Planning for Success - Prediction with Confidence

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Example Projects

Content

- Need for Enhanced Planning
- Support Service Design
- Deployment Planning
- Modelling
  - Demonstration
- Benefits

Need for Enhanced Planning

- Defence Budget Reductions
  - Decrease in service personnel
  - Prioritisation of capabilities
  - Shift in procurement strategy
- Operational Environment
  - Short notice demands - agility
  - Fluid requirements - flexibility
  - Increased tempo - responsiveness
- Accountability
  - Budgets held by Front Line Commands
  - DE&S focus on Value for Money delivery
  - Increased financial & reputational risk to industry

Total Support Force

- Combination of military and industry resource to deliver optimum military effects

- What is different?
  - Focus on improved capability
  - Increased industry involvement
  - Strategic Support Supplier (SSS)
    - Equipment availability contracts
    - New dependencies (on industry)
    - Management of industry performance
  - Contractor Support to Operations (CSO)
    - CONDO
    - Sponsored reserves
    - Locally Recruited Workers (LRW)

CONDO – Contractors On Deployed Operations

Potential Benefits

- Industry
  - Stability & predictability of future business
  - Control product change
    - Enhancement
    - Obsolescence planning
  - Monthly payments & cash-flow
  - Good business if managed properly
- Military
  - More done with less
  - Improved efficiency
- Both
  - Long term relationship

Potential Risks

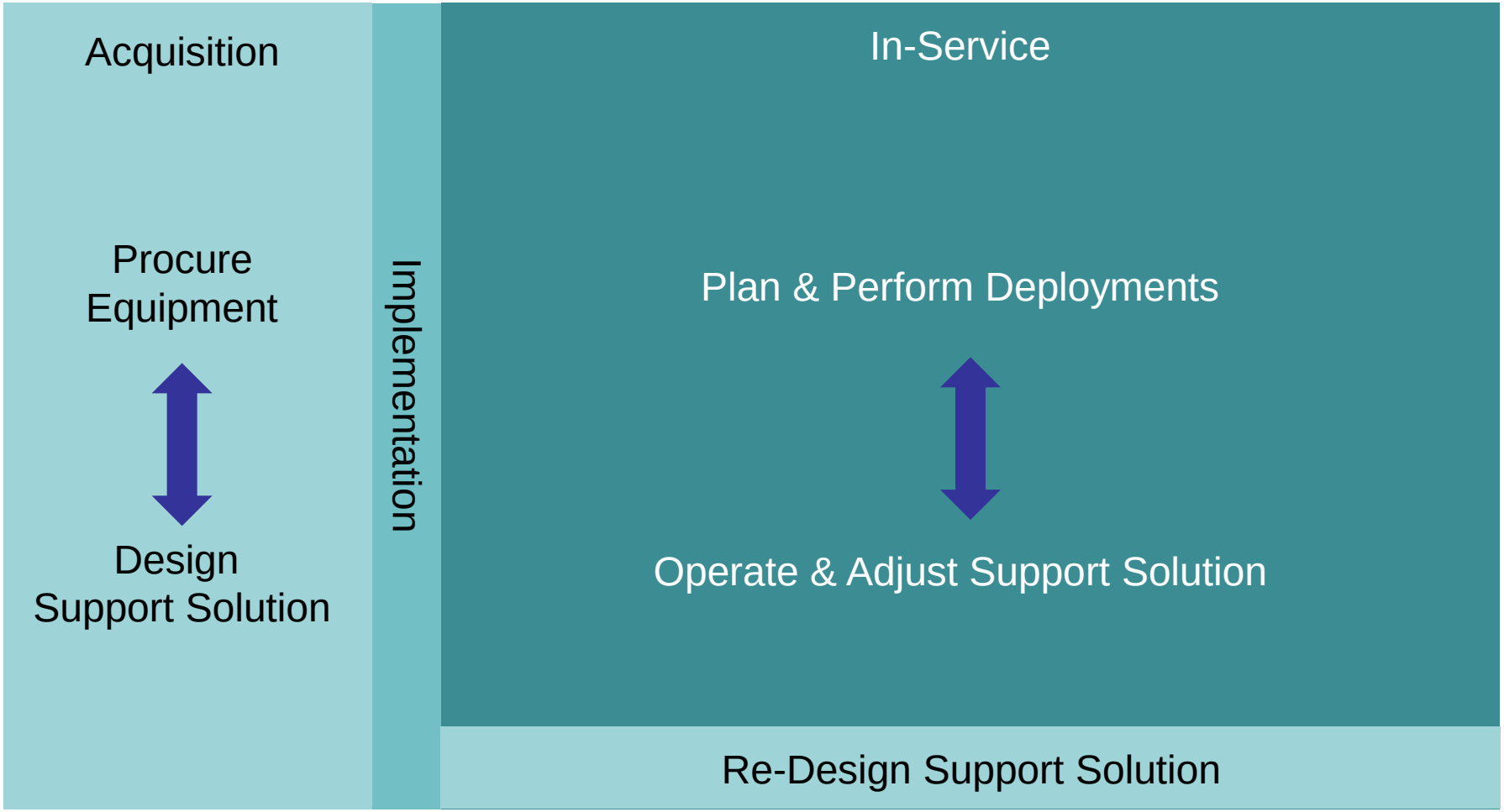
- Industry
  - Failure to achieve required performance
    - Financial penalties & reputation
- Military
  - Failure to manage industry performance
    - Impact on capability & availability
- Typically due to not understanding;
  - Scope and role of industry/military at the planning stage
  - How KPIs will be met
  - The volume and timing of resource throughput
  - The cost of the service
  - In-service management approach

