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DOD Acquisition Structures for a Dynamic World: A Case Study of Land Warrior vs TALOS

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DOD ACQUISITION STRUCTURES FOR A DYNAMIC WORLD: CASE STUDY OF LAND WARRIOR VS TALOS

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Abstract
The United States Special Operations Command (USSOCOM) is revolutionizing the capabilities of the warfighter with the Tactical Assault Light Operator Suit (TALOS) program. The program will equip USSOCOM operators with a powered, armored, exoskeleton to enhance their survivability, lethality, and mobility. The project launched in 2013, with a functional prototype scheduled to be complete in 2018. The aggressive development timeline necessitated that USSOCOM use a novel acquisition structure—the Joint Acquisition Task Force (JATF). The JATF structure mandates a government team as the lead integrator, consisting of acquisition personnel, engineers, and users. This study compared the TALOS acquisition structure to that of Land Warrior, a similar project in regards to scope that used a traditional acquisition structure. The Land Warrior program launched in 1993, underwent numerous scope changes, and was eventually cancelled in 2007 with only limited fielding. This study identified that a root cause for Land Warrior's cancellation is that its acquisition structure failed to capitalize on commercial innovations and changing requirements. These issues are critical considering the increasingly rapid advances in technology and the dynamic nature of the global socio-political climate. Meanwhile, the JATF structure allowed USSOCOM to avoid many of the pitfalls that Land Warrior experienced. This study analyzed developments to date to collect lessons learned from the TALOS project, focusing on its ability to capture innovation. This analysis found that the JATF structure allowed TALOS to foster innovation and account for changing requirements in a dynamic world.

Keywords
Acquisitions, JCIDS, Innovation

Introduction
Historically, technology developed by the United States military has out-paced that of the commercial sector. However, modern commercial technology is rapidly and unpredictably advancing, causing some military technologies to be obsolete by the time that they are fielded. These issues are coupled with dynamic changes on the global socio-political stage, which can result in changing needs for warfighters.

Land Warrior, a project that intended to augment the situational awareness of dismounted Soldiers through advanced electronics, faced these problems. The project was conceived in 1993; however, the inability of the project to keep-pace with commercial technology and adapt to the Global War on Terror, resulted in numerous delays, with the project eventually being cancelled in 2007. Despite 15 years of development and $500 million spent, the system was never fielded. This paper performed a root cause analysis on the failure of the Land Warrior system; the analysis identified that a fatal issue arose from the traditional Department of Defense (DoD) acquisition structure. The acquisition structure could not readily adapt the development process to account for changes in requirements due to commercial technology advances and changes in warfighter needs.

A new United States Special Operations Command (USSOCOM) initiative, the Tactical Light Assault Operator Suit (TALOS), is similar in scope to Land Warrior. However, this project uses a novel acquisition structure, the Joint Acquisition Task Force (JATF). The JATF structure allows the government to more readily leverage novel technology advances and account for changing warfighter needs. The TALOS program serves as an excellent example of how the government can design complex systems in a dynamic world.

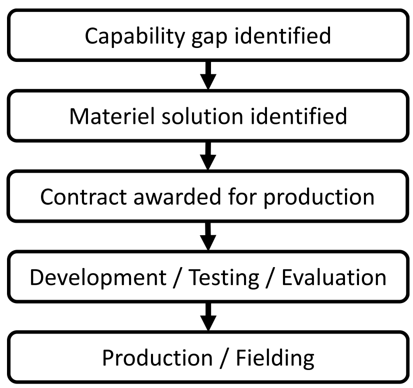
Challenges to Developing Military Systems in a Dynamic World

DoD Acquisition Timeline

While the DoD acquisition process is typically considered unnecessarily complicated, the process can be simplified down into the series of major steps shown in Exhibit 1 (Goldfien, 2015). First, the warfighter identifies a capability gap, which are the required capabilities that the warfighter is not able to perform. A requirement is derived from the capability gap and vetted by different agencies for an appropriate solution. The solution can include changes in doctrine and training, all the way to a materiel solution (i.e. a solution based on giving new equipment to the warfighter). If a materiel solution is deemed technically feasible, technical requirements for the materiel solution are derived. These technical requirements are included in a request for proposal that is distributed amongst industry. Different companies will submit proposals; the proposal that is lowest cost and technically feasible will be awarded a contract. Upon that contract being awarded, the contractor will assemble a team to develop the system. Early prototypes will undergo a number of tests, many of which are performed through government agencies to provide the contractor with user feedback. After testing, the systems are produced and fielded.

