SPECIAL REPORT

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Australian naval combat helicopters—the future

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by Andrew Davies

Executive summary

- *The current state of naval aviation is a significant capability shortfall for the Royal Australian Navy (RAN). The failure of the* Super Seasprite *program means that the RAN continues to lack a helicopter-launched anti-shipping missile. And the last helicopter-borne dipping sonar system for anti-submarine warfare left service in the mid-1990s.*
- *The lack of a helicopter-based active dipping sonar and state-of-the-art engagement capability for anti-submarine warfare is a problem not just in terms of protecting the fleet from increasing numbers of submarines in the region, but also in terms of providing Australian submarine crews with realistic training.*
- *The world helicopter market has two likely contenders for the RAN's future embarked helicopters—the Sikorsky MH-60R* Romeo *variant of the* Seahawk *and the NATO Helicopter Industries NH-90* NFH. *The* NFH *is designed to be truly multi-role. Deliveries of MRH-90 (another version of the NH-90) aircraft for the maritime support role begin late this year but the fully-capable* NFH *variant is still developmental. The* Romeo *is more mature and will meet the Navy's essential requirements but is a smaller aircraft that has less capacity than the* NFH *in some roles.*
- *With the MRH-90 entering service with Army and Navy in the next few years, the* NFH *would bring with it some commonality across the ADF's helicopter fleet as the types have significant airframe and avionic similarities. The* Romeo *would be essentially a stand-alone platform in terms of logistics and support.*
- *Defence plans for the future naval helicopter fleet are designed to avoid high-risk developmental programs or mid-life upgrades involving Australian-unique complex integration issues. By improving the availability of the current* Seahawks, *it should be possible to await further maturity of each type so that their operational performance can be fully evaluated.*
- *Data on the cost and performance of the Navy's helicopter operations suggests that the hardware acquisition will only be one part of the work required to rebuild this important capability. Having adequate numbers of properly trained personnel, and efficient support and logistics arrangements, will also be critical—not just to improve the delivery of capability but to ensure safety of operations.*

The consistent shortfall in aircraft availability and operational performance has previously had a negative impact on the morale and retention of crews.

- *Naval aviation has been below par for some years, despite a myriad of internal and external reviews. The management of naval aviation must be improved, with appropriate delegation of responsibility and accompanying accountability against relevant performance measures and benchmarks. Resourcing must be matched to those benchmarks.*

Introduction

The current fleet of embarked helicopters consists of sixteen Sikorsky S-70B-2 *Seahawks* and six Westland Mk 50 *Sea Kings*. The anti-submarine warfare and surface search capability is provided by the *Seahawks*. The *Sea Kings*, currently used in the maritime support role, will be replaced by the European sourced MRH-90[1], which will also serve with the Army, in 2010.

As ASPI has written before, embarked helicopters are critical components of the capability of a navy's surface vessels. They have also been an area of capability shortfall for the Royal Australian Navy (RAN) for years, despite continuing high (and growing) annual costs. Consequently, the RAN is unable to perform some war-fighting tasks as well as it should. Given the Prime Minister's recent emphasis on future naval capability, it is an opportune time to examine the options for improving Australia's war-fighting naval helicopter capability.

An embarked helicopter greatly extends the reach of the ship's weapons and sensors. It can act as a communications relay enabling 'over the horizon' targeting, or directly undertake long-range search and strike missions itself. They can conduct anti-surface and anti-submarine warfare missions with missiles and torpedoes, move personnel and stores ship-to-ship or ship-to-shore and conduct search and rescue activities.[2] That the majority of surface combatants are helicopter capable underpins the fact that a capable embarked aircraft is considered to be an essential part of the ship's information collection capability and ability to deploy offensive power.

The eight *ANZAC* frigates can embark a single helicopter, lacking the hangar and deck space for more, as will the future Air Warfare Destroyers. (The four *Adelaide*-class frigates can embark two *Seahawks*.) In practice that means that each ship can have a helicopter flying for only a part of each day.[3] Of course, this assumes that a helicopter is available for embarkation—something that is not always possible given that the fleet of sixteen *Seahawks* have to be spread between training, maintenance, upgrades and the ships at sea. It is therefore critical that the RAN's helicopters are multi-role capable and have high levels of availability.

