HELMSMAN

The Helmsman Sustainment Complexity Review

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1. EXECUTIVE SUMMARY

The Helmsman Institute was engaged by the Defence Materiel Organisation (DMO) to review the complexity of DMO sustainment operations. This review evaluated the complexity of sustainment, the causes for this complexity, made comparisons with commercial organisations with similar operations and analysed the impact of this complexity on the DMO. Additionally, Helmsman have provided recommendations to reduce this complexity.

Helmsman completed a nine month exercise, with field trips and data capture from twenty-six product lines, with a focus on the larger product lines.

Sustainment Complexity

The results of the review identified that sustainment complexity included product unique factors (Foreground Complexity) and factors that where consistent across products (Background Complexity).

Helmsman found that Foreground Complexity is dominated by seven factors:

- **Systems** - The inherent complexity created by the 'system of systems' used to deliver the required defence capability.
- **Orphanage** – The level of to which Australia has become the design authority for the systems within a product create substantial additional complexity as Australia takes over design authority.
- **Age** – As platforms progress through the capability life cycle, the complexity of sustainment changes. The most important age factor is the level of certainty around planned withdrawal dates.
- **Usage**- The missions, locations and deployment of ADF products creates complexity through the need to manage multiple locations and sub-fleets of equipment. The most significant factor in usage is the level of ongoing combat theatre rotations.
- **SPO Business Model -** The business model that the Systems Program Office (SPO) follows creates a varying level of complexity. The single most important area of the business model that drives complexity is the quality and type of supplier relationship.
- **Controls –** To sustain the more complex products, sophisticated databases and systems for configuration, maintenance and inventory management are required to ensure integrity. If these lack integrity, the SPO's face considerable challenges in managing sustainment.
- **Stakeholders-** The network of relationships that a SPO has to manage and work with can create substantial complexity, with the most telling complexity driver being the level of ongoing public and political interest.

Background Complexity is mainly impacted by three factors:

- **The Compliance Burden**- SPOs operate with a high compliance burden created by the background level of regulation. This is exacerbated by the 'grey' needs of providing responses to public and political concerns the level of risk tolerance within the sector and the efficiency of the DMO's compliance processes.

- **Business Constraints-** The DMO has a number of unique business constraints which limit the degrees of freedom for a SPO. These are mostly from ADF and Government staffing and funding approaches.

- **The DMO business model**- The DMO business model has a wide variation in approach to the sustainment role. Historical issues around original parent organisations, individual service influences and the attendant variation in functions present challenges to full integration and harmonisation across the sustainment function. This differs from the now mostly harmonised approach used in acquisition.

By combining these and numerous other factors, a comparative assessment of the overall complexity experienced for each product was developed. The following diagram (Exhibit 1) represents the assessment of overall complexity for each of the products examined.

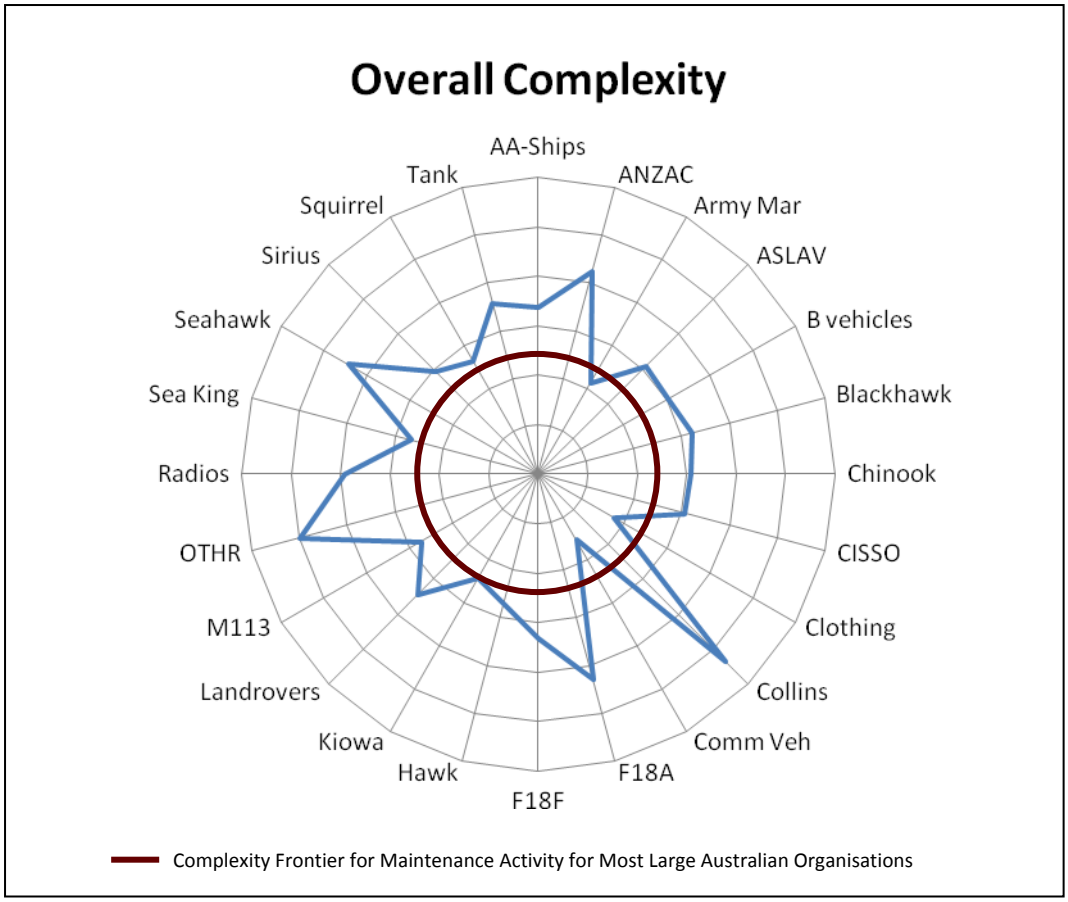

Exhibit 1: Relative Sustainment Complexity across DMO product lines
(*note –Helmsman identified that a substantial increase in complexity would occur if the ADF experienced an increase in operational tempo to that of a significant wartime tempo)

Comparison of Complexity

When compared to other Australian organisations, most DMO products are of similar complexity, but a number are more complex. In regards to the most complex ADF systems are more complex than most Australian commercial systems

The complexity of ADF systems with sophisticated combat and mission systems is higher than systems generally supported by Australian organisations. Platforms with this level of complexity include ANZAC, Collins, F18, SeaHawk and OTHR. Other platforms that would expect to be of similar complexity would include the P3, Wedgetail, FFG, Vigilaire and ARH.

The Impact of the identified Sustainment Complexity factors

A number of Factors are largely outside of DMO control

Factors that are largely outside of DMO control are those that are strongly driven by Government and ADF decisions around the required defence capability, and general governance requirements that apply to all government departments.

These include:

- Systems Complexity
- Orphanage
- Aging
- Compliance Requirements

Some Significant Factors are largely under DMO control

Factors that are under DMO control are mostly related to the way in which sustainment is conducted. These factors include the relationships with suppliers, the systems that the DMO uses, the way in which it manages compliance and the processes, skills and approaches the staff use day to day. These factors include:

- The contracting approach
- The control systems
- Compliance efficiency and processes
- DMO business model

Recommendations

Helmsman is recommending three main actions:

1. Create the capacity (space) to execute Smart Sustainment by:
   - Applying lean methodologies to the DMO compliance process development.
   - Moving supplier relationships to a stronger through life outsourced approach (with value for money changes).
   - Automate compliance and reporting requirements where cost effective.

2. Introduce a more consistent operating model across sustainment by:
   - Developing a Sustainment Manager role similar to that of a Project Manager.
   - Developing asset management skills within the DMO.
   - Providing sustainment based measures, methods and tools to enhance business oriented reporting.