While straightforward, the actual time between the identification of the capability gap to the fielding of the system can be substantial. For example, the original capability requirement for the Joint Light Tactical Vehicle was derived in 2006; the first operational vehicle will not be delivered to a unit until 2019. While these timelines are necessary for assuring fiscal responsibility and technology development, the outside world is not stationary during these timeframes. Changes external to the project could cause a system to be obsolete or unnecessary prior to fielding.

Exhibit 1. Simplified DoD Acquisition Timeline



Innovation

Innovation is defined as the introduction of novel methods, ideas, and products to solve a problem (Innovation, 2017). The US military maintains a proud history of innovation, spanning "initiatives in weapons, tactics, organization, training, and other areas" (Rodriguez, 2016). Historically, innovations in military technology have led to modern textiles, vehicles, weapons, and computer systems. Despite this rich history, the current military fails to incorporate the principles of innovation into its acquisition process (Weisberger, 2014).

The previous decades have seen a massive increase in the amount of innovation in the commercial sector. Silicon Valley is littered with companies that are attempting to develop and market disruptive technologies. Though many of these companies focus on electronics, the digital nature of modern technology allows for these innovations to disrupt many other industries to include energy, automotives, aviation, communications, and computing.

The increase in innovation stems from a number of causes. First, the global communication infrastructure allows for the rapid spread of information, fostering collaboration between inventors across the globe. Second, several large companies base their business model around fostering innovation both internal and external to their company. Third, the domestic pool of engineers and scientists has substantially increased. This increase is due partially to the changing perception towards math and science. Also, small innovations in computing technology can result in considerable wealth when spread across the number of computer and cellphone users globally.

Innovation, by its very nature, is not predictable (Rodriguez, 2016). While traditional advances in technology are achieved through years of development efforts, innovation is caused from looking at a problem from a different viewpoint. For example, traditional Li-ion batteries increase in energy density by 6-10 percent per year; meanwhile, the development of a novel battery chemistry could achieve energy densities ten times that of Li-ion. Such an advance is difficult to predict when writing technical requirements years before a system is to be produced. However, if not properly accounted for, a military technology could be obsolete by the time that it is fielded due to innovations in the commercial sector or other military applications.

Changing Scopes

The rapid rise of innovative technology is mirrored by a dynamic socio-political stage. This socio-political stage necessitates that militaries be prepared to fight a broad array of adversaries. While the US military must still prepare for war with traditional, near-peer nation-states, an evolving global climate allows non-state actors to become increasingly relevant. These decentralized groups can push the US into war—twelve terrorists with box cutters brought an entire nation to a standstill and launched a war that still rages on 15 years later.

The increasing relevance of non-state actors is empowered by proliferation of technology. For examples, there are 98 mobile cellular subscriptions per 100 people globally (World Bank, 2017). While the proliferation of cellphone technology is positive overall, it does allow terrorist groups to spread their ideological thinking much more rapidly, especially through social media. Additionally, the widespread use of cellphones allows terrorist groups to communicate effectively to plan and coordinate a complex attack.

Since these insurgent groups are located across the globe and any of these groups could start a war, modern systems must be adaptable so that they can account for these changing requirements (Clevenger, 2016). Leading up to the Global War on Terror, many military systems were designed for conventional warfare. Suddenly, these devices were being used for wide area security and counter insurgency missions that they simply were not designed for. The DoD had to rush production of new technologies more suited for these mission sets. For example, before the Global War on Terror, the DoD developed the High Mobility Medium Wheeled Vehicle (HHMWV) to move Soldiers across the battlefield; however, the HMMWV could not handle the new threat posed by Improvised Explosive Devices (IED). In response, the DoD devoted massive amounts of time and resources to field more appropriate vehicles.

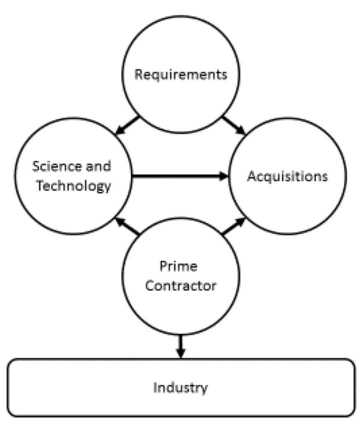
Acquisition Structures

Traditional DoD Acquisition Structure

The traditional DoD acquisition process leads to an acquisition structure involving the multiple entities shown in Exhibit 2. These entities work together to field a materiel solution for a capability gap. The requirements community disseminates information about a capability gap to the acquisition community and the science and technology (S&T) community. The S&T community then evaluates the requirement and determines if a materiel solution can fill a capability gap. In doing so, the S&T community typically consults with major industry partners that provide them snapshots of the current state of technology. The S&T community then provides technical requirements for a material solution to the acquisitions community. The acquisitions community will contract the project out to a prime contractor, typically a large defense company. The prime contractor then owns the project; they will proceed to assemble their teams, to include subcontractors, and start building prototypes.