The deck space and networking capability that will be provided by the 27,000 tonne *Canberra*-class amphibious ships entering service from around 2014 will provide the RAN with an opportunity to greatly expand its use of helicopters in task group operations. Using multiple helicopters simultaneously facilitates activities such as multi-static sonar operations against submarines[4] or cooperative engagement of targets, where one helicopter provides the sensor data and targeting information and another delivers a weapon.

This ASPI *Special Report* reviews the current plans for providing the RAN with a new war-fighting helicopter, and highlights some of the issues that will bear watching.

Capability status

In terms of the high-end war-fighting roles for the helicopter fleet, ASPI noted recently that this is the most problematic of the Navy's major capability areas.[5] The shortfall in naval aviation capability also contributes to the current poor capability in Anti-Submarine Warfare (ASW)—an area that will only grow in importance as advanced submarine types proliferate throughout the Asia–Pacific region. None of the helicopters in service or in the delivery process can deploy a dipping sonar for submarine detection.[6] As well, the expensive failure of the *Seasprite* program means that there is currently no helicopter in the fleet capable of launching an anti-shipping missile. For the purposes of engagement of surface targets, the RAN's *Seahawks* are limited to providing targeting data for missiles or torpedoes launched from ships or maritime patrol aircraft. They can engage submarines with a Mk 46 lightweight torpedo, though their effectiveness is limited by the performance of this now near-obsolete weapon. An attempt to equip the aircraft with the more modern MU-90 light-weight torpedoes was suspended in 2008. The helicopter's inability to take effective autonomous action against the spectrum of potential targets increases the risk not only to the aircraft itself but also to the host ship and the force it is operating from.

The MRH-90, now well-advanced in the procurement process, will be used in the maritime support role, including boarding operations, medivac and the movement of personnel and supplies between ships and ship-to-shore. The aircraft features a corrosion-protected airframe suitable for use in a maritime environment, but it is not fitted with some of the features (specifically powered blade folding and a deck recovery system) required for operation from the decks of frigates or destroyers. The intention is to operate them from the amphibious and support ships—the 'fat ships' of the fleet—in the utility role, where they will perform vertical resupply missions ('vertrep'), trooplift and search and rescue.

The availability and cost of the current fleet

Availability

Table 1a shows the planned and actual flying hours for Army and Navy helicopters.[7] The Army's *Blackhawk* and *Chinook* fleets, both in high demand for deployed operations, are achieving over 80% of the planned flying hours. And the *Seahawks*, representing the only combat helicopter capability among the Navy's fleet, are managing three quarters of the planned hours. Overall Navy is down in flying hours because of the failure of the *Super Seasprite* program—meaning that their planned 1,800 flying hours could not be delivered. Taking the *Seasprite* hours out of the calculation, we find that Navy and Army are performing similarly—both are producing a little over 80% of their planned hours across the fleet.

And comparing the most similar types leads to a similar conclusion. Table 1 also shows the hours flown per aircraft, which shows that each available *Seahawk* is, on average, flying more hours than each *Blackhawk*.[8] (And the *Seahawk* number is understood to be higher still in the period since the last public figures were released, as aircraft that have been in a modification program again became available for operations.) Given the difficult operating environment on board ship and the marine-specific features of naval helicopters, such as the more sophisticated mission systems, corrosion protection and deck-handling systems, Navy's performance compares favourably with that of Army.

(As an aside, the consistent shortfall of flying hours achieved compared to flying hours

Table 1: Planned and achieved flying hours for ADF rotary wing fleets 2006–07

	Type	Planned flying hrs	Actual flying hrs	% achieved	Hrs flown per aircraft
Navy	Seahawk	3300	2439	73.4%	187
	Sea King	1600	1228	76.8%	205
	Squirrel	4000	3560	89.0%	274
	Seasprite	1800	0	–	–
	Total	**10700**	**7227**	**81.2%**[a]	
Army	Blackhawk	7500	6157	82.1%	176
	Kiowa	10360	8417	81.2%	205
	Chinook	1270	1168	92.0%	195
	Iroquois	4090	1958	47.9%[b]	78
	Total	**23220**	**17700**	**82.3%**[c]	

Notes (a) Excludes Super Seasprite hours.
(b) Iroquois underfly was the result of the aircraft being retired from operation.
(c) Excludes Iroquois hours.

