast emptiness that comprised the inability to be in contact with home, it could likewise expand through having that connection to home. Time feels long to a sailor who cannot call home, and sometimes calling home, and knowing what is going on there can feel just as long.

Homer, the second engineer with a wife and two sons in Halifax, explains:

You miss a lot of stuff, though. We go...I love camping. The only time I really find time long here is, like you say, you don't know the days but you kind of know when you're calling home that they're up to the trailer, they're camping, right. I love it, always loved it. So when they're up there, I find it's Friday, Saturday and Sunday, when I know they're up there, I find the days long. [...] I call her. She's up there or out to a fire or something, or having a few drinks and I'm here. (Homer, Aug. 23, 2010)

Homer's experience is interesting because it challenges the assumption that it is the time in between – when calls cannot be made – that feels long. Sometimes, according to Homer and others, having that communication and knowing what you are missing can feel similarly long. Time stretches out, reminding sailors of what they are missing at home. I noted this same affective sensibility in John's journal from the trip across the Pacific. At one point, on Canada Day, his wife and children were heading to the family cottage, and would be staying there for a week. There was no Internet access at the cottage, and so it would mean he would have absolutely no communication from home for several days. John writes about not knowing what is happening while there is no access:

The thing that seems to make my day go by is wondering what everybody is doing at home. I always have visions of good times and lots of excitement. It really helps the days go by thinking about everybody. (John's journal, July 3, 2009; day 49)

As the week wears on, time seems slower and slower, dragging on for John. "Another day, no emails. I now wish the cottage had Internet access," he writes on July 6, 2009. And then on July 10, a letter arrives from home, "What a day. I got the biggest email ever. It was like 2 pages long. I was so happy to read it, I ended up reading it twice." In these pages, time stretches out and feels long for John, knowing that he is missing out on a family trip to the cottage and his brother's birthday. Knowing the fun that was being had without them was hard to get through, and the days dragged on until they returned.

Revealed through these stories is the ways in which access to mobile ICTs shifts sailors' perceptions and experiences of time. It is about how time *feels* for sailors – sometimes it feels fast, sometimes endless – when they are able to communicate with home.

Importantly, these experiences are linked to deprivation; cellphone and Internet access were completely unavailable when crossing the Pacific, and the one daily message that each sailor could receive became precious, a lifeline to the outside world. However, beyond simply how time feels, these experiences reflect a kind of co-presence – a bringing together of people across space and time through the use of mobile ICTs. It is this final aspect of connection to which I now turn.

Feeling the presence of home

The literature on cellphone use pays attention to the ways in which cellphones straddle the home-work divide, with the particular notion of 'absent presence' used to articulate the ways in which people who use mobile devices to manage work while at home are physically present but psychologically absent (Middleton, 2008; Gergen, 2002). As Gergen states, "one is physically present but absorbed by a technologically-mediated world of elsewhere" (2002: 227). However, my observations revealed something different; rather than being psychologically absent, cellphone use brought a kind of co-presence into being. It was not that sailors were taken away psychologically to the 'elsewhere', but rather that the 'elsewhere' was made present here. There is a struggle to be present in the lives of their families at home, while at the same time to feel the presence of their families while they are away at sea. This co-presence was evident in

sailors' discussions of how they parent from afar, and also in how time becomes elastic, stretching and contracting based upon their ability to connect with home. This co-presence is a sensibility unto itself; it is not only something felt by sailors, but it also affects them in their lifeworlds at sea. Thus, it warrants a more specific focus here, considering how this co-presence is brought about by the use of mobile ICTs, and also how it shapes their day-to-day lives. In other words, while being "present" through access to mobile ICTs has underpinned much of this section, I now consider how this co-presence affects sailors in their daily lives at sea.

In a way, sailors articulate a sense of co-presence when they are in contact with their families by way of mobile ICTs, meaning that while they are not physically present, being in regular contact feels like they are there, and also that their families are with them at sea. This was evident earlier in the discussion, particularly in terms of what John referred to as being "half there"; sailors who were trying to parent recognized that their presence could be felt at home by their children. The other side of that feeling, however, is how sailors themselves experience co-presence. For some, being in contact with home and feeling present allowed them to relax; they feel more settled knowing what is happening at home.

I asked Rusty how having regular contact with home has changed his seafaring experience. He explains:

It relaxes you more. You're not as eager to get home. [...] Now, every day I go to work, well, I was talking to them three hours ago or five hours ago or however long it was ago. I've seen them on the Internet. I was talking to them. Everything is fine. So that pressure is gone, so you can

concentrate more on your work and you're more at ease. It reduces the stress tenfold. (Rusty, Aug. 16, 2010)

Because sailors cannot be physically present at home to see that everything is okay, having this kind of co-presence gives them a better sense of knowing what is happening at home. With this, they can relax and concentrate on their work, knowing that all is well at home. Likewise, Igor, the Chief Mate with a wife and son in Ontario, suggests that through being connected via communication networks it “feels like you are closer”; he can sense that co-presence. When questioned further about the feeling of this co-presence, he said that if something is going on at home, he would rather know than not know. He referred to not wanting to be “ambushed”:

For me, it is good to know. [...] Got to know. If you don't know when you arrive at home and you're in [a] good mood that you're going home and suddenly... shoo... crash on her head. [...] She doesn't want to share the negative emotions. So sort of, she's keeping everything to herself and – but I know. I know her voice. The way she tells me something so I know it is way worse. I know what to expect. (Igor, Aug. 27, 2010)

For Igor, this co-presence provides peace of mind, knowing that even if things are bad, he knows about them. By hearing his wife's voice, he can hear in her tone whether or not he needs to be prepared for the worst when he gets home. This allows him to not worry about feeling ambushed, something that sailors identified as one of the key concerns that punctuates their reunions. For sailors, they are excited and in high spirits when they come home, and it proves incredibly difficult to arrive home to bad news. They would rather know ahead of time.

Sometimes, being in contact can lead to a feeling of homesickness. This was intimated when Homer was discussing how time stretched on endlessly when he knew what he was

missing at home, but it also emerged in a more explicit fashion and was something that I experienced quite acutely. On about the tenth day of my voyage, we had arrived in Saint John, NB at the Irving Oil plant. That afternoon, I had received an email from home. It was an innocent email from my 14-year-old daughter, simply giving an update about how much she and her sister were enjoying their time at my brother's house while I was away. However, it hit me quite suddenly that night, just how much I missed them. I wrote:

I am also homesick. I think that for the first week or so, I was so overwhelmed that I didn't have time to be homesick. But last night, at port in Saint John, I was overcome with a desire to go home. Connor's email made me want to pack my bag, grab a taxi to the airport and go home. I've had enough. I felt that a little bit during the first three days. But then it kind of went away, as I got busy doing my work. However, sleeping is a problem here, and often at night I step out onto the deck to breathe some fresh air. When I did this last night, I had a bit of a cry. I know I can't go home. (fieldnote, Aug. 16, 2010)

That night, as I was overcome with homesickness after hearing from my daughter, I ran into Willard when I was out on the deck. He asked me about my children, and where they were while I was away. Strangely, simply talking about them to him made it a little better, bringing their presence into our conversation, feeling them near. A few days later, during my more formal interview with Willard, I asked him about this, and he suggested that calling home every day helps. We said:

Willard: I like to talk to them every day if I can. Even if it's for only five minutes. I don't care, right.

Me: I'm worried about it being worse after [calling home], I don't know.

Willard: But you did get a little homesick after you were talking to them, didn't you?

Me: Yeah, I was homesick in Saint John.

Willard reassured me that this was quite normal, that it was something sailors felt. The bittersweet sense of co-presence is that it reminds you of what you are being deprived of – what you are missing. Distraction by way of a little television and sleeping were suggestions to put aside these feelings. What is interesting about this conversation is that Willard was neither shocked nor surprised to learn that I was homesick after hearing from my daughter. It is something that sailors become accustomed to as part of their work. This was reflected as well in the journaling done by John during his trip across the Pacific from China. Nearly every day, John reflected upon the events at home, after he had received his email. Some days he expressed concern and worry at his inability to be there; others he expressed joy upon hearing of their adventures. Sometimes, however, his homesickness was palpable, as he received news from home and simply wanted to be there. On the 95th day of his voyage, after receiving his email, he wrote:

As for home, the days go by fast when I am busy but at night when I lay down I have trouble sleeping thinking about everything I have missed. I really miss being there to help out, I miss having somebody in bed with me [...] and I miss everybody. (John's journal, Aug. 18, 2009)

Thus it becomes evident that for even a seasoned sailor like the Captain, the co-presence brought about through the use of mobile ICTs can bring about a great deal of homesickness. The loneliness felt through a sense of being isolated from one's family was manifest. Co-presence brings about palpable absence.

The co-presence made possible through mobile ICTs affects sailors by bringing their families into the discourse of everyday life at sea. Families are brought into this co-presence through the telling of stories and sharing of moments that go on at home. There

were countless moments throughout my month at sea where I witnessed how families were brought to life and made a part of their daily lives at sea. Everyone knows the names of spouses and children; everyone shares a little about each other's private lives. Saul, who has well over twenty years of sailing experience, was able to articulate this shift quite succinctly, "We talk about home a lot more" (Saul, Aug. 14, 2010). I witnessed Saul earlier that day in the mess room at dinner, bring his family into co-presence in the room. He was supposed to be at a wedding that day; his partner's son was getting married. Saul told us about the wedding, sharing details about where it was taking place and about the bride and groom. Then, he stood up and read aloud a poem he had written, that he had asked to be read at the wedding. He had the room in stitches; his poem in its iambic pentameter told the story of the bride and groom, and by the time he was finished we all had a very good idea about the more private details of the happy couple. It was because of his use of MSN to chat with his partner that he felt such a level of involvement in the wedding, and it was through email that he could transmit the poem to his partner. Their co-presence was facilitated through his relationship with mobile technologies.

What this co-presence of family, and the sharing of stories from the home front does, according to Captain John, is make sailing life bigger, wider. Sailing is quite a closed environment, where eleven men live together in close quarters for weeks at a time, eating meals together and working side by side. This became acutely evident when they sailed across the Pacific, where the daily letters from home became somewhat up for public consumption. The sharing of stories from home became a central aspect of daily life,

bringing a sense of newness to break up the monotony of daily life at sea. Moreover, John felt that the closed environment of the ship, made bigger through the co-presence of families, was significant, something that those shoreside did not experience. He says,

I've gone quite a long time without communication with only the email here and the email there, but I found it hard for me. So if it's hard for me, it's got to be hard for them. And even though it's maybe not as hard because they're enjoying themselves and because they still have the whole family support [...] They've got the neighbours. They've got the friends and everything where I've got the friends here and that's all I've got.
(John, Aug. 15, 2010)

For John and others, feeling the co-presence of their families while they are away at work makes their worlds feel a little bigger, a little more open. John goes on to explain,

Now, with the Internet and stuff, what people are doing is they're taking that culture of staying together with the group and now diverting slightly and bringing their family into the picture so they have their group here on the ship and they have their family, whereas before, it was strictly the group on the ship. (John, Aug. 15, 2010)

The affective sensibility that John locates here is about the feeling of family, where when there was little to no communication with the outside world sailors felt more like a family. Now, due to mobile ICTs, there is less of a feeling of family and a greater awareness of the "real" families that are at home.

One of the consequences of this familial co-presence on the ship, is that it can lead to isolation onboard. Similarly to studies done by Sampson et al. (2007, 2008) about deep sea Filipino sailors connecting with home, sailors on the Victorious noted the isolation and loneliness that comes with increased connectivity with home. In part this is because sailors' free time is spent in their cabins, on the cellphone or computer. Rusty says,

It makes everybody antisocial. [...] Everybody tends to stay to their own, um, but you can see in the evening here at suppertime when everybody's eating, and as they're finished eating, nobody just goes around and sits down and lounges around and watches TV. We eat, clean up our plates and gone to the cabin because they're talking to their kids, they're talking to their wife, whatever, and they're usually in there till 8 or 9 o'clock and then they're turning in. [...] So there's not a team spirit thing (Aug. 16, 2010).

This is an interesting observation, noting that having the co-presence of families works, as John says, to isolate people, "our free time is spent on our own and isolated" (John, Aug. 15, 2010). John had alluded to this earlier, when he noted that, prior to mobile ICTs onboard, the crew "was the family". Now, everyone's ability to maintain connections to home with regularity changes that for him.

It should be noted, however, that this is not necessarily a bad thing. I asked Bill, the cook, if he felt it was a drawback that the mess room was not busy in the evenings with social activities. Bill states,

Nope. I mean ah, it's just like you finish your day at work on land. Would you hang out at the office afterwards? Do you guys get together over your desk and hang out? No. You go home.

That's your home in there [pointing to the cabin area]. I mean, it might be smaller but it's, you know, everybody does their things, right. Some guys might be on the computer. Some guys go to sleep. Some guys eat more, you know. Ah, like, everybody has their routine. Everyone does their thing, right. You have your laundry to do. I talk to my wife. Like, when I finish my day here cleaning up, I go to my room and take a shower and relax for a bit and then I usually talk to my wife. (Aug. 18, 2010)

Bill's comments are important, lest one become nostalgic for the 'old days'. While there may well be greater isolation and sociability, as sailors spend more time in the co-

presence of their families, this is not necessarily a negative consequence. As Bill so precisely asks, “Would you hang out at the office afterwards?”

Summary

I would like to conclude this chapter by returning to my opening fieldnote. An interesting thing happened as we travelled from Nova Scotia to Newfoundland. We fell outside of the satellite footprint, and the Internet access was lost. This was not unexpected.⁴⁹ In fact, it was something that everyone talked about. I was warned about having no working communication technologies for several days, when the satellite-based Internet access would not work, and we would be too far from shore to pick up cellphone signals. There was almost a sense of excitement about the impending silence. Pierre, a seasoned sailor from Quebec who had experience deep sea sailing as well as Great Lakes sailing, told me, “just wait. Just wait until we lose the connection. People will be out at night. You will not see the empty halls then. It will make a difference” (Pierre, Aug. 19, 2010). Indeed it did. In the evenings after dinner, people were in the mess rooms chatting, excited about wives and girlfriends who might visit once in Newfoundland. After we left Newfoundland, and began the slow, steady journey back up the St. Lawrence River towards Montreal, with the realization that our connectivity was gone for the better part of two weeks setting in, things fell eerily quiet. It was as if, for that moment in time, we were back in the days of yore, when casting off from the dock meant very little contact with family and friends on the outside. In our steel, floating

⁴⁹ While the crew was prepared to lose Internet access when we crossed the Gulf of St. Lawrence, the router broke at the same time. As a result, Internet was actually lost for close to two weeks, as opposed to a few days.

world, I understood for a moment what it is like completely off the grid. It was strange without sailors standing on the stern decks talking on the phones in the evenings. I watched them mill about, talking quietly as we slid past the Laurentians, smoking cigarettes and telling stories. And, it allowed me a moment to pause, and think carefully about all that is afforded to sailors through their access to mobile ICTs.

Although the men on the *Victorious* have different backgrounds and different uses for their mobile devices, the narrative that tie these men together is about connection. The focus on personal communication highlights how sailors connect to home, and how those connections shape, and are shaped by, their experiences onboard, and their experiences with mobile ICTs. There is reciprocity here, as mobile ICTs afford certain opportunities to sailors in terms of parenting, experiencing time and the co-presence of space. At the same time, these mobile devices gain their meaning and their significance in the way that they are used by sailors. I witnessed the ingenuity and creativity of sailors crafting mobile networks out of duct tape and Wimax antennas, and seeking out the highest point in the vessel to make a phone call – as John put it, “standing on one leg with one finger in the air,” trying to get decent reception.

By drawing upon the stories told to me during interviews as well as John’s journal and my own fieldnotes, this chapter illustrates the tenuousness of mobile ICTs, while at the same time proving their exigency. Mobile ICTs are not reliable in the always-moving context of life at sea; connections fail, modems and routers break, cellphones fall out range, ships sail beyond the footprint. Yet, as this chapter reveals, these connections are

crucial to how sailors manage their absence from home, in terms of parenting, time and presence. Not at all ubiquitous or calm, mobile ICTs figure prominently in the daily lives of sailors.

Sailors are technicians who draw upon a variety of skill sets to develop complex relationships with technologies of mobility. From early appropriation of walkie-talkies to keep in contact with family, to payphone races and now jerry-rigged Wimax antennas to supplement shoddy Internet access, sailors demonstrate their keen technical relations with mobile ICTs to enable their mobility. At the same time, there is an affective sensibility to this entanglement of sailors, mobile ICTs and movement; more than emotion, it is a way of feeling mobility that is sentient. Sailors' social reality is one of deprivation and need, absence and presence, silence and sound. Being away from home – the single most defining feature of life at sea – feels different now that mobile ICTs are more readily available, and this affects sailors in a variety of ways, from how they participate in raising children, how they experience time, and how they are affected by the co-presence that is brought about through access to precarious communication networks.

As Thomas et al. (2003) have argued, while there is a dearth of research into seafarers' lives in general, the little work available brings into evidence that prolonged absences from home, punctuated with intense experiences of partings and reunions leave sailors susceptible to loneliness, homesickness and 'burn-out' syndrome. In the more than ten years since their research, a great deal has changed in the shipping industry, particularly in terms of the availability of mobile ICTs. Specifically, cellular phones and airtime

packages have become significantly more available both in terms of cost and coverage areas. As well, many shipping companies, at least those whose vessels sail the Great Lakes – St. Lawrence Seaway system, have installed satellite-based Internet on their vessels for both work- and leisure-related activities. While this Internet service is much slower than what most in Canada experience by way of high-speed access, it nevertheless enables communication through email, Skype, MSN, Facebook and other social media. Shipping companies are increasingly aware that in an era where demand for people to enter the profession of sailing is much higher than the supply of willing bodies, providing adequate access to mobile communications including the Internet is paramount for recruiting in this day and age. Together, the use of mobile ICTs – cellphones and Internet access – have changed the experience of being away from home for sailors.

Chapter V

Workplace Technologies: Working on the digital ship

Far from developing simply into instruments of [...] surveillance or elements of some kind of “super-panopticon”, communications networks have become, it seems, technologies of freedom.”

- Barry (1996: 138)

We're in Holyrood, Newfoundland, preparing to leave Conception Bay, heading further up the coast to Botwood. I'm watching John, the captain, and the local harbour pilot⁵⁰ as they talk quietly by the chart table. The pilot – a seasoned, stocky man with bright blue eyes and white hair – is tracing a route on the paper chart spread out in front of them. He's pointing out a passage inside Fogo Island that could shave time off the journey – and time is a precious commodity. John has not travelled that way before, and it will be nightfall when he has to navigate through the islands. At the end of their conversation, the pilot tells John not to rely on the ECDIS [the electronic chart]; “the paper charts are good,” he says.

It's a route known to local pilots, but not by navigators who aren't from here. The pilot's knowledge of the “local” and his privileging of the paper chart points to a different kind of knowledge about the sea, the islands, the rocks & shoals than that which is available through an electronic chart.

The legacy of paper has deep roots.

(Fieldnote, August 21, 2010)

Introduction

“Look, I'm 33 years old,” said John (the captain), his feet crossed, clad in flip-flops, propped up on the console, “and I'll probably become one of those grumpy old captains

⁵⁰ A marine pilot is someone who is required to be onboard in most Eastern seaboard harbours and the St. Lawrence Seaway System (some Canadian vessels, including the Victorious, have their own trained pilots for parts of the Seaway, but below Montreal and on the Eastern Seaboard, they are required to take a local pilot). Marine pilots have received specialized training, and while the Captain maintains command of the vessel, the pilot sets the course and directs maneuvers.

at the end that doesn't want to give the [paper] charts up and all the young lads around me will be like, 'this guy is crazy.' But it's because maybe they won't understand where I came from." It is a sunny August morning, and we are slowly making our way down along the coast of Nova Scotia, on the way to the Eastern Passage. The door is open, fresh sea air wafts into the wheelhouse, and we are chatting, both of us with our feet up, the autopilot working its magic. We are talking about technology. John, a child of the 1980s, grew up on video games, barely remembers adult life without Internet access, and considers himself an early adopter of technology. Yet, here he was, staunchly defending the paper chart – not necessarily resisting electronic charts, but recognizing the importance of paper. This young Captain who by his own account embraces new technology feels strongly about what might be lost, as paper charts slowly become a thing of the past. He could feel the wave of new technology washing over him, a wave that is brought about by the introduction of mobile ICTs on the ship.

The previous chapter explored the uptake of mobile ICTs by sailors in terms of how they use these connections to manage their long absences from home and family. In this chapter I continue the exploration of mobile ICT use, the “holy trinity of the age of computerized networks” (Barney, 2000: 29) by examining the affordances, opportunities, and challenges brought about by their use and integration into the workplace, including the engine room and wheelhouse. Communication technologies have changed drastically on ships, and gone are the days of telegraph rooms (Image 5.1)⁵¹. Today's vessels feature integrated mobile ICTs that are no longer confined to only the realm of communicating

⁵¹ Some ships were equipped with telegraph rooms, which were entire rooms dedicated to the vessel's communication equipment.

with ships and shore, as would have been the case in Image 5.1. Now, mobile ICTs are implicated in ship-to-shore communication with shipping company offices, regulators, Vessel Traffic Service⁵², and many others, as well as integrated in aids to navigation in the wheelhouse (Image 5.2), and the engine control and monitoring systems in the engine room (Image 5.3). This chapter considers this broader realm, exploring the uptake and consequences of computers with Internet access, specific aids to navigation⁵³, and engine room automation on the Victorious.



Image 5.1 The Science Museum in London, UK, published this image of a telegraph room on a ship. There is no date provided, but this image illustrates what shipping was like prior to mobile ICTs. Image: <https://twitter.com/sciencemuseum>

⁵² Vessel Traffic Service is a marine traffic monitoring service that monitors vessels and controls shipping traffic around the world. They are similar to air traffic control for aircraft. Ships check in with VTS, reporting their position, cargo, and destination, and VTS reports back with shipping traffic in the area, any check-down requests (requests made by ships to ask other ships to slow down when passing), and other marine traffic related information.

⁵³ There are many aids to navigation that every sailor knows. However, certain technologies are introduced by sailors as “new” when I asked about them, and it is those technologies that I focus on here.



Image 5.2. A view from the centre of the wheelhouse of the Victorious, looking at the console. The wheelhouse is replete with mobile ICTs, bringing information to the navigation crew. Photo: August 15, 2010.



Image 5.3. The NORIS screens in the engine control room on the Victorious. These displays allow engineers to monitor pumps, levels, equipment functionality and more. Photo: August 12, 2010.

My respondents were the first to identify what might be considered “new” in their industry, while recognizing the long histories of these so-called new technologies.⁵⁴ In part, this is due to the fact that the Victorious is a new-build; many of the crew had previously worked on her sister vessel, the Everlast, and were drawing comparisons between the two vessels. Also, it was because many of these sailors knew of a world at sea without Internet access, before electronic charts, and before automated engine room systems. Through interviews and observations, a coherent narrative formed that cut across myriad different technologies and locations on the vessel.

Significantly, sailors did not speak at great length about the promises of these new technologies; such promises were a given. As described in the first section below, each of these technologies was mandated, by some combination of the shipping company, the International Maritime Organization, Lloyds Register (the classification society that maintains technical standards in the industry), and Transport Canada, amongst other regulatory and governmental bodies. As professional sailors, they understood that these technologies would bring about improvements to their jobs – safety and efficiency being the most prominent.

⁵⁴ It is important to note here that there is an extensive body of work that problematizes the use of the word “new” in relation to technological change (see Molz, 2014; Hesse-Biber, 2011, Gitelman, 2006, and Chapter 3). I followed Hesse-Biber’s boundaries, defining new as technologies which “introduce a significant break in the way individuals, groups, and society as a whole conduct their everyday activities, as well as add new dimensions to our understanding of the social world” (Hesse-Biber, 2011: 4).

The stories that sailors tell illustrate the logic of technological rationality, namely ways in which mobile ICTs are put in place to improve efficiency and reduce risk (Barry, 1996).⁵⁵ As this first section reveals, sailors understand this logic and appreciate the benefits that are afforded by their use. However, in the second section, sailors discuss the compromises that they have to make in order to receive the benefits of technology. Their stories reveal a skepticism for new technologies, concern for the increasing visibility that is brought about through mobile ICT use, and frustration borne out of their autonomy and expertise being undermined by the constant connectivity afforded by these instruments. Together, these convergent sets of experiences with so-called new technologies highlight the tensions that exist between the promises of mobile ICTs in the shipping industry and the reality thereof. As this chapter argues, mobile ICT use, while affording improved safety and efficiency, erodes sailors' sense of knowing their ship; these devices distance sailors from their experience-based knowledge of sailing.⁵⁶

On becoming a “digital ship”

“It used to be that when we’d cast off – when we’d let go of the lines and head out to sea – we’d be free.” (John, August 8, 2010)

My goal in this first section is to describe some of the technologies that my participants have identified as significant when asked about the influx of mobile ICTs in terms of their professional practices and working lives, and explore sailors' perspectives on the

⁵⁵ There is a robust body of literature that explores the ways in which ICTs have been developed as instruments of corporate and/or governmental power and control (see Beniger, 1989; see also Barry, 1996, Chun, 2006).