Following the award of the contract, the S&T community and requirements community do not actively engage with the development of the system. Rather, the acquisitions community liaisons with the prime contractor only requesting support from the other communities as necessary. Typically, the acquisition community will request support for testing and evaluation from the S&T community and the requirements community respectively.

Exhibit 2. Traditional DoD Acquisition Structure

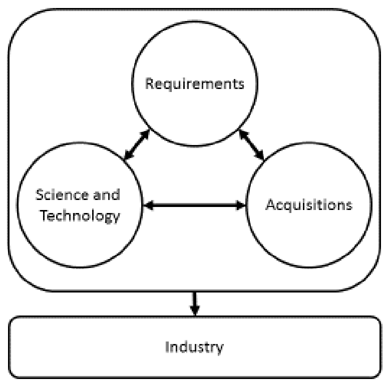


Joint Acquisition Task Force Structure

The traditional acquisition process uses a disciplined acquisition process that relies on a very fixed structure to look hard at the requirements and the trade-offs. However, urgent acquisition programs require a more agile approaches to meet more aggressive timelines. One such program was the Dragon Spear program where the USSOCOM rapidly needed to field modifications to the MC-130W System in 2009. To meet an aggressive timeline, USSOCOM established a JATF. In less than 12 months, an MC-130W was outfitted with its new suite of weapons. Seven months later, the capability was deployed to Iraq (Breede, 2014).

The JATF Structure promotes collaboration between the personnel handling requirements, acquisitions, and S&T, forming a cohesive team with a direct flow of information between the different entities, as shown in Exhibit 3. The requirements are typically managed by special forces operators, the end-users of the system; the acquisition processes are performed by contracting officers and program mangers; the science and technology analysis is performed by engineers. After performing the initial needs analysis, a JATF decomposes itself into teams, each consisting of members from each of the three categories. These teams are tasked with addressing a major line of effort for the project and are empowered to openly talk to industry to aid in the effort. These interactions can range from informal interactions at conferences and trade shows to putting members of industry under contract to provide technical support. In this way, the JATF operates as the prime-contractor and lead integrator of the project, roles typically held by large defense companies.

Exhibit 3. Joint Acquisition Task Force Structure



Changes in Requirements Related to Acquisition Structure

Over the course of a project, requirements must sometimes be changed for the aforementioned reasons. All changes to the project after contract award must go through the acquisition offices; however, the acquisition community is not the typical source of the requirement changes.

The need to change a technical requirement can either come from the prime contractor or from the S&T community. The S&T community typically tracks the state of technology since they have the technical expertise needed to identify the implications of these advances. However, unless the S&T community is heavily tied into a project, the information may not be communicated to the acquisitions community. Meanwhile, the prime contractor is tied-in heavily with the rest of industry, allowing them first-hand access into the state of the technologies relevant to their project. The prime contractor may choose not to report these advances to the acquisitions community if it potentially delays or causes issues with their project. Alternatively, they may report these advances if they feel that a change in technical requirements could be beneficial to their company.

A change in operational requirements from the warfighter can propagate down into changes in the system requirements. The requirements community will push down the need for these changes in operational requirements to the acquisition community. The acquisition community will then work with the S&T community to identify the changes to the technical requirements.

Upon identifying these changes in requirements, the acquisition community must work with the prime contractor to push through a change order. The change order will modify the requirements in the existing contract and update the cost. The prime contractor can push back, going as far as denying the change order, though that can result in contract cancellation.

One central issue towards these changes in requirements is that the entities in the traditional DoD acquisition structure that can identify the need to change the requirements are not the ones that can actually change the requirements. Additionally, communication between these entities can be somewhat limited, since they are not co-located and can potentially be scattered across the nation. However, the JATF structure allows for very open flow between the different entities by co-locating the users, engineers, and acquisition officers. Additionally, when the JATF is decomposed into teams, each team includes members from all three communities to allow them to readily collaborate and work through changing requirements.