3. Continue to improve on core business by:
   - Improving the control systems used to support the technical sustainment areas for specific SPOs.
   - Clearly informing stakeholders of the impacts on sustainment associated with changes in complexity.

Contents

2. HELMSMAN COMPLEXITY REVIEW

1. What elements create complexity in sustainment?

Helmsman recently completed a nine month field evaluation of the complexity of sustainment of the products supported by the Defence Material Organisation (DMO). The scope of effort was constrained to the complexity as experienced by the DMO. The evaluation consisted of field trips to some of the largest DMO Project Offices (SPOs). During these trips, Helmsman evaluated twenty-six different products, ranging from the Collins submarine to Army Maritime products and Commercial Vehicles.

The Field trips established which factors drive complexity using Helmsman's underlying complexity theories and models. During the field trips, the project team interviewed in excess of 200 SPO personnel for a total of approximately 500 man hours of interviews. Helmsman also reviewed substantial data provided by the SPOs, the DMO and from public sources.

It was apparent that while some factors changed across products, others factors had the same impact regardless of which product was being evaluated. The factors that change in complexity from product to product are 'Foreground' complexity factors. These are generally factors driven by the product or SPO characteristics. Helmsman identified 65 foreground factors which explained the variation in complexity between the products.

'Background' factors generally introduce complexity irrespective of the product or the SPO. These factors are driven by the DMO business environment and the methods and systems used to manage the overall approach to sustainment in the DMO.

2. Foreground Factors

Foreground factors are created from the technical issues faced in managing the product, the way the product is used, and the specific business context within which the product or SPO is sustained.

The 65 Foreground factors that Helmsman identified as driving the underlying complexity required to sustain a product were grouped into three areas:

1) **Technical Complexity Areas – Complexity based on what was acquired**

This is the inherent complexity created by the systems used by the product or platform to provide the required capability. This underlying system complexity is modified by the level of orphanage, the global fleet size, age issues, and the complexity of supporting the product.

2) **Usage Complexity Areas – How it is used**

Usage complexity measures the way that the platform is being used in ADF service. The two factors that modify usage complexity are, the way the product is deployed and distributed (Usage) and the variation and size of the Australian fleet (Variation).

3) **Business Context Areas – How it is managed**

The Business context captures the issues created from the way that the Commonwealth oversees and governs the assets in the product lines. The main elements are the SPO business model (mainly contracting approach), the quality of the SPO control systems, and the stakeholder complexity faced by the SPO

Within the three groups, an additional level of commonality created ten groupings of factors (represented below in Exhibit 2). This breakdown provided a meaningful level of complexity groupings to identify actions that could be undertaken to manage the complexity. Only the most significant areas (Systems, Orphanage, Age, Usage, Business Model, Business Controls and Stakeholder Complexity) are covered in the main body. The others are described in detailed model definition documents presented to the DMO previously.

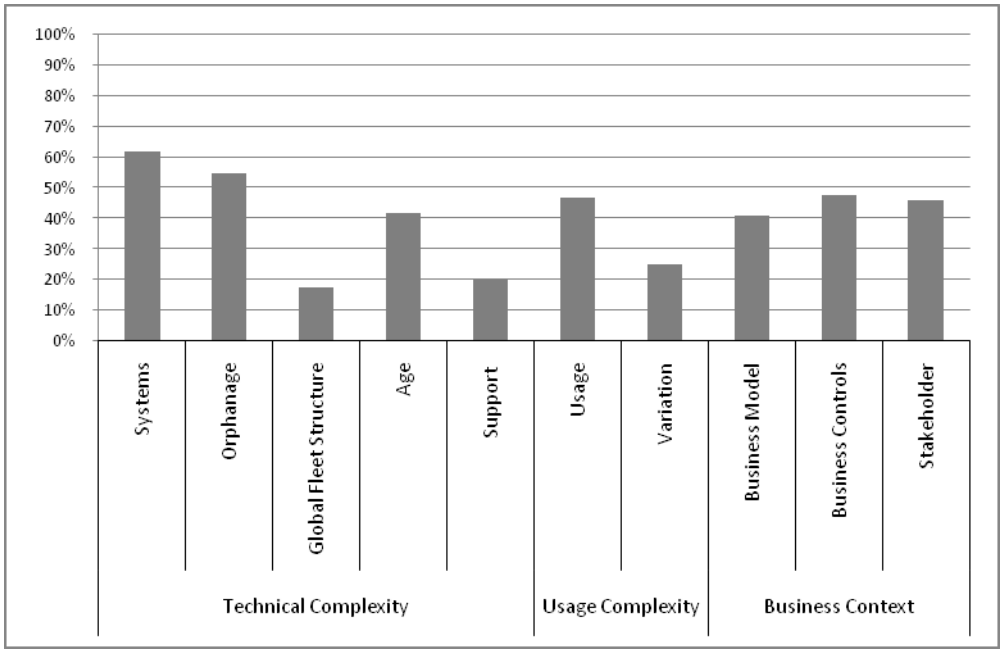

Exhibit 2: Factors driving Foreground Complexity

Technical Complexity

Technical complexity is inherent in the technology, the state of the technology and the way the technology is integrated. These factors tend to remain fairly static through the life of the product except for impacts of upgrades, aging and configuration changes.

Technical complexity includes five areas:

- System complexity
- Orphanage complexity
- Global Fleet structure
- Age related complexity
- Support related complexities

Of these five areas, Systems, Orphanage and Age related complexity are the most important in indicating the complexity of the product.

System complexity

Systems complexity factors are the most important in creating complexity across all products. The activities captured in the systems complexity factors identified that most of the complexity is created by the engineering issues associated with the 'system of systems' in the product.

The main systems identified in these 'system of systems' were:

- The structural elements (hulls, chassis and bodies, and fuselage elements)
- The mechanical systems (engines, propulsion, ancillary, and service systems (fire suppression, water, electrical and similar))
- The combat or mission systems (the effectors, command and control and sensor systems) and the level of fusion and integration within these systems.

Based on the knowledge gained from the project complexity work undertaken previously, Helmsman was able to simplify data capture by looking at the domains that the combat systems operated across; and their role in the battle space network.

The most important predictor of systems complexity is the level of complexity of the mission or combat system. The platforms that have highly integrated and multifaceted combat and mission systems create far more complexity than mechanical or structural systems.

The system complexity of a product or platform is essentially inherent in the required capability. That is, once a given level of capability is selected, the complexity of the underlying system is mostly given. The relative systems complexity of the products evaluated is shown in Exhibit 3.

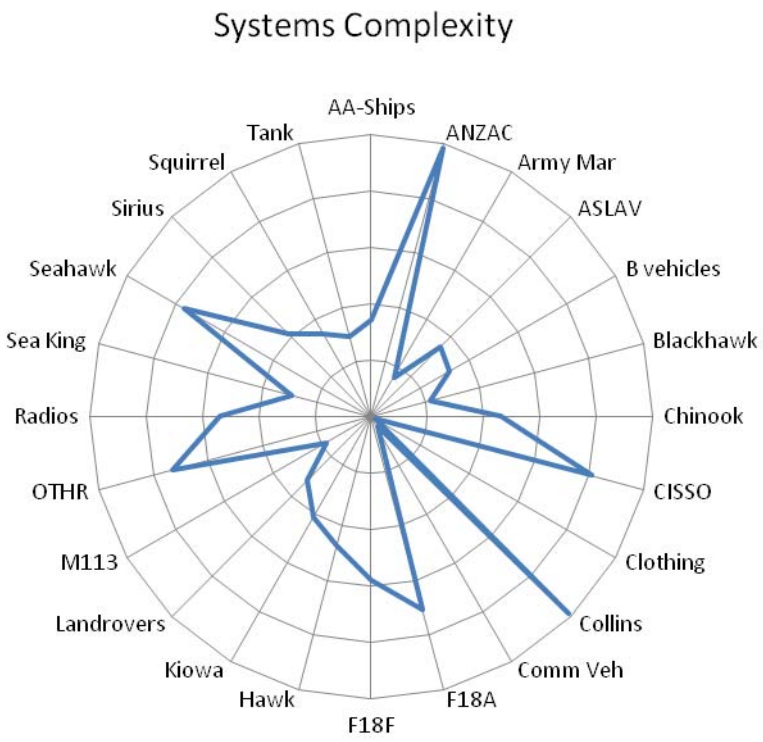

Exhibit 3: Relative Systems Complexity across DMO product lines

Orphanage Complexity

One of the earliest and most striking findings of the review was the impact of product orphanage. Product orphanage occurs when the ADF becomes isolated from global support for the product. Orphanage can be created strategically or tactically. The strategic creation of orphanage is created when the Government decides to select a technology where the ADF is the parent organisation for the design, and thus takes on board the majority of the engineering risk.