KPI - Key Performance Indicators

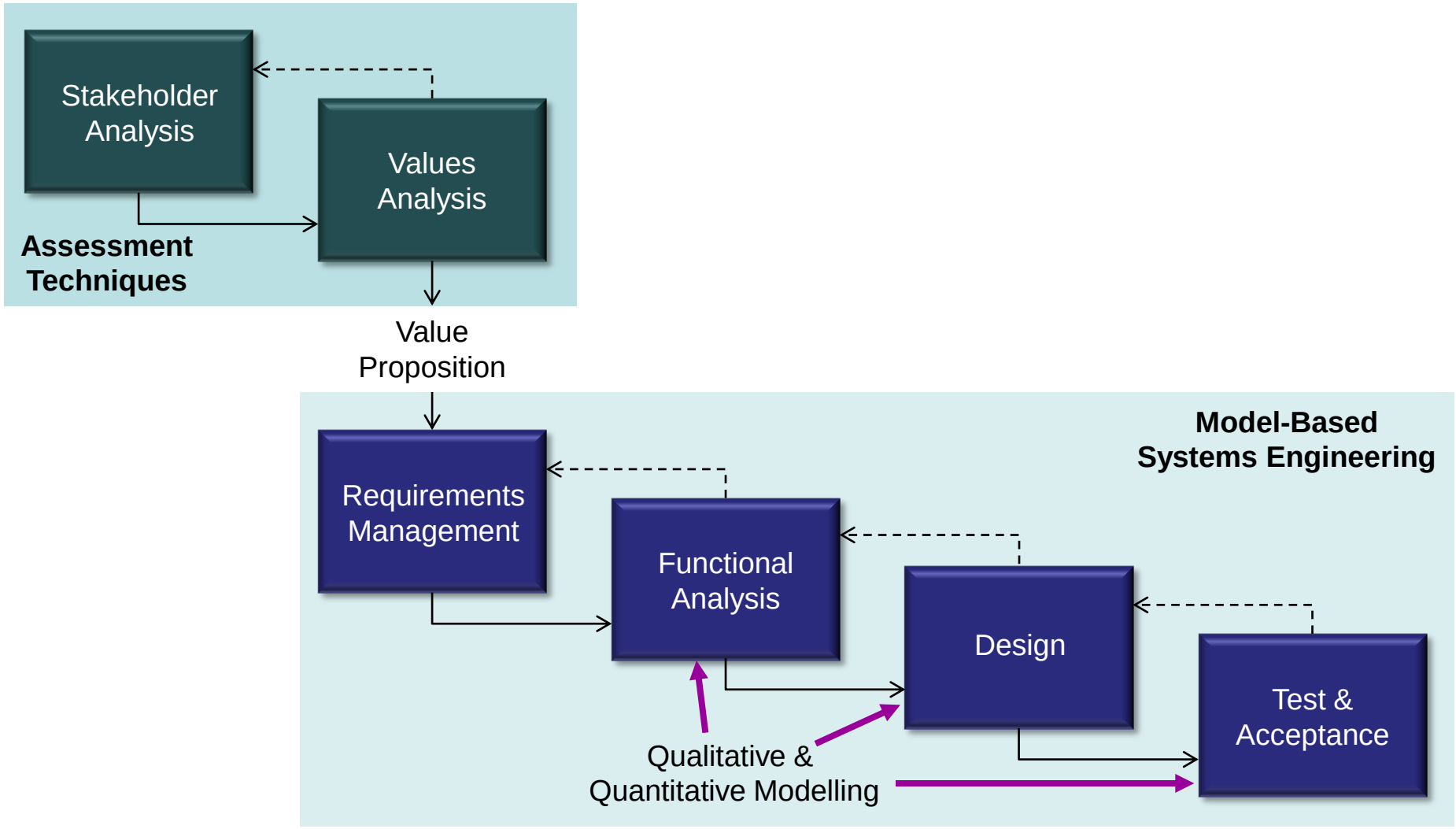
Needs

- Industry Planning
  - Clearly understand long term commitments
    - Associated performance requirements and costs
    - Solution options
    - Impact of decisions
- Military Planning
  - Clearly understand military and industry mix
    - How capability and availability can be met and the associated cost
    - Industry dependencies
    - Use of performance criteria
    - Solution options
    - Impact of decisions