The rigid nature of the traditional DoD acquisition structure necessitates the use the Joint Capability Integration and Development Systems (JCIDS), which uses of milestones to follow the process shown in Exhibit 1 (Goldstein, 2015). However, the cohesive nature of a JATF allows the use of a spiral development process. Spiral development, commonly used by agile software companies, leverages incremental prototypes and testing to adjust requirements during the development cycle. The spiral development process can be useful for a number of programs, including those with a significant human-machine interface, those that leverage commercial technology, and those with ill-defined initial requirements.

Case Study of Land Warrior

Overview of the Land Warrior Program

Following the end of the Cold War, the US Army launched the Land Warrior initiative to eliminate common capability gaps experienced by traditional infantrymen. Upon dismount from their vehicles, Soldiers' situational awareness immediately deteriorates as friendly forces disperse across the battle space. Land Warrior aimed to enhance the lethality, command-and-control, survivability, mobility, and sustainability of equipped units by allowing the Soldier to: "send and receive secure voice communications; create, send, receive, and store information; display and transmit still frame video and thermal visual images to include digital maps and graphics; and transmit and receive position location information and calls for fire" in addition to facilitating "far target location, target hand-off, and fire distribution" (Clifton, 2008).

Ultimately, however, Land Warrior fell victim to the inherent inefficiencies of its acquisition structure which prevented it from accommodating rapid advances in commercial technology and an evolving global climate including the beginning of the Global War on Terror.

Land Warrior Program Timeline

Exhibit 4 displays the development timeline for Land Warrior, broken up between programmatic development, testing, and setbacks. In 1993, the Army established an initial need for the integrated electronic system that would become Land Warrior. In 1994, the Army began developing operational requirements, and subsequently the development effort began. After a program restructure in 1998, work began on Land Warrior Version 0.6 which was field tested in 2000. After this experiment, the operational requirements were again restructured to be consistent with the realignment of forces focusing on traditional tank warfare. TRADOC approved these new requirements later in the same year.

In 2002, developmental testing began for the first generation of Land Warrior. Its designers completed their Critical Design Review (CDR), and in November the updated Land Warrior operational requirements were approved. Shortly thereafter, Soldiers from the 82nd Airborne Division conducted Land Warrior's first Early Functional Assessment (EFA). They deemed the system unreliable, lacking a robust enough architecture capable of handling Soldiers' needs or required connectivity. The lack of capability was partially due to a change in mission scope for the Army as infantrymen were now executing wide-area security missions and stability operations as part of the Global War on Terror.

In 2003, Soldiers from the 75th Ranger Regiment conducted a second EFA, echoing similar skepticism about the system's reliability, while also citing the high cost per unit. The high cost had become a significant issue because the Army was focusing its budget on war essential purposes. Congress and Program Executive Office (PEO) Soldier dissolved the agreement for the remainder of the first iteration. The Army also cancelled production of 140 systems in favor of an alternative program, the Dismounted Battle Command System (DBCS). Despite this, General Dynamics C4 Systems (GDC4S) was awarded a contract to develop the second generation with a special emphasis on Stryker-equipped units. Later, the U.S. Army Infantry Center approved an initiative to restructure the LW program again.