Sources: Defence Annual Report 2006–07, Portfolio Budget Estimates 2006–07

planned is a little puzzling. For example, Navy has failed to achieve its planned flying hours for the *Seahawk* for seventeen years in a row. If nothing else, one might reasonably have expected the planning figures to be revised downwards.)

The RAN has received considerable criticism over the years for its management of helicopters. We note that there have been many reviews of naval aviation (thirty in the fifteen years between 1985 and 2000 alone), and that Navy's helicopter maintenance culture came in for sharp criticism in the Nias Island *Sea King* Accident Board of Inquiry report. A 1999 Australian National Audit Office report stated that:[9]

> *The audit found that the effectiveness and efficiency of the Defence resources employed in NAF [naval aviation force] could be improved. Of greatest concern is the low rate of availability of aircraft, which is a major difficulty in meeting operational and training requirements. NAF helicopter operating costs are a further concern...*

Navy has undertaken to address many of those criticisms and, based on the data publicly available, seems to be performing as well as its other ADF counterparts. And this appears to be having a positive effect on staff retention. Anecdotal evidence suggests that the morale and retention of flying and support personnel was on a downward trajectory even before the Nias Island accident. But the latest figures provided by Defence show that the separation rates for aircrew in the last twelve months is around 5%, a healthy figure and below the overall ADF average (typically around 6% for naval officers). The corresponding figure for naval aviation engineers is 7%.

But the failure of the *Seasprite* to be delivered into service presents Navy with a problem. An embarked flight (a 'flight' is a naval term for an aircraft and crew that can go to sea) needs over 200 hours per year to assure basic skill competency across the range of operational tasks. Operational requirements would further increase the number of hours required. At an annual flying rate of 187 hours, each *Seahawk* generates less hours than is required for the skills maintenance of one flight. Given the operational demands on the fleet—Navy has kept at least one

Seahawk almost continually embarked in a major combatant on station in the Middle East since 1991—it is clear that the demands on the *Seahawk* fleet are going to present an increasing challenge as the aircraft ages. This will have consequences for the way the *Seahawk* fleet is managed during any future project work.

And it is not just a matter of having aircraft available to perform the tasks required for its host ship. If the RAN's submarine arm is to maintain high levels of proficiency, it needs to be able to train regularly against state-of-the-art anti-submarine warfare systems. The RAN needs to be able to generate enough helicopter flying hours (and the high-level ASW capability) to allow this to happen.

Costs

Naval aviation is an expensive enterprise. It is undertaken in a harsh and isolated environment. Each flight is a separate, self-contained operating unit that requires a full set of spares, test equipment, publications and authorised maintainers. And this effort may need to maintained independently for up to six months at a time. For that reason it is difficult to make 'apples versus apples' comparisons of platform operating costs.

The mechanism by which Defence reports its costs does not help. The aggregated annual cost of outputs (i.e. services provided to government by Defence) includes a number of factors that are not related to the immediate support of the platforms involved in the capability. A good example is the 2007–08 annual report, which gives a total cost of naval aviation of over $1.55 billion, compared to $630 million in the previous year. The difference is mostly due to the write-down of the *Seasprites*, a cost unrelated to the maintenance of the current fleet.

But we can make some progress if we extract some aggregated and averaged costs. Table 2a shows the running costs (approximated by adding the personnel and suppliers costs as reported in the Defence Annual Report) for Army and Navy. With the total flying hours as shown in Table 1, it is possible to calculate an aggregated cost per hour. The result is that RAN aircraft cost, on average, twice their Army counterparts per flying hour.[10]

But, because of the very different operating environments, we need to do some more work before making any comparisons. Table 2b shows the *direct* cost per flying hour for some of the main types (with the civilian SouthCare Bell 412 medical helicopter included as a baseline). The 'direct cost' figure is an estimate of the marginal cost of each flying hour.[11] This is a useful measure because it allows some of the overheads faced by the ADF, such as technical certification and oversight requirements, which contribute to the high average cost per flying hour shown in Table 2a, to be factored out.