⁵⁶ It should be noted here that the experience-based knowledge of sailing, and “knowing your ship” is something explored in greater detail in the next chapter.

ways in which these devices have improved working life on the *Victorious*.⁵⁷ Sailors identified the following technologies as “new” to their industry: computers with Internet access; aids to navigation including Automatic Identification System (AIS), and Electronic Chart Display and Information System (ECDIS); and an engine room automation system called NORIS. Together, these technologies comprise some of what is known as the “digital ship.”⁵⁸

While computers have been mainstays on cargo vessels since the 1980s (see Stopford, 2000, for a detailed history of what he calls a “quiet revolution”), the crew of the *Victorious* identified the increased connectivity that has come with improved satellite-based Internet access as something new in their industry. Computers with satellite-based Internet access are located in the wheelhouse (Image 5.4) and engine room, along with the offices of the Captain and Chief Engineer, the ship’s office, and the engine room on the barge. These computers are connected to a central server, located in the ship’s office that is accessible to shore staff over the Internet. Satellite-based Internet access is purchased by region (or “footprint”)⁵⁹, which means that shipping companies purchase an area of coverage, and if they sail outside of that footprint, they lose signal. Internet is considerably slower than the common high speed Internet access enjoyed by the majority of land-based Canadians. This connection enables email access with the shipping company office (herein referred to as “the office”), regulators, and other maritime-based institutions. Some of these messages are routine. For instance, each morning Igor, Chief

⁵⁷ This is by no means an exhaustive list of digital technologies on the *Victorious*. See Appendix A.

⁵⁸ “Digital ship” is a term commonly used in the industry, to discuss myriad new, digital, and mobile ICTs in the shipping industry. Annual conferences and trade publications reflect the importance of this term.

⁵⁹ See Chapter 4 for a detailed description of this service.

Mate, issues the Daily Report. Sent to the Captains and Chiefs of both vessels (Victorious and Everlast), as well as a number of shore-side personnel, the Daily Report is an email that details the vessel's current location and ETAs for various call-in points. This kind of routine communication allows for the logistical staff in the office to book journeys, crew changes, the taking of fuel, and other routine organizational practices, giving them a much more accurate set of timings from which to build schedules.

There are other ways in which Internet access improves communication and hence the efficiency of the vessel. Office staff use "circular email" to provide information to many people about managerial and operational issues, and it is used regularly to communicate with the crew of the Victorious.⁶⁰ Circular email provides an efficient way to deliver a uniform message to a large number of people instantaneously, something that was not previously possible. Internet connectivity is also used to manage interactions with border agencies. Canada Border Services Agency and U.S. Customs and Border Protection, agencies with whom vessels in the GLSLS have regular contact, require all forms to be submitted by fax. Victorious does not have a fax machine, but uses a computer-based service called MyFax to send faxes over the Internet.⁶¹ Moreover, the Captain and Chief use email to correspond with office staff⁶², suppliers, regulators, inspectors, and other institutional bodies as well. While this may seem routine, it is novel to sailors, who

⁶⁰ Circular emails are the digital equivalent of circular letters, one of the oldest known forms of business letter, used by businesses to announce or deliver information to a large audience.

⁶¹ In 2016, U.S. Customs and Border Protection now allow vessels to submit clearance forms via email. Canada Border Services Agency still requires only fax submissions.

⁶² In addition to circular emails, email was a regular form of correspondence with the office, for everything from form submissions to payroll, and a variety of day-to-day operational conversations.

would previously have to rely on access to phones, the mail system, or face-to-face meetings to address issues.

The crew appreciated the significance of this connectivity, and spoke positively about the ways in which such connectivity allows for fairly consistent communication with shore-side facilities and more efficient management of the ship. John explains,

It is a positive thing in that I can get things done faster than I normally would without [Internet access]. Now I can send my customs papers or U.S. clearances and everything like that ahead of time, and you can get all this stuff taken care of so that if there is an issue, you have it solved before you get into port (August 15, 2010).

Connectivity thus streamlines John's job, and affords him the opportunity to give and receive updates, know exactly what is happening in real-time, and increases the efficiency of the vessel.

During my presence on board, they were implementing an inventory control system called Sinex, which, via Internet connection, provides live and up-to-date information feeds with shore-side personnel for such processes as planned maintenance and repair, technical monitoring, drills and purchasing. The goal of Sinex is to automate maintenance routines, manage purchasing for the vessel, and ensure that all drills and reports are completed in a timely manner. I spent a significant amount of time discussing Sinex with Saul, the Chief Engineer, whose responsibility it was to see the implementation through to completion. Saul sees it as a "bigger safety net":

It's more accurate and reliable. So at the administrative end, the whole philosophy with the paperwork is to order the parts that you need to keep the machinery running, to keep the machinery properly maintained, and to

keep up with the manufacturers' specs and adhering to Transport Canada or any other authority [...]. I think we're running a ship much more efficiently with all the new technologies, especially communications (August 14, 2010).

Saul sees the implementation of Sinex as a way to regulate and automate the maintenance procedures. Twice a day, Sinex automatically updates the program in the office by Internet transmission, using what he calls a "seamless interface". This seamless interface means that the system automatically updates any changes made by the crew on the main server, which in turn is updated over the Internet for the shore-side staff. The result is that the office staff know exactly what maintenance is being done, as well as what is upcoming, and they can not only ensure the work is being done onboard, but also order any necessary parts or inspections, all in real time.

To sum up, computers with Internet access afford greater communication with office staff on shore, which is understood by the crew to improve efficiency and build in a "safety net" by way of allowing shore staff to monitor the work being done on the ship, plan accordingly for inspections, maintenance, and parts, and be better prepared by having instantaneous information at their disposal. It should be noted that this kind of connectivity is required not only by the office, to ensure consistency, accuracy, and instantaneous communication, but also by Lloyds Register, the classification society that establishes and maintains technical standards in the shipping industry worldwide, as well as their customers.⁶³

⁶³ Vessels are 'vetted' at least twice a year by oil companies, to ensure that the vessel is up to their standard for use. Part of this vetting is to ensure that there is proper, modern, communication systems in place.



Image 5.4 The Captain, John, works at the computer station in the Wheelhouse. Photo: August 9, 2010

The “digital ship,” though, is more than just computers with Internet access. There are some specific technologies in both the wheelhouse and the engine room that sailors identify as new. In the wheelhouse, the term “eNavigation” is being used in the industry, to discuss the suite of new technologies that are aids to navigation. These include Automatic Identification System (AIS), and Electronic Chart Display and Information System (ECDIS), amongst others. These technologies are implemented first and foremost to improve the safety of vessels, as well as to allow for a greater control of shipping traffic by Vessel Traffic Services and various border control agencies.

The first of these, Automatic Identification System (AIS) is a shipboard broadcast transponder system that uses GPS location information to transmit ship ID, position, course, speed and other data to all other nearby ships and shore-side authorities over a common VHF radio channel (Image 5.5). It is designed to perform three key functions: in a ship-to-ship mode for collision avoidance; as a means for coastal states to obtain

information about a ship and its cargo; as a traffic management tool when integrated with Vessel Traffic Services (SiiTech, 2016; Cockcroft and Laneijer, 2011). In other words, ships equipped with AIS technologies continuously transmit information about their location, speed, cargo, and destination amongst other things to other ships and Vessel Traffic Services over VHF, while at the same time receiving automated AIS data to their receivers about other ships in the area (Image 5.6).

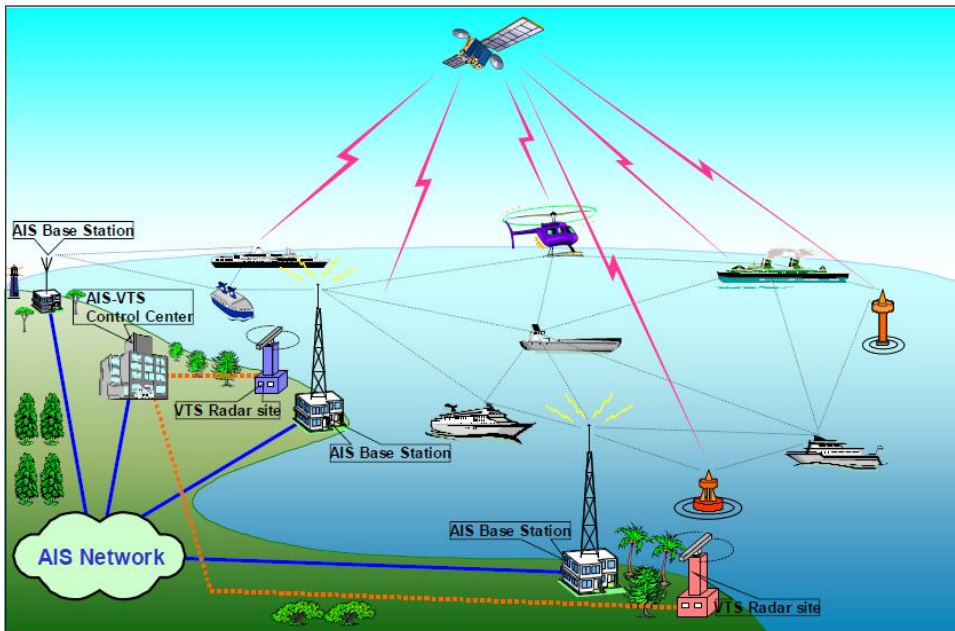


Image 5.5 This graphic demonstrates the AIS network. Digital GPS signals are sent from the ship to the VTS control centre via VHF connection. Source: Wikipedia Commons.



Image 5.6 This is the AIS screen on the Victorious, listing all vessels in the area. To see more information about a vessel, one would highlight a ship and select it for more information. Photo: July 12, 2011.

AIS technology became standardized by the United Nations' International Maritime Organization (IMO), for any international vessel over 300 gross tonnes in 2004.

According to Creech and Ryan (2003), this standardization is due in part to a request by the U.S. Coast Guard which was working with policymakers to redefine its U.S.

Maritime Homeland Security protocol, a cornerstone of its overall response to the events of 9/11. In seeking to monitor all vessels near its shorelines,⁶⁴ the U.S. submitted a request to the IMO to advance the Safety Of Life At Sea (SOLAS) AIS carriage requirements by 2004, a request with which the IMO complied.

Under the auspices of improved safety of vessels and seafarers, AIS is now a mainstay in the wheelhouse of ships around the world. Significantly, there are two key differences between AIS and previous wireless communication technologies that serve as aids to navigation: the continuous broadcasting of information from ships to other vessels and to Vessel Traffic Services, and the fact that such transmission is automated. Rather than simply receiving information from ships and shore as Marconi⁶⁵ had envisioned it, AIS means that ships are automatically, continuously transmitting a great deal of information about themselves to anyone who is interested, with very little interaction on the part of

⁶⁴ Currently, AIS information is available for vessels within about 40 nautical miles of an AIS antenna, as that is the maximum capability of VHF technology. The European Space Agency announced in 2014 that it has developed satellite-based AIS transmission, which would allow for a much greater coverage. This is not standardized as of 2016.

⁶⁵ In Marconi's words, early developments in mobile communications were about "bringing to the ship information regarding time, weather conditions, navigational warnings, and news of happenings in the world at large, as well as facilitating social correspondence [...] and keeping ship owners in touch with their ships" (as quoted in Hancock, 1950: ix).

sailors, the implications of which I unpack later in this chapter. There is little doubt that there are benefits to its use. John summed up how AIS has improved navigational work:

They're watching us and basically they're looking out for our best interest. I mean, they can use that information and we'll use that information to look for other vessels, to find other ships, and it gives us much more information than what it would before. I mentioned before about calling that ship three miles away from me with no name, you can't reach them and stuff like that. You can see them on the radar, just as a target. You can't pick them out several miles away. You can only basically pick out a shape. So now [with AIS], when you're out in the open waters, you can actually call up the guy by his name and say hey Mister so-and-so, what are your intentions? Where are you going? So it's definitely impacting the safety of the vessels and making things more readily available so that there are less accidents. So it is a positive thing at the end of the day. (John, August 15, 2010).

John's response points to the ways in which AIS has improved his job, increased communication and hence safety between vessels, as well as how it has provided greater environmental protection. Igor, the First Mate, concurs with John, and elaborates on how AIS works within the space of the St. Lawrence Seaway system. Igor discusses how previously, ships in the St. Lawrence Seaway would try to get ahead of other ships, in a race to the lock.⁶⁶ They did so by misrepresenting their position and their speed. He says,

Ships did not give the proper location to the Seaway --- they give the false information and nobody could track them, which is not fair. So they needed something. [Now], the Seaway can monitor the progress of the ship and they know exactly where [they are] --- And also, they can monitor speed limits in the river because different sections of the river have different speed limits. (Igor, August 26, 2010).

Igor points out that the increased monitoring has led to a system which is more 'fair' for all ships, because nobody can misrepresent their position.

⁶⁶ This is important, because if one gets behind a slow ship (and some are much slower than others), a 7-hour canal transit can turn into a 13 hour canal transit.

I first became aware of AIS because I wanted to track my journey every day. One of the Seaway pilots in Quebec City told me of a website where I could see exactly where I was at all times. By simply logging in, and choosing the region of the world, all of a sudden I had access to an incredible amount of information about the Victorious. I could see where we were – *to within 10 metres* -, how fast we were going, I could see what other ships were nearby, what kind of cargo they had, and so forth (Image 5.7). Sites such as marinetraffic.com and siitech.com allow users to track fleets or individual vessels, determine cargo and destinations amongst other information; much of this is now available on mobile apps for cellphones, iPads and laptops.

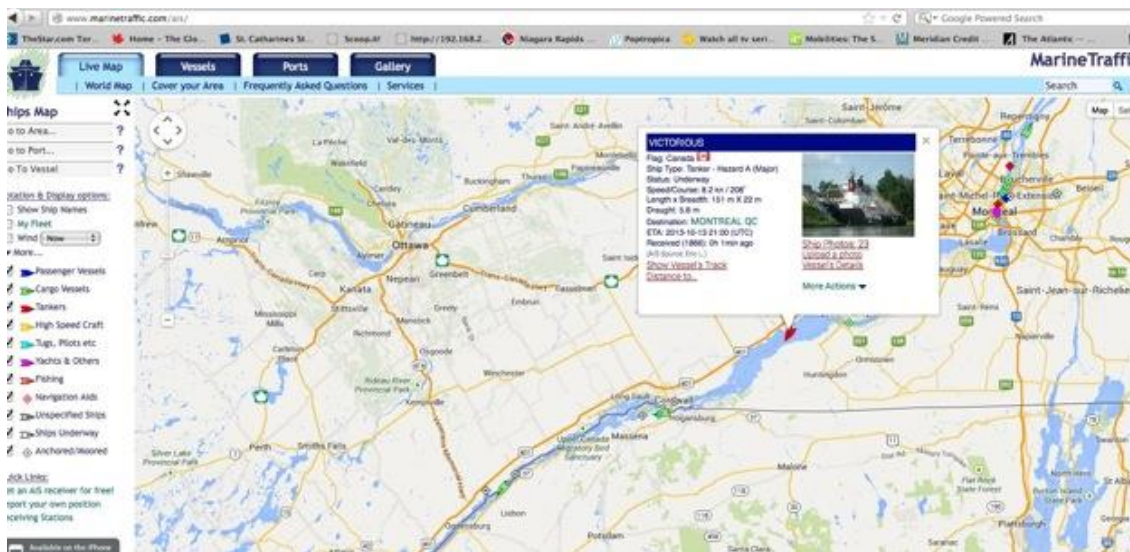


Image 5.7 Screen capture from www.marinetraffic.com,⁶⁷ one of the most prominent AIS-based websites, reveals the availability of information about a ship at any given time, to anyone with Internet access.

⁶⁷ This screenshot is from marinetraffic.com, the most popular AIS boat tracking software currently available. The pilot in Quebec City recommended siitech.org, which is what pilots use.

The second navigational ICT that sailors identify as “new” is ECDIS, or Electronic Chart Display and Information System. It is a computer-based navigation information system that complies with the International Maritime Organization (IMO) standards as a replacement for paper sea charts. Whereas AIS has no specific predecessor, ECDIS is connected to, and sometimes in tension with, the long history of paper charts.⁶⁸ Paper sea charts have been “the fundamental tool for the navigation of ships for centuries,” (Ward et al., 2000). Recognized as a legal document by international law, paper sea charts are graphical representations of particular maritime regions, including information about depths, coastlines, navigational hazards, the location of aids to navigation (such as ranges), and information about tides and currents, amongst other things. John explained to me that his very first college course was about paper charts and how to use them. To him, they are fundamental to the industry:

I think that looking on a paper chart, and that’s been the practice for hundreds of years, is that you don’t want to give up, you know, what would be considered good seamanship. You’re losing one of the oldest forms of navigation [...]. They’ve been around since the days of sail and that’s how everything came to be is by making these paper charts (John, August 15, 2010).

Sailors use paper charts every day, plotting their routes, marking their voyages, and doing chart corrections. They use paper charts to calculate distances and times, determine their location, and make navigational decisions. In this way, paper sea charts are not just representations of space on a page, they are navigational technologies that are implicated in the shaping and creation of sailors’ realities (November et al., 2010).

⁶⁸ I explore this tension later in this chapter.

The advent of global positioning via satellite, coupled with the availability of powerful, affordable computers brought about the development of electronic charts, specifically ECDIS (Ward et al., 2000).⁶⁹ ECDIS combines GPS data that allows for the ship's positioning on the screen, with the integration of other ship sensors and a powerful database of digital charts. Brought together, the ECDIS screen allows a navigator to see in real time ship positions, sea chart information, data about surrounding vessels (via AIS integration), and a history of ship movements. Whereas with paper sea charts, a navigation crew can spend several hours a week on chart corrections and plotting the ship's movements, this all occurs automatically using ECDIS, saving the crew a great deal of time. More than a time saving device, however, it is the "continuous, unified presentation of relevant navigation information" (Ward et al., 2000: 156) that makes ECDIS so valuable. Igor feels strongly about the value of ECDIS, and calls it the "most important piece of navigational equipment" on the vessel, and it is precisely because it brings together so much information in one place:

It is the most important by far. Absolutely. Let's say we go here [pointing to a location on the ECDIS screen]. Over there [pointing to the chart table] I have to check the paper charts and over here the radar and then the compass and the speed and everything else. I'm all over the place. With ECDIS? It's all here, right here, it picks up every target, picks up everything else, AIS, speed, course, everything (Igor, August 26, 2010).

Because it collates information about speed, compass direction, tides and currents, sea charts, alarms, GPS, and more, it has become a valuable technology to aid in navigational decision-making.

⁶⁹ While it is beyond the scope of this dissertation to trace the history of electronic charts, see Finch-Boyer (2012) for a detailed analysis of said development (and see also Ward et al., 2000; November et al., 2010). Importantly, ECDIS standards were set by the IMO in 1995, and ECDIS was deemed an acceptable form of chart carriage requirements in 2000.



Image 5.8 a & b: The photograph on the left shows the paper sea chart and table. The photograph on the right shows the console featuring Radar (on the left) and ECDIS screen (on the right). Photos: 17 August 2010.

The navigational crew of the *Victorious* uses both ECDIS and paper sea charts. I often observed Pierre, the Second Mate, on his afternoon watches doing chart corrections. Paper charts require constant updates and corrections that are delivered to the vessel in the mail. The Second Mate's job is to correct these changes on the charts themselves. At the same time, I watched John as he maneuvered into locks, constantly checking his location and speed on the ECDIS screen, which is positioned directly adjacent to his steering panel. Both technologies are used daily, and are vital to the safe functioning of the vessel.⁷⁰

The last technology that I would like to introduce as “new” according to the sailors on the *Victorious* is NORIS, the engine room automation system. Since the mid-1960s,

⁷⁰ According to the IMO, it is now legal to have no paper sea charts on a vessel, as long as there are two ECDIS machines onboard, each with a separate power source.

automation in the engine room, led by improvements to electronics and computerization has become increasingly prominent (Drews, 1968; DiGiorgio, 1998). The Victorious is outfitted with an advanced automation, monitoring and control system called NORIS (Image 5.3 above), which is regulated by Lloyds Register.⁷¹ NORIS is a German-made system of sensors, switches, transducers⁷² and indicators that monitor speed, pressure, temperature, and levels of engine room equipment, and sends out alarms when something might be wrong. This programmable logic controller (PLC) system has over 3,000 measuring points, and it uses these points to monitor myriad engine room technologies. NORIS does not simply monitor and sound alarms, it is also part of the command protocol. For example, if the captain pushes “the sticks” down⁷³ in the wheelhouse to increase the speed, a signal is transmitted to NORIS, which interprets the command and changes the pitch of the propeller accordingly. NORIS controls the pitch on the propeller by monitoring it and keeping the RPM constant. If less RPM is required, then NORIS sends a signal to reduce fuel.

NORIS screens are located in the engine control room and the wheelhouse, and alarm panels are also located in the mess room, and the cabins of the Chief Engineer, Second and Third Engineers.⁷⁴ The NORIS screens provide a digital representation of every pump, engine, and motor in the engine room. Engineers look at the screen to monitor

⁷¹ According to Saul (Chief Engineer), Transport Canada used to regulate monitoring and control systems on ships, but now it is done through Lloyds Register.

⁷² A transducer is a device that takes a physical quantity, such as pressure, and converts it into an electrical signal.

⁷³ Sailors call the bridge telegraph that controls the engine pitch (forward, reverse, speed) “the sticks.” In fact, when I asked the navigation crew what the technical term is for this throttle, they said the technical term is “the sticks.”

⁷⁴ It should be noted that the engineers have no choice about these screens – they are in all engineering cabins, and cannot be turned off.

fluid levels, temperatures, and identify potential problems. Colour-coded with red and green bars (where green means “okay” and red means “trouble”, according to the Chief), these screens become a vital interface between the engineers and the functioning equipment in the engine room. To put it bluntly, the NORIS alarms sound very regularly. I observed countless occurrences of NORIS alarms going off, followed shortly thereafter by engineers heading down to the engine room. Sailors discuss these frustrations later in this chapter.

Similarly to the response by navigators about digital navigation equipment, engineers acknowledge that NORIS improves their work, streamlining engine room monitoring and improving safety. Saul, the Chief Engineer, identified its main benefits as efficiency and safety. It is more efficient than previous systems he has worked with because its monitoring and controls are so tight. NORIS monitors the engine several times per second, much more than that which could be done by a human, and this allows for greater control. Safety is improved because “alarms can be issued more quickly because monitoring is more closely applied” (Saul, August 22, 2010). By this Saul means that because of the constant monitoring, if problems do arise, the alarms are triggered more quickly than that which could be done with human monitoring, and engineers can thus respond more quickly.

Moreover, just as integrated bridge technologies have been developed to increase labour efficiency by reducing bridge teams to the “one-man bridge”, so too have engine room automation, monitoring and control systems that reflect a desire for the “unmanned

engine room.”⁷⁵ Automated engine rooms now attempt to seamlessly control engine rooms, and remote monitoring enables greater flexibility for engineers.

Homer (Third Engineer), details how his work is different compared to the Everlast, which does not have this automation:

This one’s mostly more automation and through computers. You can go in and you can start every pump locally and on the screen, but the Everlast, you’ve got to go down. [...] So this one here, you can start them on the screen, on the computer screen itself (August 23, 2010).

Being able to start pumps from a computer screen means that engineers do not have to run up and down three flights of stairs, saving them time. In addition, when the Victorious is in open waters⁷⁶, NORIS enables them to have an unmanned engine room at night. NORIS does the night watch, and the engineers respond only if a NORIS alarm sounds. As Homer says, “I can have the night to myself.”⁷⁷ Homer not only enjoys the convenience of remote pump starting and unmanned engine rooms, he also finds NORIS improves efficiency:

Actually, it will probably give you a better overview of the engine room when you track which way it’s going, like do a piping system. It’s probably quicker, right. You can bring that piping system up on the screen and you can follow it out. Well this pipe goes there so you know there’s bells right here,⁷⁸ so let’s check that one, right, instead of going down with a flashlight and going through all the bells and looking for it, probably you trace it faster than you would if you never had the system (Homer, August 23, 2010).