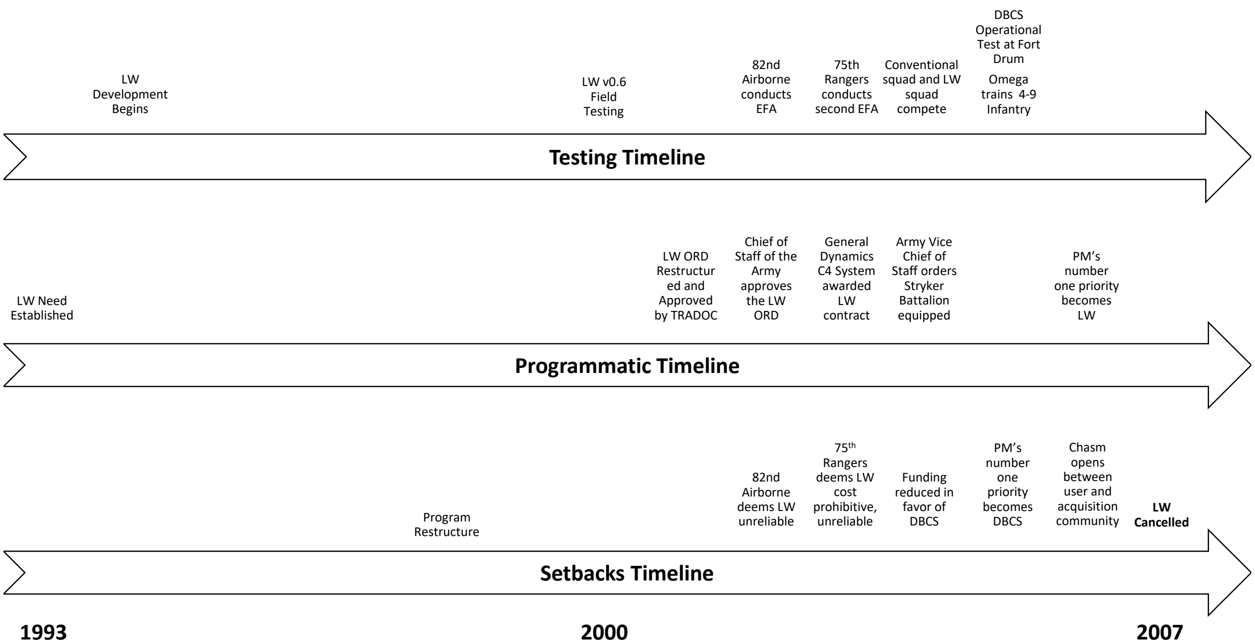
Land Warrior progressed, completing a second CDR in May of 2004, but unfortunately the Army reduced program funding in favor of the DBCS. Just a month later, a side-by-side experiment was conducted at Fort Benning pitting a conventionally equipped squad against a Land Warrior equipped squad. Land Warrior performed well in this test, and the Vice Chief of Staff of the Army ordered an entire Stryker battalion of 440 personnel to be equipped.

In early 2005, PEO Soldier was mandated to shift focus to the DBCS, in response to growing pressure from the warfighter to produce systems relevant to current operations. PEO Soldier altered the acquisition structure accordingly, focusing solely on the DBCS. In August, the Army Test and Evaluation Command tested the DBCS with the 10th Mountain Division at Fort Drum where it performed quite poorly. As a result, focus shifted back to prototyping Land Warrior, culminating in a highly successful training course with 4-9 Infantry.

As testing progressed into 2006, the chasm between the user and the acquisition community began to widen. Users were skeptical that LW could be adapted to meet the needs of units across the military. Additionally, as the LW program entered its thirteenth year, many could not understand how LW had not deployed any variants, while the commercial civilian market had produced several essentially equivalent technologies in the same time frame. A VIP demonstration day was organized to impress several high level officials; however, the Soldiers that participated in the test expressed extreme dissatisfaction in the system's setup, usability, size, and weight, especially when compared to commercial technology.

As a result, the Army cancelled the Land Warrior program in 2007.

Exhibit 4. Land Warrior Project Timeline.



Land Warrior Acquisition Structure

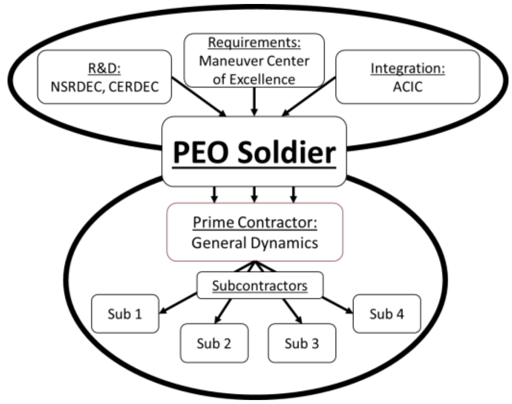
The Land Warrior acquisition structure exhibits many of the aforementioned characteristics of the traditional DoD acquisition layout. Exhibit 5 graphically depicts the organizational relationships of the major players in the acquisitions process. The initial requirements were produced by the Maneuver Center of Excellence (MCoE). The S&T efforts were handled by the Natick Soldier Research, Development, and Engineering Center (NSRDEC) and the Communications-Electronics Research, Development, and Engineering Center (CERDEC). The testing was supported by the Army Capabilities Integration Center (ACIC). The acquisition process was overseen by PEO Soldier, who awarded a contract to General Dynamics C4 Systems (GDC4S), which had a number of subcontractors developing the different components to the Land Warrior system.

Since the acquisition structure used a traditional DoD Acquisition Structure, after the contract was awarded to GDC4S, any contract modifications had to be implemented by PEO Soldier. However, they did not have the capacity to change the requirements without input from NSRDEC, CERDEC, or MCoE.