Tactical orphanage occurs when a platform that was originally mainly supported internationally, drifts away from that standard. This can occur in one of two ways, either the platform upgrade plan migrates away from the global standard, or the global standard becomes obsolete and Australia becomes isolated through obsolescence.

The complexity created by orphanage results in increased engineering demand, decreased supplier support, part supply shortages (and increased prices) and general increased management oversight.

The complexity created as a result of orphanage for the products evaluated is shown in Exhibit 4.

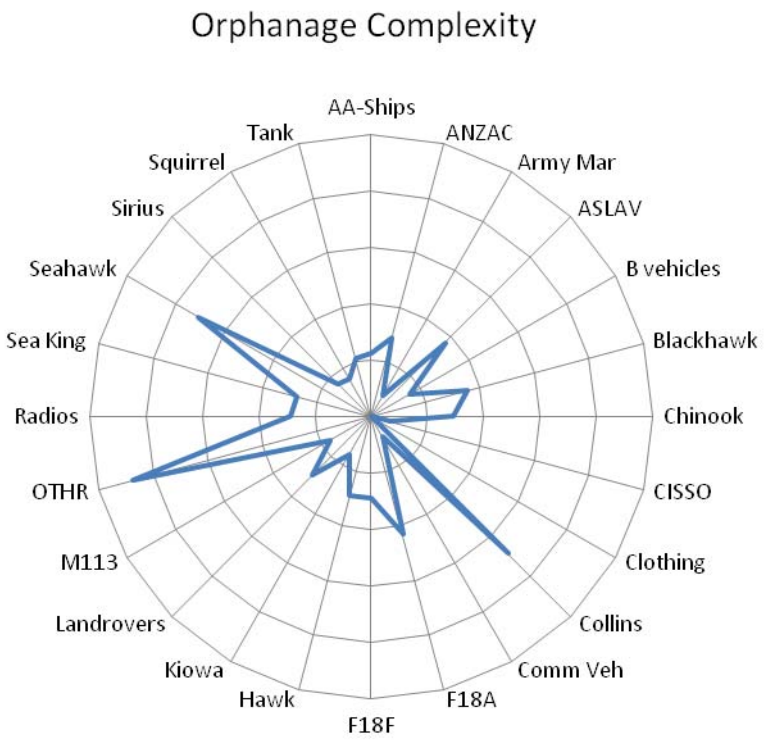

Exhibit 4: Relative Orphanage Complexity across DMO product lines

Age Related Complexity

Age related complexity is mostly created by issues related to increased levels of uncertainly as products age. The most significant age related factors relate to lack of clarity around planned withdrawal dates. The actual age of a product has some, but less impact on the complexity (other than for the F18A which has significant corrosion and structural issues that will be compounded if the planned withdrawal date varies).

SPOs that had issues around moving or uncertain planned withdrawal dates had much higher complexity. This was created from the need to plan, replan and plan again and again. Each time a planned withdrawal date moves the end of life costs and sustainment approaches have to be reviewed by all elements of the SPO. The SPO has to review the engineering risks, the maintenance plans have to be recut, the inventory level for parts has to be recalculated and potential lifetime buys enacted. The faster the planned withdrawal dates are changing the higher the complexity created for the SPOs.

Obsolescence of parts is also an important complexity factor, but the majority of the issues created by obsolescence are captured through the orphanage complexity measures. As parts become obsolete, the main impact is to make the product more tactically orphaned, with the ADF becoming more and more self reliant.

The impact of age on the complexity of products evaluated is shown in Exhibit 5.

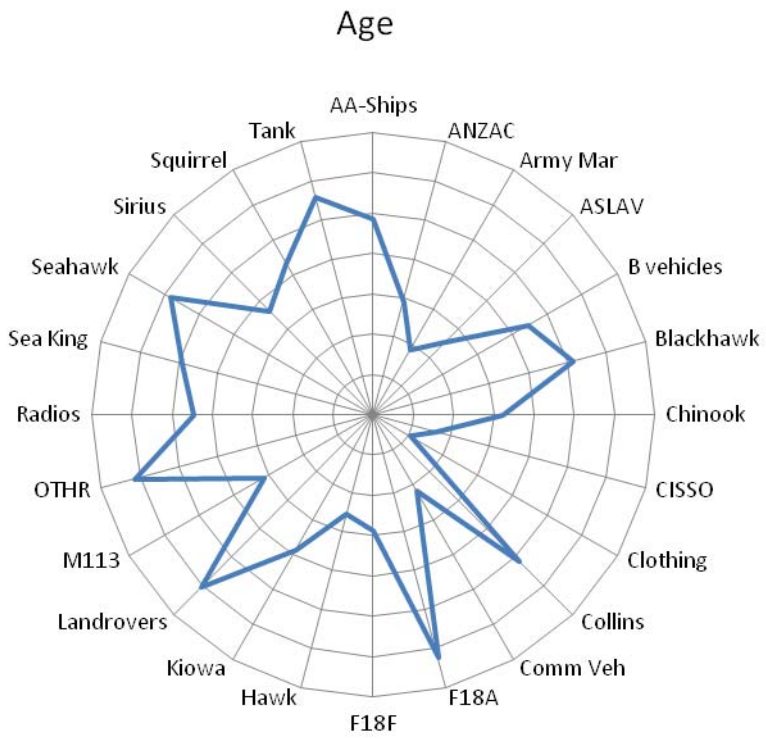

Exhibit 5: Relative Age Complexity across DMO product lines

Usage Related Complexity Areas

Usage related complexity evaluated the way the usage and fleet of required technical capability is used in the ADF. This area captures the consequences of deployment, both in terms of locations, operational deployment and fleet sizes.

The locations and geographic dispersion of equipment have a sizable impact on the complexity required to manage the equipment or product. This is generally due to increased numbers of stakeholders, and an increase in the difficulty of managing the fleet across distributed locations. This fleet management constraint is created as the fleet becomes a series of mini-fleets, each with unique aging, usage and environmental issues, requiring unique and specific management.

The most important usage factor is the level of ongoing combat theatre rotation. For some products, the regular combat theatre rotation of equipment is creating high levels of complexity as the SPO has to prepare equipment, plan for deployment, support the equipment in field with very high levels of responsiveness, prepare the return, and manage the restitution after Customs and AQIS inspections and repair battle damage.

The comparisons of complexity levels related to usage are shown in Exhibit 6.