⁷⁵ Regulations for Victorious/John J. Carrick indicate that in enclosed waters, the engine room must always be manned.

⁷⁶ Being in “open waters” means that the vessel is not in the confined waters of canals, rivers, and harbours. On the Victorious, we are in “open waters” when on the Great Lakes and the Atlantic Ocean. “Confined waters” would be the Welland Canal, and the St. Lawrence River, for example.

⁷⁷ As the Third Engineer, Homer is often on call at night. While he works regular daytime hours in open waters (7:00 a.m. to 5:00 p.m.), he is on call at night should any alarms sound. The panel in his room wakes him up, and he must try to solve the alarm.

⁷⁸ By “bells,” Homer means that this is where the alarm has triggered.

Homer's sentiments are echoed by other engineers, all of whom understand that the use of NORIS makes their jobs more efficient. Its graphical interface and automatic alarms afford them opportunities to solve problems more quickly, to monitor pumps from a distance, and to pinpoint problem areas expeditiously.

Together, computers with Internet access, navigation technologies including AIS and ECDIS, and NORIS, the engine room automation system, comprise a great deal of what sailors consider to be "new" in their industry. However, these technologies are changing the experience of sailing in complex ways, and sailors' stories tell of a world where the appropriation of technologies in their daily lives is a site of struggle – struggle over meaning, use, and power.

The compromises of new technology

From the standpoint of my participants, their voices came together in articulating the ways in which using these new technologies has made their jobs more complex. While using mobile ICTs improves working life onboard the Victorious, such use comes with compromise. Their stories reveal a skepticism for new technologies, concern for the increasing visibility that is brought about through mobile ICT use, and frustration born out of their autonomy and expertise being undermined by the constant connectivity afforded by these instruments.

Skepticism

Despite the fact that technologies such as Internet access, AIS, ECDIS, and NORIS are required technologies in their industry, and despite the fact that sailors recognize these technological changes to be of benefit, there remains a certain skepticism about the ways in which these mobile ICTs are being taken up. Skepticism has long been a key concept in studies of “being-with” technology (Mitcham, 2003). Mitcham suggests that this can be traced back to ancient times as one articulation of the relationship between humanity and technology. “Technics, [...] although to some extent required by humanity and thus on occasion a cause for legitimate celebration, easily turn against the human by severing it from some larger reality” (2003: 491).⁷⁹ This ancient skepticism that Mitcham described still holds sway, as sailors express their anxieties about the ways in which these new technologies are changing their understanding of being at sea, and also calling into question their experiential knowledge of sailing.

I sensed that, at the heart of this skepticism was trust. As a navigator, John expresses this when talking about just how much he must rely on the digital aids to navigation:

When you can't see 200ft in front of you and you can't see the front of your boat, it's nice to know that your Aid is picking up the smaller boats, that it's picking up the harbour and that it's picking up the buoys in the channel because once you've committed to something, you have to keep going because you can't just stop the ship in the middle of something because you'll end up in more trouble. So you have to keep going. Um, in a snowstorm, if you're in a narrow channel, well, you have to live with that and you have to just keep going, even though you can't see. So this is

⁷⁹ These ancient anxieties were about detaching the farmer from the field, or the crafter from the craft but they still resonate. Modern skepticism about new technologies such as nanotechnology (Metag, Kohring and Marcinkowski, 2011), or artificial intelligence (Juma, 2016) to name but a few, demonstrate that with any emergent technology, public skepticism plays an important role.

where your Aids to Navigation come in and you have to trust them to get you through that (August 15, 2010).

Fog and snow wreak havoc, because in those situations where the fog is so dense, or the snowfall is so heavy, it is impossible to see beyond the bow of the vessel. Navigators must be able to trust what their aids to navigation are telling them. ECDIS, AIS, RADAR, amongst others become the navigator's eyes and ears. When a technology like ECDIS comes along, it is difficult to rely on it because that trust has yet to be established.

John explains:

We still use paper charts and what that is for is that, you know, maybe there's an error in the electronic charting. *It hasn't fully come to that stage where electronic charts are fully trusted, yet.* Um, they are a new invention. They have been in for the last, I'm going to say our companies have had them for about fifteen years, maybe eighteen... (August 15, 2010, my emphasis).

Telling here is John's assertion that ECDIS is a new invention, having *only* been on his company's vessels for approximately fifteen years. This was extraordinary to me; fifteen years feels like a long time, and certainly long enough for a technology to be trusted, and a part of everyday life. But John did not see it that way. From his vantage point, sailors have been using paper charts for hundreds of years; fifteen years is nothing. I pressed

John about this, and it comes from the nature of the medium itself. John explains:

It's very old school to just pull a chart out, you know, wipe your hands across it and draw your lines and figure out exactly in bad weather where you need to go and get a whole perspective of what the whole picture is, and really get a feel for what you want to do, whereas on the electronic chart you're doing it electronically, but it just doesn't feel real. It doesn't feel like you're getting the whole picture, like, you're making... I don't know. It seems like you're ripping yourself off, like not doing it proper, you know what I mean? It feels like you're just kind of, you're not getting the whole responsibility thing by putting it on there electronically. Like, if

you put it on paper, it seems like you're doing more of the proper way, as it's been done for hundreds of years (August 15, 2010).

The weight of paper bears down on John, a combination of the tactile nature of spreading his hands across a paper chart – being able to get a “whole perspective” of the ship's journey, and the legacy of his sailing forefathers, whose proven methods feel safe.

Together, these factors hold sway, as John grapples with the digitization that is already afoot. To him, when it comes down to it, he trusts paper charts:

It feels more real. When you're looking at [...] the electronic chart on the computer, it doesn't give the sense of, you know, the real issues. It seems like this is all input. I guess even with paper charts, they're still input by computer when they print them like that, but you don't get that feel that you're looking at the whole picture, that you're missing stuff, it seems, on your electronic chart. [...] You don't want to put all your faith into it.

John remains skeptical of ECDIS, with its computer screens, multiple sources of information, and instantaneous positioning and also about the interface itself. He explains,

If I look on a [paper] chart, everything is there for me. I can see the shallow spots and I can see the markers and where everything is. It's all laid out for me. Now if I got to the ECDIS, I have to make sure the scale is right and I have to make sure it's got everything included. I mean, if I'm zoomed out too far, it won't show me the shallow spots, it won't show me everything that's on the paper chart. It's just much more difficult to get the right information (August 26, 2010).

Placing his position using parallel rules and dividers⁸⁰ on a paper chart is trusted; it is safe. For John it is not that the digital technology might be wrong necessarily, it is more that the paper technology is right – it is more “real”.

⁸⁰ Parallel rules are an instrument that looks like two rulers, connected with pivots, and dividers are the instrument that measures distance on the chart.

Engineers articulated similar feelings of skepticism around automation in the engine room, particularly in relation to NORIS. As discussed earlier in this chapter, NORIS is the automation, monitoring and control system that serves as an interface between the engineer and the engine room. Its monitors are placed in several different locations, including the Engine Control Room, the wheelhouse, and the Chief Engineer's cabin, and mini-panels are situated in the mess room, and the cabins of the second and third engineer. These monitors are equipped with alarms; when a sensor is triggered in the engine room, the alarms sound at all of these panels simultaneously. While NORIS is recognized for making work more efficient, it is not without controversy. Engineering crew, including both the licensed engineers and the engine room utility that I interviewed articulate skepticism about the ways in which NORIS was designed and its potential fallibility.

As outlined above, NORIS is a German-made system of sensors, switches, transducers⁸¹ and indicators that monitor speed, pressure, temperature, and levels of engine room equipment, and sends out alarms when something might be wrong. Saul, the Chief Engineer, refers to NORIS's design as a "Frankenstein system", because of its illogical progression of alarms due to design and wiring issues. In an engineer's mind, if there is an incident, there is a logical progression – events should unfold in a certain sequence. However, as Saul said, "with Frankenstein, alarms don't make sense to the engineer." I probed this issue further, and Saul said, "a guy who never sailed designed our system." He gives the example of how on Victorious, when they shut the engines off, every low-

⁸¹ A transducer is a device that takes a physical quantity, such as pressure, and converts it into an electrical signal.

pressure alarm will go off, because the system is unable to determine that it has been shut off on purpose. Although it is possible to “teach” NORIS, it is a cumbersome, lengthy process for which there is little time. As a result, engineers are regularly grappling with a design that sends out false alarms.

This design can lead to frustration for engineers. While NORIS does the monitoring of the engine room automatically, engineers must respond to every alarm that NORIS triggers. As Homer tells it, sometimes the illogical design of NORIS leads to “ghost alarms,” alarms that just do not make sense. He says,

Oh, last night it was on. It was wicked. I never slept at all last night. The alarms was going all night. Just something with the alarms that is called bullshit alarms. It’s just an alarm that goes off for no reason. It’s just a ghost alarm, but I had a lot of them, and some alarms was, I had to go down and fix. After four alarms, I just stayed down there. Yeah. I just kept getting alarms, kept getting alarms. I said I might as well stay down and fix one problem and get it fixed, get it out of the way. So yeah, last night was wicked (Homer, 23 August, 2010).

I observed this many, many times during my month onboard. NORIS alarms would screech, an engineer would go down to the engine room, the alarm would be false, and the engineer would return to what he was doing. These ghost alarms can lead to an engineering crew that becomes skeptical; they cannot trust NORIS.

Saul gave me an extreme example of this distrust of NORIS, by showing me a non-conformity report⁸² that he had completed for an incident that had recently taken place.

In enclosed waters, a steering gear fault was picked up by NORIS. This set off an alarm,

⁸² A non-conformity report is issued whenever there is a situation that does not conform to the company policy or broader regulations.

which was heard in the wheelhouse. However, the Captain at the time was shiphandling, and could not respond to the alarm.⁸³ He did not think twice about it, as the alarms are so common, but in this instance it was a real steering alarm. As Saul says,

NORIS is constantly alarming up there, and most often the Captain doesn't even blink. He's busy shiphandling, and he knows the engine crew takes care of NORIS. But, in this example, the engine crew are all working on something on the barge, and don't respond quickly. But remember, it's the steering gear fault, and so now the Captain has no steering, he's in enclosed waters, and doesn't know he has no steering (Saul, August 22, 2010).

Importantly, in this example NORIS was correct; the steering gear was not working, and the alarm was sounded. However, for a variety of reasons, including the fact that the Captain was busy shiphandling in enclosed waters, and that NORIS regularly alarms, the Captain did not attend to NORIS, and the engineers were unavailable. Without a doubt, losing steering in enclosed waters is one of the most dangerous things that can happen on a ship, often resulting in grounding. Fortunately, this time the vessel went to anchor, and the steering gear fault was repaired quickly, with no harm to vessel or crew. The U.S. Coast Guard was informed of the steering loss incident, and they boarded the vessel for inspection. The delay was minimal, a permanent repair was completed in the next port of call, and eventually a steering alarm was installed in the wheelhouse that could not be ignored. What this incident illustrates, however, is a deep distrust for the design flaws of NORIS, akin to the "boy who cried wolf" parable. How can they know if the alarm is real? In this example, NORIS was correct, but was ignored. Other times, the automation technology misses things altogether.

⁸³ Ignoring NORIS alarms is very common in the wheelhouse when in enclosed waters, because the alarms are going off constantly, and the Captain must concentrate on steering the vessel.

All the engineering crew with whom I spoke could tell me stories about critical moments where NORIS did not alarm, and a keen eye or ear was needed to discover the problem. Homer, who had suffered a sleepless night due to the ghost alarms before I interviewed him, told me why the protocol is to do a complete round of the engine room.⁸⁴ He says,

You do a full round, right. You go down and when you're checking before you leave, and one of the purifiers kicked out and I never got an alarm for it. So I don't know why. I should have got one. [...] The computers screw up easily, very easily. Just to get one glitch, it could screw up and could cause a big problem (August 23, 2010).

Homer's concerns are important, highlighting the ways in which he feels the drive towards automation is dangerous. Had he not completed rounds, the purifier issue would have gone unnoticed. Homer is keen to state that these technological errors mean that engineers must be increasingly vigilant. I had heard from other engineers about another instance where Homer caught a problem that NORIS missed. I asked him about it:

Yeah, it was a fuel line. She was dropping fuel. I was walking by and I seen her dump fuel and so I came up, I got the Chief. I said there's something wrong. We're dumping fuel. Like, she's not normally only at .6 cubes. That's what she'll use on full out on consumption of fuel and she was up to 1.2, so she was doubling up her fuel. So she's dumping somewhere, and it was just one of those valves cracked and that's where she was dumping. (Homer, 23 August, 2010)

In this example, it was Homer's knowledge about the gauges that prevented a larger problem. He knew that the fuel consumption rate was higher than it should be, which led him to do further research until he found the problem. The automated monitoring system did not pick this up. The "unmanned engine room" – a very real goal of shipping companies wishing to reduce labour costs and increase efficiency and safety – means that

⁸⁴ By this he means that the engineer must check the equipment manually during each shift, to make sure that everything is working properly.

the potential for “big problems” increases. In a similar way to which John, the Captain, is skeptical about electronic charts being unproven, the engineers face questions about how to trust automation technologies that miss alarms. They respond with vigilance, knowing that they cannot trust NORIS to catch faults, and being increasingly aware as they do rounds that something might be amiss.

In this section, I explored navigators’ and engineers’ skepticism about the influx of mobile ICTs in the workplace. For these crewmembers, these technologies do not simply augment or improve their work. Rather, they must be able to absolutely rely on technology at crucial moments, whether it is steering in enclosed waters, or in poor visibility conditions. This reliance is significant, because the crew is well aware that technology is fallible; it makes mistakes. These mistakes can have dire consequences for navigators and engineers, as they work to keep the ship, the crew, and the environment safe. Their skepticism works to maintain a balance between taking advantage of the opportunities brought about by new technologies, and recognizing their potential for error.

Location and visibility

One of the most significant changes to working on a ship is brought about by a confluence of technologies and social practices. GPS technology makes location readily available, AIS broadcasts said location, and the Internet has made it so that everyone, including sailors and shipping companies along with ordinary folk, can monitor the movements of vessels. AIS (Automatic Identification System), as outlined earlier, is the

automated system that constantly broadcasts a ship's location, speed, cargo, and destination via VHF signal, making it readily available to anyone with Internet access. From an organizational perspective, this ability to track and monitor vessels as part of the overall logistical management operations of location-based services surely improves shipping logistics management. Moreover, as discussed above, being able to track vessels improves safety and security of vessels in port, as Vessel Traffic Services are better able to monitor movements, cargo, and destinations.⁸⁵

From the perspective of my study, however, I was interested in what this meant to the crew themselves in terms of how they experience being tracked and increasingly visible. As discussed earlier in this chapter, the benefits to the crew are clear in terms of safety and fairness, as Vessel Traffic Services can better manage ship movements, but at what cost does such safety and security come? As this section explores, visibility of location is experienced in interactions with border and harbour security, shipping company organization and control, and also unknown "boatnerds" on the Internet.⁸⁶ All of these interactions work to undermine the power and expertise of the navigational crew because their situational knowledge is subordinated to the technical information provided through visibility.

⁸⁵ As the literature reveals in Chapter 3, there is empirical evidence demonstrating this improved safety of ships since the mandating of AIS technology.

⁸⁶ The term "boatnerd" is used to describe a community of people around the world who have a keen interest in the shipping industry. Some boatnerds are former sailors, but many are just "fans" of the industry, and can be seen at locks and docks taking photographs of ships to share on the Internet. I discuss boatnerds further below.

One of the most significant aspects of being visible via AIS is that the vessel's movements are tightly controlled at the border and harbour security level. Through its standardization and enforcement, AIS is a very powerful actor in the new geography of logistics (Cowen, 2010, Cowen and Graham, 2010). John told me of a time when they were in Boston when their AIS equipment stopped working properly. He says:

We were coming into Boston a couple of years ago and our AIS signal was going intermittent. The US Coast Guard and the Boston traffic, they lost it on us. They got very nervous. We were coming into a US port --- a loaded tanker --- and they were like, okay, we see you. Okay, everything's good. All of a sudden where did you go? Your signal is gone. So now, it raises alarm bells. Why did their signal disappear? They've taken their signal off. What's going on? And then two minutes later, our signal reappeared again. So now the traffic in the area sees us coming, going, coming, going, so it starts to, you know, people just wonder. And when we got into Boston, to shorten up the story a bit, basically, they told us that we are not leaving Boston harbour until we have a new unit and our unit worked 100%. So we ended up having to fly a guy in and bring a new unit in and replace everything before we could go and we lost time. They would not allow us to go without it. So AIS in its short time has become incredibly important. (John, 15 August 2010).

This story is telling, because it demonstrates the power of AIS, in terms of its ability to render a vessel visible and capable of being tracked. The critical aspect is that the moment that the AIS technology becomes inoperable – the moment when the vessel becomes invisible – is the moment when they are cast as a security threat. As long as their AIS is transmitting data, *as long as their location is visible*, they are non-threatening. This is particularly significant because, while AIS technology is supposed to be about ship safety, in this instance it seems to have little to do with the safety of the vessel, and much more to do with border security. Moreover, because the cargo of the Victorious is considered “hazardous”, and therefore a terrorist target by the ship company insurer, its itinerary and location are meant to not be widely available. Being made

visible for anyone on the Internet to see completely undermines their safety at sea, in order to render more secure the borders, harbours and the Seaway. There seems to be a contradiction in logic here.

While visibility of location gives increased power to Vessel Traffic Services and port authorities, it also provides greater opportunity for monitoring and intervention at the shipping company level. Whereas previous to the implementation of AIS and readily available Internet access, companies were mainly concerned with departure and arrival times, with little communication between these two points, now companies are questioning every aspect of the journey. The journey, rather than being just from point A to B, is opened up to scrutiny, criticism, and control. As a result, captains are increasingly ceding decision-making power to their offices. John explains:

So as a company, they need to know everything because they've got everything calculated. [...] So an example would be last night. I sent an email, asking if they want me to go to anchor or do they want me to just go in, you know, to go slow and save a bit of fuel. Well, back in the day, it really wouldn't matter. I would just decide. It wouldn't matter. I wouldn't have communication so they wouldn't say anything to you after, and you would just do what had to be done. But now, you'd better send something because if you do nothing and they'd be like well, why did you do that. It's always, everything seems to be questioned (August 15, 2010).

In this situation, because the company is able to monitor the vessel's movements so closely, their ability to question and control the crew is increased. Being visible via AIS over the Internet means that their own decision-making power is diminished.

John hesitantly uses the word “micromanaged” to describe how he feels about the ways in which the company is increasingly involved in the decision-making practices onboard.

He states:

In all the manuals they say that the Captain has full responsibility, and at the end of the day when something happens, that’s what they’re going to tell you, that you had full responsibility.⁸⁷ But, they also want to dictate how you direct your responsibility, so to speak. But you know, twenty-five years ago or thirty years ago, the companies and the higher-ups used to just get their bottom figures⁸⁸ and that was the end of it. But now with this technology, as soon as a boat slows down somebody on the Internet has noticed it, and posts on the Internet, why is this boat going slow,⁸⁹ and the next thing you know, the company is calling. I’ve got an Internet posting saying that you’re going slow. So it’s like you have to justify everything... (John, 15 August 2010).

In this way, John sees that a combination of AIS technology, along with its ready access on the Internet for anyone to see, has stripped him to some extent of his autonomy as Captain. Decisions that he would have otherwise made freely based upon his experience, credentials and judgment must now be justified to the company. AIS has thus increased the amount of control and interaction from the company. At the same time, while the Captain is under much more scrutiny on a moment-by-moment basis, as John puts it, at the end of the day, the efficient, safe operation of the vessel is still his responsibility. This tension is not lost on John or the rest of the crew. Decisions such as whether or not to enter the piers of a port or canal reside, in many instances, with the Captain. He must gauge wind conditions and determine whether or not it is safe. The pressure to enter the piers is high, as he is aware of the company’s need to deliver product on time, but if there

⁸⁷ This full responsibility is of major concern. If a ship goes aground, or faces some other catastrophic event, it is the Captain who is held personally responsible. He can face civil liability and criminal charges for his decision-making.

⁸⁸ By “bottom figures” he means that the focus was on the outcomes (timing, cargo delivery times, etc.) rather than monitoring the progress at the micro level.

⁸⁹ Here, John is referring to the boatnerd community. I unpack this further below.

were to be an accident, such as hitting the pier in high winds, it would be solely his responsibility – a responsibility for which he is held personally and professionally liable. Added to this pressure is the knowledge that, with AIS-enabled Internet tracking, his company can question his decisions much more readily. They can see other ships entering the piers, for instance, and question his ability as a Captain if he chooses not to enter. Alternately, his company can see other ships at anchor, and question why he would take such a risk. No matter what decision he makes, his judgement and expertise are continually called into question.

It is important to point out that the company does not call into question every decision the Captain or the Chief Engineer might make on a day-to-day basis. Rather, it is the *potential* for such questions to be asked that is at issue. The visibility brought about through AIS technology means that sailors are making their decisions as if someone is watching, whether or not they are. That potential, much akin to Foucault's (1977) panopticon, means that sailors govern their actions accordingly, self-surveilling their decisions based upon that visibility.⁹⁰ Thus power shifts to the observer – the company – as sailors consider their decisions in light of being rendered visible on the internet.

Relevant here as well is John's reference to "somebody on the Internet" posting a message about the ship's movement. This may seem irrelevant, but it is actually quite a point of frustration for sailors. On the Great Lakes, there is a community of "boatnerds" who are avid fans of shipping on the Great Lakes. Their website, boatnerd.com (Image

⁹⁰ According to Foucault (1977), the metaphor of the panopticon describes disciplinary societies where conscious observability is a form of power. Zuboff (1988) extends the metaphor to examine how computer technology increases the visibility of workers by measuring their behaviour and output.

5.9) includes three different links to view vessel traffic, a news page, and an Information page, where boatnerds post questions to other boatnerds about ship movements, cargo, histories, and other issues, and lively discussion often ensues. When something strange is happening, such as rumours of a boat grounding or a vessel being stuck in ice, it is often the Information boards on boatnerd.com where first reportings are published. In other words, John's fears about "somebody on the Internet" posting something about his speed or destination are not unfounded. Even when the shipping companies themselves are not watching, someone else surely is. Importantly, while some of these boatnerds are former sailors, many are simply folks who enjoy ship watching. Their comments and questions may seem innocuous, but professional sailors and shipping companies all monitor boatnerd.com. In one story I was told, a sailor had waved to a boatnerd in the Welland Canal to have his picture taken. The photograph was posted on boatnerd.com within a couple of days, and the sailor in question was reprimanded by his company for not wearing his full uniform. In another example, a Great Lakes captain blocked all boatnerds from his Twitter account, because his popularity on social media landed him in trouble with his shipping company's social media policy.⁹¹

⁹¹ MMTL does not have a social media policy, but other large Canadian shipping companies such as Canada Steamship Lines have put such a policy in place. Even without the policy, sailors know to never say anything on social media about the company, complaints, location, or cargo. It is simply a 'given' that this information is private.

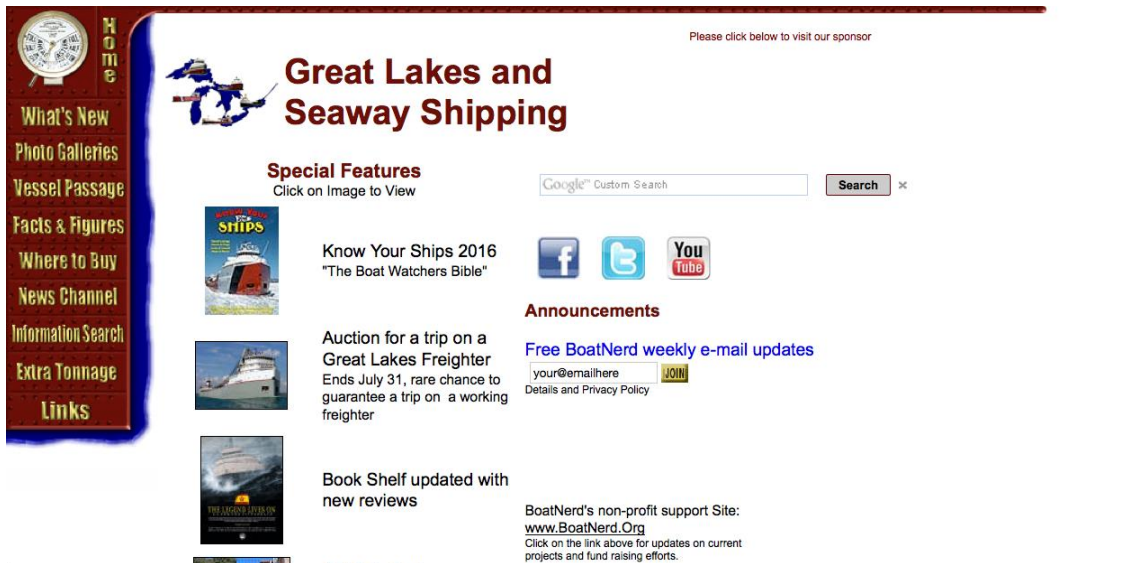


Image 5.9: The boatnerd.com main page, where boatnerds go to share and find out information about ships on the Great Lakes. Image taken July 24, 2016.