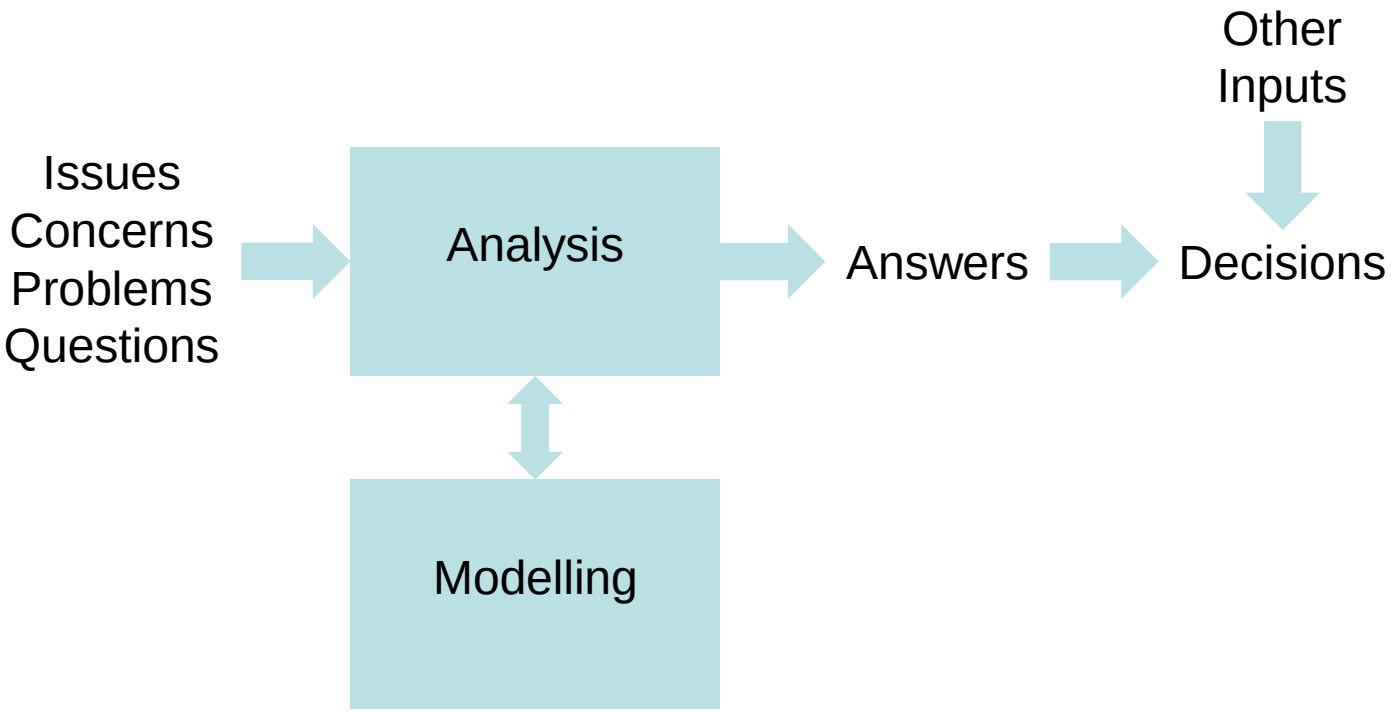
Lifecycle (Simplistic View)