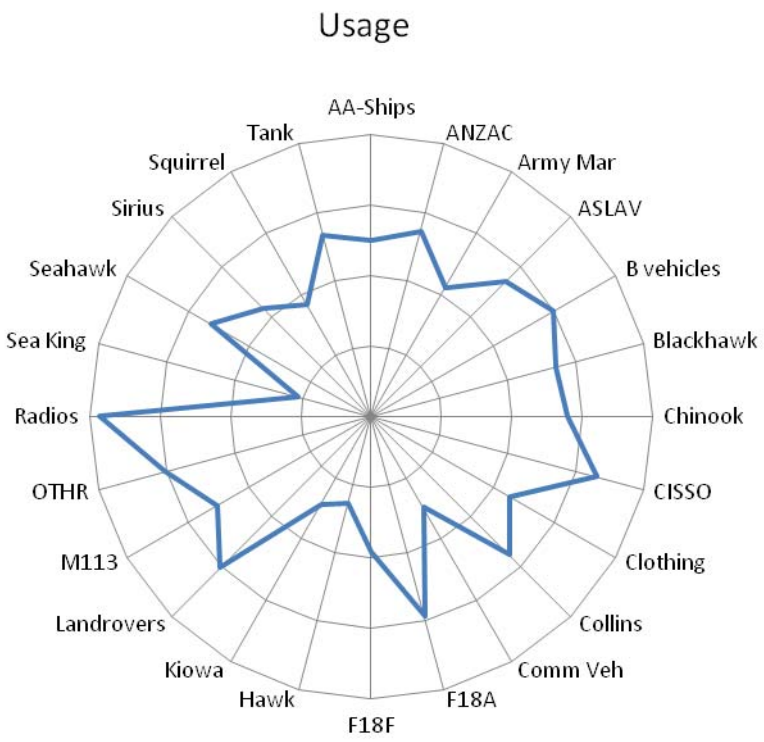

Exhibit 6: Relative Usage Complexity across DMO product lines

Business Context Complexity Areas

The Business Context complexity area is the measurement of the complexity created by the management and business approaches to managing a product. The factors of the business context complexity include the more business oriented sub-factors of (captured under business model areas), controls (mostly technically related) and stakeholder complexity.

Business Model Complexity

The business model complexity factor includes those relationships, processes, systems, governance, policies and other business activities that are required to manage sustainment. The business model factor has two significant sub-factors in creating complexity. These two sub-factors are the type of contracting model used to manage the product, and the status of the supplier relationship.

The contracting model is one of the most important sub-factors for the DMO, as it is an area that is essentially under DMO control.

Helmsman assessed the complexity created by the contracting model by evaluating how much of the activities of the SPO where outsourced, how clear the accountabilities and measures were and the coverage of the contracts. These elements where then combined into a more limited set of measures that captured the typical range of arrangements in the SPOs. This approach was sufficient to evaluate if contracting was an important driver of complexity, and what was needed to reduce complexity.

As the review progressed, it became clear that the contracting model was a very important determinant of complexity, and the team developed a perspective on the efficacy of the various

models from both a complexity creation perspective, as well as some indicators of value for money and strategic risks around implementing the approaches that reduce complexity the most.

In essence, the review found that a well structured performance based relationship with a strong well managed relationship is extremely effective in reducing complexity for the SPO and the DMO. However, the ability to achieve value for money in these agreements requires additional elements to be considered.

The impact of the business model by product is shown in Exhibit 7.

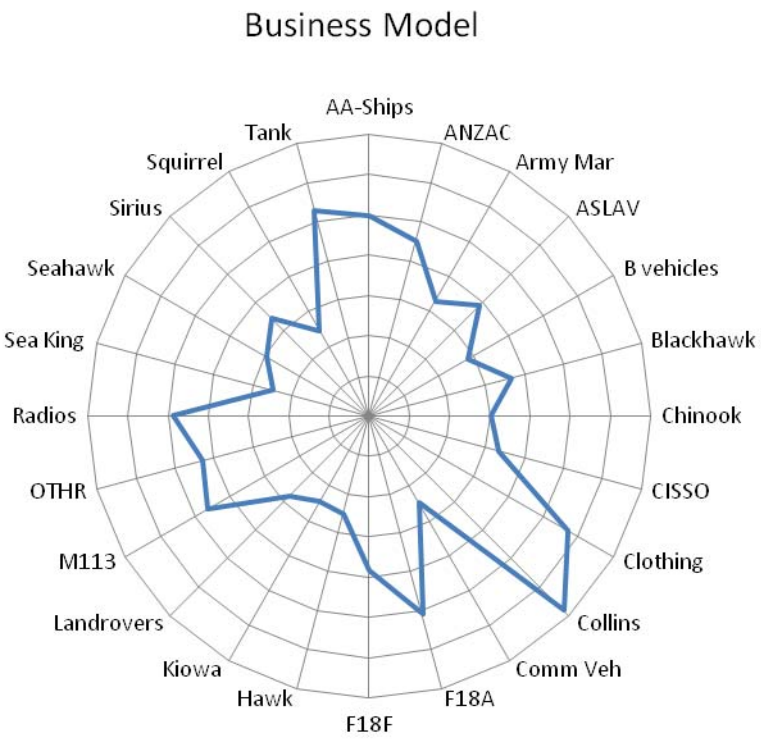

Exhibit 7: Relative Business Model Complexity across DMO product lines

Business Controls Complexity

In most of the SPOs (especially those with more complex platforms), there is a substantial need for IT systems, data, and data quality to support the cost effective and low risk management of sustainment activities. Core to these systems are three large control and quality assurance systems:

- Configuration management
- Maintenance, usage tracking and service management
- Parts Management Logistics, inventory and supply chain management

- **Configuration Management Systems**. The configuration management system is core to managing engineering and technical risk in complex platforms. It allows engineers to quickly and comprehensively understand any engineering changes to a platform or product. If this

information is not available or of low quality, the level of engineering effort will rapidly escalate and engineering issues emerge during sustainment.

- **Maintenance Management Systems**. These systems identify and control the level of servicing and the approach to servicing required on a platform. The more robust the maintenance system, the more pro-active and effective servicing and remedial activities are in reducing repair and maintenance costs. These systems are most effective when the history of usage is captured together with repairs and planned maintenance activities. If this system is weak the time to complete, and cost to complete deeper maintenance docking and similar refit activities can increase very rapidly.

- **Parts Management**. In any MRO (Maintenance, Repair and Overhaul) activities, parts searching and availability can result in up to 40% of the delay in repair times. [1] Critical to having parts availability is a well structured inventory management system that has valid forecasts (often driven from the maintenance and usage systems), accurate inventory controls and supply chain integration. If the expected usage and inventory is poorly structured, then maintenance timeframes can be severely eroded.

Helmsman identified a number of SPOs where one or more of these systems were in a very poor state, creating substantial impact on the complexity of sustaining the product or platform. The exhibit below captures both the complexity of the required system, as well as the condition of the system. The comparison of complexity levels related to business controls are shown in Exhibit 8.

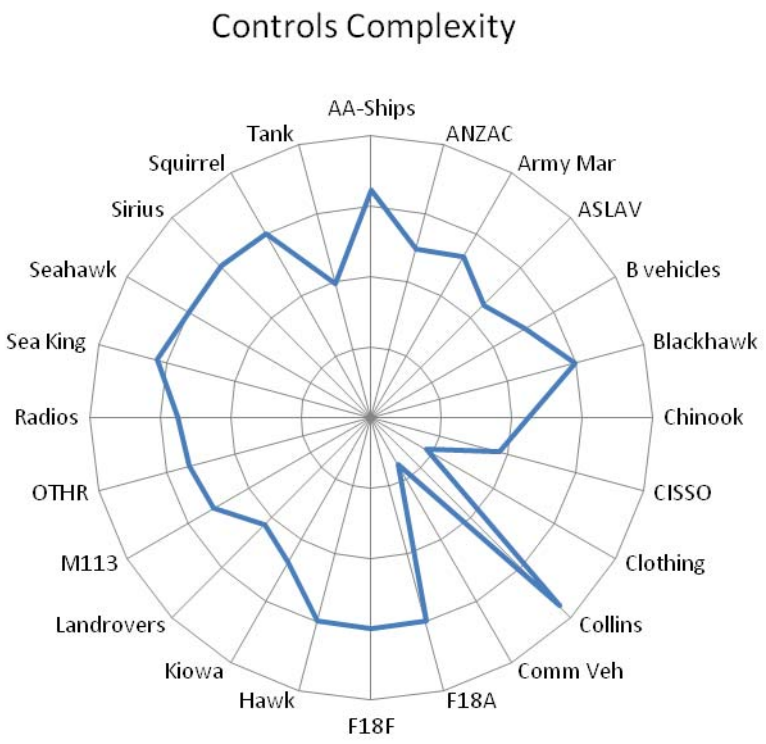

Exhibit 8: Relative Controls Complexity across DMO product lines

[1] Helmsman research MRO practices across Refinery Maintenance, Nuclear, Telco, IT, Aviation, Pipeline, Vehicles

Stakeholder Complexity

The most significant impact from stakeholder complexity related to the level of political interest that the product consistently faced, or the potential for the SPO to create substantial interest. All SPOs had the potential to become subject to public scrutiny if a major issue occurred, but some SPOs were the centre of ongoing public and political interest, and others had operations or product characteristics which meant that they were more at risk of facing public or political scrutiny than others.