The civilian benchmark medivac SouthCare helicopter costs $5,755 per flying hour to operate. (And incidentally produces many more flying hours per year—695 hours in 2007–08 at a total cost of $4 million.) The military helicopters are rather more expensive on average to run. That isn't too

Table 2a: Running costs of Navy and Army aviation fleets in 2006–07 (2008 $)

	Cost	Total flying hours	Cost per flying hour
Navy	$430 m	7,227	$59,500
Army	$520 m	17,700	$29,380

Sources: Defence Annual Report 2006–07, Reserve Bank of Australia inflation calculator

Table 2b: Total and direct costs of helicopter flying hours 2006–07		
	Direct cost/hr flown	
Navy	$45,317	(Seahawk)
	$23,616	(Sea King)
	$5,208	(Squirrel)
Army	$20,659	(Blackhawk)
	$7,738	(Iroquois)
	$2,865	(Kiowa)
SouthCare helicopter	$5,755	

Sources: Defence Annual Reports and FINMAN 4, Snowy Hydro SouthCare Annual Report 2007–08

surprising—many of the military helicopters are significantly larger than the SouthCare Bell 412, and they are fitted with more complex systems.

But the figures are still suggestive. Army's smaller utility *Iroquois* (now retired) was an airframe broadly comparable with the Bell 412. And we see that the direct cost of operation is also comparable (the difference of 15% could be due to the factors noted above, the operation of Army helicopters from diverse locations and the higher payloads carried, including light weaponry). And the very small and simple *Kiowa* is cheaper still. On the other hand, the Navy's *Squirrel* (half the weight of the *Iroquois*) should also have a smaller direct operating cost—but the figures reveal a much smaller differential.

Comparing the most similar types, the Navy *Seahawks* cost more than twice as much per flying hour than their Army *Blackhawk* relatives. To be fair, one of the drivers of higher cost is the need for Navy to operate with single aircraft packages, and often for months at a time without direct access to the external supply chain. Being able to operate multiple aircraft from one site allows Army a certain economy of scale not available to the Navy's embarked flights.

However, the differential of 119% is very large. So there is a question to be asked regarding the apparent high cost of the Navy's helicopter ownership. ASPI does not have the data to investigate further, but it may be a fruitful area of investigation before a large investment is made in the future helicopter fleet. The ideal comparison would be with similar fleets of naval helicopters. And it is important to understand the baseline for naval aviation operating costs. As will be discussed in the next section, through-life operating costs of the fleet may be a crucial discriminator between future options.

Rationalising support

The entry into Army and Navy service of the MRH-90 means that synergies can be developed between Army and Navy in training (and perhaps sharing) maintenance and flight personnel. The ability to better manage a consolidated workforce might ameliorate some of the problems of retention. And there is further potential if the future naval helicopter is the NATO frigate helicopter *NFH*, a dedicated naval helicopter that comes from the same stable as the MRH-90. (See the next section.) Some positive steps have been taken already in the form of preliminary training for ADF helicopter crews and maintainers being co-located, as well as the establishment in Brisbane of a single MRH-90 Systems Project Office that will manage the acquisition of the aircraft for both services.

Further steps could include making the support and provision of helicopter flying hours the responsibility of a single service and contracting a single maintenance provider. Such reforms have the potential to provide additional efficiencies on top of those provided by operating similar helicopter types.

Any drive for greater consolidation will have to be balanced against considerations of the different ways in which the services operate their helicopters and factors of geography. Navy flights are integrated into ship operations while Army flights deploy as a multi-aircraft unit. The hub of the RAN's helicopter maintenance is Nowra in NSW, while Army's helicopter effort is centred on Oakey in Queensland. Nonetheless, it may be possible to use a single facility for deep maintenance, even if routine work remains dispersed. And there is no need for the work to be performed by uniformed personnel, except in so far as it is necessary for the sustainability of the deployable uniformed maintenance workforce. Consistent with recent trends, and with Navy's stated vision for its helicopter fleet, more outsourcing is likely—provided of course that the value-for-money case can be made.

