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Life Cycle Modelling Data Required to Sustain the International Monitoring System

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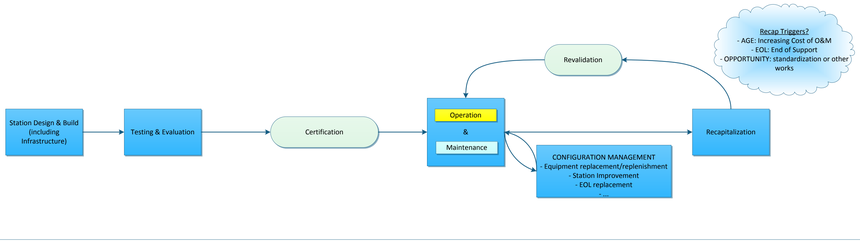
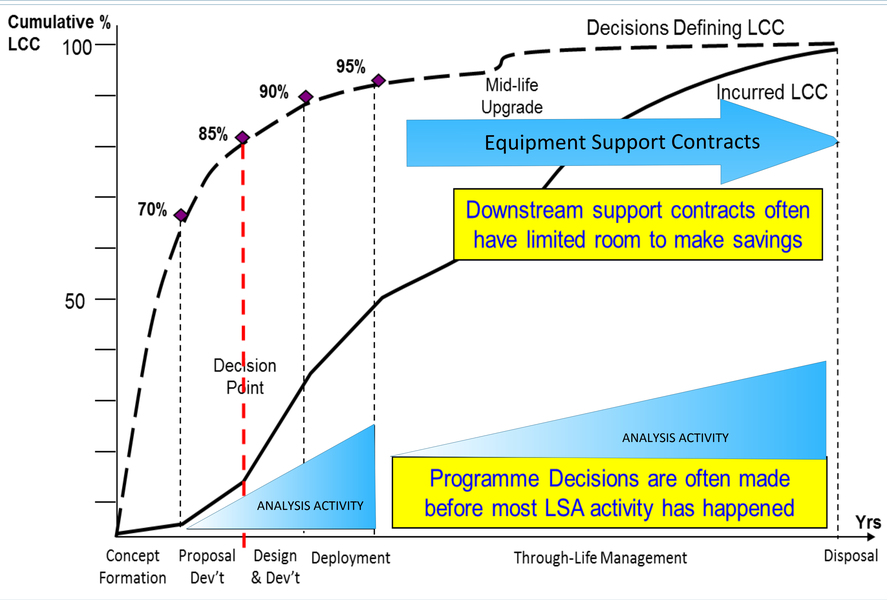
The International Monitoring System network consists of hundreds of facilities, composed of four different technologies with a variety of designs, deployed in diverse environments around the globe. The sustainment of this network with a high level of availability is challenging and requires extensive resource planning for its optimization. The PTS has already developed a sparing capability to determine the optimal quantity and location of spare parts. In parallel, a life cycle analysis capability continues to be developed to support PTS decision making on station design, recapitalization, and effective logistics support. An overview of IMS activity-based life cycle modelling, which identifies and optimizes the activities and resources required to support and sustain stations through their whole life, is presented. The data required for life cycle modelling, where it can be found, and how to bring the disparate sources of data together is explored.

STATION LIFECYCLE



COMMITMENT AND CUMULATIVE COST DURING LIFECYCLE



The chart above shows how the typical profile of the cost and effort needed to support a system (such as IMS Stations) throughout their life cycle is largely determined by decisions early in its development. If these decisions focus solely on the operational requirements of the system, then important supportability considerations may be overlooked, and the sustainment effort becomes baked into the design.

Supportability Analysis should be a continuous activity but can deliver the greatest benefit if undertaken early in the programme. Of course, some analysis data can only be produced after the system is operational, so it can become an iterative process.