Support Service Design - Approach

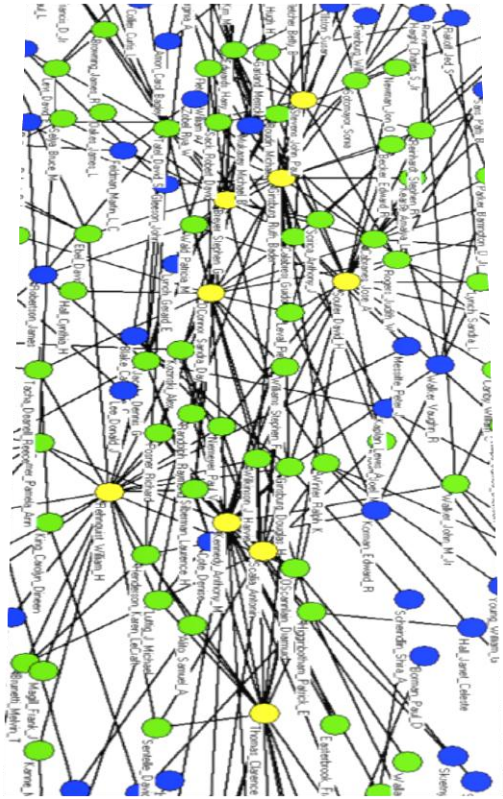


Analysis & Modelling Relationship

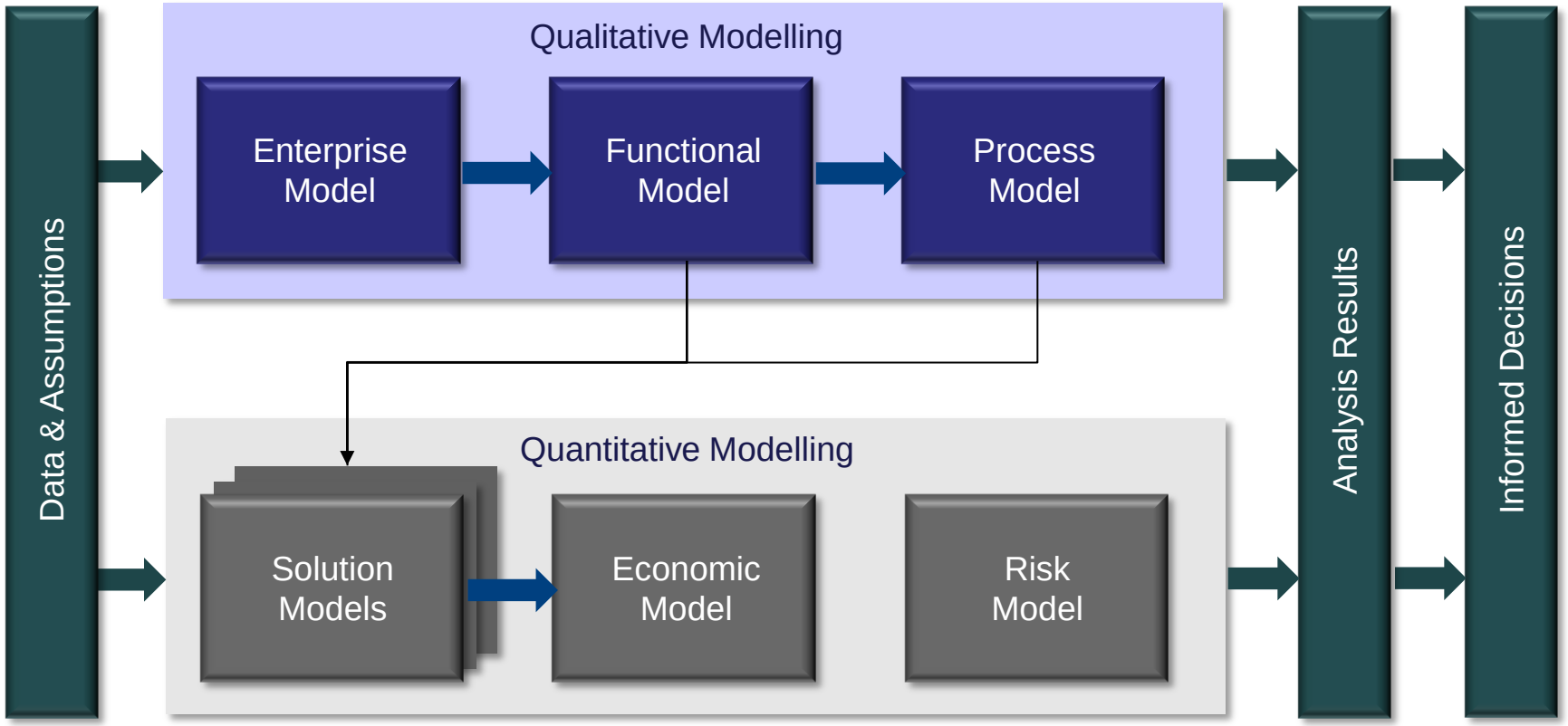


Why Modelling?

- Natural part of thinking
  - Analyse, model, compare & contrast
- Increase in complexity requires more ‘brain power’
- Models help us understand and manipulate
  - Graphical models provide visual clarity
  - Mathematic models aid detail understanding and manipulation
- Complex situations require complex solutions



Support Service Design - Different Modelling Activities



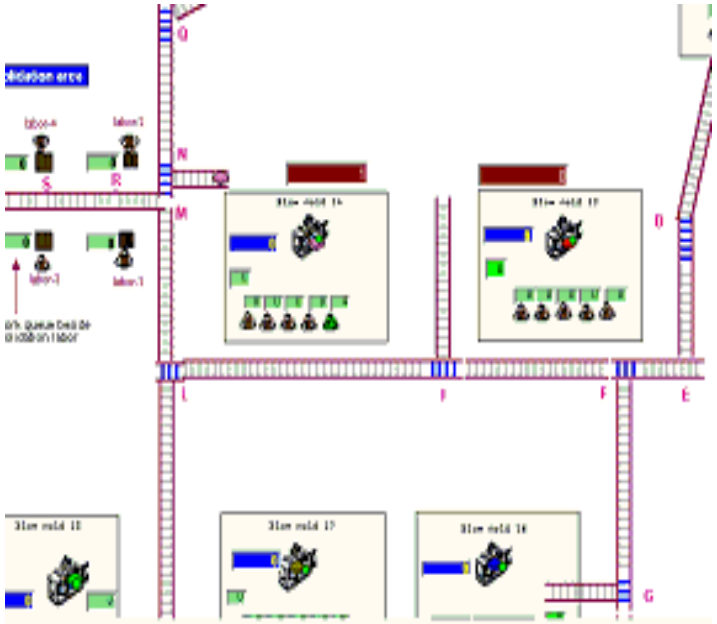
Qualitative Modelling

- Capture an illustrative view of the operation
  - High level operation or ‘enterprise’ view
  - Functional Model
  - Business Process Model