Future acquisition plans and the world market

The cancellation of the *Seasprite* program has forced a rethink of plans for the future naval helicopter fleet. Recent public versions of the Defence Capability Plan (DCP) included a major mid-life upgrade and life-of-type extension to the *Seahawk* fleet, costed at up to $1 billion in the 2004–14 DCP and scaled back to $450 million in the 2006–16 edition. This program will now proceed as a more modest *Seahawk* Capability Assurance Program (SCAP), designed to ensure that the helicopters can continue to operate safely and with acceptable reliability, but not involving major war-fighting system replacements. It will be in two parts; SCAP-1 will deal with urgent logistic obsolescence issues, while the composition of SCAP-2 will be determined by studies now underway and its scope could be affected by the timing of any replacement.

In parallel to the SCAP program, a project will begin for the acquisition of a new helicopter type to deliver the high-end war-fighting capability required for the fleet, including the ability to deploy dipping sonar and carry anti-ship missiles. This approach is a welcome development. Mid-life upgrades involving combat systems and integration of new weapons have a history of being late, over budget and of delivering less than the desired capability. The trick now will be to avoid complicating any future acquisition by imposing Australian-unique modifications on otherwise off-the-shelf platforms—another historically proven method for generating cost and schedule overruns.

One of the major drivers in any selection process will be the desire to rationalise the number of types in the ADF helicopter inventory. This has been explicitly stated in Navy's 2020 Vision for its helicopter fleet, and in the Defence Capability Plan exposition of Project Air 9000.

Two contenders

There are a number of Western naval helicopters on (or about to be on) the world market. Two of those, the Royal Navy's AgustaWestland *Merlin* and the Sikorsky S-92 *Cyclone* being developed for Canada, are physically too large to operate from the RAN's surface combatants. The Sikorsky S-70 *International*—a development of the *Seahawk* already in RAN service—requires a crew of four and would complicate workforce management without offering a large quantum of capability improvement. So the options boil down to two credible choices—the NATO Helicopter Industries[12]

NH-90 *NFH* (NFH stands for 'NATO Frigate Helicopter') and the Sikorsky MH-60R ('*Romeo*') version of the *Seahawk* developed for the United States Navy.

Of the two, the *NFH* was conceived as a truly multi-role aircraft, and is under development. The first aircraft will enter service (with The Netherlands and France) towards the end of 2009, but will be configured only for utility and search and rescue duties. The full military configuration, with ASW and ASuW systems, as well as electronic support measure systems, will enter service in 2011. The helicopter is compatible with the MU-90 lightweight ASW torpedo that Australia has acquired, and has two dipping sonar system options integrated with its mission systems and capable of working with sonobuoy systems and the Link-11 fleet data link.[13] The *NFH* is a large and advanced helicopter, and is expected to cost approximately €35–40 million (A$70–80 million) per aircraft.

The MH-60R (*Romeo)* is currently entering service with the US Navy (USN). It will replace the older *Seahawk* ASW and ASuW models. It has a suite of sensors including a lightweight airborne sonar system, and an advanced airborne fleet data link system. In USN service it can carry the Mk 50 and Mk 54 lightweight torpedoes as ASW weapons and it can be fitted with an extended wing that can carry four Hellfire missiles. The *Romeo* will be a flexible war-fighting helicopter and is much less expensive than its European rival (at least in its baseline USN form). Budget estimates show a unit procurement cost to the USN of approximately US$30 million (A$45 million).[14] The unit cost to Australia through an FMS deal (or direct commercial purchase) would be somewhat higher as initial overheads that the USN has already incurred would be added.

However, the *Romeo* in its USN form is not readily adaptable to the utility helicopter role. In particular, it is not well-suited for personnel movement missions. (Configured for ASW it can embark only one passenger. With some ASW equipment removed it can accommodate four. The *NFH* has a seating capacity of six even in ASW or AsuW mode, and more if some equipment is demounted.) The USN gets around this problem through the use of two *Seahawk* variants to cover the entire range of embarked helicopter roles. The MH-60S (*Sierra)* variant is used for personnel movement, search and rescue and vertical replenishment (and, in the future, for mine detection). The USN has the luxury of having more landing spots available on its surface vessels, which makes this strategy more viable than it might be for the RAN. However, Australia is not the only country that will face these constraints, and there is a prospect that Sikorsky will develop an 'international *Romeo*' that has demountable sensor fits that would allow the aircraft to be refitted for alternative roles in a short time—with a timeframe and costs yet to be determined.