The compromises of new technology in sailors' professional lives are brought into being by their inability to fully trust these navigational aids and engine room automation systems, and also by having their decision-making power slowly taken away by powerful technologies that render their location visible to anyone with Internet access. I wanted to know, then, why this mattered to them. How did it feel, this skepticism and increased control, for sailors with long histories in the industry? The stories they share tell of worrying about deskilling in the industry, and a devaluing of their expert knowledge.

Deskilling and Devaluing Knowledge

The late materials scientist, Ursula Franklin, in her 1989 CBC Massey Lecture, *The Real World of Technology*, provides a compelling account of the social consequences of technology in the “real world” - our everyday lives. In her lecture, she argues that there are two kinds of technological development, holistic and prescriptive. Holistic technologies are craft-driven, using the skills and knowledge of the maker from

beginning to end, where one person uses multiple skills, has control, and makes decisions. Contrasted with holistic technologies, prescriptive technologies break down the process into multiple parts, with multiple people having a small amount of skill, the clearest example of prescriptive technologies being the assembly line. Importantly, whereas with holistic technologies the worker is *in* control, with prescriptive technologies the worker is *under* control (Brown, 2015). Franklin argues:

Today's real world of technology is characterized by the dominance of prescriptive technologies. Prescriptive technologies are not restricted to materials production. They are used in administrative and economic activities, and in many aspects of governance, and on them rests the real world of technology in which we live. While we should not forget that these prescriptive technologies are exceedingly effective and efficient, they come with an enormous social mortgage. The mortgage means that we live in a culture of compliance, that we are ever more conditioned to accept orthodoxy as normal, and to accept that there is only one way of doing "it" (1999: 17).

While written more than twenty years ago, her analysis here is apt, and helps us to understand what sailors are experiencing as mobile ICTs infiltrate their workplace. AIS, ECDIS, NORIS, and constant connectivity via Internet access – this suite of mobile ICTs that have quickly become the modern sailor's 'real world' – are quietly helping to restructure life at sea.

"I'm drowning in paperwork," says John, when I ask him about how his work is changing. "Now I do piles of paperwork, with a small bouts of shiphandling when I'm not busy," he laughs, seeming relieved to talk about it. I asked him to expand:

With email, the companies are now sending emails that you have to get answered and you have to give them the right answer and answer them right away and sometimes that's taking you into the evening hours because in the daytime, you're still trying to keep the rest of the ship

running like you normally would and you can't spend that time on answering these emails and checking them. So you have to spend your nighttime hours continuing on with the job. [...] You have to answer all the emails from suppliers to technicians to everybody, to where you're going to be next and when you're coming back (John, August 15, 2010).

The constant and continuous connectivity means that I witnessed more than 50 emails being sent back and forth to order new coveralls, instead of sending one person down to the ship to take measurements and place the order. Captains are now routinely submitting payroll via Internet, submitting Customs clearances, ballast reports, ordering parts, securing technicians, answering questions about crew changes, cover-all sizes, and anything else that the office demands of them. Arguably, according to John, this is a different kind of knowledge, less about being a sailor and more about being an administrator. "A lot of my time is spent on the computer. My computer skills have to be good, I have to know how to reset a server and work on the systems in place. Some captains I know still type with two fingers" he says, "it's got to be hard for them." He has a point. Just one generation previously, captains had no paperwork to complete at all. While all of this might be considered a different skill, John sees it as a clear move towards ceding control to the office. "It has changed sailing substantially in the last twenty years. As more technology is brought in, ships are starting to be run from the office. You're losing something" (John, August 15, 2010). What John is losing is control over the vessel and decision-making power, leaving him feeling as if his years of sailing experience and knowledge are devalued. John's navigational skills become subordinated to his administrative tasks.

A second concern, one that was expressed both by the navigation and engineering crews, was one of privileging technological information over experiential knowledge. By this I mean that the sailors whom I interviewed are becoming concerned that the information made available by way of mobile ICTs is considered more important, or more correct, than their acquired knowledge from being sailors. Knowledge borne out of experience is absolutely vital to sailors, including knowledge about how the vessel moves (every vessel moves differently), how the engine room smells and sounds, how the wind is blowing, amongst many, many others. There is an entire sensory realm to sailing, forming a delicate balance of intuition and experience that new technologies cannot touch. Observing an engineer walk through a room and being able to pick out a problem, or watching a navigator enter a lock at a specific angle, because he knows the lock, and knows that there is a current there, and knows that the boat “shoots across” every time – it is this kind of knowledge that stands to be undermined.

“It’s not always as easy as what it looks like on the ECDIS or these other Aids. It takes a lot more experience, and a lot of knowledge to get through these kinds of things and to help you. The next day is never the same as the last. There is always something different, something changed,” says John, as we navigate the locks through Montreal. I am at the wheel, slowly bringing the Victorious into the lower Beauharnois lock. My hands are sweaty, my knees weak. Forty million dollars of ship is in my hands, and I do not know what I am doing. John, standing right behind me, helping me steer into the lock, is showing me why ECDIS in particular was only somewhat helpful. “It looks like a straight shot on here, eh?” he asks. I agree; it looks like I should just steer directly into

the lock. “But, there’s a current from the port side, and I know that she gets pushed every time,” he says, telling me to come in high, with enough room so that when the ship was pushed from the port side, I would not bang on the starboard side coming into the lock.⁹² “If you bang,” says John, “Willard will call up from the engine room and give you trouble for spilling his Pepsi, and you will hear complaints at dinner because you woke the night shift.” I do not want to hit the wall of the lock. The lesson that John is teaching me is about shiphandling, knowledge and expertise. Nothing on the “digital ship” could help me here, as I steered into the lock. This requires knowledge about how the ship moves, what the conditions are like around the lock, how quickly she slows once in the lock so that I do not hit the ship arrester at the front of the lock, and so much more. As I bring the vessel to a stop in the lock, without hitting anything, I breathe a sigh of relief.

According to John, what gets subordinated with the influx of mobile ICTs is his instinct and expertise. “Ah, it’s instinct and knowing what’s going to happen. It’s instinct coupled with experience to predict how you’re going to end up,” he says. This instinct is developed through his navigational training in school and his experiences over the past fifteen years. What a good navigator develops, he says, is a strong sense about what will happen, the kind of sense that no technology can rival. He explains,

At the end of the day, it’s your senses that are going to be right more times than not. If something doesn’t feel right, if it doesn’t look right, nine chances out of ten it isn’t right. [...] Because ECDIS or the other Aids may tell you that you’re doing fine, but if you start to feel nervous and something doesn’t feel right then it’s probably because it isn’t. Sometimes by the time these technologies catch it, it’s too late, like going over a shallow spot or something like that. We have instruments that indicate that but if you could see that you’re only a couple feet off the rocks, I

⁹² The wheelhouse is at the back of the ship. Looking out the window, the port is the left side, and the starboard is the right. I remembered this as a writer – it is P.S., like post script.

mean, and there's a slight error in your equipment, then you can't depend on it. You have to use your visual senses and your hearing and everything. You have to watch your vessel (John, August 15, 2010).

John explains to me that ECDIS is becoming smarter, in that it can now anticipate turns, and actually tell you when to turn. However, John is very uncomfortable with this, because as he puts it, "so much of sailing is about knowing that sometimes you turn sooner, or sometimes later" depending on the weather, the traffic, past experience, whether a small sailboat is in the way, or so many other factors that the navigational equipment cannot anticipate. "Cadets today don't know how to tell how much water is under the keel if the instruments fail," he says, "They don't know how to think if the ECDIS doesn't tell them." This is the kind of deskilling brought about by mobile ICTs such as ECDIS, AIS, and even Internet access that concerns him so much. As sailors rely more and more on technologies to do the "thinking" for them, the less knowledge they build up, and the less intuition they develop to know when things are wrong. From John's perspective, the results can be devastating.

Likewise, privileging technical information produced by NORIS over the experiential knowledge of engineers is an ongoing concern for the engineering crew. Here again, engineers are well aware of the push towards technology. Homer succinctly states, "So like, I think they're leaning more towards the technology part. They shouldn't be that way" (August 23, 2010). I pushed Homer and others on this, wanting to know what was being lost, with this "lean towards technology". For Rusty, the engine room utility whose hands are always black from taking apart machinery, it is about the know-how that comes

from actually *doing* things, as in taking machinery apart and knowing how it operates.

Rusty argues,

It all starts from old schooling. [...] It makes me crazy, you still have to know the basics. If you can go and read that screen and it says low oil circulation in the engine, well, if you don't know what that means, then that's technology that is absolutely no good to you (August 16, 2010).

Rusty's concern is that sailors who work in entirely automated engine rooms will not know how an engine works, how a pump or a gear functions or how to take them apart to fix them. Much in the same way that Captain John slides his hands across a paper chart and can visualize the world around him, so too do engineers, as they walk through the engine room, knowing the sounds and smells of the equipment.

I asked Saul, the Chief Engineer, about this "old school" knowledge. He states that, "a sailor has to use all his senses," and that being in the engine room is as much about sight, sound and smell as it is engines, generators, valves, gaskets and NORIS. These observations were agreed upon by the other engineers. Chester, the second engineer with over twenty years of sea time, states, "You go up to the engine room and if there's a problem, you'll probably smell it before anything else." When I asked Homer about his sensory knowledge as opposed to the automation system, his eyes lit up, and he started talking. He says:

Smells here, yeah. You can get used to the smells when you walk into the engine room. Certain areas have got certain smells because of the, like, you might have a cargo tank, right, or a fuel tank or just a ballast tank, and if you walk around and there's another smell that's not normally here, you know there's something wrong. [...] If something was seizing up, just by walking around you could smell something, like smell something burning that's not normally there all the time. You could say something's wrong here, it's not right. (Homer, 23 August, 2010)

The “old school” knowledge that both navigators and engineers develop comes from their embodied experiences, as they come to know their vessels. It comes from experiences, both good and bad, involving their senses and intuition, to know when things are wrong. This kind of knowledge is important, and it is not (yet) something that mobile ICTs can deliver. The concerns that sailors express are very real. As Chief Engineer Saul states, “we’re changing the breed of engineer.” This matters; engineers of the future may not know why there is low oil circulation in an engine, and navigators of the future might trust their digital aids just a little bit too much. What does make sense, here, is that these sailors express deep concerns about the deskilling of crew, and the devaluing of their knowledge, as it becomes increasingly subordinated to the information made so readily available by mobile ICTs. Both the Captain and Chief Engineer expressed utter frustration at how those in the office – some of whom have never actually sailed on a cargo ship – are now questioning their decisions. Their expertise, which is based upon a wealth of experience and knowledge of how the ship feels and moves becomes subordinated to the fact that someone in an office can see how fast they are going, and wants to know why they are not going faster. Beyond micromanaging, this brings up some rather troubling issues around decision-making, autonomy and whose knowledge is privileged when things go awry.

Summary: A sea of information

It changes how I understand the sea. There’s something about perspective, about imagining my boat on the paper chart. You don’t get that with digital.

-John, May 28, 2010

The aim of this chapter has been to consider the affordances, possibilities and compromises that are brought about by the increased use of mobile ICTs on the *Victorious*. I wanted to focus on technologies in the workplace – technologies used in the ‘real world’ of sailors as they work in the wheelhouse and engine room – to understand the complex relationship between these devices and those who use them. Without a doubt, there are vast improvements to the efficiency and safety of the vessel, improvements that the sailors would not forfeit. Their lives are easier. However, as this chapter shows, there are some very real compromises that sailors must make in terms of their continued skepticism over the trustworthiness of these devices, the ways in which they are increasingly visible and hence increasingly scrutinized by a variety of actors, and the ways in which these technologies lead to a deskilling and a devaluing of sailors’ embodied knowledges and expertise.

These are interesting times for sailors, as they experience the shift of power from sailors who would cast off and “be free”, to the constant tethering brought about by mobile ICTs. This is not surprising, given the deep body of academic literature that acknowledges this freedom/tethering dynamic (Barry, 1996; Chun, 2006, Straw, 2006). However, I believe it reveals something more, because more than just being virtually tied via Internet connections, power is shifting, authority is being more firmly administered from shoreside bodies, and expertise is being undermined, whether it be by the boatnerd watching the *Victorious* move through the Welland Canal, or by the office staff writing up an officer for improper dress in a social media post.

More insidious, perhaps, are the quiet ways in which automation and digitization are changing the kinds of knowledge that sailors draw from. Rusty expressed deep worry that young sailors will know how to read the screens, but unlike Homer who solved the rather serious issue, they will not know that higher fuel consumption means that there is a cracked valve leaking fuel somewhere. Their knowledge will be more about how to read and operate NORIS screens than how to take apart a steering gear. Likewise, navigators who are trained only on ECDIS, and do not know how to measure and plot courses on a paper chart have a different set of skills. They are less likely to imagine their vessel on the paper chart, to see “the big picture” as John puts it. Moreover, as ECDIS develops, it becomes more involved in navigation, “telling” sailors when to turn as Captain John said. The world he fears is one where navigators are no longer thinking about currents, tides, winds, and myriad other factors, and simply turn when ECDIS tells them to. In this world, something is lost – some factor that John recognizes in young cadets. One day, we were discussing who might be the next officer to be promoted to the rank of captain. For John, he could see it easily. “Some have it, and some just don’t. And if you don’t have it, I can’t teach it to you,” he said. This is the kind of know-how that he fears we lose, as the “digital ship” develops.

I want to leave you with a final thought, which is about the sensory world of sailing alluded to towards the end of this chapter. Sailors talked about the importance of their senses in doing their job. We heard about how in the engine room the first sign of trouble comes from your sense of smell – something smells off. Likewise, in the wheelhouse, it is your senses that really bring the truth to you, and John told us how he has all of this

digital equipment, but as much as he can, he looks out the window and trusts his senses. “You know if something’s wrong,” he says, “you can sense it.” This “situated knowledge” (Haraway, 1988) that sailors possess stems from their embodied experiences on ships, developing deep wells of knowledge from which to draw. This chapter and the one previous both consider and focus upon mobile ICTs, but they also hint at a world bigger than devices, a world of a different kind of knowledge about being at sea. In the next chapter, I decentre ICTs so as to explore this embodied experience of sailing. This was not something I expected when I stepped onboard *Victorious*, but if these mobile ICTs are being positioned in the industry as technological solutions to the problems arising through the practices of shipping, then I think a better understanding of that practice is in order. Asking sailors how they “know their ship” is the next step.

Chapter VI

Steel turns to liquid: Embodied knowledge on the digital ship

It is a curiously shaky world we live in.
– R.E.D. Bishop (1979)

As darkness fell, I stood momentarily on the warm steel of the barge, gathering my belongings and looking anxiously back at my family, waving at the gate. I took a deep breath and followed Saul, the Chief Engineer, as he led me across walkways, up ladders, through heavy steel doors, along corridors... feeling more as if I were in a rabbit warren than a ship. Down we went, and then down further still, one stairwell much like the last, until we arrived at my cabin. Saul showed me where I could find blankets and sheets, told me to make myself at home, and left; he had work to do.

It's now 10:30 at night; I've been onboard for an hour and a half. I've made my bed, explored the entirety of my cabin, unpacked my books and clothes. [...] I am immediately struck by my visceral reaction of being on a ship. Though I have a cabin with two portholes, my sense of motion comes not from vision – from watching the world go by - but from the constant rumble of the engines and squeaks from the walls. I can sometimes feel the sway, but mostly it's the ever-present vibration that reminds me that we are, indeed, on the move. On the Victorious, everything shakes.

[...] This ship feels alive – like a giant animal and I've climbed into her belly. Standing here, walls shaking, engines rumbling, the scent of exhaust filling my nostrils, I can feel it – sense its power. Like I've let go, and given over to the will of the machine.

(fieldnote, August 5, 2010)

Introduction

“Stand right here,” said Saul, pointing to a spot in the middle of the barge. It is August 11, 2010, a beautiful day, and the first day that we have stopped since I stepped onboard

seven days ago. The sun is shining and a warm breeze wafts in from the harbour. We are unloading cargo in the Eastern Passage, Nova Scotia (Image 6.1). Saul has spent the morning with me, touring the anatomy of the Victorious, from the cavernous lower decks of the engine room with low-slung doors and claustrophobic corridors, two decks below the main living quarters, to the highest accessible deck of Victorious, called the Monkey's Island (the deck above the wheelhouse, where all of the communication antennae are located), where I could stand and see the vessel stretched out before me and the harbour beyond (see Image 4.5 in Chapter 4). It is important to Saul that I get a sense of the whole vessel; he is an engineer, and wants me to see how it all works. This moment, standing on the barge and asking me to stand in this specific spot, is the highlight of the tour for Saul, his *pièce de résistance*. I did not hesitate, moving to stand where he was directing me (Image 6.2). Sure enough, in that very spot was a vibration that I had not felt elsewhere on the ship, a steady-like-a-beating-heart, low frequency vibration that could perhaps best be described as making the ship feel alive. Saul grinned; he could tell that I could feel it. "That's the natural frequency," he told me, "that's how a sailor knows his ship".⁹³

⁹³ I return to this concept of "natural frequency" later in this chapter. For now, I merely introduce the idea to help demonstrate to the reader just how intriguing and vital vibrations are, because Saul directly connects natural frequency to "knowing" his ship.



Image 6.1: Chief Engineer Saul (on the left), and Captain John (right), on a tour of the Victorious in Eastern Passage, Nova Scotia. August 11, 2010.



Image 6.2: In this photograph, the researcher stands on the barge at the exact spot where the natural frequency was being sensed. August 11, 2010. Photograph by Saul, Chief Engineer.

It was at this moment that I fully grasped why we do ethnographic fieldwork. I could have done semi-structured interviews over the phone to ask about sailors' experiences with mobile ICTs, and would have generated valid results. However, this is what I would have missed, this curiously shaky world of sailing, living on a ship that rumbled and

shook its way down the St. Lawrence River. More importantly, and highly relevant here, I would have missed witnessing just how important this embodied knowledge is to sailors, particularly at those moments when it is in tension with the technical knowledge derived from mobile ICT use.

This chapter is about ship vibration. It is buttressed against two chapters that have explored the ways in which mobile technologies are enacted in the daily lives of sailors, from how they are used to cope with being away from home, to the ways ICTs are powerful actors that call into question sailors' knowledge and expertise. This final story takes up where I left off in Chapter 6, exploring how sailors think with their bodies. It does so by positioning the Victorious itself as a mobile technology, communicating information which sailors use to make sense of their daily working lives at sea. In essence, it reinforces the knowledge and expertise that is called into question in the previous chapter, and it demonstrates that, even with all of these digital and automation technologies now permeating the fabric of sailors' everyday lives, they still, first and foremost, rely on their embodied knowledge to do their jobs. The virtual and the representational worlds of the sailor are important, but the physical world still holds sway.

The narrative unfolds as follows: I begin by making the case for why we need to pay attention to vibration on a digital ship. This is followed by a section that considers the power of vibration, demonstrating how sailors experience it by considering both the technical and affective ways of knowing vibration. Here, we see how sailors develop

different tactics for managing vibration, both in its presence and its absence. In the final section, sailors show how they use vibrations in their job to both diagnose and mediate their experiences with equipment. The embodied knowledge that sailors develop through feeling the ship – the visceral, tactile knowledge in the hands – is unique to their vessel and jobs.

Mobile Technology, Embodied Knowledge, Vibration

Our bodies are instruments through which we become aware of the world beyond our skin, the archives in which we store that knowledge and the laboratories in which we retool our senses and practices to changing circumstances. Bodies, in these senses, are historically malleable and contextually specific. Our senses are the conduits through which knowledge of technology and the environment flow and, through returning habit and reflex, the ways we habituate to our changing habitat.

-Joy Parr (2010: 1)

I struggled most with this chapter, because I was unsure what a story about a vibrating ship has to do with intersecting tales of mobile ICT use; how did the narratives connect? Ethnography teaches us to begin and end with our participants. With that in mind, I returned again to the sailors whose experiences have built this dissertation. They led me to two points of justification. The first harkens back to the prologue (see pages i - iv). When I was first considering doing a project on mobile technology, Saul's words were, "She should come on the Victorious. It's a mobile technology if ever I've seen one." This is supported in academic scholarship that positions the ship itself as a medium of communication (see Hodson & Vannini, 2007). It has been argued that,

[F]undamentally; there are no epistemological differences between technics (i.e., devices, tools) such as a wireless digital phone and an old ship's horn: Both are ways of knowing the lived world and making it meaningful by modifying it. Further, both extend the human ear and both

need to be concretely used by live reflexive embodied selves and physically engaged through appropriate techniques (i.e., abstract and practical manners of use and know-how) (Vannini & Vannini, 2008: 1276).

From the Chief Engineer's perspective, mobile technologies are much more than cellphones and electronic charts; the vessel itself is a mobile technology. The Victorious communicates information to navigators and engineers continuously. Her sounds and smells, the way she shakes, how she moves through the water, her "reek and jiggle" (Hutchinson, 2000) – all of this is information for sailors, communicated not through wireless devices, but through their embodied presence on the ship. This perspective opens up the possibility to consider other kinds of communicative events beyond those already explored thus far.

From the sailors' premise that the ship itself is a mobile technology, constantly and instantaneously communicating information that sailors make meaningful through their daily practices, I found my second point of justification: their embodied knowledge is absolutely critical to their jobs. In the previous chapter I could sense that there was significant tension between the information sailors knew with their hands and that which was brought about by the use of mobile ICTs. Homer's eyes lit up, for example, when I asked him about how he uses his senses in his job as an engineer. While there was a great deal of information available to him through the NORIS automation system, Homer was compelled to smell the air and feel the piping. It was through his sensory perceptions that he knew his job. I wanted to tease this tension out, and understand more fully the significance of embodied knowledge - known by the body, through the body.

My participants know that studying mobile technology means studying the *Victorious* herself as a medium of communication. They also know that this kind of communication is something that is experienced through their bodies; beyond all of the dials, screens, and digital aids, there is an embodied knowledge of the ship that transcends other kinds of knowledge. Ship vibrations, the focus of this chapter, are one such communicative event that is experienced by sailors through their bodies.⁹⁴ These vibrations are ways of knowing, as Saul says; they are meaningful, embodied moments that are crucial to understanding life at sea.

To have a body is to vibrate. A heart beats, a larynx and an eardrum vibrate, a body shivers in the cold. Vibration is intrinsic to our physical bodies. What I want to get at, however, is mechanical vibration – the vibration produced through the MaK engines, generators, and the oscillatory currents of the electrical systems of the *Victorious*.⁹⁵ Saul, who has over 23 years of sailing experience, explained the mechanical vibration of the ship to me in terms of the natural frequency he showed me on the barge. Our exchange, which took place four days after my tour of the *Victorious* in the Eastern Passage, went like this:

⁹⁴ Certainly, this discussion of vibration is not to the exclusion of all other visceral, physical aspects of sailing. Somatic experiences including seasickness, the acrid scent of warm asphalt, steering the ship onto a horizon line, feeling the heat of the cargo through my shoes, and many others punctuated and shaped my ethnographic journey. I focus on vibration as one such experience because it was a strong recurring theme discussed by my participants in their interviews.

⁹⁵ Anyone who travels via any mode of engine-based transportation recognizes the specific vibration of that vehicle, which is produced through movement. Consider how we might know the vibrations of our car, or think about the shaking that happens on a train as the wheels hug the track (for examples see Hutchinson, 2000; Bissell, 2010; Adey, 2010). What is important here is that each mode of transportation, right down to the specific vehicle (the particular automobile, the train car, the plane, or the ship), has its own unique vibration.

Me: Natural frequency. Can you explain that a little bit for me because I think that's really interesting how you know... how that on that one part you can, you know, feel that.

Saul: I don't know that I can explain it.

Me: I just mean, what does it mean to you?

Saul: On the aft deck, when we're in port, those stairs going up to the next deck, they're nice and steady, but if you go and look at them now, the railings are shaking. So, for an engine, it's called the critical speed. Some engines, you can't ever run at certain RPMs because these engines are so big that they hit a natural harmonic and they just... steel turns to liquid...everything just starts moving. I don't know how else to describe that. It's one of the toughest things to figure out, engineering-wise (Saul, 14 Aug. 2010).