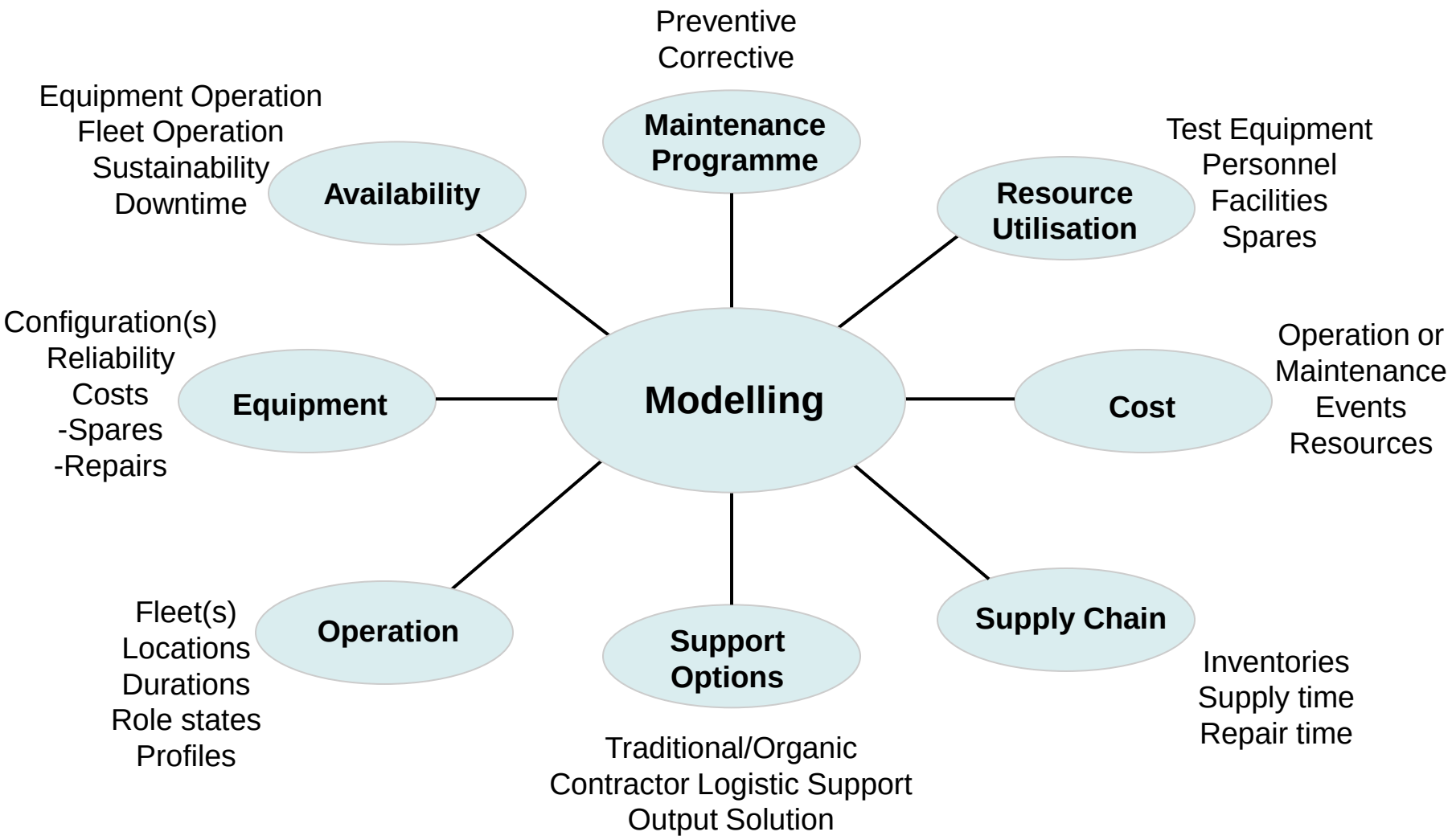
- Benefits
  - Provide visual clarity
  - Identify scope of responsibilities
  - What should be done & who will do it

Quantitative Modelling

- Deterministic
- Stochastic
  - Dynamic simulation
    - Virtual representation
- Benefits
  - Enables assessment of options
  - Enables trade-offs
  - Enables sensitivity analysis
  - Identifies how many, how often, how much
  - Aid cost estimation and prediction



Example of Scope

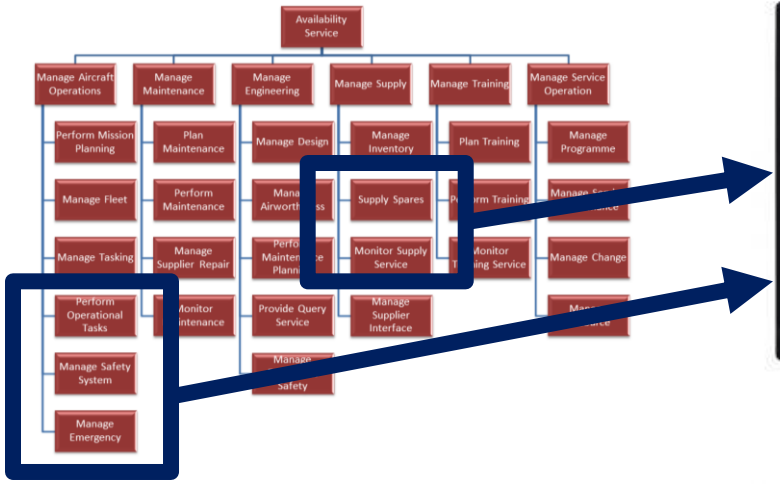


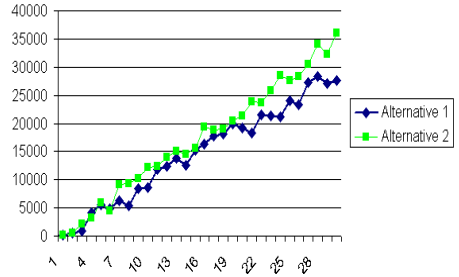
Example Modelling Approach

Qualitative Model

Quantitative Model(s)

Outputs

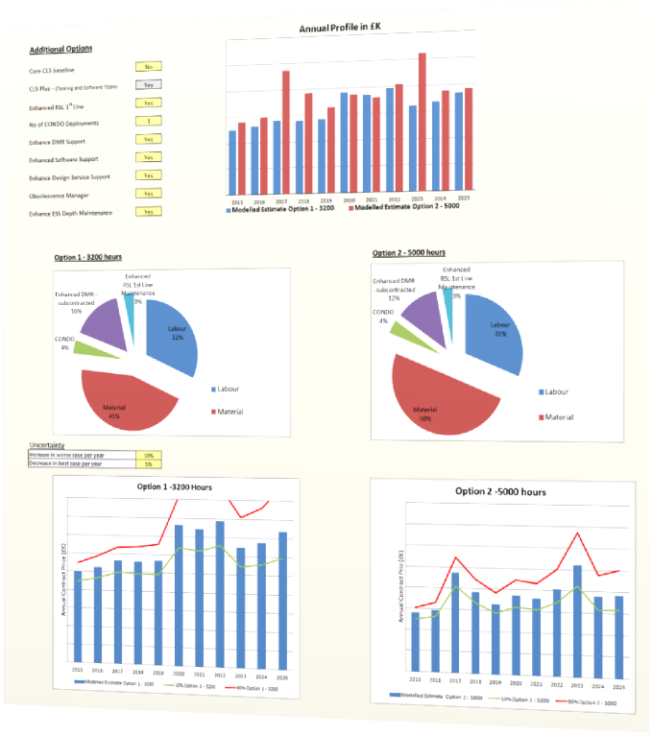




Dynamic Modelling Capability

- Enables
  - Situation awareness
    - Sub-systems interdependencies
  - Manipulation of planning
  - Manipulation of data