Key questions for Supportability Analysis are:
- What are the key drivers (of downtime, cost, effort, etc.)? Use concepts such as Cost of Reliability (CoRe = Cost x Quantity / MTBF).
- What are the best maintenance, sparing or shipping policies (i.e. what, when, where, how)? Consider using modular equipment (shorter MTTR) and holding spares for equipment with longer purchase lead time.
- Over the whole life cycle, which gives the better 'bang for the buck': the more reliable and more expensive equipment, or the less reliable but cheaper equipment?
- When is the optimal time to upgrade equipment or recapitalize the station?

Supportability Analysis requires data from many sources covering all aspects of the system life cycle, from design, purchase or production, testing and installation, through operational life to disposal or replacement. Preparing the data required for a particular analysis takes time, so better data collection and cleansing methods will also improve the analysis activities.

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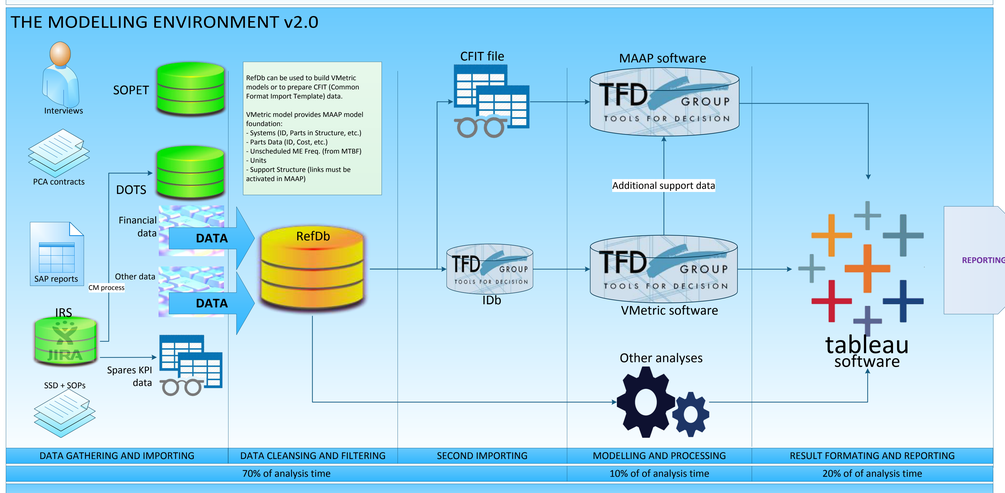
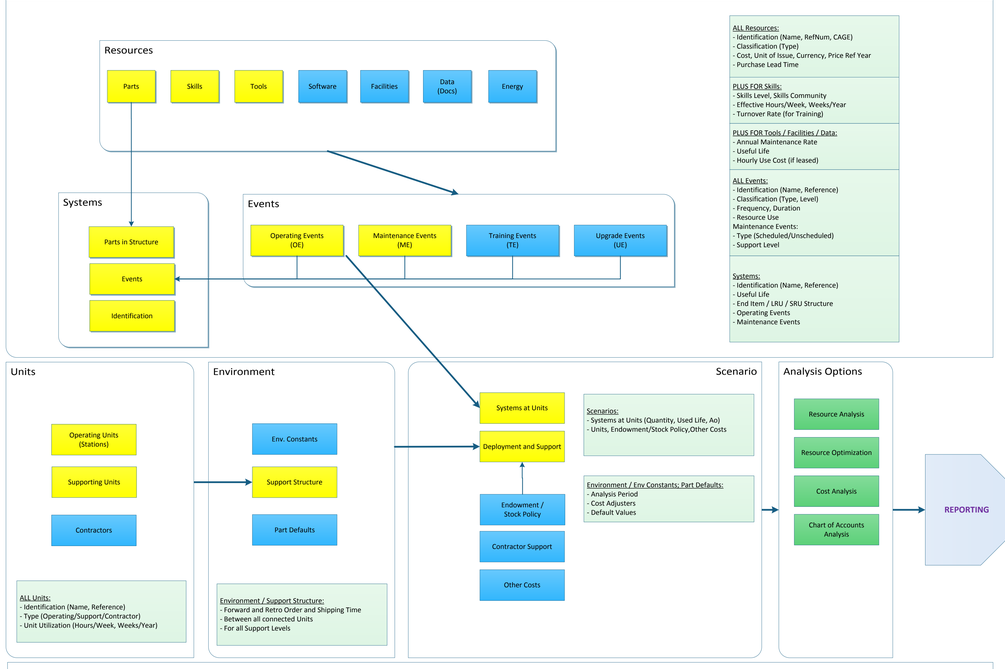
Systems Involved in Lifecycle Modelling with MAAP®