Compelling here is Saul's inability to articulate what happens when "steel turns to liquid"; it defies words, but rather is something that his body just knows. There are persistent, unique mechanical vibrations on a ship that are felt *through* our physical bodies. While vibrations do not determine sailors' experiences, sailors construct their social reality, in part, through the ways in which they actively interact with vibrations (Bissell, 2010; Hodson & Vannini, 2007). Let me tell a story of the sensational realm of vibration at sea. I begin at the beginning, during the sea trials and the maiden voyage of the *Victorious* in 2009, to establish just how significant vibration is as part of the technical practice of sailing. The stories told here show the ways in which sailors develop tactics to manage vibration, both in its presence and also its absence. We witness how sailors' bodies become attuned to the shakes and jiggles of the moving vessel, as they move from having those first fears of sailing a new boat to as Saul says, knowing their ship.

Powerful vibrations: Getting a “feel” for the Victorious

In nautical terms, a shakedown cruise is the term used to describe the first voyage of a newly launched vessel, to test its equipment and performance. Sometimes called sea trials, the shakedown cruise provides an opportunity for new equipment to settle and be tested, for the crew to become acclimatized to the new vessel and to ensure overall functionality of equipment. Although the etymology of the term seems uncertain, it is generally agreed amongst my interviewees that when a ship is first launched, its vibrations are so significant that equipment is rattled and sometimes shakes right off the walls (is “shaken down”). This first voyage is crucial to sailors, not just because it is a time to test equipment and make necessary performance adjustments, but also because it is the first time sailors can get a feel for their ship.

Sea trials for the Victorious began in late May, 2009 (Image 6.3), in the waters off Penglai, China. Sea trials were described to me as exhausting, as sailors and shipyard employees work day and night over several days to get things working.⁹⁶ Saul (Chief Engineer) had been in China for 9 months overseeing her building, and knew every inch of piping, every engine, each piece of equipment. Although he was deeply immersed in the building process, Saul was nervous. “Anything and everything goes wrong during sea trials,” he recounted. One of his main jobs during sea trials is to measure vibration. Too much vibration could lead to potential equipment failure. He says, “during sea trials,

⁹⁶ Sea trials are notoriously grueling. The ship is crowded with workers, including sailors, shipyard workers, industry professionals, managers, and supervisors. They work through the night and over several days repairing leaks, testing equipment, gauging engine performance and so on. They are exhausted by long hours punctuated by intense physical labour, and a lack of proper sleeping quarters. Sailors “hot bunk” during sea trials, meaning that they take 4 hour shifts in a bed before the next person comes along to sleep in the bed.

vibration and noise levels are all closely monitored, reported, making sure they meet the minimum spectrum” (Saul, 14 Aug. 2010).



Image 6.3: The Victorious undergoes her “shakedown cruise,” Penglai, China. The tug has not yet been connected to the barge. Photograph courtesy of Igor, May 26, 2009.

When sea trials were completed and vibrations were brought to within the minimum allowable spectrum, the Victorious was soon ready to cross the Pacific on her way home to Canada, a 35 day voyage. Despite all of his work during the previous nine months, and despite his more than twenty years of experience in the engine room, and even despite the success of sea trials, Saul was scared about this journey. He says, “This is the first new build I’ve ever been on, the Victorious, and that’s what’s really scary when we first left China because it’s brand new. *So I didn’t have a feel for it yet*” [my emphasis]. This concern was reiterated by others during interviews; the single most worrying aspect of the long journey was that they had yet to “know their ship” by feeling how it moves.

Once they were under way the vibration was very pronounced. In fact, despite all of their work during sea trials, when they sailed the Victorious across the Pacific the vibration

was much greater than expected. Being an engineer, Saul was quite interested in the techniques that led to this excessive vibration. He explained to me that normally on a tug and barge the stern of the barge should be slightly lower than the bow of the tug. However, when they originally pinned in the tug with the barge prior to the Pacific crossing, the stern of the barge was slightly higher than the bow of the tug; in other words, it should have been the other way around.⁹⁷ This caused the vessel to vibrate more than it might have done otherwise because there was too much water moving between the two pieces, which in turn caused excess air in the propeller. The end result, according to Saul:

Once we were too scared to take the pins out in Korea, because if we got into any kind of trouble we would need to go to a dock, and we didn't want any of that. So we left it that way to cross the Pacific but that caused an enormous amount of vibration in the wheelhouse (Saul, 14 Aug. 2010).

For Saul, this vibration was worrisome particularly in terms of electronic equipment failure, which he was most concerned about while crossing the Pacific.⁹⁸ He spoke of the extent to which the vibration became an increasing concern as the voyage continued:

Everything. Brand new equipment was failing. [...] We lost one radar [...] Yeah, it was all brand new, like electronics and electric connections were vibrating apart and yeah. So, when you have 6,000 HP beating under your feet, you're going to get a vibration (Saul, 14 Aug. 2010).

This specific example brings into sharp relief the importance of the physical environment of sailing in relation to mobile ICTs. On land, cellphones, computers, and other mobile

⁹⁷ "Pinning in" is the process of connecting the tug with the barge. The barge is notched, and the hydraulic pistons from the tug "pin" into it. Depending on ballast and cargo, it can be pinned in different notches. Moreover, it is impossible to know until the vessel is actually sailing if the trim needs to be adjusted.

⁹⁸ It is important to remember that when crossing the Pacific, there is no access to stores, suppliers, or contractors who might otherwise be brought onboard to repair damaged equipment. Saul's depth of worry came from knowing that if things shook apart while crossing the ocean, there was very little he could do. He even joked about being so tired during this crossing that he kept falling asleep still wearing his tool belt, holding a roll of duct tape.

ICTs operate in relatively shake-free environments and have reasonable lifespans. At sea, however, too much vibration, as experienced on their Pacific voyage, could, and did, significantly impair the electronics. Laptops wear out more quickly, routers stop working, servers break. I witnessed this, too, during my time onboard. In the opening of Chapter 4, I wrote about how we lost Internet access after two weeks onboard; this internet access was lost because the router had broken, a direct result of too much vibration. Sailors expressed their frustration many times to me, as equipment wore out quickly and office staff failed to fully appreciate the reasons why. The office staff were not able to grasp the extent to which vibration wears down the equipment.

Vibrations on the Pacific voyage not only wore down equipment, sailors themselves became fatigued. John, now Captain, was Chief Officer at the time of this inaugural trip. He gave me a glimpse into those early experiences onboard *Victorious* by sharing with me his daily journal kept during the sea trials and Pacific crossing (Image 6.4). In this journal, John wrote about a variety of experiences in readying *Victorious* for the sea, about the sea trials, and about the voyage across the Pacific that was ended nearly three months later. It became evident how important vibration was from the very first day they left drydock:

Well we have completed our first day on the run. We went from Penglai anchorage to Dalian anchorage. The day gave us a good indication of the things to come. We shake and vibrate when we are going at full speed. If I stand for too long, my legs start to feel numb (John's Journal, June 10, 2009).

I had difficulty imagining vibrations so strong that one's legs would go numb just from standing, and so I asked John about this after reading his journal. "It's true!" he

remarked. “The vibrations literally shook me until I couldn’t feel my legs. It was crazy.” As John talked, I began to visualize the Victorious holding John by the shoulders and saying, “Here I am! Here I am!”⁹⁹ In other words, these vibrations seemed to be how the Victorious was communicating with the crew. Moreover, what John knew at that moment was known through his body; it was visceral.

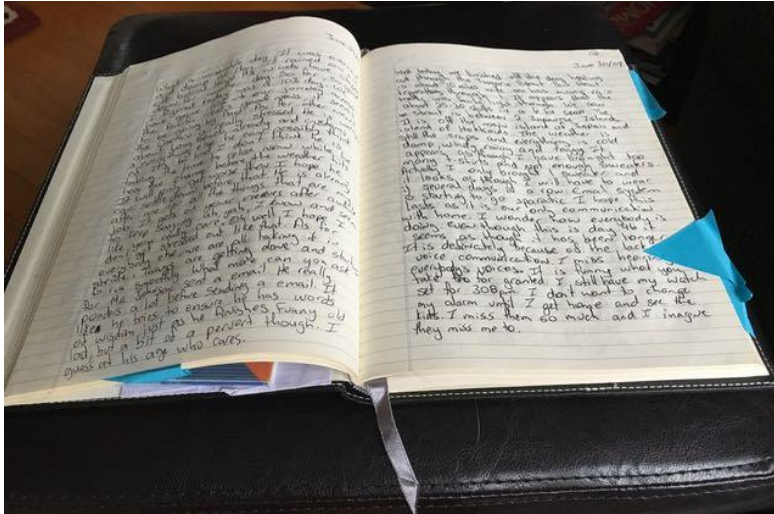


Image 6.4: John’s journal from his trip across the Pacific.

Just as the electronic equipment became weary of vibration, so too did the crew. John wrote, “Everybody is starting to complain about sleeping. There seems to be a lack of it going on around here. This thing shakes like there is no tomorrow” (John’s journal, July 3, 2009). Constant vibration over more than thirty days at sea took its toll. The crew became physically exhausted by the shaking. At the same time, it became a point of bonding, as they suffered together. I asked Bill, the ship’s cook, about this: “Well yeah. Everyone complained about the vibration, but there’s nothing like something to complain about to get everyone together. I think it brought us together” (Bill, August 17, 2010). The Victorious is positioned here as a point of convergence, bringing sailors together

⁹⁹ That is what I wrote in my fieldnotes, “Here I am! Here I am!”.

over a common concern. The vibrations from the ship worked to develop a collective identity around their common set of experiences.

In response to this constant fatigue, John began to develop tactics to help manage vibration. Whereas Saul's engineering approach was to do his best to keep vibration to within the minimum allowable spectrum, this did not serve them well once at sea. On July 21st, John wrote:

Tired. Tired. Tired. Oh do I ever have trouble sleeping some nights. I tossed and turned for 3 hours. I heard every squeak from the vibrations and it drove me crazy. I spent time chasing around trying to shove pieces of paper where I thought it was coming from. This, of course, doesn't help when you're tired. It only seems to make things worse (John's journal, July 21, 2009).

When I read this, I was surprised, because this was precisely the response that I had when first joining the Victorious. I felt the vibrations in my cabin so strongly and consistently that I, too, spent one evening trying to shove small pieces of paper into everything that was making noise, in a desperate attempt to gain some peace. According to my journal:

Today is Stop the Vibration day. I've been onboard for four days now. We are somewhere out on the Atlantic Ocean, and these vibrations are making me crazy. I taped them. Then, this afternoon I tried to silence them – an impossible task. I figured out that if I open the bottom drawer of my bed just slightly, the rubbing stops and then there's no more squeaking. I folded up a piece of paper towel and wedged it in the air vent. I keep the bathroom door closed (8 Aug. 2010).

Early on in my voyage, I even recorded the sounds of the vibrations in the owner's cabin, where I was living for the month (audio file 1):



Audio file 1: Right-click on the sound icon and click “play” to hear a two-minute clip of vibration in the Owner’s Stateroom (my cabin). Recorded August 10, 2010.

I recorded the squeaking of the air vent above my head, the grinding sound the door made as it shook in its hinges, the constant squealing made by the drawers under my bed as they rubbed together, amongst many others. Like other sailors, I began to seek out ways of lessening the noise emanating from vibrating objects in my room. As you can hear, the sounds emanating from the Victorious can feel overwhelming. Lying in bed at night in the dark, one can easily focus on the squeaking doors, or the rattle in the ceiling vent, to the point of frustration. Developing tactics to silence the noise becomes quite important when trying to sleep.

Moreover, the constant movement and vibration can be dangerous if you are not prepared for it. Within the first week of my time onboard, Ryan, a young sailor from Newfoundland who was quite new to his job as an engine utility had an accident. We were about a day and a half outside of Halifax, on the Atlantic Ocean, when he fell through an engine room hatch to the floor below. With a dislocated shoulder and broken teeth, he was tended to using First Aid until we could get to the hospital in Halifax. I asked Saul, the Chief Engineer, about this. He said:

You have to be more careful on these. [...] I’m very cautious. I’m very cautious of the people around me as well. [...] But while you’ve been here, we’ve had one injury down in the engine room, and he’s a rookie. Usually the rookies, they’re the ones that aren’t used to the vibration, or aren’t familiar with the ship. The big thing with sailing is you have to be

always prepared for the ‘what if’ conditions. At the end of the day, you have to tie down your work. If it’s not complete, everything has to be secured (Saul, 14 Aug. 2010).

If you do not have a feel for vibration and movement, you are more susceptible to injury. Moreover, if things are not tied down and secured, they can shake off the walls due to the constant jiggling, which can lead to injuries. As such, a great deal of attention goes into securing things and tying them down as a strategy to manage vibration.

One area where this was abundantly evident was in the mess room and galley. Take for example the cooking area (Image 6.5). In this picture, Bill the cook is shown in his working space. You can see the rim on the counter to protect things from shaking off, there is a guard that he can attach to his stove, there are non-slip mats everywhere to keep things in place. Bill is 48-years old, and has been a chef on land for his entire adult life, working at a casino for a number of years, as well as owning his own restaurant managed by his wife. I asked him how things are different at sea, particularly in terms of vibration:

We built boxes on the counters and different things to keep things in place. I mean, everything’s tied down or bolted to the walls. We have a lot of non-skid padding underneath all the cookies up there. Usually they’ll have some bolted. I’ve been on ships where they have those office boxes bolted right to the wall. Stacked on top. They fill it with things like sugars and teabags and all kinds of hot chocolate containers... different stuff like that. You have cereal containers sort of tied down there on the wall. My storage rooms, too, all have edges, like the tables have edges built in and all the countertops come with edging so that things don’t shake off. Bookshelves, everything (Bill, 18 Aug. 2010).

There is a great deal of creativity and thought that goes into the design of the galley. Even the dining tables have edges so that plates do not shake off during a voyage.

Rimmed countertops, bolted shelves, and non-slip padding under everything works to contain vibration and make it manageable for those living on the Victorious. These kinds of “securing” and “tying down” techniques were evident everywhere, from the wheelhouse to the galley to the accommodations.



Image 6.5: Bill, pictured in the Galley of the Victorious. Photo: Aug. 28, 2010.

While the vibration was excessive during their Pacific crossing, I had a sense that during my time onboard, vibrations were a regular part of life. I began asking the crew about their experiences with vibration, and the response was clear: you get used to it. Before long, vibrations fade into the background of daily life at sea; they become ubiquitous. Our bodies learn the vibrations of the Victorious to the point where they are part of us. When I asked Rusty about vibrations during one of our nightly 9:00 pm cups of tea, he laughed. As an engine utility who works with the engines all day, he much prefers ship vibrations to other kinds of noise: “I can’t sleep with a TV on, but I can sleep down next to the engine like a baby.” Rusty’s response was quite common; sailors’ bodies simply adjust to the shaking and rumbling of the Victorious.

Strangely, vibration becomes most prominent for sailors in its absence. Willard, a 45-year old deckhand from Newfoundland who has been sailing for about ten years, explains:

Yeah, I get used to [the vibration] for sleeping. Certain boats you go on is more than others, and I find that if, like, when we first come away, you get used to the noise sleeping and if you go to port and everything shuts down, when you're in port and everything is quiet, I find it harder to sleep because I got used to the noise (Willard, 19 Aug. 2010).

A peculiar thing happens when vibration ceases, which requires its own kind of strategy to manage. I was warned about this. In nearly every instance when I was interviewing sailors about vibration, I was told that vibration is not really a concern until it is absent, such as when sailors go home. Homer explains it well:

When you go home, you notice them. You don't notice it on here, but when I go home, the silence is deafening. You'll notice it when you go home and you're lying in bed and all you're hearing, you're not hearing nothing, and it's just, it's unbelievable. I don't know what it's like. I can't explain it. Your mind just wanders because of it. You're so used to hearing this (Homer, 23 Aug. 2010).

This deafening silence was reiterated by John, who has been sailing for more than thirteen years. He says,

I have a harder time at home - getting home the first couple of days because I'm without that vibration. I'm without the noise. I'm without the smells. And it takes getting used to at home, to hop into bed and to lie there and for everything to be truly silent, because that's freaky (John, 15 Aug. 2010).

Sailors like John become so accustomed to their physical experience of sailing, that being without those vibrations can be entirely disruptive. Time and again, I was told of various strategies and tactics that sailors developed to be able to sleep at home without vibration.

This includes things like leaving a TV or a fan on, to one sailor who was so frustrated by lack of sleep that he went out to his garage, got his lawnmower, started it up outside his bedroom window, and went inside to finally get some sleep. In these stories, vibration is noticeable only in its absence, its low frequencies haunting and echoing well beyond the ship. In so doing, vibrations transcend the home-work divide in a way. Mobile technologies like cellphones work to bridge the space between home and work by bringing home to work (see Chapter 4), and the mobile technology of the ship does the same, by bring work to home. Sailors go home, and their bodies still feel work – their bodies expect the vibration, and when that vibration is absent, they find ways to reproduce it. Indeed, when I went home after a month onboard, my body still felt those vibrations for three nights. I woke up with my body feeling the low, steady shake of the *Victorious*. My body held onto this feeling of the vessel, long after I had departed.

In this section, I have tried to establish just how powerful vibrations are in the everyday life of a sailor. I did so by exploring how sailors get a feel for their ship during its sea trials and the maiden voyage across the Pacific, interspersed with some of my own observations of my first experiences with vibration. While it is impossible to properly convey just how significant vibrations are in a sailor's world – it is something that really must be felt to understand – the stories here bring together moments of frustration, creativity, and companionship, as sailors grapple with vibrations and seek to make sense of those moments where vibrations are both present and absent. In these instances, the body quite simply knows what it feels.

Working with vibration: Diagnosis and Mediation

One afternoon, about three weeks into my journey, I was out on the deck of the tug speaking with Igor, the Chief Officer about his work. As we chatted, I felt the vibration suddenly change as the pitch in the engine dropped. We were out on the Atlantic Ocean at the time, and I started to worry immediately that something was wrong. Why were we slowing down? I interrupted our conversation to ask Igor about this change in pitch, and he radioed down to the engine room to find out. The engineers had taken load off one of the engines for a few minutes to do some routine maintenance work. So, there was nothing to worry about. However, Igor winked at me, and smiled broadly, “See, you’re a real sailor now,” he said, “you can feel what’s going on!” This was a brief exchange, but an important one, as I was beginning to learn what the machinery felt like and what that might mean. More to the point, it was a moment where I could see how useful vibrations are to sailors. I began to ask questions about how sailors use vibrations in their work, and what emerged were two intersecting narratives: diagnosis and mediation.

Vibrations generate a great deal of information for the engineers and navigators which they use to diagnose problems with the machinery and electronic equipment. It is akin to a doctor listening to a heartbeat – the steady vibration a telling story about the patient. Just like a patient’s medical records, the engineering room constantly monitors and records vibrations in order that they can have a base level from which to draw comparisons. And, just like a doctor, an engineer can sketch out the anatomy of vibration. My persistent questioning of the Chief Engineer about vibration encouraged him to try to help me understand what they mean to him. One day, Saul came up to the

wheelhouse with pen and paper, and began to draw out what vibration looks like to him. I found this interesting that he was still troubled with his inability to technically explain vibration – the mystery of steel turning to liquid – but he wanted to help me visualize it. He drew two circles, each representing one of the engines on the Victorious, and showed rings around these circles to represent the vibrations emanating from the engines. The closer the engines are to each other, the more pronounced the vibration. This was one reason why the Victorious has such strong vibration, he explained. The engine room is much smaller than other ships he has worked on, and it makes for stronger vibration (Image 6.6).



Image 6.6 One of the generators in the engine room of the Victorious. Photo: August 11, 2010.

He also explained that on larger vessels, where the engines are farther apart, they have vibration analysis equipment to help engineers grapple with the effects of natural frequency. These technologies create a database of historical information about vibrations. Saul says:

Every six months, you have a route and you'll take vibration readings in your accumulated database. If at one measuring point all of a sudden the vibration changes dramatically, mechanically that could be telling you that you have a bearing failure or something's not quite right through a weight, a counterweight or something, and it can be pretty dangerous as well (Saul, 14 Aug. 2010).

While this vibration analysis technology is not available on the Victorious because there is too much noise interference with the engines being so close together, he nevertheless drew on his knowledge from experience on larger vessels to help explain how vibration works, and why they matter in terms of engine performance. If the vibrations are measuring outside the realm of acceptable levels, this can help the engineers diagnose issues. At the very least, they are alerted to potential problems with equipment. This is the technical aspect of vibration analysis.

There is, however, a more affective, visceral aspect of vibration analysis that sailors revealed through their everyday experiences – a feeling of knowing something is wrong. Becoming accustomed to the vibration on the Victorious, sailors have a base line for how the vessel is supposed to feel. Their bodies become accustomed to these vibrations, and they do not pay any attention to them because vibration becomes ubiquitous and quotidian. However, as my own experience outlined above illustrated, when vibrations change, when the pitch drops or things go silent, it can be a sign of trouble. In the examples that follow, it is not vibration analysis technology that signals potential trouble, nor the automation system that monitors and controls the engine room equipment, but the actual bodily sensing of vibration. Saul told me of one of his experiences on the Everlast, a sister tug to the Victorious. The Everlast was built in 1977, and at 33-years old, she has

been well shaken. Saul had spent over ten years on the Everlast since reflagging her in 2000.¹⁰⁰ He was intimately connected with her. Saul shared with me one of his experiences with me:

I came back from holidays in the Canal. It was late at night and I couldn't sleep. I was lying on my bunk trying to sleep and I couldn't. So I went down to the port engine and I was standing on the engine and it felt all wrong. So I went down to the hold-down bolts and found three of them broken off and the engine was actually, that end of the engine was actually dancing on the frame of the ship. So I could feel that three storeys, no four storeys up. The feel of the ship (Saul, Aug. 13, 2010).

In this remarkable account, Saul reveals how his body has become an “archive of sensory knowledge” (Parr, 2010: 1) wherein his feel for the ship, based upon years of sensing vibrations from the engines, had become highly accurate. Saul's intuition – that things felt “all wrong” – was predicated upon the feeling of the vibrations and knowing that they were not quite right. For a Chief Engineer, this embodied event of vibration is critical to the safety and functioning of the vessel. He had sailed on the Everlast many times, and could sense how well the engines were working by literally standing on an engine, allowing the vibrations to surge through his body.

This embodied knowledge is powerful, and it is something that I asked other sailors about when I questioned what it felt like to notice that vibrations had changed - to sense that something has shifted. Rusty, who could sleep next to the engine “like a baby,” told me a story about being used to the way the Victorious sounds, and listening carefully when those vibrations change:

¹⁰⁰ Reflagging is a term that means to change the national registry of a ship. The Everlast was previously called Bilibino, and was Greek-owned.

But no, if I hear a new sound, it intrigues me and I have to wonder what it is. Like, even the sound of a diesel engine changing, a load coming on the engine and it's not the norm. Like, you get to a point where you know the sound of every engine. I can lay in bed and if they start something outside, I'll say okay, they're starting the fire pump because I know the sound of it.

Rusty's narrative is revealing, in that he speaks of a relationship where his body is not just being acted upon by vibration. Instead, his body is active; it is communicating to him things about different pieces of machinery based upon changes in vibration. It also is a moment that spans both the technical and affective realms of mobility, because it is dependent upon Rusty's knowledge and ability to feel and sense the technology of the machinery. There is a balancing of technical know-how and intuition that is foregrounded through the processes of vibration.

For sailors, the vibrations - or more specifically the changes in vibrations - serve as a communicative event that mediates their relationship with their equipment. When there is a change in engine vibration, there is information communicated between sailors and the vessel that they are constantly attuned to. The shaking, or not shaking, is a way of conveying information about what is happening on the vessel. Homer is Third Engineer, and this was his inaugural trip on the Victorious. He had previous experience on the Everlast, but had only been onboard the Victorious for three weeks when I interviewed him. Yet, he had already become attuned to the subtle shifts in vibrations, and what those meant. During an interview in the mess room, we started to talk about what we were feeling right at that moment:

Me: To me, it's making a different sound now that it was five minutes ago, right?

Homer: Now he's checking her back. [...] He's changing the pitch on the blade so now that's causing...giving the vibration feeling. [...] So it's slowing down, she's going to slow down.

Me: Are you always listening for that?

Homer: Yeah. You can always hear it, yeah. You know when she's picking up the speed and slowing down. Or she's, like last night, when we left, I knew when we were slowing down. I was down below, I knew when he shut her off. I was doing a round on the engine, around the engine room, and I heard her. You could hear her die right down but she never died down. She kept on the same speed but you could hear the load come off her. So she's dumping so much fuel to her. [...]

Me: So you just have an awareness?