Issues with Land Warrior and Changing Scope

From the beginning, the changing nature of the global military environment plagued the Land Warrior project. Because the program began in the post-Cold War environment, Land Warrior was fixed in a nation-state versus nation-state mindset that, while on a much grander scale, rooted itself in traditional small unit tactics. Such an active, kinetic form of warfare demanded little more from a technological solution like Land Warrior than enhanced battlefield awareness, typically for lower level commanders.

Exhibit 5. Land Warrior Acquisition Structure



However, the beginning of the Global War on Terror in 2001 brought a far different approach to ground combat, primarily focused on security and stability operations. This change in operating environment stretched U.S. forces thin, often requiring smaller units (often platoons and individual squads) to conduct operations throughout a much larger area. Small unit commanders required an improved understanding of the battlefield across a spectrum of larger and more nuanced mission sets. The need for greater situational awareness of individual Soldiers and small unit commanders skyrocketed, effectively increasing the complexity and volume of capabilities Land Warrior was tasked with providing.

In addition to adapting to this tactical and strategic evolution, the Land Warrior project manager was forced to attempt to balance competing interests from higher up in the chain of command. Land Warrior was being pulled in multiple directions, essentially tasked to develop a one-size-fits-all solution to accommodate the ranging needs and requirements of almost every infantry subcommunity, including: special forces, airborne, mechanized, light, heavy, and air assault units. These subcommunities each brought their own expectations to bear, imposing overly ambitious desires on a nascent system already constrained by available technology and its own acquisition structure.

Moreover, this time period saw a large amount of innovation and disruptive technologies in the commercial electronics sector. For examples, cellular phones evolved from the Nokia 101 "candy bar" phone to the Nokia N95 smartphone during this time. Similar progress was made throughout the electronics industry. However, the Land Warrior system was not able to readily modify its technical requirements to be able to keep up with this rapid technology growth in the commercial sector. Soldiers saw this as a failure since their adversaries because commercial products, which were available to their adversaries, were more advanced than the LW system.

Case Study of TALOS

Overview of the TALOS Program

The TALOS system is a powered armored exoskeleton inspired from the Marvel comic book Ironman suit. The suit will provide technology that increases operator survivability, lethality, mobility, and spatial awareness in the current battlefield environment, especially in urban and room clearing operations. The TALOS system is a USSOCOM initiative intended to provide operators a distinct battlefield advantage over enemy combatants. Due to the inherent usefulness of the suit, the TALOS program became a top priority for USSOCOM, with a goal of developing a functional prototype by 2018 (Harper, 2014).

TALOS Acquisition Structure

TALOS adopted a Joint Acquisition Task Force structure to organize its development team. JATF-TALOS was established in September 2013, combining special forces operators, engineers, and acquisition personnel to form the team. The new team performed an initial analysis of the system and identified several of their shortcomings. Though many of these shortcomings were addressed by pulling additional personnel from USSOCOM, the JATF reached out to industry to get contracted support for key vacancies, especially those related to systems engineering.

Though the overall goal of TALOS is to deliver an advanced combat suit, USSOCOM decided to also treat TALOS as an opportunity to try novel acquisition strategies. One such strategy was establishing a JATF with the intent of mirroring the success of Dragon Spear. As mentioned previously, the Dragon Spear program used a JATF in collaboration with an agile spiral development process to rapidly field aviation updates to the MC-130. That decision also set the JATF to serve as the lead integrators of the project as opposed to using a prime contractor.

The initial team performed a functional decomposition of the TALOS system, following the initial requirement analysis. The JATF was divided up into functional teams, such that there were users, engineers, and acquisition officials on each team. Originally, six functional teams were developed for mobility, power, survivability, human factors, communications, and data processing. Certain functional areas, such as the mobility function and the power function that were considered high risk. As such, extra personnel and resources were allocated towards that function. Each functional team was empowered to connect directly with industry to investigate solutions. Promising solutions could be awarded contracts to develop and test their technologies for inclusion in the TALOS prototypes.

TALOS Timeline

Exhibit 6 gives a timeline of the TALOS development effort, consisting of separate lifelines for testing, programmatic developments, and setbacks (JATF-TALOS, 2016). The timeline spans from 2013 to the present.

In 2013, ADM McRaven, the head of USSOCOM, established a vision that special forces operators should be equipped with an "Ironman Suit." USSOCOM subsequently took his vision and established a need for the TALOS system. The project was unveiled at the Special Operations Forces Industry Convention in May 2013, and the JATF was established soon thereafter. By the end of 2013, the JATF was fully assembled and subsequently decomposed into their functional areas. These groups immediately started to reach out to industry to identify solutions.