As well as uncertainty in the timeframe for an 'international' aircraft to be developed, the demounting and remounting of sensors and other systems may prove to be easier in theory than in practice. Each time a system is replaced, there will be an inherent risk of damage or misadjustment and an associated need for retuning and/or re-calibrating each system for acceptable performance. Unless such a system is proven to be reliable under realistic embarked conditions—as attested to by USN operators—it would be preferable to stay with the baseline USN configuration and accept the limitations that would come with that. Attempting to do otherwise would also bring with it the time, cost and effort required to recertify the helicopter—an issue that has caused problems for the *Tiger* Armed Reconnaissance Helicopter and *Seasprite* programs.

Both contenders will require recovery and deck-handling equipment for bringing the

helicopter down safely in rough seas and/or poor visibility and for moving it securely on the deck after landing. The RAN's current vessels employ the US-developed Recovery Assist, Secure and Traverse (RAST) system that involves attachment of a cable to a probe on the bottom of the aircraft prior to landing. The future *Hobart*-class Air Warfare Destroyers will have a similar but not entirely compatible system called the Aircraft Ship Integrated Secure and Traverse (ASIST) system.

As configured for their existing customers, neither contending helicopter will be compatible with the aircraft securing and traversing system to be built into the AWDs (the Curtiss-Wright centreline ASIST), although the situation is somewhat complicated. The *NFH* will have as a baseline a European system called *Harpoon,* which uses a probe on the aircraft which locks into a grid on the deck. But Italy is adapting its *NFH* aircraft to use a variant of the deck-handling component of the ASIST system (called Twin Claw ASIST, which is not the same system the RAN's AWDs will have). The *Romeo* has the RAST as a standard fit and, although the probes of the ASIST and RAST systems are compatible, the method of aircraft capture is significantly different and it would only be able to use the system in its manual mode.

To operate from the different types of Australian surface combatant, either type will require some modification—again with a cost and risk to be determined. As well, if the new aircraft are to be able to operate interchangeably from any of the RAN's surface combatants, there will be a requirement to modify ships to accommodate the different restraint and traversing systems—again at unknown cost and risk and with the potential to reduce interoperability with allies.

Through-life issues

Given the stated requirement to reduce the number of types in the ADF helicopter fleet, the *NFH* appears to be well-placed to succeed, given that it is claimed to have significant commonality with the

Table 3: Comparative advantages of the *NFH* and MH-60R for the RAN

	NFH	MH-60R	Comment
Multi-role capability	✓✓	✓	The *Romeo* meets all essential requirements but the *NFH* has significantly more capacity in some roles. The USN operates two *Seahawk* variants to cover the whole suite of embarked helicopter roles.
Acquisition cost		✓	A$70–80 million for the *NFH* versus A$45+ million for the *Romeo*.
Commonality across helicopter fleet	✓		*NFH* will share about 80% of its avionics and airframe with the MRH-90. The *Romeo* will have limited commonality with the existing *Seahawk* fleet and none with the MRH-90 about to enter service.
Compatibility with surface combatants	?	?	Neither type is certified across the systems that will be on Australia's surface combatants and modifications to aircraft and/or ships will be required.
Through-life cost	?	?	Hard to judge on available data. Airframe and avionics commonality between the *NFH* and MRH-90 may be offset by additional complexity and high acquisition cost. Running costs of either type will depend on how closely the RAN baseline matches that of aircraft in service elsewhere.
Maturity	✓	✓✓	Deliveries of *NFH* begin late this year, but it will not enter service with the full suite of capabilities until 2011–12. *Romeo* is operational in USN now.

already-ordered MRH-90. The commonality will not extend to sensor and weapons systems—which will vary due to the differing operating environments and roles—but the basic airframe and avionics will be largely interchangeable.

The competition is still a real one. As we saw earlier, the *NFH* is likely to cost considerably more than the *Romeo*. Any savings that would accrue through fleet commonality would have to be offset against this acquisition cost difference and the benefit of greater interoperability (including logistically) with the United States. It is not clear which type would offer the best value when calculated across the life of the type. The *NFH* will have a number of configuration differences amongst its users, while the USN will—or is at least planning to—maintain tight configuration control. If Australian aircraft could be firmly baselined against the USN configuration, they could potentially benefit from the economies of scale of a much larger USN fleet. The evaluation of both types would require detailed information, including the possible procurement arrangements (such as whether ongoing technical management and support could be part of the acquisition)—and preferably drawing on actual operating experiences and costs. Table 3 summarises the relative merits of the two competing helicopters.

