Wholesale Inventory Investment Model – Improving Requirements Determination and Purchasing Efficiency

Introduction

1. Inventory management in the Royal Australian Navy (RAN) is characterised by large inventories supporting complex and diverse systems. Requirements are driven by both planned and unplanned maintenance. Inventories are diverse, held for long periods of time, often slow moving with long lead times. Unavailability of stock, even for relatively simple items, can have a disparate impact on the capability of the RAN at any given point in time. Improving stock availability through improved requirements determination has the potential to raise Navy's capability at any given point in time.

2. As a Federal Government Agency charged with the efficient and effective use of public monies inventory procurement agencies are bound by strict and comprehensive procurement guidelines which are the limiting factor in the quantity of procurements that can be undertaken in any given period. Regardless of accurately predicting the requirement improved purchasing efficiencies are required to actually ensure the individual items are available when required.

Wholesale Inventory Investment Model

3. The Logistic Support Agency – Navy (LSA-N) spends in the order of $250 million per year to meet the inventory requirements of Navy. The LSA-N set about establishing a robust automated process that allowed for the accurate determination of inventory requirements over the forthcoming 20 year period. This determination had to be focused around Navy's unique business and organisational requirements. LSA-N has encapsulated this determination and the associated business rules in a software tool referred to as the Wholesale Inventory Investment Model or WIIM.

4. The WIIM collects disparate data sources that best represent the different drivers of future demand and uses a combination of planned activities, past usage and identified contingency requirements to determine future stock requirements over the next 20 year period. It captures not only inventory management data but the Configuration Management Data for each item to allow the data to be viewed or focused on a range of attributes. Figure 1 represents the high level data flows for the WIIM.

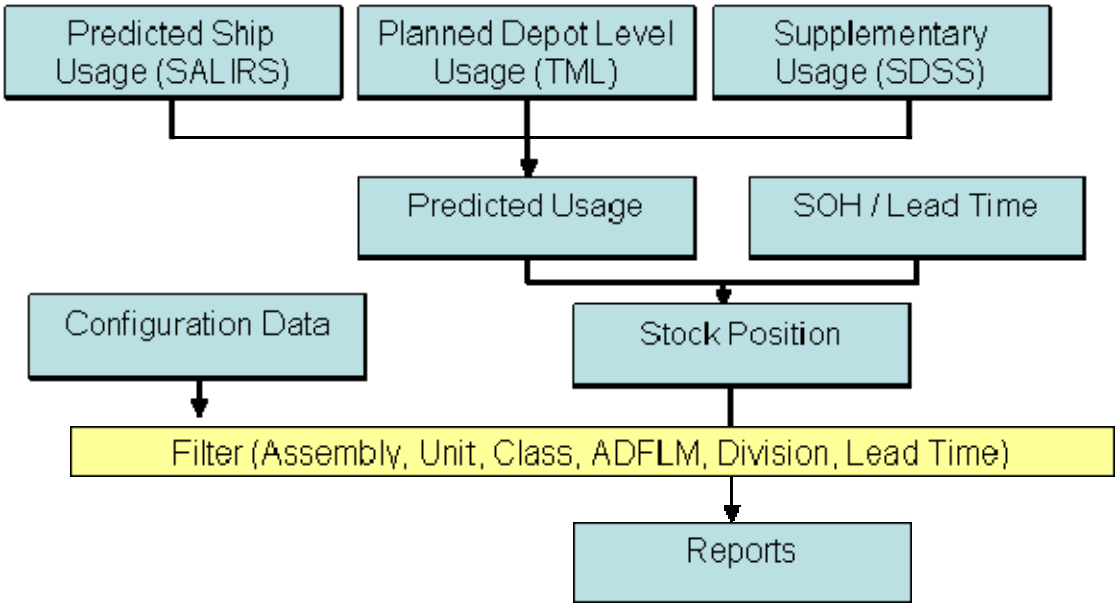

Figure 1 – WIIM high level data flows

5. For non repairable items the WIIM determines the investment level required for the items based on item characteristics such as cost, lead time and item criticality. For repairable items the WIIM calculates the repair pool size using a required confidence level of item availability based on a Poisson function, it then calculates over the next 20 years the level of repair action required as well as future buys necessary to maintain the repair pool as items leak from the pool holdings due to loss and being beyond economical repair.

WIIM Characteristics

6. The WIIM is a data warehouse that collects, records and shapes data from a range of disparate systems automatically on a daily basis. As item details or attributes are changed in core information systems these changes are automatically reflected in the WIIM. Access to the WIIM is through a web interface that is available across Defence. Reports are able to be designed and scheduled to run at predefined intervals and can be automatically emails to predefined lists of users.

7. The WIIM allows for a very high degree of automation in data updating, report generation and delivery, and the placing of bulk procurement orders.

Impacts

8. The implementation of the WIIM has allowed for the systematic determination of requirements for over 400,000 items managed by the LSA-N using a set of criteria and business rules that can be articulated and agreed to by a range of organisations within the

maritime environment. The development of the WIIM led to the development of those broad business rules.

9. When WIIM recommendations are fully realised within the wholesale warehouses it is expected that there will be a 70% reduction in stock outs for items managed by the LSA-N. This has huge potential to improve the availability of RAN capability at any given point in time.

10. With over 20,000 items identified for procurement in the first year a critical success factor will be the ability to convert requirement determination recommendations into actual stock on the shelf. As the WIIM also collects supplier data for each item bulk purchase lists can be generated for each supplier with procurement action electronically initiated. The efficiencies in the purchasing action will allow the LSA-N to increase its agility in purchasing and increase the procurement capacity of the LSA-N.