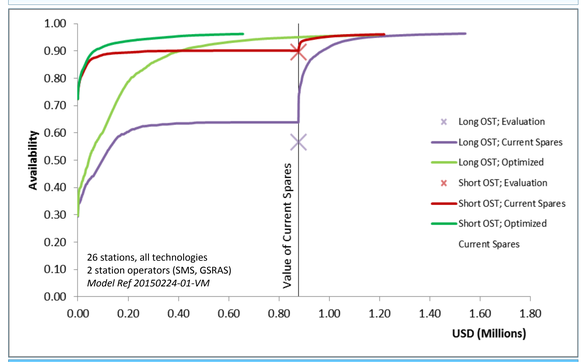
Analysis Data Requirements for Lifecycle Modelling with MAAP®



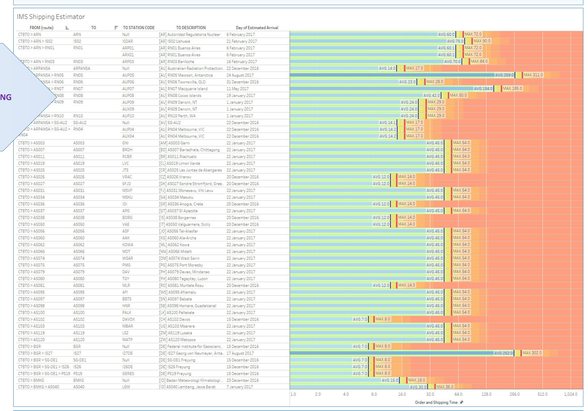
Legend:
DOTS: the Database of the Technical Secretariat – the primary repository of all data under Configuration Management
RefDb: Reference database used to extract, transform and load modelling/analysis data from DOTS and other sources (custom-built in-house)
IDb: Intermediate Database – data staging area between the RefDb and the modelling/analysis tools (custom-built by TFD)
CFIT: Common Format Import Template
VMetric: Spares Optimization software tool (proprietary to TFD)
MAAP: Life Cycle Cost analysis software tool (proprietary to TFD)
Other data query and analysis tools include BI tools, data visualisation tools and various SQL tools and applications

Run Options
Primary data (In scope)
Secondary data

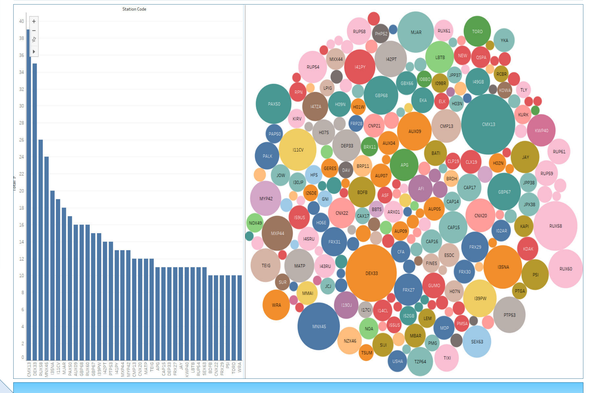
Cost vs Operational Availability report



Shipping estimator



Spares KPI report



Optimized Sparing implementation report