Conclusions

Australia's naval aviation capability has been problematic for well over a decade. Costs have been high and performance low. The RAN does not have the capability it requires to provide its surface fleet with modern war-fighting capabilities, or to train its sailors and submariners in the gamut of naval warfare tasks.

The current plans for the acquisition of a new generation of helicopters appear to be sound, with the caveat that the usual problem of introducing Australian-specific modifications does not appear to be avoidable. The world market only has two credible candidates, and both come with pros and cons.

Much has been made of the advantages of rationalising the ADF's helicopter fleets. Indeed, that was a major rationale for the establishment of the AIR 9000 project in its current form and the retirement before life-of-type had been reached of the Army's *Blackhawk* fleet. The *NFH* would seem to be a logical choice from this point of view. But the Sikorsky *Romeo* option also has its advantages, primarily in acquisition cost and maturity at the time of writing. (Of course, if the argument for rationalisation was correct, the former might be offset when a considered analysis of through-life costs is made.)

Probably the best option, if time and capability requirements allow, is to make a decision at such time as operator experience with both types, operating in their full range of tasks, is available.

And acquiring the hardware is only part of the story. The RAN needs the right number of suitably-trained personnel and an effective and efficient support system to get the most from any future purchases. Based on publically available information, there remains some way to go.

Endnotes

1 MRH-90 (Multi-Role Helicopter) is an Australian designation for the NATO Helicopter Industries NH-90.

2 Combat search and rescue (CSAR) is not equivalent to civilian search and rescue (which naval helicopters are also required to do on occasion) and requires a specially-equipped helicopter. With the LHDs coming along, with the potential for amphibious operations on greater scales, the ADF's need for a dedicated CSAR capability will only increase.

3 One full set of aircrew and maintainers (thirteen personnel in total) enables an aircraft to fly for up to ten hours in any twenty-four due to aircrew flying limits. If two crews are embarked then twenty-four hour availability (as opposed to actual flying) is possible if operationally necessary. These rates of effort would be difficult to sustain for an extended deployment.

4 Where, for example, acoustic sensors can be placed in the water in multiple locations simultaneously, allowing a single active sonar to act as a sound source for multiple passive sonars.

5 ASPI Policy Analysis 23, *ADF Capability Review—Royal Australian Navy*, April 2008.

6 The *Sea Kings* could deploy dipping sonar, but the equipment was retired in 1995.

7 The planned flying hours figure is not the figure reported *after* the event in the Defence Annual Report—it is the planned figure from the Defence budget papers, which shows what was intended *before* the period in question, and therefore provides a more accurate indication of planning versus reality.

8 Any assessment of the availability of the *Seahawk* fleet must take into account the impact of Project SEA 1405, which provided the *Seahawk* fleet with a Forward Looking Infra Red sensor, Electronic Support Measures (ESM) and Electronic Counter Measures (ECM) capability. This project has reduced the number of available Seahawks by three for the last five years and has been allowed for in this calculation.

9 Naval Aviation Force Department of Defence, Audit Report No.44 1998-99, Australian National Audit Office, Canberra, 1999. Available at http://www.anao.gov.au/uploads/documents/1998-99_Audit_Report_44.pdf

10 And this calculation overestimates the Army helicopter costs because it also includes a fixed-wing component that does not factor into the flying hours.

11 The figures of direct costs per flying hour are drawn from the *Defence Finance Manual 4 (FINMAN 4)*. Informal advice suggests that the *Sea King* figure might be an underestimate.

12 NATO Helicopter Industries (NHI) is a consortium consisting of Eurocopter, AgustaWestland and Stork.

13 The L3 HELRAS and Thales Underwater Systems FLASH.

14 Department of the Navy Fiscal Year (FY) 2009 Budget Estimates, Aircraft Procurement Navy, Washington, February 2008.

About the author

Dr Andrew Davies is the director of the Operations and Capability Program. He has previously written on naval capability issues including the ADF's anti-submarine warfare capability, the future submarine, and on the decision on the air warfare destroyer program.

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Important disclaimer

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