The result of this increase public interest risk was higher levels of compliance, reporting and review levels. The source of this increased complexity is addressed in more detail in the next section.

The comparisons of complexity levels related to stakeholder complexity are shown in Exhibit 9.

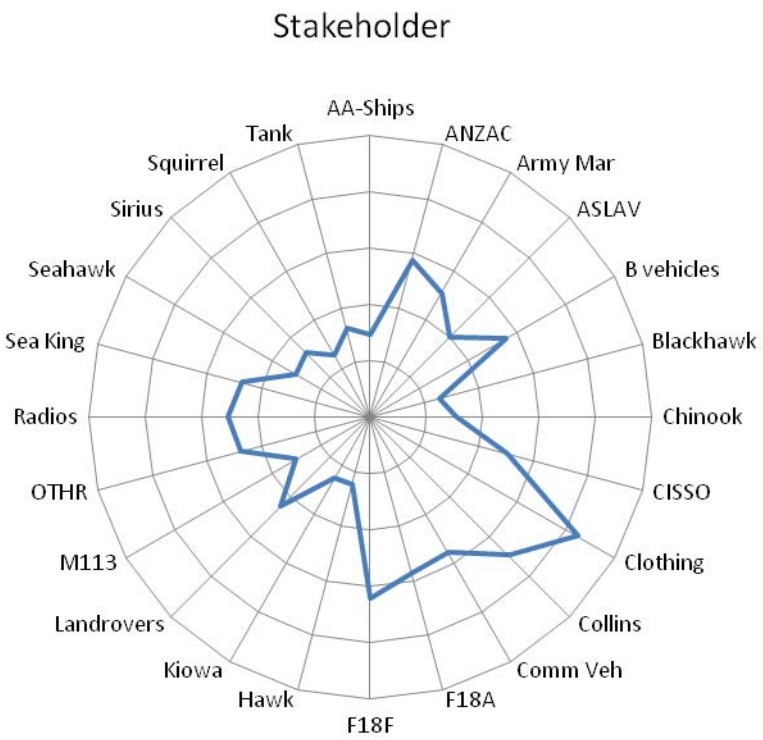

Exhibit 9: Relative Stakeholder Complexity across DMO product lines

3. Background Factors

Background factors are the factors that consistently impact all SPOs and products across the review. Helmsman identified three areas (the compliance burden, business constraints and the DMO business model) that create background complexity for all SPOs (illustrated in exhibit 10 below)

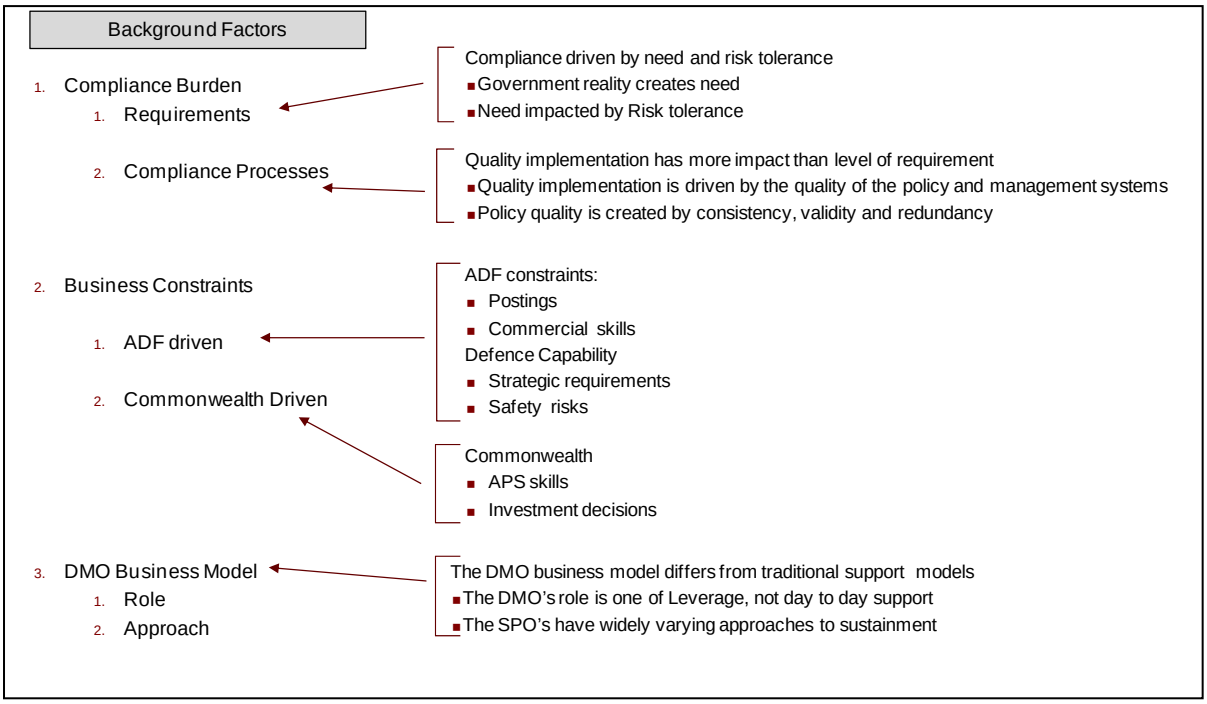

Exhibit 10: Background Complexity Factors

The Compliance Burden

The compliance burden is the level of activity required to ensure that a SPO is following all of the policies defined by all the various organisations, functions and departments that are dictating to the SPO how to conduct business.

Typically, the SPO will have to follow policies from:

- Government and Government Department policies, other Department processes, Administrative Law
- ADF, Services, external regulators (CASA, EPA, DEFAC, ITAR, FMS) and other functions and areas
- Service or Group Engineering, Logistics, PM, IT, Security, HR and Finance function policies
- Division or Branch Engineering, Logistics, Security, HR and Finance function policies

The interrelationship of the drivers for the compliance burden is illustrated in Exhibit 11 below:

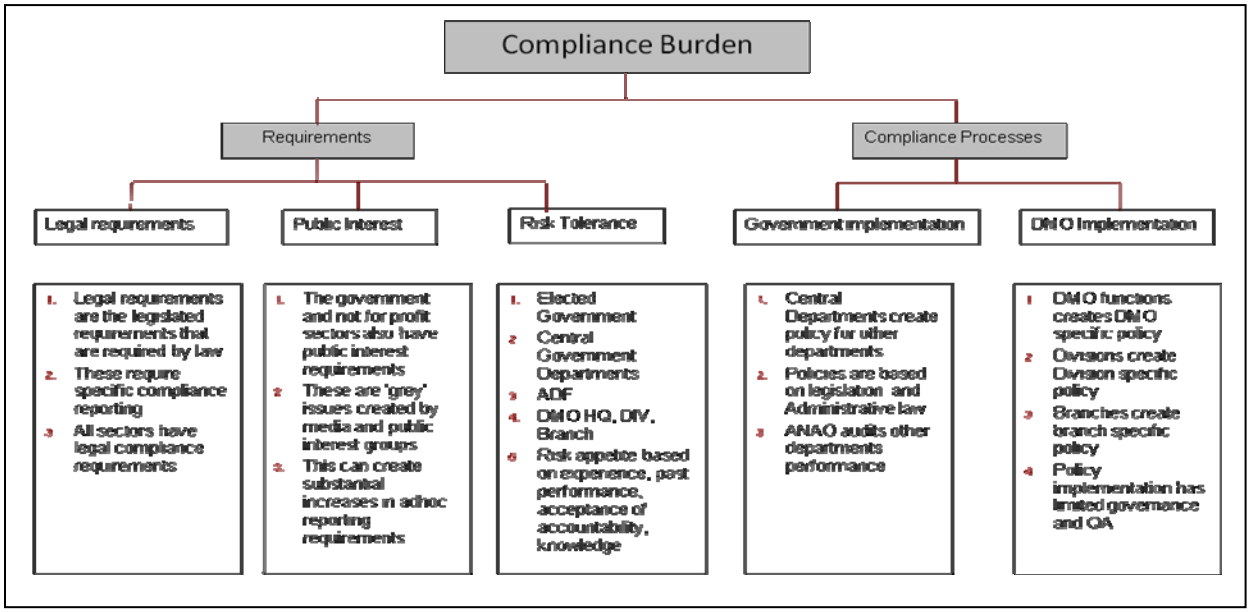

Exhibit 11: Background Complexity Factors

- **Legal Requirements**

Legal requirements are the legislated requirements that are created by the government. These are the requirements that can be measured across sectors. That is, all sectors have some level of regulation and compliance requirement. Some legal requirements are the same across all sectors and have to do with Health and Safety, Labour, Tax and similar national and state legislation. Other legal requirements are sector specific and require adherence only by the sector. In the case of Defence, the two areas that impact are Defence specific regulations and government department specific regulations.

- **Public Interest**

A relatively unique driver for the compliance burden is the 'grey interpretation' issue created by political, media, special interest and public interest. This 'grey interpretation' is not an issue for most other commercial sectors to the level that government and non-for profit organisations have to deal with. Beyond statutory requirements, commercial organisations only have to satisfy shareholder interests, as such public interest is only a consideration if it may create a significant impact on shareholders' interests. As a result the level of reporting required to manage marginal public interest issues is generally very low, unless there is specific large and widespread brand damage potential.

The public sector is substantially more reactive to smaller specific individual and special interest public concerns. This appears to be an appropriate and necessary result of the democratic process and the role of government in representing constituent needs.

- **Risk Tolerance**

While the role of government is to represent the interests of the community, the ability for the government, public servants and departments to deliver maximum value for money for the maximum number of stakeholders is modified by the political risk tolerance of leadership throughout the levels of government, from the elected government, through the various department leaders and the individual, public servants in the ADF and DMO.

Risk tolerance is a function of experience, confidence, potential impact and awareness, and preparation around potential issues. Risk tolerance thus changes as different political and public interest contextual issues flux and wane. The changing needs for ad-hoc reporting and information on various topics create significant additional compliance burden complexity.

- **Government Implementation**

The level of regulation together with the levels of risk tolerance in government departments accountable for government internal policies drives the level of compliance burden significantly. As legislation and compliance requirements pass through central government departments (such as the Department of Finance, ANAO, PMC, DEEWR, DFAT, DEWHA) the compliance burden gains greater definition.

These departments create policy to underpin the legislation which results in a compliance burden for the DMO and the policy will be created with varying levels of clarity, quality, and conflict and audit ability. The DMO will have to comply and sustain audits from the ANAO on these policies.

- **DMO Implementation**

While this entire compliance burden is contextual to the DMO, the project team noticed significant variation in the implementation approaches, quality, clarity of the policies created in the DMO functional areas, Divisions and Branches. As the team travelled in the field the amount of compliance varied by startling amounts, and the level of compliance burden from the various functions (HR, Engineering, Security, Finance, Procurement, Legal, Logistics, IT, Maintenance) changed based on experience, approach, skill level, risk tolerance of SPO staff and numerous other factors.

It was clear from the field trips that the DMO internal implementation of already complex compliance requirements was significantly increased by the internal compliance implementation oversight and governance processes used within the DMO and the sustainment related areas.

Business Constraints

Business constraints exist for all organisations. They are the limits placed on choices and decisions by the business context, stakeholder requirements or other external and internal limitations. The DMO is similar to most organisations in having a number of important business constraints. However, many of these constraints are fairly unique to the DMO as an organisation with significant commercial focus.

The business constraints placed on the DMO are created by:

Constraints from being part of the ADF and the way the ADF chooses to do business

- Military posting cycles

Posting reduces leadership effectiveness in creating sustainable support models, which require longer time horizons to achieve. The ADF requires that staff be frequently posted from one role to another. This is a significant constraint on the DMO where roles require multi-year strategic leadership around change. Complex changes generally require a sense of accountability, and the ownership of the results of change. This is difficult to achieve when the staff have limited duration in leadership roles.

- Lack of business experience in military appointments

Decision making efficiency is reduced by the requirement to have military trained personnel in business oriented roles. While military backgrounds create strong leadership, strategic and management skill, they do not generally include deep understanding of finance, economics and the reality of profit based organisations. This results in difficulties in managing the substantially business oriented sustainment activities.

- Role tensions in military appointments

The career path of the military creates tensions around allegiance and career paths. Military appointees in sustainment roles, generally see their career paths as users. While this creates strong user focus, there can be reduced focus on business, DMO and Government focused outcomes. This can create an unconscious bias towards over servicing the customers' demands, beyond the level agreed or required.

Constraints created from being part of the Commonwealth

- Public Servant Hiring

Commonwealth staff requirements create labour constraints as government regulations around staff hiring models can result in reduced commercial experience and capability limits in staff.

- Investment decisions

Investment decisions are also constrained by the Government approval and funding processes which are not asset management focused.

Constraints created from being in the business of Defence Equipment Support

- Strategic issues relating to supporting Defence capability.

Due to the need to ensure strategic defence issues are protected, issues such as secrecy, capability requirements and similar defence industry unique issues are legitimately imposed on the DMO's freedom to act in a purely commercial manner.

- Safety issues

The environment and equipment used by the ADF, and some of the operating environments have significant OH&S concerns. This creates constraints on the level of oversight and governance that can readily be outsourced to independent organisations.

The DMO Business Model

A business model describes the internal business approach, structure and orientation of an organisation used to deliver the required services, given the business constraints an organisation faces.

Role of a Systems Program Office in the value chain

A business model can be defined by identifying the role the organisation plays in the supply chain, using the following structure (after Porter). This model is illustrated in the diagram below (Exhibit 12).

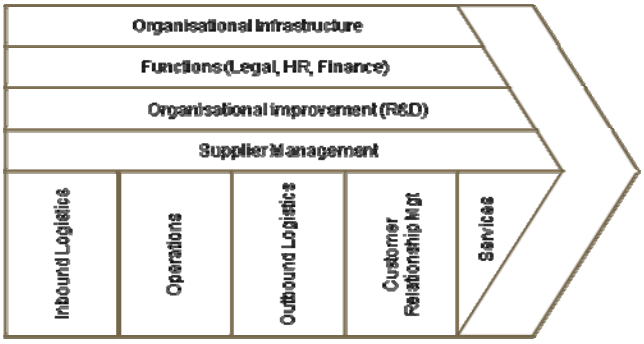

Exhibit 12: The Value Chain

Helmsman identified the level and number of products that operated across the various roles. The more roles that the SPO performed across the diagram, the more complex the role became, the more the supplier management role was performed at a higher level the less complex. Helmsman identified that the roles and focus varied across the value chain and this is illustrated in the diagram below, where the bars indicate the total of the level of involvement of SPOs in the associated role in the value chain (Exhibit 13). The two most common areas of focus were in Customer Relationships and Supplier Management.

