Optimisation in the Aviation Industry

Introduction

Systecon Consultants have gained an in-depth knowledge and experience of the use of logistics support and spares optimisation in the aviation industry. A number of projects have covered various aspects of the industry ranging from Initial Spares provisioning for a new fleet over reduction of repair lead times by improving spares supply, to dimensioning lean and effective spares assortment for outsourced SLA (Service Level Agreement) driven spares supply. All with the common objectives of reducing costs, increasing efficiency and fleet availability. Another common denominator is that the results have enabled the customers to reduce costs and increase their competitiveness.

The following are a number of Case Studies of 'real-life' projects that show the benefits of our approach.

Case Study 1: Aero Engine manufacturer and supplier

An Engine Services Company (ESC) has for several years been working with a sequence of projects, all aiming to, in a cost/effective way, decrease the average repair Turn Around Time (TAT) for the engines processed through their workshops. ESC is using SAP R3 as their transaction tool.

Objectives

The dynamic nature of ESC' environment means that it is not enough to rely on historic information alone when calculating stock levels. Hence, an important objective was to increase accuracy by proactively trying to predict the need of spares based on actual and expected orders combined with historical experience.

As ESC spare part stocks (including pipelines) represented values in the area of hundred million dollars, even minor percentage improvements would give large nominal savings. The goal was to identify reductions of around 20% of the total investment in spares. Implementation

The project was performed in two steps:

1. An initial study was conducted including 50 selected items two engine types. The objective was to check:
    - The access to and quality of needed data
    - The capability of OPUS10™ to reflect the special logistics support organization of ESC
    - The potential for improvements
2. A fully automated transfer of all relevant information for about 1000 items for each engine type, from SAP R3, via the MS-Access based forecasting tool into OPUS10™ and transfer of the optimized results back to MS-Access.

Results

1. The first step was performed during 3 weeks concentrated work with a group of 3 experts, one aircraft logistician, one local expert from ESC and one OPUS10™ consultant from Systecon. The results indicated, for both the engine types that the potential savings were clearly higher than 30%. So the goal of a 20% cost reduction combined with improved TAT for the engines repair/overhaul seemed to be within reach. The quality of the data from SAP R3 was acceptable, but quite a number of inconsistencies in the transaction system were found.

2. The second step - to automate the process - took another 3-4 weeks. This was performed by one database technician, two software consultants from Systecon and the local expert from ESC. ESC has since then continuously been working to adjust, item by item, their actual spare part stocks and pipelines into the optimal interval (level) and to refine the information stored in SAP R3. The last few years' development within the aviation industry has amplified the dynamics of ESC business area. Thereby increasing the need for methods for making correct decisions and adapting quickly. 10% savings was achieved the first year and another 10% the second year.

The pay-off of this work is impressing: For each invested dollar the direct savings are in the magnitude of thousands of dollars. In addition, the overall effectiveness, i.e. the engines repair TAT,

has been significantly improved.

Case Study 2 - Service Level Agreements

Introduction

A major MRO provider supplies its customers with (repairable) spares according to contracts with agreed Service Levels. The stock of spare parts has a very slow stock turn around (i.e. a high share of slow/non movers). In addition, there are thousands of "emergency" shipments per year to minimize the aircraft on ground time and to meet schedule requirements.

The Support organisation is built as a network with 3 main bases and interestingly has different support structures for different items.

The required data exists in an ERP-system and other systems.

Before installing OPUS10™ as the selected tool for spares dimensioning, a pilot study was conducted. The objectives of the Pilot Study were:

- Determine current status, for instance what service level is achieved today considering current investment and current allocation?
- Estimate savings potentials if using OPUS10™ rather than current methods. ?What would be the optimal spares investment if a completely new spares provisioning were to be done?
- Suggest changes for short-term improvement. What short-term changes can be done to increase service levels?
- Determine requirements for direct data transfers from the ERP-system and other systems.

The data to populate OPUS10™ was gathered by interfacing the tool to the ERP and other systems where the data was held; this is shown the diagram below. The Items for Pilot Study were selected based on a number of criteria;

- One Aircraft type
- 69 items (rotables) chosen to be included in the model:

    - Cost drivers - by calculating number of units on hand multiplied by average unit price. (20 items)
    - High demand items - number of units per system was multiplied by removal rate (17 items)
    - Expensive 'slow-movers'. (14 items)
    - Expensive 'non-movers'. (18 items)
  - Selected items represent around 45% of total investment in rotables

The analysis performed covered the following areas;

- The current situation
- Optimal assortment and allocation of items
    - Short term improvement
    - Reallocation
    - Replenishment
- Other studies
    - Essentiality classes
    - Preventive Maintenance

In summary there were four major outcomes of this study:

- There is a potential long term saving of over 30% of rotable spares investment
- A significant improvement potential short term through modest adjustments
- "Hot-listed" items identified
- The results are being used as leverage in contract negotiations to secure more beneficial Service Level Agreements

Case Study 3: An airline buys new aircraft

A major airline wishes to purchase a number of new aircraft but is also interested in whether its current policy of holding spares is cost effective.

The study consisted of two phases;

- Analysis of the current spares holding and philosophy
- Analysis of the spares and maintenance support for the new fleet.

The initial analysis was performed using OPUS10™ and the simulation tool SIMLOX™. The results can be summarized as:

- The quantity of items spared by the airline achieves the Service Level for each of the items.
- The quantity of items spared by the airline achieves a low Aircraft Availability that means a large Aircraft Down Time. The reason for this Availability level is primarily the transport times and the quantity of certain spares.
- It is interesting to note that a few items have a large waiting time for a spare, if there is no spare in stock.
- An approach using OPUS10™ can show improvements in both investment and Aircraft Availability over the existing airline approach, so either significant savings and or increased availability can be made.

The simulation analysis has shown that there is a difference in operational performance between the airline and OPUS10™ Spares Scales even when a Distribution of Item Repair Times is included. However there is a significant difference in the cost of spares between the two Scales with OPUS10™ being the cheaper.

The second phase of the study had a number of different requirements:

- Standardize the data gathering process
  - All necessary data (input to OPUS10™) was defined, including the data sources - both for existing and new contracts
  - The data quality was analysed for correctness and rectified.
- Automate the data gathering process.
- Automate updating SAP from OPUS10™ results.
- Competence building in the organization
  - The organisation was educated (those who will run OPUS10™ as a part of the continuous strategic planning and those who gives input to the RFQ process).
  - Building acceptance of calculating the optimum based on all rotables and repairables for all systems.
- Incorporate OPUS10™ in relevant business processes (Long Term Planning & RFQ), including making user guides.
- Step-by-Step start using OPUS10™. Focus

on cost driving items first.

In addition a number of strategic questions were addressed. These covered aspects such as:

- As the fleet size increases do the airline move towards a two hub operation
- As the fleet size increase what is the best maintenance support philosophy, for instance is it possible to outsource some or all maintenance and what are the benefits
- Is there a single store or multiples.
- Is it possible to identify areas for cost savings and or improve performance?

Systecon(UK) Systems & Logistics Engineering
PO BOX 4612, Weymouth, Dorset DT4 9YY
T +44(0)870-241-3749 F +44(0)1305-768480 E systecon@systecon.co.uk

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