- Provides
  - Virtual & dynamic visualisation
  - Graphical outputs
  - Understanding of options
  - Trade-off comparisons
  - Cost estimates

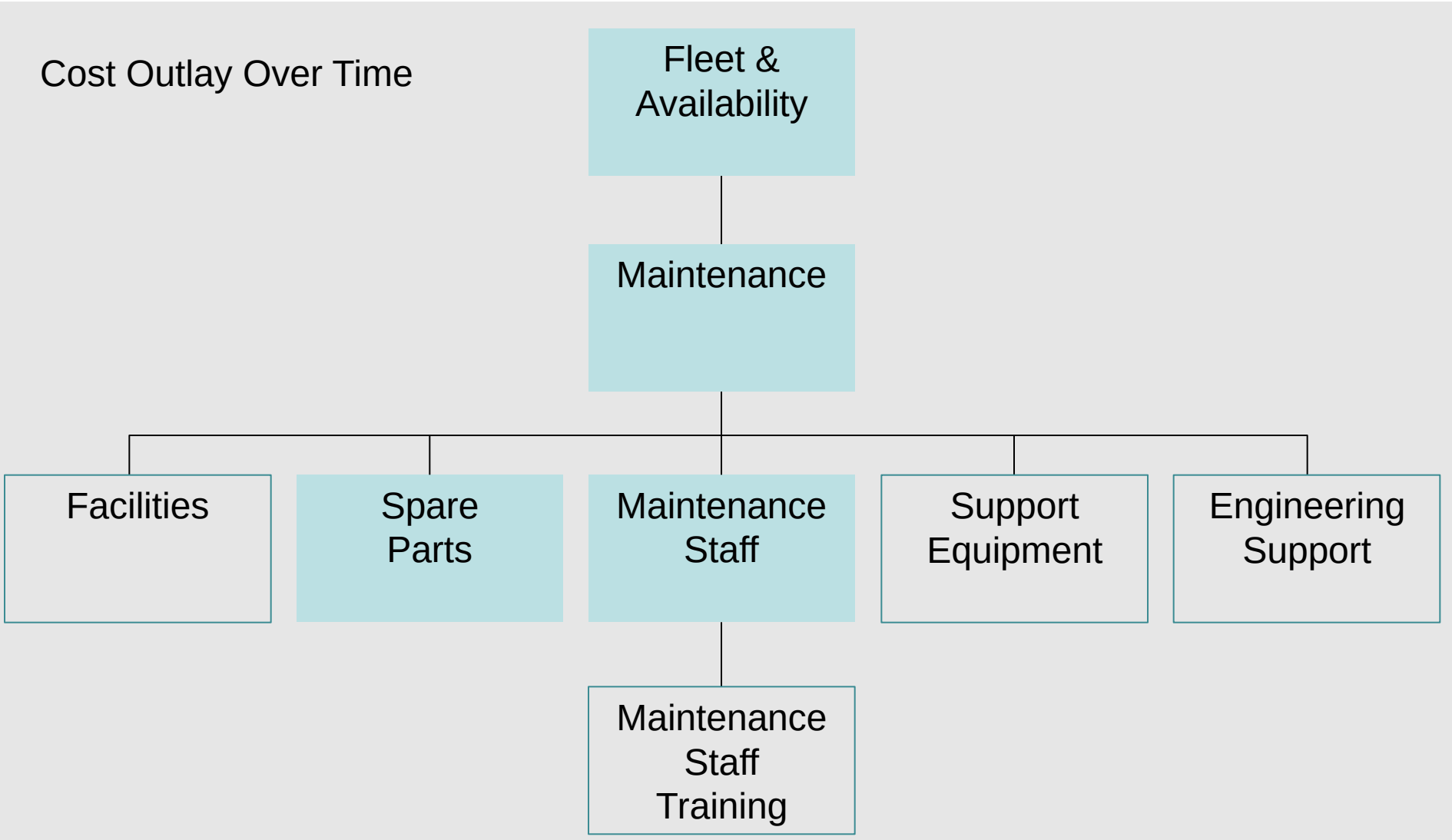


Demonstration Model - Considerations

- Scaled down version of a real model
  - Commercial sensitive data
  - Aircraft but could be vehicles, ships, sub-systems, people, etc.

- Addresses some support questions
  - Potentially many more questions so model(s) can be adjusted to address others