Homer: Yeah. [Chester] was in there. He switched from one generator to another generator and I was over welding with a welding helmet on and the RPMs go off something. So I took my helmet off and I went into the control room and I asked, I says "[Chester], the RPMs just come off something" and he said "Oh, that was me shutting down the generator" (Homer, August 23, 2010).

Here we can see how the information he is processing through his body by sensing vibration is mediating his relationship with the equipment. He feels something and he then processes the various possible equipment issues that could be occurring. This moment is made more significant knowing the loudness of the engine room. The MaK engines are enormous, and so loud that one must wear ear protection when inside. At the same time, Homer was welding, and had a helmet on, making his sense of hearing even more impaired. Yet, through all of this – the incredibly loud machinery, the ear plugs and the welding helmet – his body was still listening for information, highly attuned to the shaking of the machinery. When Chester shut down the generator, certain information was conveyed to Homer through his sensing of vibration, which caused him to double-check to make sure everything was okay. Homer was drawing upon his

technical knowledge about the smooth operation of the machinery, along with his intuition that something might be awry because of the information communicated to him through the process of mechanical vibration.

This balancing of technical know-how and intuition played out in different ways. While Rusty, Homer and Saul relied on the generative force of vibration to diagnose changes in the engine room, navigators use vibrations to mediate their communication with the Engine Room. Several times throughout my observations, I noticed that it was a change in pitch in the engines that had navigators calling down to the Engine Room to find out if there is something going wrong. The information carried through the experience of vibration travelled more quickly than any phone line or telegraph message. For Captain John, changes in vibration become crucial to sensing if there is trouble. He says:

I've gotten used to sounds and how they portray in everyday life. So whenever a sound changes, that means something is happening, and if something is happening, that could be a good thing, or a bad thing or a reason behind it, but when there's not a reason behind it, that's the time for your, you know, your awareness to be heightened because something's not going right. So when you hear steady vibration and then it stops, I start to get, you know, what is happening? So without these senses, I get thrown off (John, 15 Aug. 2010).

John's comments reveal not only how he knows his ship through its vibrations, but also the alacrity with which he processes this information and uses his senses to guide how he captains the vessel. I observed these kinds of responses to changes in vibration several times during the course of my study. At one point, the pitch increased significantly, and the Captain felt the change in vibration immediately and called down to the engine room to find out what was happening.

Vibrations, then, are generative in that they help sailors to “know their ship” and they convey a great deal of information about what is going on, on a moment-by-moment basis. Faster than a phone call or telegraph message, vibrations – especially the change in vibrations – are the first sign of trouble. While there is a technological knowledge that emerges through this generative process, including knowledge about engines and generators, missing bolts and broken pumps, there is also an affective knowledge. This is the hard to pin down moments that sailors try to explain to me about intuition and experience that gets to the heart of how it feels to be a sailor, and how those feelings affect them. As John put it, “But at the end of the day, it’s your senses that are going to be right more times than not. If something doesn’t feel right, if it doesn’t look right, nine chances out of ten it isn’t right” (John, 15 Aug. 2010).

In this section, I have focused on how sailors use vibration to do their jobs. I have tried to demonstrate that vibrations are a vital part of the “knowledge in the hands” that sailors use first. They use their embodied knowledge – the feel of the ship – to diagnose potential mechanical failure, and to mediate their relationship with equipment.

Summary: A curiously shaky world at sea

Long before digital shipboard automation, electronic charts and AIS, before cellphones, internet access and satellite feeds, sailors were moving through the World’s seas, oceans, rivers, and canals. They did so with expertise and a great deal of knowledge about how to operate these incredibly large vessels – expertise that was borne out of their

experience, mentorships, non-digital aids to navigation, more rudimentary gauging systems, and embodied knowledge. They “knew their ships”. That has not changed. Today’s sailors have access to an enormous amount of digital, mobile ICTs at their disposal, but even with all of this, they first and foremost rely on their embodied knowledge of the vessel to know that everything is in order. What this chapter has done is to underscore the physical, material and embodied practice that is sailing. Sometimes, when examining all of these digital devices, we forget this aspect, but to me, this is the part that really matters when studying life at sea. The materiality and embodied knowledge of being a sailor holds sway.

What are the lessons to take away from this chapter? We have seen that the Victorious itself is a mobile technology, participating fully in the construction of the social worlds of the sailors who crew her. The information that is communicated through the vibrations that emanate from the engines, generators, and oscillatory currents of the electrical system is important and demanding, and we witnessed how sailors grapple to make sense of these vibrations. Some approach with a technical eye, seeking to define and contain vibration through understanding the physics that produce such movements. Others approach with a more affective, embodied way of making vibration make sense, wherein their fatigued bodies propelled them to seek out tactics and strategies for coping. The result is a common sense of purpose that contributes to a sense of shared community as they came across the Pacific.

We also witnessed how sailors pressed vibration into use. Their ‘knowledge in the hands’ is used to diagnose trouble, to the point where they know when an engine is coming unbolted three floors below. Although vibration is ubiquitous, their bodies are always listening. When the pitch changes, when the load comes off an engine, or when things just become strangely quiet, sailors know to be alert. This embodied knowledge of how the *Victorious* is *supposed* to feel is positioned by my participants as their first line of defense. When a vibration changes, sailors do not turn to any of the multitude of mobile ICTs available to them. Rather, they turn to their own knowledge and instinct to determine what might be happening, and when they are unsure, they turn to each other.

These vibrations also bring into stark relief the very physical, material world in which digital technologies must operate at sea. This is an important point. The constant vibration shakes apart electronic connections. It wears devices out. The mobile ICTs on the *Victorious* are, for the most part, the same ones that land-based people have. Their laptops, cellphones, routers, and servers are not built to withstand the world in which they are placed. I did not witness any built-in redundancies in digital communication equipment. When the router for the internet shook apart, we waited two weeks to get a new one in Montreal, which was the first opportunity to have a technician onboard. Spare equipment would have helped.

In R.E.D. Bishop's book, *Vibration*, a technical book about marine engineering that I picked up when I was on a tour of a marine college in Ontario¹⁰¹, there is a particularly unusual definition of vibration for students. He provides a non-mathematical, non-physics related account of vibration, focusing instead on the human condition on a vibrating ship. He explores ways in which "unwelcome oscillations" could be controlled and overcome, taking into account that while vibration is indeed a subject of physics and math, it is also a social experience. Thus the fact that vibrations are curious becomes the cornerstone of recognizing the sociality of the generative process of vibration. As this chapter has revealed, these vibrations are generative – they do things, and they reveal something about being at sea.

When I went home, I couldn't sleep. And when I did finally sleep, I awoke for three days in a row, sure that my whole bed was vibrating. To be clear, it was not, but my body held onto that shaking, rumbling, vibrating feel of the *Victorious* for three days. Vibrations were the first thing I encountered on *Victorious*, and the last thing to leave my body. In this chapter we have seen bodies that stand as living archives of sensory knowledge that intersect with technological equipment. The knowledge that bodies hold about their vibrating worlds is sentient (Bruno, 2007); it is both technical and affective. Engineers have a technical language to explain natural frequency, but they cannot quite articulate how they know that something is not quite right; they can feel it. Likewise, navigators have the technical know-how to hear when pitch changes unexpectedly and thereby

¹⁰¹ I met with the director of the Great Lakes International Marine Training and Research Centre at Georgian College in Owen Sound, Ontario in December, 2010, after my ethnographic journey, to gather some background material on the industry and working conditions in Canada.

interpret these vibrations as communicative events, yet at the same time they rely on their intuition – their senses – to guide their critical decision-making.

Chapter VII

Conclusion: A Sentient Voyage

“There is nothing more enticing, disenchanting, and enslaving than the life at sea.”
- Joseph Conrad (1986)

Lying on my bed, eyes closed against the noon hour sun, I thought about the seemingly never-ending roll and pitch of the Victorious as she slowly rounded the southern tip of Newfoundland, two miles out in the Atlantic Ocean. For the third day in a row, despite copious amounts of Gravol, ginger pills and constant use of SeaBands wrist-bands, I found myself completely immobilized with seasickness. The knocking on the door roused me from my haze, and I opened it to find the Captain, John, standing there looking rather impatient. “Come on,” he said, “we’re going for a walk.” As I followed him out onto the deck, he said, “Take those wrist bands and throw them over the side.” Incredulous, I hesitated, but he insisted, and so throwing caution, and my wristbands, to the wind, I did as he instructed. Looking somewhat pleased, John told me that we were now heading up to the wheelhouse.

The wheelhouse, nearly 18 metres above sea level, was somewhere I hadn’t been in days. The highest point on the Victorious, it moves the most with the swell of the ocean, and hence is the worst possible place to be when seasick. I followed him up three flights of stairs to the wheelhouse, and out onto the bridge wing on the port side, just as we neared St. John’s. When I looked through the wheelhouse door, all I could see was sea-sky, sea-sky, and I felt panic rise in my throat. However, John began to tell me sea stories, and for the next four hours, as we slowly sailed past St. John’s, Signal Hill, and the rugged eastern coast of Newfoundland - some of the most spectacular scenery I have ever seen – I was regaled with stories from the Captain’s sailing history. At times these stories were serious, at others they were side-splittingly funny. But there was a lesson in them that I didn’t realize I was being taught, until hours later.

By the time we arrived in Conception Bay [about 4 hours later], I realized that I was no longer seasick. In fact, I was never seasick again for the rest of my journey. Asking John about this, he told me that I was fighting the movement of the ship and the sea, and that instead I needed to let my body learn its movements. The lesson was learning what it feels like to be at sea – about letting go of thinking about movement, and instead letting myself feel movement, learn it, know it. It was entirely sensual – smelling

the sea air and tasting its salty mist, watching the breathtaking scenery, feeling the movement of the ship on the water, listening to the sea stories and the sounds of the boat moving through the sea.

(fieldnote, August 23, 2010)

Introduction

“If you had the chance to do it all over, would you still become a sailor?” I asked John, as we slowly raised in Lock 3 of the Welland Canal. It was 1:00 a.m., Tuesday, August 31st, and I was due to depart in a few hours.¹⁰² I had been onboard for 28 days, travelling more than 4,000 nautical miles with the crew of the Victorious. I felt a strange emptiness – sadness even, knowing that it was time to go home. John smiled, now used to these big questions from me. “I would,” he said, quietly. I did not say a word, waiting for him to elaborate. “I love my job. You got to see a bit of it. You got to see the wide open space of the ocean, and the whales and porpoises, and the high cliffs of Newfoundland. You got to feel that freedom, moving through the water.” I nodded, he was right. “But it always comes at a price, you know? It’s hard. It’s hard being away from my kids. It’s hard relying on shitty cellphone service when I really want to talk to someone. Even the industry – all of this technology makes it better, sure, but look how different it is. It’s all digital now. Some days I feel like I’m playing a video game, not driving a boat. It’s crazy.” He paused, calling to the deck crew on the radio as we let go of the lines. “But I couldn’t imagine doing anything else. It’s pretty much that simple. This is who I am.”

I wanted to close my dissertation with these two vignettes because they are both telling of just how closely aligned are a sailor and his vessel. My experience out on the Atlantic

¹⁰² I departed the Victorious at 4:30 a.m. in Lock 7 of the Welland Canal, August 31, 2010.

that day was unforgettable, and is one that I often retell because to me, that was truly the defining moment when I knew what it meant to be a sailor. I had to learn how to feel the ship and its movements. Likewise, beyond the gruff exteriors of the sailors with whom I worked, who made bold claims that they only sailed for the money, I found a group of men who loved their jobs. The pride in their work was evident, from the constant polishing and buffing of the vessel itself, to the eagerness with which they were so willing to share with me their knowledge and expertise. But more importantly, and as Igor so eloquently stated, there is just something about sailing; *the steel holds you*. I watched sailors come out onto the deck in the early morning light to drink a coffee and watch the world slowly slide by, and the quiet contemplation of those moments still resonates (Image 7.1 & 7.2). They seemed content.



Image 7.1. Saul drinks his coffee in the early light as we head up the St. Lawrence River past the Laurentians. Photo: August 27, 2010.



Image 7.2. This is Saul’s view. The clouds touch the tops of the Laurentians as we slowly head up the St. Lawrence River. Photo: August 27, 2010.

Being at sea does not feel like emotion, but rather affect; the process of one’s body “infolding” its context (Massumi, 2002), and as we have seen, this context is increasingly digital. Moreover, this context is constantly, as Latour (1996) argues, pitting the skipper in the breeze against the navigator, now hunched over his computer screen or steering using his tiny, video game-like wheel.¹⁰³ The tensions between the visceral, physical and embodied knowledge of sailing and the technological representations thereof became increasingly evident in my study. It took me a long time to fully appreciate this tension. I was more prepared to grapple with narratives about home-life balance and the affordances brought about by cellphones and Internet access, as well as considerations about the ways in which digital technologies are being brought into being in the wheelhouse and engine room. I was less prepared to try to make sense of the shaking, rumbling, vibrating context in which all of these social relations were situated. Yet, this is

¹⁰³ This video game-like feel will only increase. On the Desgagnés ships currently being built in Turkey they have replaced this small wheel with a joystick.

why we do ethnographic inquiry; it is in these moments of encounter with the unknown and unexpected that there exist unique opportunities to develop a thicker description, and formulate a deeper understanding of that which we seek to know. I hope the power of the shaking, rumbling world of the Victorious came through to the reader.

At this point, I would like to offer some modest considerations about how this matters, and what contributions this thesis makes to a growing oeuvre of work on living and working in a mobile environment.

Considerations for Theory

I approached this study with a determined focus on sailors because I believe that it is important to pay attention to the creative capacities, practices and struggles of those who actually bring technologies into being in their everyday lives (Oudshoorn & Pinch, 2005; Bakardjieva, 2000). Moreover, as Tally (2013) notes in his study of maritime transportation journals over a twelve-year period, less than 5% of articles actually focused on the experiences and practices of sailors. Instead, most of the studies about mobile ICTs in the shipping industry are impact-driven, quantitative studies that tend to separate technologies from users. While this literature importantly quantifies the ways in which digital technologies are improving safety and efficiency of the shipping industry, this thesis has demonstrated sailors themselves already know this. Sailors readily discuss the ways in which digitization and automation are improving their jobs; it seems to be a given. Moreover, separating user from device pits the two against each other in a causal, deterministic manner; sailors are positioned as passive users of technologies where things

just happen. A central concern of this thesis, then, was to recast the sailor as an active agent in a complex techno-social assemblage of users, devices and social practices so as to tease out the needs, affordances, potentialities, complications and context that might arise on the “digital ship”. As Vannini et al. argue, “This relational view of technology demonstrates that technology is neither a utopian nor a dystopian force driving the universe towards progress or innovation. [...] Mobile technologies [have] the potential to transform – and be transformed by – the very relationships in which technics and technicians are involved” (2012: 4). In other words, this perspective allows me to move beyond the proven fact that mobile ICTs are making seafaring safer and more efficient to ask questions about the affordances, possibilities and complexities brought about through their enactment on the digital ship.

When I turned to look at this complex socio-technical set of relations between sailors and mobile ICTs, I found tension between the physical, corporeal knowledge about sailing and the technological – and now digital – world of representation. We witnessed this at such times as when Homer told of his anxiety around the fact that the automation system in the engine room was telling him everything was fine, while one of the pumps was dumping fuel. His embodied knowledge of the engine room was pitted against the representations of that room on a screen. Adding to this tension is the virtual world – a world of online co-presence brought about by internet access and cellphone communication – that further adds to the complexity of the socio-technical assemblage in which sailors move.

To address this complexity, I turned first to Bolter and Grusin's concept of remediation (2000; see also Crang et al., 2007; Graham, 2004). From their perspective, online and offline worlds are not neatly divided, but rather are different threads woven into the fabric of everyday life. I expected that remediation would help me to make sense of the tension between the physical, representational and virtual worlds of seafaring by considering how they feed into each other and create shared knowledge. To some extent, this was the case. Sailors' stories of life at sea, and the ways in which their families were brought into co-presence on the vessel illustrates this kind of remediation process. Lives at sea are enriched by being able to communicate with home, and bridge the divide between home and work. Yet this approach fell short because on the *Victorious*, the distinction between physical, representational and virtual worlds was brought into sharp relief. Crang et al. argue that, "daily lives do not encounter a great divide of offline and online worlds; rather, each feeds into the other in a subtle, complex, and continuous interplay" (2007: 2408). My observations on the *Victorious* showed otherwise.¹⁰⁴

Because of the mobility of the vessel, as it moved in and out of cellphone tower reach and satellite footprints, there was indeed a distinct and significant divide between offline and online worlds. In Chapter 4, sailors told stories of the struggles they have because they are often in places where cellphones and Internet access do not work. Rusty's heartbreaking account of being in the middle of Lake Erie when his son was in hospital is perhaps the most memorable of these, but every sailor had a story about the frustrations and compromises they make because these services are not reliable.

¹⁰⁴ While the focus of this dissertation is sailors' experiences with mobile ICTs, the fact that a moving vessel brings into focus the vital importance of infrastructure is not lost (see Parks and Schwoch, (2012), Parks and Starosielski, (2015), Graham and Marvin, (2001) for an overview of the importance of studying material infrastructure across which all of this information and communication flows).

At the same time, I found this stark divide between online and offline worlds afforded sailors the opportunity to be creative and as they engineered solutions to improve or augment the connectivity that was available to them. Thinking about Chester's Wimax antenna, duct-taped to the outside railing reveals how sailors try to have some sense of control over, and participation in how much access they can acquire. As well, I observed sailors moving up to the highest point on the ship to acquire better cellphone service, and at one point there was laughter in the Mess Room as somebody posted a meme on the bulletin board, appropriated from the Lion King, about trying to get a cellphone signal (Image 7.3). While they are able to joke about their frustrations with being able to maintain connections, it was quite clear to me that there was a great divide between online and offline worlds – a divide that sailors had to strategically manage all the time.



Image 7.3. This meme was posted up in the Mess Room on the Victorious, and the sailors joked about how someone must have made it just for them.

I came to understand that the sharp divide between online and offline worlds had to do with their mobility. Because the vessel is always moving, accessing an infrastructure that might feel readily available to those on land often becomes a significant obstacle. Caren Kaplan argues that:

New technologies appear to promise ever-increasing degrees of disembodiment or detachment, yet they are as embedded in material relations as any other practices. They require hard industries as well as light ones; in addition to the bright and mobile world of designers and users, human hands build the machines in factories that are located in specific places regulated by particular political and economic practices (2002: 34).

Kaplan's observations are astute, and helpful here in demonstrating the significance of context; all of the social relations I observed were located on a moving vessel, and this movement proved to be a central actor in the narrative. It was the moving in and out of reception zones that brought the online/offline divide into sharp relief, and reinforced the ways in which sailors actively engage with technologies in order to gain access to their networks.

Mobilities researchers have opened up social inquiry to make sense of movement and perhaps even privilege it as a starting point. As was demonstrated herein, mobilities research locates transportation and communications firmly within the socio-economic and political context in which it unfolds (Vannini, 2012; Cresswell, 2010 and 2006; Urry, 2007; Hannam et al., 2006). Mobilities researchers also account for the "moorings" (Hannam et al., 2006; Adey, 2010) to make room for the material infrastructure that supports movement. Moreover, the 'new mobilities paradigm' provided me with the ability to discuss the affective world of being on a ship; I was able to explore what it feels like to be a sailor, and how those feelings affect them. This proved to be particularly useful to help me tease out the importance of vibrations. It was the shaking and rumbling of the vessel – the constant movement of the ship, the equipment, and the crew – that in

many ways “infolded” (Massumi, 2001) everything else. The shaking of the vessel caused communication equipment to break down. Those vibrations revealed an entirely different way of knowing than that which was explored in relation to mobile ICTs. Sailors knew if something was wrong simply by the feel of the Victorious, long before any one piece of digital equipment let them know. The pre-eminence of that physical, embodied knowledge seemed to underpin everything else. It was the difference between steering a ship, and steering a ship in a simulator.

Drawing from remediation theory and the ‘new mobilities paradigm’ took me a long way to being able to frame this thesis, but mobilities studies has the potential to de-emphasize the politics of technological use in everyday life. By focusing attention on mobility itself, something that sailors themselves were not particularly concerned with, there is a potential to tend too much to the ways of movement, without being able to critically analyze the ways in which mobile ICTs are implicated in relations of power, something that sailors are indeed incredibly concerned with. As a result, I find myself borrowing from technology theorists whose words resonated with what I was observing.

I argue, therefore, that the critical challenge is to pay attention to the sociotechnical power that is being obfuscated because of the “dazzling light” (Graham, 2004, see also Kaplan, 2002) of mobile ICTs. Studying life at sea becomes an excellent context in which to do so for a number of reasons. First, the importance of context is evident when considering the vessel itself as a mobile technology. That the Victorious is so loud, that it has unique smells, that it moves through the water in particular ways that are unique to

the vessel reveal the power of context. This context shapes sailors' knowledge about sailing to a much greater extent than any of the so-called new digital devices that they use. Those vibrations shook apart a router not made to endure the salty sea air and the constant shaking of the ship, which in turn shut down Internet-based communication for nearly half my journey. The vessel is powerful. Moreover, how the Victorious moves, and how the engines, pumps and generators all function leads to an embodied knowledge that exists prior to, and outside of mobile ICTs. Sailors know this, and privilege this knowledge in their day-to-day activities. While there may exist much tension between the visceral, embodied knowledge that sailors have, and that which is garnered through their interactions with mobile devices, when it all comes down to it, sailors must rely on their senses first. As John said, "It's not always as easy as what it looks like on the ECDIS or these other Aids. It takes a lot more experience, and a lot of knowledge to get through these kinds of things and to help you. The next day is never the same as the last. There is always something different, something changed."

Secondly, studying sailors shows how the sociotechnical power of mobile ICTs is becoming increasingly centralized. In the literature on mobile phone use research has shown the tension between control and freedom, the "emancipation dance" as Ling (2004) calls it, where mobile technologies are cast as agents of control for organizations with the trade-off being increased freedom for employees (Middleton, 2007). However, peering beneath the dazzling lights of new technologies on the Victorious reveals an industry that is increasingly reliant upon digital technologies to the detriment of those who actually use these devices. Sailors are not afforded the same degree of freedom.

AIS, ECDIS and computer-based Internet access coalesce control for the shipping company, as they are able to monitor vessels more closely through both increased visibility on the Internet and instant and constant connectivity. However, the sociotechnical reality in which sailors now work is one of deskilling of work, subordinating of experiential knowledge and expertise, and self-surveillance brought about through the panopticon-like gaze brought about by knowing that at any moment in time, somebody might be watching.¹⁰⁵ Sailors now govern themselves accordingly. The significance of the centralization of sociotechnical power in the mobile environment of a ship cannot be understated. Sailors are finding their deep-rooted knowledge of their field – their expertise and very specific set of skills – is being increasingly undermined to the point where, as Saul the Chief Engineer pointed out, “they’re changing the breed of engineer.” With a different knowledge base developed out of using digital devices, it shifts the ways of knowing that sailors have relied upon for generations. It is a different kind of engineer who can read a computer screen indicating that a pump is failing than one who can smell that something is amiss. It is a different kind of navigator who gets his position from an ECDIS chart than one who spreads his hands over a paper chart and instinctively understands his position in relation to the land, the currents, and shoals. Far from the kinds of holistic technologies that once comprised a sailor, there seems to be a much more of a move towards prescriptive technologies (Franklin, 1999), technologies that narrow down knowledge, deskill sailors and centralize sociotechnical power outside and beyond the vessel.

¹⁰⁵ Indeed, since the time of this study, many Canadian vessels have now installed “security” cameras to monitor all activity on deck and at the docks. This surveillance is increasing, and sailors have little to no input into the placement of these cameras.

Third, and perhaps most dangerous, therein lies a potential for a kind of detachment of the sailor from his ship. Embedded in the narratives that sailors told of the new relationships that they are building with mobile ICTs in the wheelhouse and the engine room is a fear, perhaps, or at the very least reticence to take up these new devices because they are feeling distanced from the vessel itself. Consider how compelling Chapter 6 was, with all of that visceral, ruddy knowledge. Consider how Homer's eyes lit up when I asked him to talk about how he uses his senses in the engine room to diagnose and detect trouble. Think, even, of that moment of skepticism about electronic charts, when John talked about how he just doesn't trust the ECDIS, because he cannot lay his hands on it in the same way. Finally, consider how sailors talked about how different sailing was before cellphones and computers in the cabins. Although they would not give up for a moment the connectivity that they have now, they acknowledge that something is lost, something that connects them as a crew. They are just a little bit farther apart. All of these moments speak to a potential for distancing and detaching sailors from the closeness they have with the ship. This becomes heightened, of course, when we consider the centralizing of sociotechnical power discussed above. What sailors rely on the most is that intimate connection that they have with the vessel; it is that closeness, it is feeling the natural frequency, and it is how the steel holds you. If that closeness is weakened, whether through deskilling, devaluing expertise, surveillance or just by simply using digital technologies, the potential for a very different future for sailors exists.