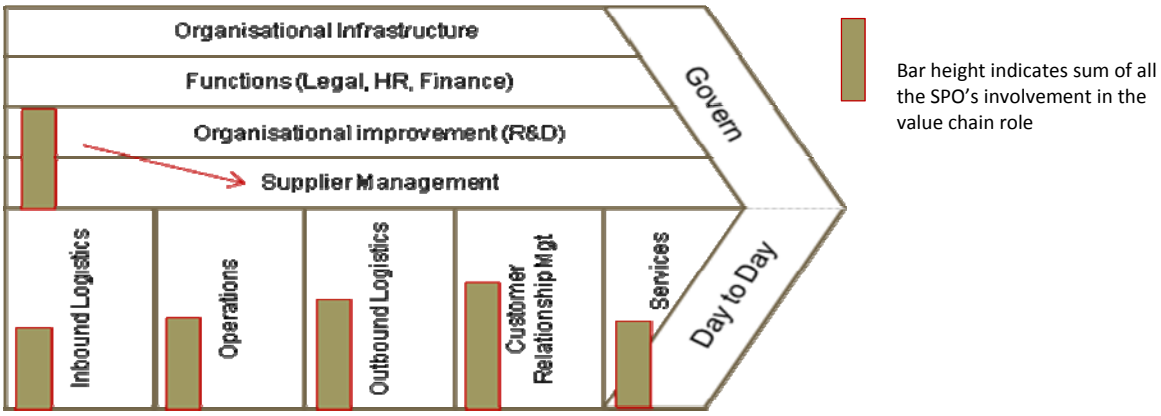

Exhibit 13: SPO activities in various value chain roles

Helmsman identified that the role played by the SPOs in the value chain varied widely. This is illustrated in the spider diagrams in Exhibit 14. In these spider diagrams, the radial distance matches the level of involvement in the role indicated in the chart title.

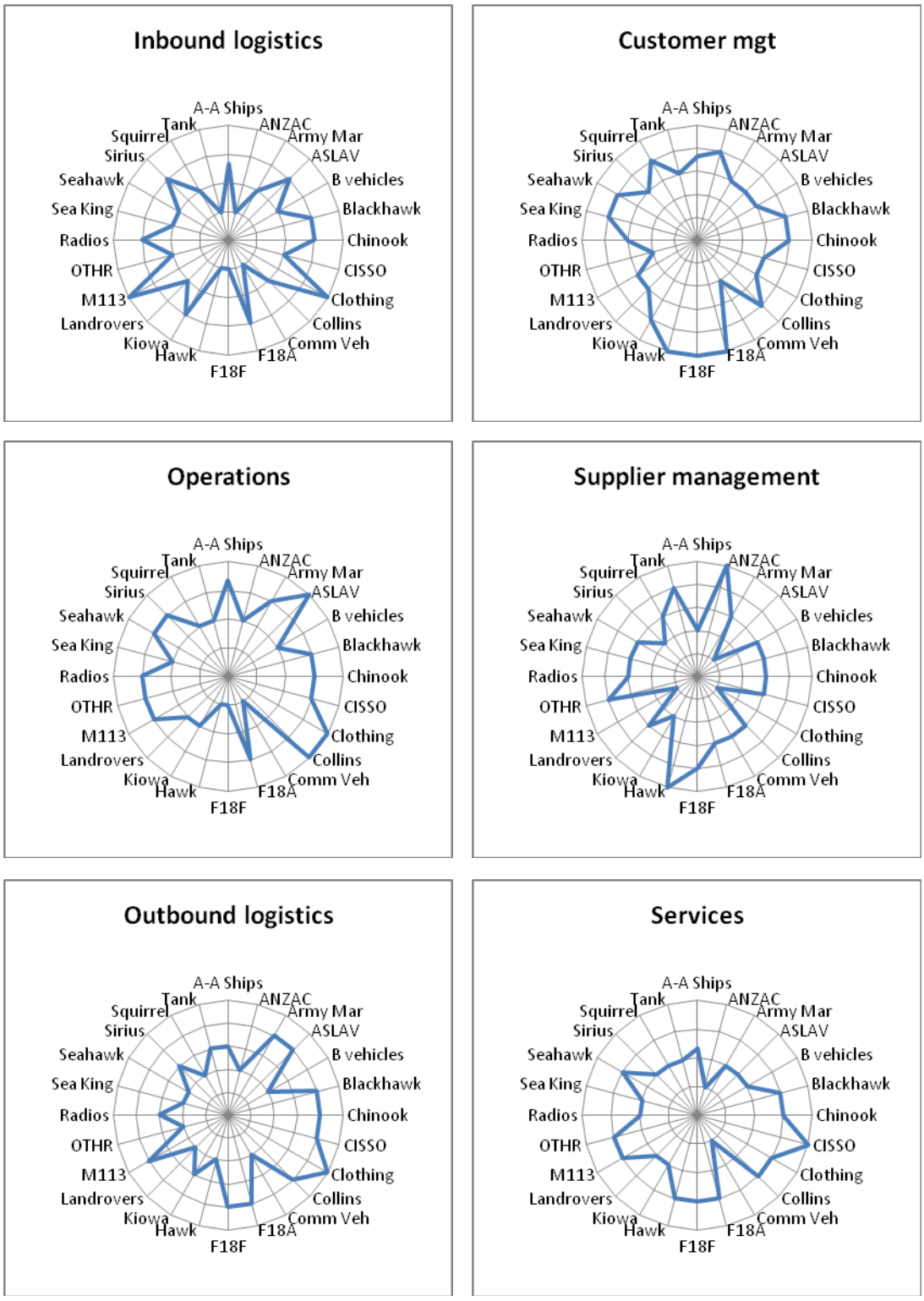

Exhibit 14: Details of SPO involvement in value chain roles

The Helmsman review identified two unique impacts that arose from this analysis.

The role of the DMO is substantially different to most commercial support organisations:

- The DMO role provides for relatively low hands on support, and far more governance

The DMO role in sustainment is at the core a leverage role, which is where the highest value is created through management and governance, not through transactions and process. As such, there are limited costs embedded in the SPO processes, most of these costs are in the user and supplier processes. In essence **to achieve Smart Sustainment, the focus should be on leverage, not leaning.**

- There is substantial variation in sustainment business approaches across SPOs.

4. How does this complexity compare to commercial operations?

As part of the review, Helmsman compared a number of factors against equivalent commercial organisations and systems. Not all factors or areas were compared due to lack of relevance or data.

While the comparisons are relevant for management decisions, they are indicative and not statistically correlated. This is because the review was confined to only DMO activities, and most data compares across the complete maintenance chain, where commercial organisations provide direct service and support for their technology. In addition, the range of products is much wider than any equivalent individual Australian organisation. There are global organisations that would have similar technological coverage (major oil companies, major aerospace companies and state organisations) and these would need to be used for overall benchmarking.

Foreground Factors Complexity Comparison

Australian Comparisons

The most complex ADF systems are more complex than most Australian commercial systems

The complexity of ADF systems that include sophisticated combat systems is higher than systems supported by Australian organisations. While much of the ADF product set is not significantly more complex than the technology used in many Australian organisations, this commonality reduces dramatically when the platform includes complex combat systems. These systems are the combination of sensors, effectors and command and control software systems on the most advanced war fighting platforms. Platforms with this complexity include ANZAC, Collins, F18, SeaHawk and OTHR. Other platforms that would expect to be of similar complexity would include the P3, Wedgetail, FFG, Vigilaire and ARH.

The chart in Exhibit 16 below is an illustration to demonstrate how the numbers of complex systems in Australia (illustrated by the blue line) reduce as the DMO complexity increases.