Demonstration Model - Considerations



Demonstration Model

2 Fleet Utilisation Options

Option 1 - 3,000 Op Hrs

Available_For_Use

In_PrevMaint

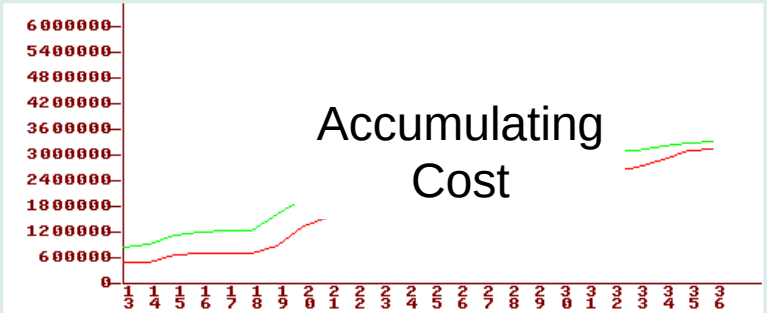
Option 2 - 5,000 Op Hrs

Available_For_Use

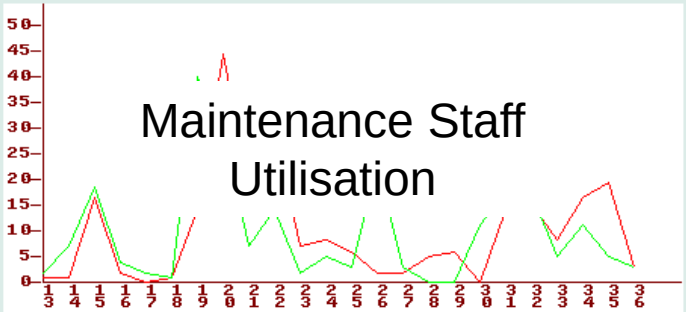
In_PrevMaint

Sys_Available

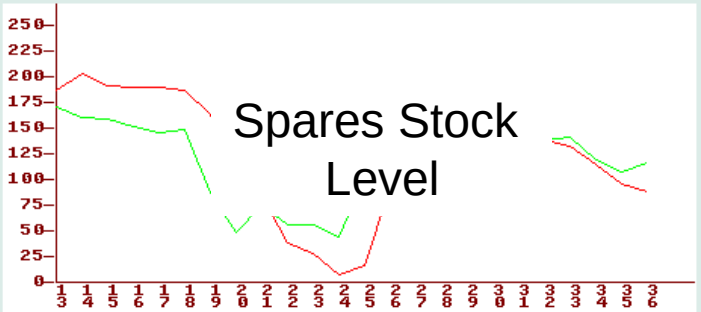
Cost



Staff_Utilisation



Stock_Level



Demonstration Model

- Fleet of 5 aircraft operating over 5 years

- Required;
  1. Understanding of the planned and unplanned maintenance impact on availability

  2. Quantity and cost of resource required to perform maintenance

- To aid analysis the following were used;
  - Deterministic spread-sheet model
  - Stochastic simulation model

Demonstration Model

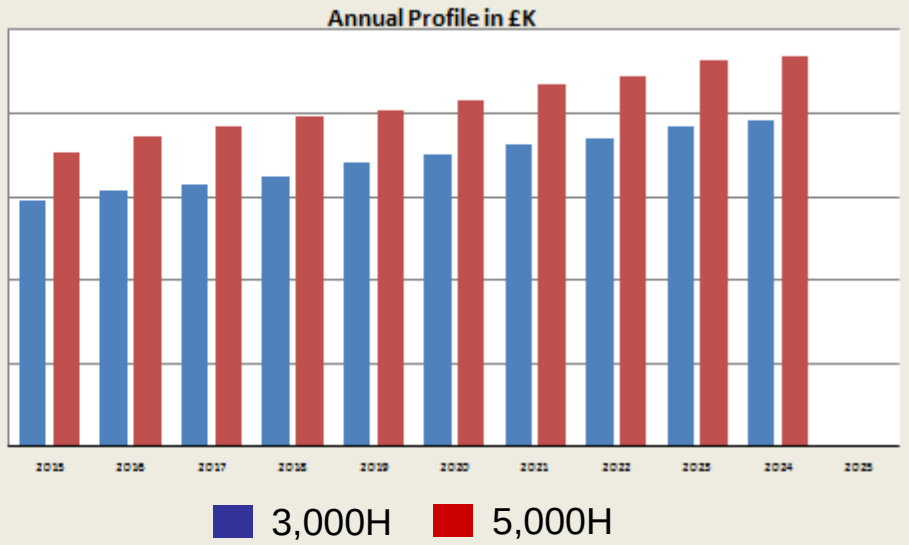
- Spread-sheet model provided estimated use of resource and cost of each utilisation option for the 5 year operation

- Simulation model used to establish a visual understanding of downtime, smooth out peaks and troughs and to obtain statistical confidence

Demonstration Model

Additional Options

Core Support Team	Yes
Core Plus (tasking and Software team)	No
No of FSE Deployments	0
Enhance Support	No
Enhance System Engineering and Depth	No
Enhanced Software Support	No
Support to Authority First Line	No