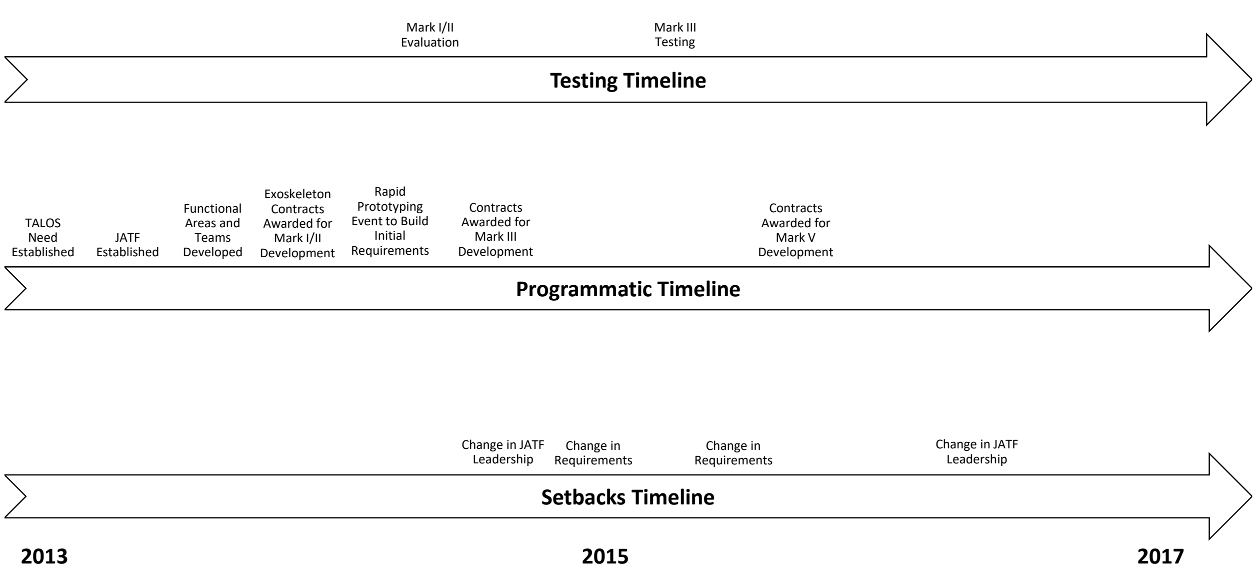
Multiple industry day conventions were held, where members of industry with relevant technology would display their devices to the TALOS team. These industry days allowed for the JATF to build a network of industry partners. These industry partners were brought in for the first of several rapid prototyping events in the spring of 2014 with the goal of determining operational requirements and deriving system requirements.

The JATF adopted a spiral development process, producing systems each year for testing and evaluation. These systems are referred to as Mark I, II, III, and V suits; the Mark IV suit got cancelled in order to focus on furthering the Mark V deliverable. Though spiral development is typically associated with an increased cost, the cost was kept in control by focusing each deliverable on certain technology improvements. Additionally, each iteration allowed for the requirements to be updated based on test evaluations. Furthermore, each requirement update could account for changes in user needs and innovations in the commercial sector.

Ability of TALOS to Adapt to Changing Requirements

The TALOS structure allowed for the rapid integration of new requirements into their design. Since the JATF functional leads had direct access to the users and to industry, they were able to review requirements after each iteration and update them accordingly.

Exhibit 6. TALOS Development Timeline



In regards to innovation, the JATF assumed a posture of constant market research. The engineers would continue to investigate new technologies from industry, academia, and government labs. Certain immature technologies were monitored closely to determine if the developments were adequate for integration into the TALOS system. These technologies ranged from hydraulic exoskeletons to haptic displays. Additionally, advances in certain key technologies, such as Li-ion batteries and computers processors, were monitored to ensure that the technical requirements were in-line with the current states of technology.

In regards to changes in scope, the inclusion of users in the JATF allowed for key technology decisions to be made with input by the end-user. For example, an initial requirement had a very high power draw for a long duration; however, projections in technology indicated that the only solution was a hybridized 2-stroke engine with Li-ion batteries. The users indicated that they would prefer a reduction in capabilities and a shorter mission duration to achieve a simpler and quieter power solution. The follow-up analysis created new operational and technical requirements to better align with a battery solution.