Considerations for Industry

Although I made no promises to the shipping company that owns Victorious, there is nevertheless value in my study for the shipping industry. It provides a unique look into a very closed world, and the candidness, honesty, and enthusiasm that sailors exhibited as they answered my questions and allowed me into their world can be used to contribute to knowledge about the shipping industry in Canada. I offer some brief thoughts for shipping company owners and operators.

First, the skepticism about new technologies is telling, and ship owners should take heed when looking at how to implement changes on their ship. Arnold Pacey (1983) once told a story about water pumps in rural India, and how they kept failing because the designers had not taken the cultural aspect of use into account. He suggests that we understand technologies as “technology-practice”, taking into account organizational, technical and cultural aspects of use (see also Franklin, 1999). Pacey’s story holds sway here, because shipping companies must resist the idea that technologies are value-neutral; they are, instead, political sites of struggle over meaning and use (Feenberg, 1991). Sailors demonstrate this struggle, as they grapple with the move from paper to digital charts, or with the shift to a fully automated engine room. For instance, there is one myth of a Captain who threw a printer over the side of the ship, because it was installed where his coffee maker used to reside. To the Captain, being able to have fresh coffee when he is working all night in the canal was much more valuable than having a printer feed from the engine room. Sailors must be able to participate in, and help make decisions about how technologies are brought into being on a ship. They are the first to be concerned

about safety and efficiency; it is their lives that are at risk, after all, so they are eager to participate. However, top-down impositions of technological change that works to subordinate their knowledge and expertise, where they feel “micromanaged” and clamped down on, will not bring about fully embracing of new technologies.

Second, there is a great deal of concern in Canada about the upcoming generation of sailors. One study completed a few years ago showed an aging population of sailors, with fewer and fewer people entering the profession (MariNova, 2005). One of the single most articulated frustrations that I witnessed was of the lack of reliable and fast Internet access, as well as difficulty accessing cellphone infrastructure. While the infrastructure question is beyond the scope of ship owners and operators, it is possible that improvements can be made in terms of providing access to improved Internet service. On most vessels that ply the Great Lakes-St. Lawrence Seaway system, Internet speed is so slow that FaceTime and Skype are an impossibility, let alone streaming Netflix or other entertainment media. Text messaging only works when in reach of cell towers, and in some cases onboard WiFi is set to block services like iMessage. The millennial generation has grown up on social media and the importance of connectivity cannot be understated. In my study, all the sailors remembered a time before this connectivity, but the next generation will know no such thing. Investing in decent Internet access, and allowing, not discouraging, personal communication through iMessage or FaceTime will only bring a stronger, more talented employment pool from which to draw. The stories told herein about balancing the home/work divide are sometimes heartbreaking, and the

more that companies do to mitigate those struggles, the more satisfied and positive the workforce.

Final Thoughts

In the years since my voyage on the *Victorious*, a great deal has changed. The *Victorious* itself has undergone a name change.¹⁰⁶ My two key informants, John, the Captain, and Saul, the Chief Engineer, have both left the *Victorious*. John has left to work for another company in an attempt to broaden his knowledge and experience in the field. Saul went back to the *Everlast* (the sister ship of the *Victorious*). He said it was because he liked the old-school engine room better, without NORIS and all the automation. He prefers using his hands, he says. Not surprisingly, the industry has continued to grow and change. Three of Canada's largest shipping companies, Groupe Desgagnés, Canada Steamship Lines, and Algoma Central Corporation are building new vessels equipped with improved communication systems including onboard WiFi that allows for faster internet connections. Some are moving towards an almost entirely digital wheelhouse; Desgagnés' new vessels, currently being built in Turkey, are installing dual ECDIS systems that replace paper charts entirely.¹⁰⁷ Companies are also taking advantage of the potentials brought about by AIS and GPS and are freely sharing their ship positions on the Web, rather than keeping it a secret. There is a lot of potential for an improved life at sea.

¹⁰⁶ It is now called the *Leo A. McArthur*.

¹⁰⁷ IMO regulations stipulate that paper charts can be replaced on the condition that each ECDIS unit is on its own power supply, so that if one loses power, the backup is available.

With all this technological change afoot, may we not forget the embodied, visceral knowledge of sailors, and may we continue to have respect for, and an acknowledgement of the fact that, in the end, it is human beings who operate all of this technology, human beings with sentient knowledge, the potential to make mistakes, and the intuition about how ships move through the water. The steel holds them, after all.

Bibliography

- Adey, Peter. 2004. "Surveillance at the airport: surveilling mobility/mobilising surveillance." *Environment and Planning A* 36 (8):1365-1380.
- Adey, Peter. 2006. "If mobility is everything then it is nothing: towards a relational politics of (im) mobilities." *Mobilities* 1 (1):75-94.
- Adey, Peter. 2009. *Mobility*. London: Routledge.
- Adey, Peter. 2010. *Aerial life: Spaces, mobilities, affects*. Oxford, UK: John Wiley & Sons.
- Alderton, T., M. Bloor, E. Kahveci, T. Lane, H. Sampson, M. Thomas, N. Winchester, B. Wu, and M. Zhao. 2004. *The global seafarer: living and working conditions in a globalized industry*. Geneva: International Labour Office, in collaboration with the Seafarers International Research Center.
- Amin, Ash, and Nigel Thrift. 2002. *Cities: reimagining the urban*: Polity Press.
- Ashmore, Paul. 2013. "Slowing down mobilities: Passengering on an inter-war ocean liner." *Mobilities* 8 (4):595-611.

- Bærenholdt, Jørgen Ole, Michael Haldrup, Jonas Larsen, and John Urry. 2004. *Performing tourist places*. Burlington, VT: Ashgate Publishing Ltd.
- Bakardjieva-Rizova, Maria, and Richard Smith. 2001. "The Internet in Everyday Life." *New Media & Society* 3 (1):67-83. doi: doi:10.1177/1461444801003001005.
- Bakardjieva-Rizova, M. 2000. "The Internet in everyday life: Computer networking from the standpoint of the domestic user." PhD, School of Communication, Simon Fraser University.
- Barney, Darin. 2000. *Prometheus wired: The hope for democracy in the age of network technology*. Chicago: University of Chicago Press.
- Barry, Andrew. 1996. *Lines of communication and spaces of rule*. Chicago: University of Chicago Press.
- Beniger, James. 1989. *The control revolution: Technological and economic origins of the information society*. Boston: Harvard University Press.
- Berg, Bruce Lawrence, Howard Lune, and Howard Lune. 2004. *Qualitative research methods for the social sciences*. Vol. 5. Boston, MA: Pearson.

Binkley, Marian. 2002. *Set adrift: Fishing families*. Toronto: University of Toronto Press.

Bishop, Richard Evelyn Donohue. 1979. *Vibration*. Cambridge: Cambridge University Press.

Bissell, David. 2007. "Mobile bodies: train travel and practices of movement." PhD, Durham University.

Bissell, David. 2009. "Conceptualising differently-mobile passengers: geographies of everyday encumbrance in the railway station." *Social & Cultural Geography* 10 (2):173-195.

Bissell, David. 2010. "Passenger mobilities: affective atmospheres and the sociality of public transport." *Environment and Planning D: Society and Space* 28 (2):270-289.

Bissell, David, and Gillian Fuller. 2011. *Stillness in a mobile world*. London: Routledge.

Bloor, Michael, and Helen Sampson. 2009. "Regulatory enforcement of labour standards in an outsourcing globalized industry: the case of the shipping industry." *Work, employment and society* 23 (4):711-726.

- Bloor, Michael, Helen Sampson, and Victor Gekara. 2014. "Global governance of training standards in an outsourced labor force: The training double bind in seafarer license and certification assessments." *Regulation & Governance* 8 (4):455-471.
- Blunt, Alison. 2007. "Cultural geographies of migration: mobility, transnationality and diaspora." *Progress in human geography* 31 (5):684-694.
- Boatnerd. 2017. "Great Lakes and Seaway Shipping - Boatnerd.com." accessed March 22. www.boatnerd.com.
- Bolter, J David, and Richard Grusin. 2000. *Remediation: Understanding New Media*. Cambridge, MA: MIT Press.
- Brown, M. 2015. "Prescriptive technologies, a reading note." A working library, accessed March 22. <http://aworkinglibrary.com/writing/prescriptive-technologies/>.
- Bruno, Giuliana. 2002. *Atlas of emotion: Journeys in art, architecture, and film*. New York: Verso.
- Büscher, Monika, and John Urry. 2009. "Mobile methods and the empirical." *European Journal of Social Theory* 12 (1):99-116.

- Büscher, Monika, John Urry, and Katian Witchger. 2010. *Mobile methods*. London: Routledge.
- Castells, Manuel. 1996. *The network society*. Oxford: Blackwell.
- CeMoRe. 2010. "The Centre for Mobilities Research homepage.", accessed February 2. <http://www.lancs.ac.uk/fass/centres/cemore/>.
- Chauvin, Christine. 2011. "Human factors and maritime safety." *Journal of Navigation* 64 (04):625-632.
- Chun, Wendy Hui Kyong. 2006. *Control and freedom*. Cambridge: MIT Press.
- Clarsen, Georgine, and Lorenzo Veracini. 2012. "Settler Colonial Automobilities: A Distinct Constellation of Automobile Cultures?" *History Compass* 10 (12):889-900.
- Clifford, James, and George E Marcus. 1986. *Writing culture: The poetics and politics of ethnography*. Berkeley: University of California Press.
- Cockroft, A, and J. Laneijer. 2011. *A guide to the collision avoidance rules*: Elsevier.
- Conrad, Joseph. 1986. "Lord Jim [1900]." *Project Gutenberg*.

Cook, R.C., K.L. Marino, and R.B. Cooper. 1981. A simulator study of deepwater port shiphandling and navigation problems in poor visibility. North Stonington, CT: Ecletech Associates.

Cook, R.C., D.D. Woods, and M.B. Howie. 1990. "The natural history of introducing new information technology into a high-risk environment." Proceedings of the 34th Annual Meeting of the Human Factors Society, Orlando, FL - Washington, DC.

Cowen, Deborah. 2010. "A geography of logistics: Market authority and the security of supply chains." *Annals of the Association of American Geographers* 100 (3):600-620.

Cowen, Deborah, and Stephen Graham. 2010. "Containing insecurity: logistic space, US port cities, and the 'War on Terror'." *Disrupted Cities: When Infrastructure Fails*:69-83.

Crang, Michael, Tracie Crosbie, and Stephen Graham. 2007. "Technology, time-space, and the remediation of neighbourhood life." *Environment and Planning A* 39 (10):2405-2422.

Cresswell, Tim. 2006. *On the move: Mobility in the modern western world*. New York and London: Routledge.

- Cresswell, Tim. 2010. "Towards a politics of mobility." *Environment and Planning D: society and space* 28 (1):17-31.
- Cresswell, Tim, and Peter Merriman. 2011. *Geographies of mobilities: Practices, spaces, subjects*. Burlington, VT: Ashgate Publishing, Ltd.
- Crow, B, and K Sawchuk. 2014. "Ageing mobile media." In *Routledge Companion to Mobile Media*, edited by G Goggin and L Hjorth, 279-290. New York: Routledge.
- D'Andrea, Anthony, Luigina Ciolfi, and Breda Gray. 2011. "Methodological challenges and innovations in mobilities research." *Mobilities* 6 (2):149-160.
- DiGiorgio, Anthony. 1998. "The smart ship is not the answer." Proceedings - United States Naval Institute.
- Drews, Donald W. 1968. "Automated Engine Room Controls - Looking Ahead." *Naval Engineers Journal* 80 (1):135-143.
- Dutton, F. 1991. *Life on the Great Lakes: A wheelsman's story*. Detroit, MI: Wayne University Press.
- Ellard, Colin. 2009. *Where Am I?: Why We Can Find Our Way to the Moon But Get Lost in the Mall*. Toronto: HarperCollins Canada.

- Elliott, Anthony, and John Urry. 2010. *Mobile lives*. London: Routledge.
- Ellis, Neil, and Helen Sampson. 2008. The global labour market for seafarers working aboard merchant cargo ships. Seafarers International Research Centre.
- Fee, J.J., W. Lascelle, and D Nieri. 1980. Concept development and simulation test plan for an advanced capabilities vessel traffic system (CAORF Report No. 43-7909-02). Kings Point, NY: National Maritime Research Center, Computer Aided Operations Research Facility (CAORF).
- Feenberg, Andrew. 1991. *Critical theory of technology*. Oxford: Oxford University Press.
- Finch-Boyer, Heloise. 2012. "History of the electronic chart." In *The ECDIS Manual*, 1-33. London: Witherby Seamanship International.
- Fincham, Benjamin, Mark McGuinness, and Lesley Murray. 2009. *Mobile methodologies*. London: Palgrave MacMillan.
- Fink, Leon. 2011. *Sweatshops at Sea: Merchant Seamen in the World's First Globalized Industry, from 1812 to the Present*. Chapel Hill: University of North Carolina Press.

Forsyth, Craig J. 1987. "The creation and maintenance of a stigmatized occupation: An historical analysis of the American merchant marine." *Maritime Policy and Management* 14 (2):99-108.

Forsyth, Craig J. 1990. "Factors influencing job satisfaction among merchant seamen." *Maritime Policy & Management* 17 (2):141-146.

Fortier, A. 2014. "Migration Studies." In *The Routledge Handbook of Mobilities*, edited by Peter Adey, David Bissell, K. Hannam, Peter Merriman and M. Sheller, 64-73. London: Routledge.

Foucault, Michel. 1977. *Discipline and Punish, trans, Alan Sheridan, trans.* New York: Vintage.

Franklin, Ursula M. 1999. *The real world of technology.* Toronto: House of Anansi Press.

Garfinkel, Harold. 1967. *Studies in ethnomethodology.* Englewood Cliffs, NJ: Prentice Hall.

Geertz, Clifford. 1973. *The interpretation of cultures: Selected essays:* Basic books.

- Gekara, Victor Oyaro, Iris Acejo, and Helen Sampson. 2013. "Re-Imagining Global Union Representation Under Globalisation: A Case of Seafaring Labour & the Nautilus International Cross-Border Merger." *Global Labour Journal* 4 (3).
- Gergen, Kenneth J. 2002. "The challenge of absent presence." In *Perpetual contact*, 227-241. Cambridge: Cambridge University Press.
- Gitelman, Lisa. 2006. *Always already new: Media, history, and the data of culture*. Cambridge, MA: MIT Press.
- Goffman, Erving. 1971. *Relations in public: Microstudies of the social order*. London: Allen Lane.
- Gordon, Eric, and Adriana de Souza e Silva. 2011. *Net locality: Why location matters in a networked world*. Sussex: Wiley-Blackwell.
- Grabowski, Martha, and Hemil Dhami. 2005. "Early adoption technology performance impact: AIS on the St. Lawrence Seaway." *Journal of Navigation* 58 (01):17-30.
- Grabowski, Martha, and William A Wallace. 1993. "An expert system for maritime pilots: Its design and assessment using gaming." *Management science* 39 (12):1506-1520.

Graham, Stephen. 2004. "Beyond the 'dazzling light': From dreams of transcendence to the 'remediation' of urban life: A research manifesto." *New Media & Society* 6 (1):16-25.

Graham, Stephen, and Simon Marvin. 2001. *Splintering urbanism: networked infrastructures, technological mobilities and the urban condition*. London: Routledge.

Grant, George. 1991. *Technology and empire*. Toronto: House of Anansi.

Green, Nicola. 2002. "On the move: Technology, mobility, and the mediation of social time and space." *The information society* 18 (4):281-292.

Hammersley, Martyn. 2013. *What's wrong with ethnography?* London and New York: Routledge.

Hammersley, Martyn, and Paul Atkinson. 2007. *Ethnography: Principles in practice*. London and New York: Routledge.

Hancock, H.E. 1950. *Wireless at sea: The first 50 years*. Chelmsford, UK: Marconi International Marine Communication Company.

Hannam, K., M. Sheller, and J. Urry. 2006. "Editorial: Mobilities, immobilities and moorings." *Mobilities* 1 (1):1-22.

- Hannerz, Ulf. 2003. "Being there... and there... and there! Reflections on multi-site ethnography." *Ethnography* 4 (2):201-216.
- Haraway, Donna. 1988. "Situated knowledges: The science question in feminism and the privilege of partial perspective." *Feminist Studies* 14 (3):575-599.
- Harper, D. 2003. "Framing photographic ethnography: a case study." *Ethnography* 4 (2):241-266.
- Harvey, David. 1989. *The condition of postmodernity: An enquiry into the origins of social change*. Malden, MA: Blackwell.
- Hasty, William and Kimberley Peters. 2012. "The ship in geography and the geographies of ships." *Geography Compass* 6 (11):660-676.
- Hemment, Drew. 2006. "Locative arts." *Leonardo* 39 (4):348-355.
- Hesse-Biber, Sharlene. 2011. "Emergent Technologies in Social Research: Pushing Against the Boundaries of Research Praxis." In *The Handbook of Emergent Technologies in Social Research*, edited by Sharlene Hesse-Biber, 3-22. Oxford: Oxford University Press.

- Hesse-Biber, S.N., and P. Leavy. 2006. *The practice of qualitative research*. London: Sage Publications.
- Hill, R. 2008. *Lake Effect: A deckhand's journey on the Great Lakes Freighters*. Sault Ste. Marie, MI: Gale Force Press.
- Hodson, Jaigris, and Phillip Vannini. 2007. "Island time: the media logic and ritual of ferry commuting on Gabriola Island, BC." *Canadian journal of Communication* 32 (2):261-275.
- Hogarth, R.M., and H.J. Einhorn. 1992. "Order effects in belief updating: the belief-adjustment models." *Cognitive Psychology* 24:1-55.
- Hsu, Hua-Zhi, Neil A Witt, John B Hooper, and Anne P McDermott. 2009. "The AIS-Assisted collision avoidance." *The Journal of Navigation* 62 (4):657-670.
- Hutchins, Edwin. 1995. *Cognition in the Wild*. Cambridge, MA: MIT Press.
- Hutchinson, S. 2000. "Waiting for the bus." *Social Text* 18:107-120.
- Ingold, Tim. 2000. *The perception of the environment: essays on livelihood, dwelling and skill*: Psychology Press.

- Ito, Mizuko, Heather A Horst, Matteo Bittanti, Becky Herr Stephenson, Patricia G Lange, CJ Pascoe, Laura Robinson, Sonja Baumer, Rachel Cody, and Dilan Mahendran. 2009. *Living and learning with new media: Summary of findings from the Digital Youth Project*. Cambridge, MA: MIT Press.
- Jäger, Thomas, and Gerhard Kümmel. 2007. "PSMCs: lessons learned and where to go from here." *Private Military and Security Companies: Chances, Problems, Pitfalls and Prospects*:457-462.
- Jenish, D'Arcy. 2009. "St. Lawrence Seaway: Inland Superhighway." *Canadian Geographic*.
- Juma, Calestous. 2016. *Innovation and Its Enemies: Why People Resist New Technologies*. Oxford: Oxford University Press.
- Jungnickel, Katrina. 2014. "Getting there... and back: how ethnographic commuting (by bicycle) shaped a study of Australian backyard technologists." *Qualitative Research* 14 (6):640-655.
- Kaplan, Caren. 2002. "Transporting the Subject: Technologies of Mobility and Location in an Era of Globalization." *PMLA* 117 (1):32-42.
- Kaufmann, Vincent. 2002. *Re-thinking mobility: Contemporary sociology*: Ashgate.

- Kaul, Adam. 2004. "At work in the field: problems and opportunities associated with employment during fieldwork." *Anthropology Matters* 6 (2).
- Kawulich, Barbara B. 2005. "Participant observation as a data collection method." *Forum Qualitative: Qualitative Social Research*.
- Kelty, Ryan. 2008. "The US Navy's maiden voyage: effects of integrating sailors and civilian mariners on deployment." *Armed Forces & Society* 34 (4):536-564.
- Klein, Natalie. 2011. *Maritime Security and the Law of the Sea*. Oxford: Oxford University Press.
- Knudsen, Fabienne. 2009. "Paperwork at the service of safety? Workers' reluctance against written procedures exemplified by the concept of 'seamanship'." *Safety science* 47 (2):295-303.
- Knutson, Peter. 1991. "Measuring ourselves: Adaptation and anxiety aboard a fishing vessel." *Maritime Anthropological Studies* 4 (1):73-90.
- Lapinski, Anna-Liesa S, and Anthony W Isenor. 2011. "Estimating reception coverage characteristics of AIS." *Journal of Navigation* 64 (04):609-623.

- Latour, Bruno. 1996. "Cogito ergo sumus! A review of Ed Hutchins Cognition in the Wild." *Mind, Culture, and Activity; An International Journal* 3 (1):54-63.
- Latour, Bruno, and Steve Woolgar. 1979. *Laboratory Life. Beverly Hills*. Princeton, NJ: Princeton University Press.
- Laurier, Eric. 2004. "Doing office work on the motorway." *Theory, Culture & Society* 21 (4-5):261-277.
- Laurier, Eric, Hayden Lorimer, Barry Brown, Owain Jones, Oskar Juhlin, Allyson Noble, Mark Perry, Daniele Pica, Philippe Sormani, and Ignaz Strebel. 2008. "Driving and 'passenger': Notes on the ordinary organization of car travel." *Mobilities* 3 (1):1-23.
- Law, John. 2004. *After method: Mess in social science research*. London: Routledge.
- Law, John, and John Urry. 2004. "Enacting the social." *Economy and society* 33 (3):390-410.
- LeCompte, Margaret D, and Judith Preissle Goetz. 1982. "Problems of reliability and validity in ethnographic research." *Review of educational research* 52 (1):31-60.

- LeCompte, Margaret Diane, and Jean J Schensul. 1999. *Designing and conducting ethnographic research*. New York: Rowman & Littlefield Publishers.
- Levinson, M. 2006. *The box: how the shipping container made the world smaller and the world economy bigger*. Princeton, NJ: Princeton University Press.
- Lew, Byron, and Bruce Cater. 2006. "The telegraph, co-ordination of tramp shipping, and growth in world trade, 1870–1910." *European Review of Economic History* 10 (2):147-173.
- Liang, Andrew WU. 2011. "Sailing on a Neoliberal Sea: Multinational Seafarers on Container Ships." *Hong Kong Anthropologist* 5.
- Lillie, Nathan. 2006. *A global union for global workers: Collective bargaining and regulatory politics in maritime shipping*. London and New York: Routledge.
- Ling, Richard. 2004. *The mobile connection: the cell phone's impact on society*. Boston: Elsevier.
- Lyon, D, S Marmura, and P Peroff. 2005. *Location technologies: mobility, surveillance and privacy: A report to the Office of the Privacy Commissioner of Canada under the Contributions Program*. Kingston, ON: Queen's University.

Mack, Kathy S. 2007. "Senses of seascapes: Aesthetics and the passion for knowledge."
Organization 14 (3):373-390.

Marcus, George E. 1995. "Ethnography in/of the world system: The emergence of multi-sited ethnography." *Annual review of anthropology* 24 (1):95-117.

Marcus, George E. 1998. *Ethnography through thick and thin*. Princeton, NJ: Princeton University Press.

Marinetraffic.com. 2017. "Marine Traffic." accessed March 22. www.marinetraffic.com.

MariNova. 2005. Short sea shipping market study. www.marinova.com.

Marshall, Catherine, and Gretchen Rossman. 1989. *Designing qualitative research*. London: Sage Publications.

Martin, Michèle. 1991. *Hello, Central?: Gender, technology, and culture in the formation of telephone systems*. Montreal: McGill-Queen's Press-MQUP.

Massumi, Brian. 2002. *Parables for the virtual: Movement, affect, sensation*. Durham, NC: Duke University Press.

- Menzies, Charles. 1994. "Stories from home: First nations, land claims, and Euro-Canadians." *American Ethnologist* 21 (4):776-791.
- Merleau-Ponty, Maurice, and Colin Smith. 1962. *Phenomenology of Perception*. London: Routledge & Kegan Paul.
- Merriman, Peter. 2014. "Rethinking mobile methods." *Mobilities* 9 (2):167-187.
- Merriman, Peter. 2016. "Mobility infrastructures: Modern visions, affective environments and the problem of car parking." *Mobilities* 11 (1):83-98.
- Metag, Julia, Matthias Kohring, and Frank Marcinkowski. 2011. "Technophobic of emerging technologies? A comparative analysis of the framing of nanotechnology in Austria, Switzerland and Germany." International Communication Association annual meeting, Boston, MA.
- Middleton, Catherine A. 2007. "Illusions of Balance and Control in an Always-on Environment: a Case Study of BlackBerry Users." *Continuum: Journal of Media & Cultural Studies* 21 (2):165-178. doi: 10.1080/10304310701268695.
- Middleton, Catherine A. 2008. "Do mobile technologies enable work–life balance? Dual perspectives on BlackBerry Usage for Supplemental Work." In *Mobility and*

technology in the workplace, edited by Donald Hislop, 209-224. London and New York: Routledge.