Benefits

11. **Budget Production.** The structure of the WIIM has allowed for the LSA-N to automatically generate a 10 year budget in terms of both when funds need to be committed and when they will be expended. It allows the budget to be broken out to meet the detailed Defence requirements. The budget can be fully justified in terms of the individual items that are required to be procured and the business rules that are applied to the individual determination. The production of the LSA-N budget has previously been a labour intensive and complex task open to individual variations, the budget is now a robust and easily defendable prediction of future financial requirements.

12. **Targeted Buy Lists.** The WIIM is able to generate targeted buy lists for items. The targeted lists may be against suppliers, a platforms or class of ships, a system fitted to one or many ships, or even by item manager. This functionality allows procurements to be focussed on any particular area of concern.

Opportunities

13. **Cost vs Risk (Confidence Level).** The LSA-N is funded by Navy to provide its inventory requirements. Historically this amount has been based on a bid by the LSA-N. In evidentially the question has always been asked, “What is the impact if we don’t give all the funds”. This previously has been a difficult question to answer quantitatively. The WIIM will now allow a range of cost/risks options to be presented to Navy to allow Navy to decide what level of confidence it chooses to fund with LSA-N then delivering to that confidence level.

14. **Reduction in Inventory Size.** The WIIM is able to identify currently held stock or stock on order that does not have an identified requirement. This will allow for stock to be identified for disposal. As configuration data is held within the WIIM items that are still applicable to current Navy platforms can be identified and retained if required.

Orders for stock that are no subsequently longer required can be identified when the requirement has changed since the order was placed, this will allow for the cancellation of items no longer required.

15. **Contingency Stock Requirements.** The RAN has a requirement to hold stocks above previous usage levels to meet contingency requirements. This contingency requirement can be driven from Navy's role in assisting in disaster relief operations and may necessitate the stocking of items not normally used in day to day operations such as nappies and baby bottles. It may also be derived from high level war requirements to correct battle damage. The WIIM now allows for these requirements to be recorded centrally and can maintain the inventory at the required levels or simply report inventory levels against the different requirements to clearly show what the inventory state for each capability actually is and the projected cost across a 10 year period required to maintain/hold agreed levels.

Conclusion

16. The development of the WIIM by the Logistic Support Agency – Navy has been a very significant innovation in logistics for the Royal Australian Navy. It has forced the development and agreement of sound business rules for inventory determination across the Maritime Support Division. The WIIM has allowed a highly structured and detailed long term budget to be produced in an automated manner that is based on very clearly identifiable facts. The automation of procurement will convert recommendations to actual results that are predicted to reduce stock outs by 70%.

Annex A – Sample of Ten Year Budget

Product	Group	Country	Value Order Placed Year 1	Value Order Placed Year 2	Value Order Placed Year 9	Value Order Placed Year 10	Expenditure Year 1	Expenditure Year 2	Expenditure Year 9	Expenditure Year 10
AOR	Inventory	Australian	$ 582,802.69	$ 418,963.98	$ 16,328.32	$ -	$ 380,611.55	$ 482,341.02	$ 170,022.65	$ 1,825.24
AOR	Inventory	UK Commcerial	$ 8,574.12	$ 3,574.03	$ -	$ -	$ 5,090.03	$ 5,988.84	$ -	$ -
AOR	Inventory	US Commercial	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
AOR	Repair	Australian	$ 237,755.03	$ 309,287.21	$ -	$ -	$ 128,706.31	$ 266,144.99	$ 277,050.29	$ 7,610.95
AOR	Repair	UK Commcerial	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,443.03	$ -
AOR	Repair	US Commercial	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
AOR	SME	Australian	$ 622,132.16	$ 366,721.86	$ 7,968.00	$ -	$ 355,810.55	$ 463,067.43	$ 232,136.61	$ 25,228.69
AOR	SME	UK Commcerial	$ 5,514.50	$ 352.41	$ -	$ -	$ 1,535.48	$ 4,047.57	$ 2,736.99	$ -
AOR	SME	US Commercial	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,728.11	$ -
CDT	Inventory	Australian	$ 28,850.15	$ 21,275.80	$ 23,563.12	$ 23,305.91	$ 25,576.41	$ 22,056.18	$ 23,587.30	$ 23,367.37
CDT	Repair	Australian	$ -	$ -	$ 1,181.40	$ 7,615.06	$ -	$ -	-$ 284.91	$ 6,216.72
CDT	SME	Australian	$ -	$ 1,969.01	$ 1,969.04	$ 1,969.04	$ -	$ 1,855.72	$ 4,299.60	$ 1,969.04
FCPB	Inventory	Australian	$ 5,438.70	$ -	$ -	$ -	$ 3,533.02	$ 1,905.67	$ -	$ -
FCPB	SME	Australian	$ 190,575.77	$ -	$ -	$ -	$ 127,506.66	$ 63,069.10	$ -	$ -
Hydro	Inventory	Australian	$ 8,154.68	$ 10,938.98	$ 12,127.01	$ 13,481.67	$ 6,854.04	$ 10,814.79	$ 11,040.86	$ 13,379.17
Hydro	Repair	Australian	$ -	$ -	$ -	$ 1,473.68	$ -	$ -	-$ 726.75	$ 746.94
LCH	Inventory	Australian	$ 316,438.53	$ 190,581.46	$ 341,294.84	$ 366,478.16	$ 224,404.36	$ 227,479.55	$ 337,991.56	$ 363,897.62
LCH	Inventory	UK Commcerial	$ 1,464.00	$ 1,464.00	$ 2,928.00	$ 2,928.00	$ 1,186.24	$ 1,464.00	$ 2,650.24	$ 2,928.00