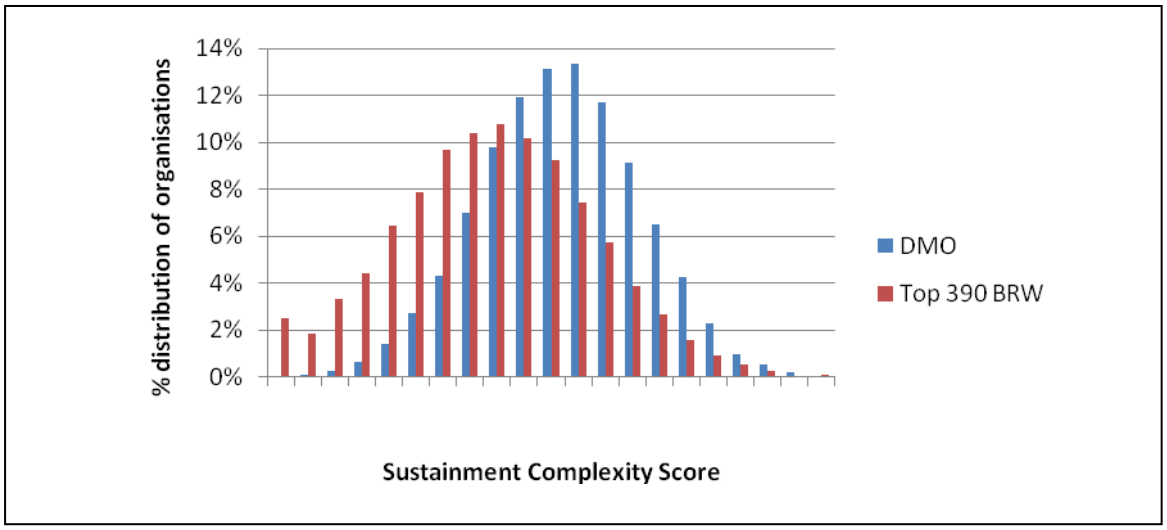

Exhibit 16: Illustrative comparison of complexity with commercial organisations

However, it must be recognised that while the overall numbers of complex systems in Australia reduces, some organisations still have technology of substantial complexity. These examples are captured in Exhibit 17 below, which captures the estimated numbers of complex technology[2] in large organisations in Australia.

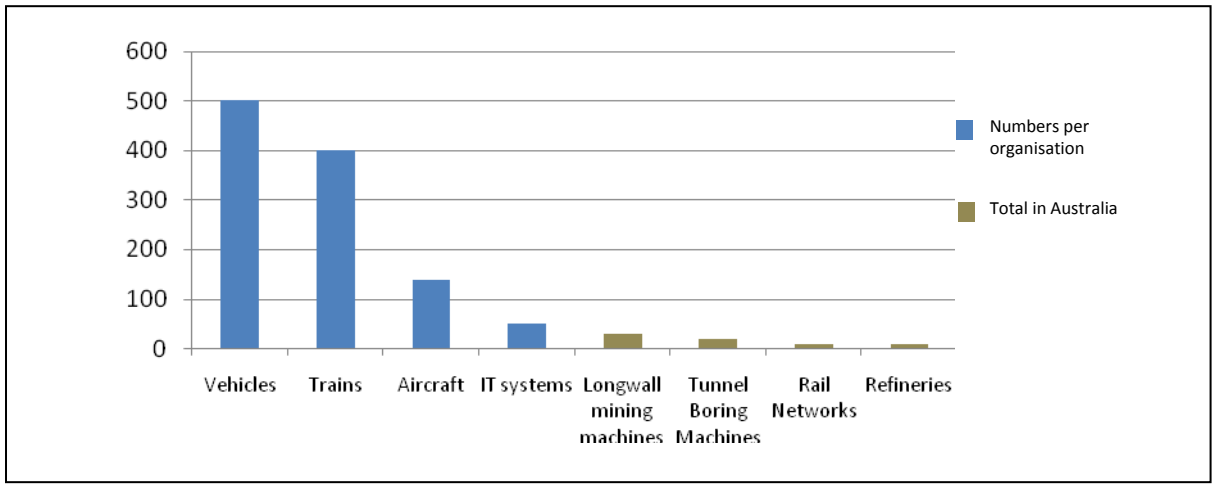

Exhibit 17: Approximate numbers of complex systems across Australian organisations

The relative complexity of the more complex technical systems such as long wall miners, tunnel boring machines, rail networks and refineries approximate that of the more complex platforms in the ADF, but the numbers are limited, and distributed across multiple organisations.

[2] The numbers for transport networks and refineries are the total for the country (transport networks applying to rail)

The overall acquisition and replacement approaches add complexity to the products above that faced by commercial organisations

The way that the ADF and the Government manage the products as assets is substantially different from commercial organisations, which take a far more cost based approach to product turnover, and seldom create orphaned solutions. Commercial organisations, as well as most state utilities and service providers also apply a strong asset management approach to their systems.

In these cases, the cost of maintenance of the asset is managed very closely and minimal modifications are made to the products, to ensure that minimal additional cost is added to sustainment. In most cases the organisations will change the way they operate to reduce the lifecycle cost of sustainment. They also make early investments in prolonging life and reducing costs in a disciplined manner.

The asset management approach will also result in long term planning around withdrawal dates, which will be based on the relative return on investment for the replacement. An organisation will withdraw equipment purely based on the fact that the replacement will be cheaper to operate and the cost of replacement can be amortised at a lower cost than the predicted cost of sustaining the current equipment. That is the equipment is replaced on a return of investment basis.

The equipment replacement approach used by the ADF is far more capability driven and the accounting approach taken by the federal government constrains the ability to manage using pure asset management approaches.

Usage and Stakeholder complexity is about the same

For most products the mission complexity and stakeholder complexity is not significantly more complex than in commercial operations. While there are some activities which add complexity (the main one being combat environments), there are organisations which operate in extremely hazardous and environmentally challenging environments.

Specific examples are off shore oil rigs and the associated aviation and shipping, Hevilift charter and helicopter services, coal mining (with the associated fire and explosion risk issues), oil refining (explosion, fire and electrical hazards), tunnelling (especially high pressure, underwater deep tunnels), open pit and deep hard rock mining.

The stakeholder complexity is not significantly greater for the DMO then that faced by most state service organisations such as Railcorp, VLine, Electrical suppliers, Banks, Telco's and similar consumer facing organisations. However, the public interest level is higher, given that federal government public interest is generally higher than that associated with state or commercial operations.

In essence, the DMO supports similar and in some cases more complex equipment in a manner which increases asset management complexity, but with similar contextual issues around mission and stakeholder complexity.

5. Recommendations

Helmsman is recommending the DMO take actions in three main areas (as discussed in earlier sections):

Recommended Actions:

1) Create the capacity to execute change by:

   a. Performance Based Contracts. Move supplier relationships to a more through life outsourced approach (with value for money changes) including continuing to improve the contracting model to ensure the right structure, governance and relationship management with suppliers

   b. Lean Compliance. Applying lean methodologies to the compliance process development, implementation and usage.

   c. Automate Compliance. Where cost effective, automate compliance and reporting requirements within extant business processes.

2) Introduce a more consistent operating model across sustainment by:

   a. Sustainment Manager. Develop a Sustainment Manager role similar to that of a Project Manager.

   b. Asset Management Skills. Developing commercial asset management expertise within the DMO.

   c. Standard Approach. Providing sustainment based measures, methods and tools to create a consistent approach to the business of sustainment.

3) Continue to improve on core business by:

   a. Improve the control systems. Improve control systems to support the technical areas of sustainment (engineering, logistics and maintenance) for specific SPO's within DMO. Ensure the data integrity of these systems is fully established and maintained.

   a. Create impact transparency. Clearly inform stakeholders of the impacts on sustainment associated with changes in complexity. These should identify the impact of increasing orphanage, ageing, and moving planned withdrawal date.