Middleton, Jennie. 2011. "“I’m on Autopilot, I Just Follow the Route”": Exploring the Habits, Routines, and Decision-Making Practices of Everyday Urban Mobilities." *Environment and Planning A* 43 (12):2857-2877.

Mitcham, Carl. 2003. "Three ways of being-with technology." In *Philosophy of Technology: The Technological Condition, An Anthology*, edited by R. Scharff and V. Dusek, 490-506. Cornwall: Blackwell Publishers.

Molz, Jennie Germann. 2014. "New Technologies." In *The Routledge Handbook of Mobilities*, edited by Peter Adey, David Bissell, K. Hannam, Peter Merriman and M. Sheller, 553-564. London: Routledge.

Morris, Jonathan, and Bin Wu. 2009. "Riding the wave of globalization: The boundaryless and borderless careers of Chinese seafarers." *Economic and Industrial Democracy* 30 (3):429-453.

Moskos Jr, Charles C. 1977. "From institution to occupation: Trends in military organization." *Armed Forces & Society* 4 (1):41-50.

Murchison, Julian. 2010. *Ethnography essentials: Designing, conducting, and presenting your research*. San Francisco, CA: Jossey-Bass, John Wiley & Sons.

Norman, D.A. 1990. "The 'problem' with automation: Inappropriate feedback and interaction, not 'over-automation'." *Philosophical Transactions of the Royal Society of London B* 327.

Norris, Andy. 2007. "AIS Implementation—Success or Failure?" *Journal of Navigation* 60 (01):1-10.

November, Valérie, Eduardo Camacho-Hübner, and Bruno Latour. 2010. "Entering a risky territory: Space in the age of digital navigation." *Environment and Planning D: Society and Space* 28 (4):581-599.

Organization, International Maritime. 1974. "International Convention for the Safety of Life at Sea (SOLAS), 1974." accessed March 22.

[http://www.imo.org/en/About/conventions/listofconventions/pages/international-convention-for-the-safety-of-life-at-sea-\(solas\),-1974.aspx](http://www.imo.org/en/About/conventions/listofconventions/pages/international-convention-for-the-safety-of-life-at-sea-(solas),-1974.aspx).

Organization, International Maritime. 2009. "Year of the Seafarer." accessed February 15. <http://gcaptain.com/names-2010-year-seafarer/>.

Organization, International Maritime. 2010. "World Maritime Day 2010: Year of the Seafarer." accessed February 15.

<http://www.imo.org/en/MediaCentre/PressBriefings/Pages/World-Maritime-Day-2010.aspx#.WKRLbhA28ZQ>.

Organization, International Maritime. 2016. "Introduction to IMO." accessed February 14. <http://www.imo.org/en/About/Pages/Default.aspx>.

Ou, Ziqiang, and Jianjun Zhu. 2008. "AIS database powered by GIS technology for maritime safety and security." *Journal of Navigation* 61 (04):655-665.

Oudshoorn, Nelly, and Trevor Pinch. 2003. *How users matter: the co-construction of users and technology (inside technology)*. Cambridge, MA: MIT Press.

Oudshoorn, Nelly, and Trevor Pinch. 2008. "User-technology relationships: Some recent developments." In *The Handbook of Science and Technology Studies*, edited by E.J. Hackett, O Amsterdamska, M. Lynch and J Wajcman, 541-565.

Pacey, Arnold. 1983. *The culture of technology*. Cambridge, MA: MIT press.

Packer, Jeremy. 2008. *Mobility without mayhem: Safety, cars, and citizenship*. Durham, NC: Duke University Press.

- Packer, Jeremy, and Stephen B Crofts Wiley. 2013. *Communication matters: Materialist approaches to media, mobility and networks*. London and New York: Routledge.
- Parks, Lisa, and James Schwoch. 2012. *Down to earth: Satellite technologies, industries, and cultures*. New Brunswick, NJ: Rutgers University Press.
- Parks, Lisa, and Nicole Starosielski. 2015. *Signal traffic: Critical studies of media infrastructures*. Chicago: University of Illinois Press.
- Parr, Joy. 2010. *Sensing changes: technologies, environments, and the everyday, 1953-2003*. Vancouver: UBC Press.
- Peters, J. Durham. 2003. "Space, time and communication theory." *Canadian Journal of Communication* 28:397-411.
- Peterson, Kimberley. 2014. "Tracking (im)mobilities at sea: Ships, boats and surveillance strategies." *Mobilities* 9 (3):414-431.
- Pink, Sarah. 2011. "Sensory digital photography: Re-thinking 'moving' and the image." *Visual Studies* 26 (1):4-13.

- Rakow, Lana F, and Vija Navarro. 1993. "Remote mothering and the parallel shift: Women meet the cellular telephone." *Critical Studies in Media Communication* 10 (2):144-157.
- Rapley, T. 2001. "The art(fullness) of open-ended interviewing: some considerations on analysing interviews." *Qualitative Research* 1 (3):303-323.
- Rheingold, Howard. 1993. *The Virtual Community: Finding Connection in a Computerized World*. Cambridge, MA: MIT Press.
- Rice, Ronald E, and Caroline Haythornthwaite. 2006. "Perspectives on Internet use: Access, involvement and interaction." In *Handbook of new media: Social shaping and social consequences of ICTs. Updated student edition*, edited by L. Lievrouw and S. Livingstone, 92-113. Thousand Oaks, CA: Sage.
- Robins, Kevin, and Frank Webster. 2004. "The long history of the information revolution." In *The information society reader*, edited by Frank Webster, 62-80. London: Routledge.
- Robinson, Thomas F. 2007. "Cooperation and quality of life among Bering Sea fishermen and their families." PhD, Social Anthropology, University of Edinburgh.

- Ruggunan, Shaun. 2011. "The Global Labour Market for Filipino and South African Seafarers in the Merchant Navy." *South African Review of Sociology* 42 (1):78-96.
- Salinas, Carlos F. 2006. "Restricted visibility: In search of a solution." *Journal of Navigation* 59 (02):349-358.
- Sampson, H. 2008. "Speaking up for better on-board welfare. The SIRC column, The Seafarers International Research Centre." *The Sea* 191:4-5.
- Sampson, Helen, and Michelle Thomas. 2002. "The social isolation of seafarers: causes, effects, and remedies." *International maritime health* 54 (1-4):58-67.
- Sampson, Helen, and Bin Wu. 2003. "Compressing time and constraining space: the contradictory effects of ICT and containerization on international shipping labour." *International review of social history* 48 (S11):123-152.
- Sampson, Helen Anne. 2006. "Transnational drifters or hyperspace dwellers: an exploration of the lives of Filipino seafarers aboard and ashore." In *Patterns of Work in the Post Fordist Era: Fordism and Post-Fordism*, edited by Beynon Huw and Theo Nichols, 612-636. Cheltenham, UK: Elgar Reference Collection.
- Sampson, Helen Anne. 2009. "The modern day challenges to seafarers' health." *The Sea* (197).

Sampson, Helen Anne. 2013. *International seafarers and transnationalism in the twenty-first century, New Ethnographies*. Manchester: Manchester University Press.

Sawchuk, Kim, and Barbara Crow. 2012. "‘I’m G-Mom on the Phone’ Remote grandmothering, cell phones and inter-generational dis/connections." *Feminist Media Studies* 12 (4):496-505.

Schivelbusch, W. 1980. *The railway journey: Trains and travel in the 19th century* (A. Hollo, Trans.). Oxford: Blackwell.

Schroeder, P.B. 1967. *Contact at sea: A history of maritime radio communications*. Ridgewood, NJ: The Gregg Press.

Schuffel, H.J., P.J. Boer, and L Van Breda. 1989. "The ship’s wheelhouse of the nineties: the navigation performance and mental workload of the officer of the watch." *Journal of the Institute of Navigation* 42 (1):60-72.

Security, U.S. Department of Homeland. 2014. Great Lakes Shipping Study. Accessed at <http://www.portdetroit.com/wp-content/uploads/2015/02/Great-Lakes-Shipping-Study-Final.pdf>.

Shaw, J., and I. Docherty. 2014. "Geography and transport." In *The Routledge Handbook of Mobilities*, edited by Peter et al. Adey, 25-35. London: Routledge.

Sheller, Mimi, and John Urry. 2006. "The new mobilities paradigm." *Environment and planning A* 38 (2):207-226.

Shepherd, T, and L.R. Shade. 2012. "Mobile phones as a 'necessary evil': Canadian youth talk about negotiating the politics of mobility." In *Technologies of mobility in the Americas*, edited by Philip Vannini, Lucy Budd, Christian Fisker, Paola Jirón and Ole B Jensen, 199-218. New York: Peter Lang.

Shouse, Eric. 2005. "Feeling, emotion, affect." *M/C Journal of Media and Culture* 8 (6):2012.

SiiTech. 2016. "Automatic Identification System." accessed March 22.
<http://www.siitech.com/AIS-Technology/Overview>.

Slack, Jennifer Daryl, and John Macgregor Wise. 2005. *Culture+ technology: A primer*. New York; Washington: Peter Lang.

Slack, Jennifer Daryl, and J Macgregor Wise. 2006. "Cultural studies and communication technology." In *Handbook of New Media: Social Shaping and Social Consequences*

of ICTs, edited by L. Lievrouw and S. Livingstone. Thousand Oaks, CA: SAGE Publications Inc.

Spence, Emma. 2044. "Unraveling the politics of super-rich mobility: A study of crew and guest on board luxury yachts." *Mobilities* 9 (3):401-413.

Steiger, R. 2000. "Enroute: an interpretation through images." *Visual Sociology* 15.

Stitt, IPA. 2004. "AIS and collision avoidance—a sense of déjà vu." *Journal of Navigation* 57 (02):167-180.

Stopford, M. 2000. "Defining the future of shipping markets." ITIC Forum 2000: Innovative thinking is crucial, Four Seasons Hotel, London UK.

Strathern, Marilyn. 1987. *The limits of auto-ethnography, Anthropology at Home*. London: Tavistock.

Straw, W. 2006. "The circulatory turn." In *Sampling the spectrum: the politics, practices and poetics of mobile technologies*, edited by B Crow, M Longford and K Sawchuk. Toronto: University of Toronto Press.

Suchman, Lucy. 2007. *Human-machine reconfigurations: Plans and situated actions*. Cambridge, MA: Cambridge University Press.

Talley, Wayne K. 2013. "Maritime transportation research: topics and methodologies."

Maritime Policy & Management 40 (7):709-725.

Thomas, Michelle, Helen Sampson, and Minghua Zhao. 2003. "Finding a balance:

companies, seafarers and family life." *Maritime Policy & Management* 30 (1):59-76.

Thrift, N. 1996. *Spatial formations*. London: Sage.

Tsou, Ming-Cheng. 2010. "Discovering knowledge from AIS database for application in

VTS." *The Journal of Navigation* 63 (3):449-469.

Turkle, Sherry. 1995. *Life on the Screen, Identity in the Age of Internet*. New York:

Simon and Shuster.

Urry, John. 2007. *Mobilities*. Cambridge, UK: Polity.

Vannini, Phillip. 2010. "Mobile cultures: From the sociology of transportation to the

study of mobilities." *Sociology Compass* 4 (2):111-121.

Vannini, Philip. 2014. "Slowness and deceleration." In *The Routledge Handbook of*

Mobilities, edited by Peter Adey, David Bissell, K. Hannam, Peter Merriman and M.

Sheller, 116-124. London and New York: Routledge.

Vannini, Phillip, Lucy Budd, Ole B Jensen, Christian Fisker, and Paola Jirón. 2012.

Technologies of mobility in the Americas. New York: Peter Lang.

Vannini, Phillip, and April Vannini. 2008. "Of walking shoes, boats, golf carts, bicycles, and a slow technoculture: A technography of movement and embodied media on Protection Island." *Qualitative Inquiry* 14 (7):1272-1301.

Vergunst, Jo. 2011. "Technology and technique in a useful ethnography of movement." *Mobilities* 6 (2):203-219.

Ward, Robert, Chris Roberts, and Ronald Furness. 2000. "Electronic chart display and information systems (ECDIS): State-of-the-art in nautical charting." *Marine and Coastal Geographical Information Systems*:149-161.

Waskul, D.D., and M.E. Waskul. 2009. "Paddle and portage: The travail of BWCA canoe travel." In *The Cultures of Alternative Mobilities*, edited by Phillip Vannini, 21-37. Hampshire, UK: Ashgate.

Wellman, Barry. 2001. "Physical place and cyberplace: The rise of personalized networking." *International journal of urban and regional research* 25 (2):227-252.

Withers, Charles WJ. 2011. "Travel, en route writing, and the problem of correspondence." In *Routes, roads and landscapes.*, edited by M Hvattum and J. Kampevold Larsen, 85-96. Farnham: Ashgate.

Woolgar, Steve. 2002. *Virtual Society?: Technology, Cyberbole, Reality.* Oxford: Oxford University Press.

Zeffiro, A. 2007. "The persistence of surveillance: The panoptic potential of locative media." *Wi: Journal of the Mobile Digital Commons Network* 1 (1).

Zuboff, Shoshana. 1988. *In the age of the smart machine: The future of work and power.* New York: Basic Books.

Appendix A

Wheelhouse Technologies









See following chart for corresponding descriptions.

Wheelhouse Technology Chart

#	Name	Description	Frequency of Use ¹⁰⁸
1	Computer w/ Internet Access	Ship's computer with satellite internet. Satellite service comes from Radio Holland, and is purchased by footprint. Used for sending daily messages, emails, checking weather, receiving orders and supplies, maintenance program and electronic navigation publications	Daily, sometimes only for the morning message and weather, and sometimes a lot, depending on what needs doing.
2	MF/HF Radio	Medium Frequency/High Frequency Radio used for long range radio communication between ship and shore. Used mostly for deep sea shipping and long range emergency radio communication.	Never
3	VHF Radio	Very High Frequency Radio, used for short range communication up to 60 miles. Used for ship to shore reporting, locks, calling in points, Vessel Traffic Services and ship to ship communications.	Daily - all day.
4	Imarsat C (aka Sat C)	Two way data and messaging satellite communication, used for ship to shore, ship to ship. When all other land-based communication is inaccessible, Sat C is used. More expensive system to use as it uses satellite communication rather than cell towers. Different from satellite-based Internet, which is a different service.	Not used frequently, but used regularly during my voyage as regular Internet had failed. Daily messages and minimal office comm. when system is down.
5	VOIP Phone	Voice Over Internet Protocol phone - satellite based phone used when cellphone service inaccessible. Known as the "space phone" as there are delays and interference.	Daily. Florida-based number (Radio Holland-based), to communicate with office, contractors, docks and clients.
6&7	NORIS	NORIS automation system monitoring screens. Both screens can show all engine room alarms and operating system onboard the vessel. For monitoring purposes only. In the engine room, these screens allow access to control equipment.	Daily – all day. NORIS is automated, so it is always on, and is always sounding alarms.

¹⁰⁸ To create this appendix, I sent a request to the Victorious to ask for a breakdown. Frequency of Use means how often these devices are used by sailors. I asked sailors how often they used each device over a 12-month period; these are their words.

8	Articouple	Control panel for connecting and disconnecting the articouple pins. This system is used to connect and disconnect the tug from barge, and is used at each and every port upon arrival and departure.	Weekly, depending on location. This panel is used to control the pinning and unpinning of the ATB, used in ports when loading and unloading cargo.
9	RADAR	S-band. Provides bearing and distances of ships and land targets in the vicinity from own ship. Used for collision avoidance and navigation at sea. S band is lower frequency and therefore less crisp, but less affected by rain or fog.	Daily – all day. Used all the time when at sea.
10	Voyage Data Recorder	This panel controls the VDR. In case of an incident, this would be pressed to save data to ensure that it won't be overwritten. Rewrites every 30 days.	Always on, but panel only used in emergencies.
11	Automatic Identification System (AIS)	Using VHF signal, automatically transmits information about ship speed, cargo, destination. Vessel Traffic Services uses AIS regularly to monitor ship traffic. AIS signals now charted on websites such as MarineTraffic.	Always on.
12	Global Positioning System (GPS)	Satellite-based radio navigation system. Used for putting positions on ECDIS, positioning for charts, connected to VDR.	Always on.
13	VHF Radio and handset	See #3 above - a second unit	Daily – all day.
14	Inter-ship communication phones	These phones call engine room, galleys, and cabins.	Daily.
15	Steering controls and auto pilot	Wheel for vessel and control panel for autopilot. Autopilot is used in open waters to have the ship maintain a steady course without having someone stand by holding the wheel.	Daily.
16	Bow Thruster controls	Omni directional bow thruster used to manoeuvre ships at slow speeds while docking and in locks.	Daily, when navigating through locks or docking.
17	Emergency Telegraph	Used in emergencies to communicate captain's orders to engine room. Eg. "slow ahead".	Emergency use only, but tested every time the ship sets sail and when approaching confined waters.
18	Engine controls	This station is where the bridge communicates with the engines to go ahead or astern at different speeds. Aka "the sticks". Other buttons used for overloads, alarms and other pertinent engine RPM/load details.	Daily, all day when ship is sailing. This is like a "gas pedal" in a car.
19	Mini-wheel	Used when docking/undocking and in locks. This mini wheel is used by the captain while he is making his final approaches.	Daily, when in locks or docking.

20	RADAR	X band. See above. The ship has two bands for RADAR. X band is higher frequency and provides crisper image.	Daily – all day. Used all the time when at sea.
21	Electronic Chart Display & Information System (ECDIS)	Used for navigation. Connected to GPS, can track ship's position, movement. Shows vessel on screen, equivalent to paper chart. Also shows speed, course, collision avoidance, range and distance from land, etc.	Daily – all day. Used all the time when at sea.
22	Weatherfax Charts	Used for weather. Charts show low pressure systems, sea conditions, icebergs and approaching weather systems. Not used very often now that Internet-based computer access provides up to date weather information.	Rarely.
23	NavTex	Navigational Telex is an international automated medium frequency direct printing service, used for delivery of navigational and meteorological warnings.	Always on, but information is also received through Internet connection.

Appendix B
Demographic Chart of Sailors

Name	Position	Age	# of yrs sailing	Home Location
John	Captain	33	15	Ontario
Igor	Chief Mate	45	13	Ontario
Pierre	Second Mate	Late 40s	> 20	Quebec
Willard	Deck Utility	45	5	Newfoundland
Wayne	Deck Utility	40	10	Newfoundland
Saul	Chief Engineer	44	23	Ontario
Chester	Second Engineer	39	21	Newfoundland
Homer	Third Engineer	36	2	Newfoundland
Rusty	Engine Utility	45	10	Newfoundland
Ryan	Engine Utility	Undisclosed	Undisclosed	Newfoundland
Bill	Cook	48	5	Ontario

Appendix C

Informed Consent Form

Study Name: **Airwaves & Waterways: Mobile networks, information & communication technologies and the locative infrastructure.**

Researcher: Heather Maguire

PhD Candidate, Communications & Culture, York University

Purpose of the Research: The purpose of this research project is to study how digital communication technologies intersect with, and constitute other systems of mobility including transportation, waterways management and navigation amongst others. It considers specifically how mariners make sense of their world “on the move” and how digital communication technologies are used to facilitate this mobility. As such, this study considers shifts towards digital navigation, the installation of satellite and VOIP phones (or “off the grid” communication devices), internet usage, along with a variety of marine-specific onboard communication systems including GMDSS, AIS, VHF radio, etc. The results of this research will be presented in the form of my PhD dissertation, as part of my degree requirements within the Joint Programme in Communications & Culture, York/Ryerson Universities, Toronto, ON. Findings from this study will also be presented at academic conferences, and submitted for publication in a variety of academic journals and other scholarly publication venues.

What You Will Be Asked to Do in the Research: I am asking for your participation in two ways: The first is the completion of a semi-structured, open ended interview, wherein I ask a variety of questions about your life “on the move” and how you use communication technologies in the context of your work and leisure time onboard the ATB. This interview will be approximately 1-2 hours in length, and will be digitally recorded with your permission, transcribed and coded using a word processor. The second aspect of this study is participant observation, wherein I observe life onboard the ATB, and make a set of detailed handwritten notes about events that relate to mobility and the use of communication technologies. I may also employ a digital camera to record these events. I will be completing this participant observation over a period of 1-2 weeks.

Risks and Discomforts: I do not foresee any risks or discomfort from your participation in the research.

Benefits of the Research and Benefits to You: There are no financial or other benefits to you to participate in this research study.

Voluntary Participation: Your participation in the study is completely voluntary and you may choose to stop participating at any time. Your decision not to volunteer will not influence the nature of the ongoing relationship we may have during the study, nor the nature of your relationship with York University either now, or in the future. You may

choose to participate in one or both aspects of this study, and you may choose to refuse to answer any questions any time during the duration of the study.

Withdrawal from the Study: You can stop participating in the study at any time, for any reason, if you so decide. Your decision to stop participating, or to refuse to answer particular questions, will not affect your relationship with the researcher, York University, or any other group associated with this project. In the event you withdraw from the study, all associated data collected will be immediately destroyed wherever possible.

Confidentiality: The information you provide will be kept confidential; original transcripts and raw data (paper and electronic copies) will only be seen by the researcher. By virtue of effect, it is impossible to guarantee your anonymity during this study, because only one ATB is being studied, and there is a relatively small number of crew. As well, digital recording devices including audio/video recorders and digital photography may be used. Therefore, your identity may be revealed through the use of these recording devices. All information you supply during the research will be held in confidence and with your consent, your name and/or position may appear in reports or publications of the research. Data will be collected through handwritten notes, digital audio/video recorders and digital photography. Your data will be safely stored in a locked facility and only research staff will have access to this information. Data will be kept for a period of up to five years after completion of the study. At that point, all interview

transcripts and field notes will be shredded, and electronic recordings will be deleted. Confidentiality will be provided to the fullest extent possible by law.

Questions About the Research? If you have questions about the research in general or about your role in the study, please feel free to contact me or my Graduate Supervisor - Dr. Barbara Crow. You may also contact my Graduate Program - Joint Programme in Communication & Culture, 3013 TEL Centre, 88 The Pond Road, York University. This research has been reviewed and approved by the Human Participants Review Sub-Committee, York University's Ethics Review Board and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines (File number **STU 2010 – 112**). If you have any questions about this process, or about your rights as a participant in the study, please contact the Sr. Manager & Policy Advisor for the Office of Research Ethics, 5th Floor, York Research Tower, York University (telephone 416-736-5914 or e-mail ore@yorku.ca).

Legal Rights and Signatures:

I _____ consent to participate in *Airwaves & Waterways: Mobile networks, information and communication technologies and the locative infrastructure* conducted by Heather Maguire. I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form. My signature below indicates my consent.

Signature _____
Participant

Date _____

Signature _____
Principal Investigator

Date _____

Appendix D

Interview Guide

1. Personal information
 - a. Pseudonym if required
 - b. Background – how long with MMTL, how long in shipping industry
 - c. What position do you hold on the ship? What does your job entail?
How many hours do you work? How much free time do you have onboard?
 - d. Personal: where do you live, when not on the boat? Do you have a family (however they choose to define “family”) How often do you see them? What is your work schedule like?

2. Perspectives on mobility and mobile communications
 - a. Do you use mobile technologies in your job? If so, which ones?
 - b. In your free time?
 - c. What do you consider mobile technologies to be?
 - d. Can you describe how you use them for your job?
 - e. How has your job changed (or has it) with the new technologies on *ATB Victorious/John J. Carrick*?
 - f. How do you use mobile ICTs to manage your personal affairs while at sea?
 - g. What does it mean to be “mobile?”

h. If you hold a job that requires communicating with land-based organizations:

- i. What organizations do you connect with?
- ii. What kind of information do you transmit, and which technologies do you use to do so?
- iii. Has the advent of new technologies changed your job?
What changes have you noticed (if any)?

3. Perspectives on importance of location, and LBS

- a. How do you know where you are, when you're at sea?
- b. How important is location to you when you are onboard the ship?
- c. If you are a crew member who uses Location-Based Services (navigational, engineering, captain) can you talk a bit about the LBS technologies that you use?
- d. How have these LBS impacted your work?

4. Any other concerns

- a. Any questions that you were expecting me to ask that I haven't?