Though the engineers and acquisition officials connected with industry through market research, JATF-TALOS held numerous events to connect the users with industry as well. This interaction was identified as a possible source of innovation, since the users would sometimes find creative solutions to technical challenges. These events included rapid prototyping events, where the JATF and industry partners worked together to develop and test prototypes. Not only did these events allow for better definition of requirements, the building and testing of prototypes also supported the final integration effort. Additionally, JATF-TALOS held a number of prize challenges to allow for more interaction with a wide range of industry. These prize challenges tackled hard issues, such as exoskeleton actuation and digital latency. They were broadly advertised to get submissions from non-traditional sources, such as small businesses and start-up companies. By developing these events, as well as the ongoing connection with industry, JATF-TALOS was able to consistently account for changes in technology (Garamone, 2015).

Lessons Learned and Application to Other DoD Projects

To date, the TALOS development can be deemed as a success; the project is projected to produce a functional prototype in Summer 2018. TALOS has not had any cost overruns and have mitigated most of the major risk items associated with the project. The project has undergone 4 spirals, producing and testing a prototype annually. The testing of the prototypes are combined with changes in needs and advances in technology to create an updated set of requirements for the next spiral. This system has allowed for the TALOS program to avoid many of the pitfalls associated with the Land Warrior program.

The Use of a JATF Structure

Though many projects need to rely on the traditional DoD acquisition process and structure, many programs can replicate the success of TALOS through the use of a JATF. In particular, the JATF structure should be applied to those projects that plan to heavily leverage commercial technology. The agile nature of the JATF allows for the requirements to be updated to remain current with the state of technology. Also, the JATF structure is useful for high risk projects with short timeframes. The structure collocates the requirement writers, acquisition officials, and S&T personnel, allowing for more collaboration and a more efficient development process. Moreover, the JATF structure is useful for projects with significant human-machine interactions. The inclusion of users in the JATF allowed for the requirements to be consistenly updated to account for changes in their mission scopes.

Inherent in the JATF structure is the government playing the role of the prime contractor and integrator. Placing the government in this position creates additional benefits in allowing for updating requirements without the need for change orders. Moreover, the government is not constrained to making a profit for their stakeholders, as are most defense contractors.

However, the use of the government as the prime contractor does have several disadvantages. First, the government may not have the necessary skill sets, especially in regards to systems engineering. JATF-TALOS overcame these shortcomings by bringing support contractors onto the team to meet these shortfalls. Second, the government does not have pre-existing networks with small companies throughout industry, as do most large defense companies. This network was inherently critical in monitoring industry and ensuring that technical requirements relied on cutting-edge technology. JATF-TALOS built its own network through the use of industry days, rapid prototyping events, and prize challenges, to allow for better outreach and industry connection. These outreach efforts were fruitful in building a large network of commercial partners.

The Spiral Development Process

The JATF structure is conducive to the frequent changing of requirements inherent in a spiral development process. Though it is possible to leverage a spiral development process with a traditional DoD acquisition structure, the structure is not flexible enough to realize the full benefits of the process. Similarly, a spiral development process is not appropriate for many DoD projects. However, it is applicable for many projects, especially those that have a large amount of risk due to a large amount of unknowns. For example, a spiral development project is useful for projects addressing a complicated, dynamic threat.

The heart of the spiral design process involves pushing hard for a first prototype for testing and evaluation, often sacrificing good systems engineering principles. Though the first prototype is often considered a failure, the development team gets better resolution on the unknowns for the project and to use this gained knowledge to update requirements for the next iteration. By rushing to an initial failure, the project team identifies areas of risk, can adopt appropriate risk mitigation strategies, and push forward to a subsequent prototype.

Conclusions

The long timelines and stringent structure associated with the standard military acquisition processes can result in final systems being fielded that are obsolete or no longer necessary. The Land Warrior system is an example of such a system. The system was developed between 1993 and 2007 before ultimately being cancelled. The acquisition structure followed a traditional DoD acquisition structure with individual centers doing the capability gap analysis, science and technology, and acquisition. Additionally, the structure necessitated that the prime contractor, General Dynamics, adhere to requirements that could not readily be changed to accommodate new requirements.

USSOCOM developed a new acquisition structure, the Joint Acquisition Task Force (JATF) to develop the TALOS system. The JATF consists of special forces operators, engineers, and acquisition officials, who also fill the role of being the lead integrators. This structure, coupled with its spiral development process, allowed for the system requirements to be updated to better account for current needs and technology innovations. JATF-TALOS has had significant success to date and serves as an example of how to add adaptability into the DoD acquisition process.

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