MS Excel spread-sheet model

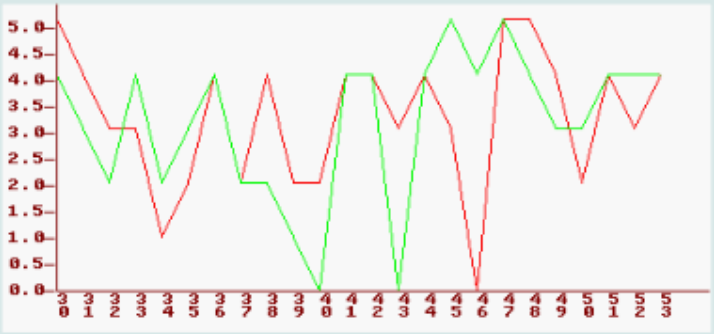
Demonstration Model

Option 1 - 3,000 Op Hrs

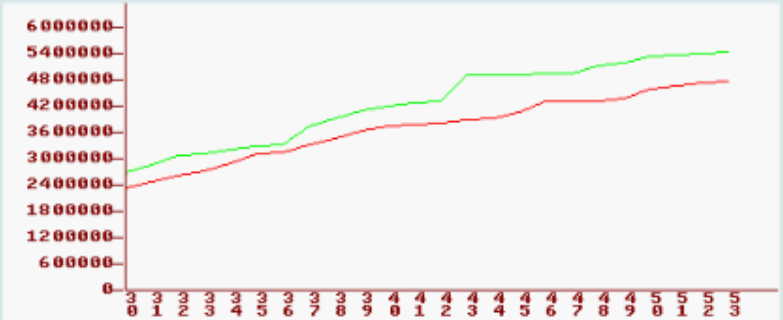
Available_For_Use

In_PrevMaint

Sys_Available



Cost

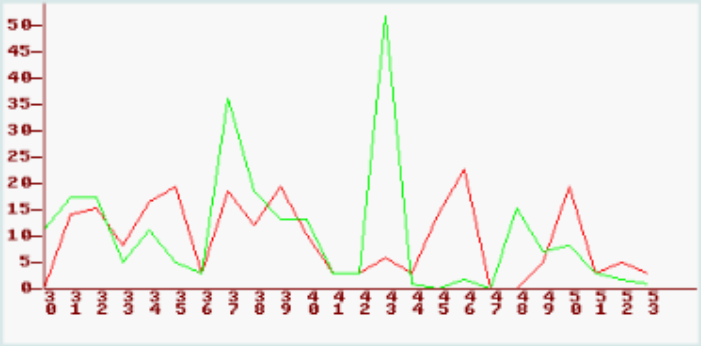


Option 2 - 5,000 Op Hrs

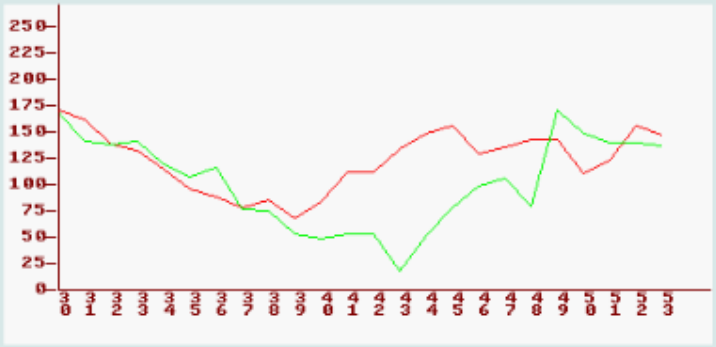
Available_For_Use

In_PrevMaint

Staff_Utilisation



Stock_Level



This provided a more realistic interpretation of aircraft availability, resource utilisation and cost profile.

Demonstration Model

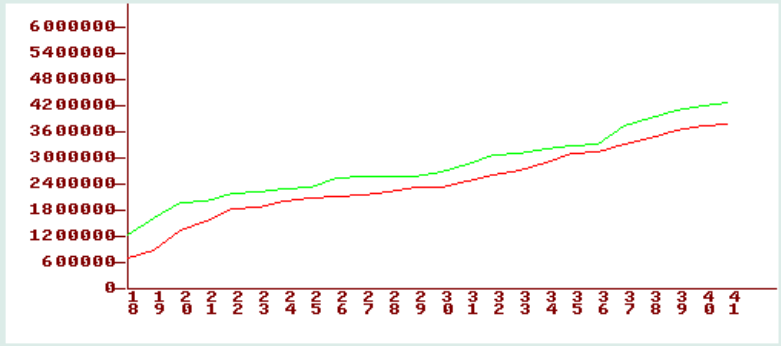
Option 1 - 3,000 Op Hrs

Available_For_Use

In_PrevMaint

Sys_Available

Cost

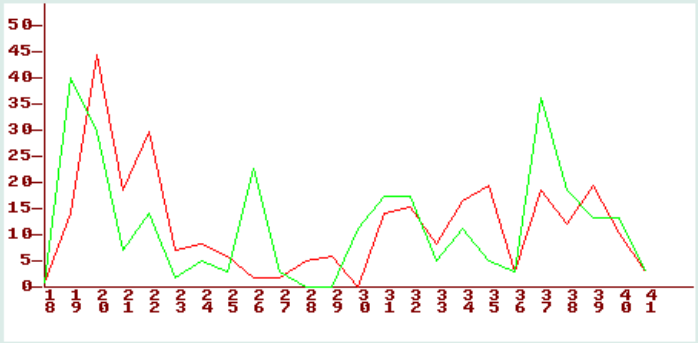


Option 2 - 5,000 Op Hrs

Available_For_Use

In_PrevMaint

Staff_Utilisation



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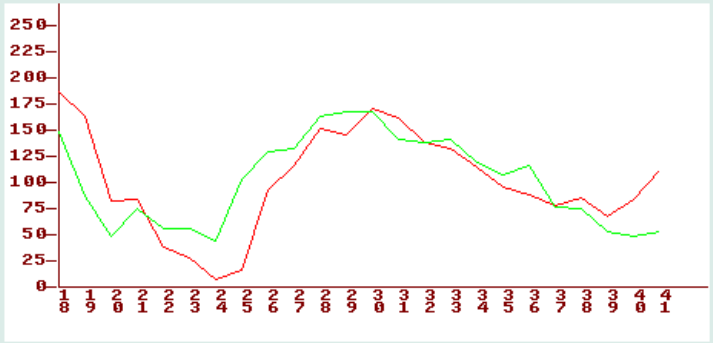


Initial simulation identified:

- Excessive equipment downtime
- Surge in maintenance staffing
- Over provision of spares

Demonstration Model

Option 1 - 3,000 Op Hrs Baseline

Available_For_Use

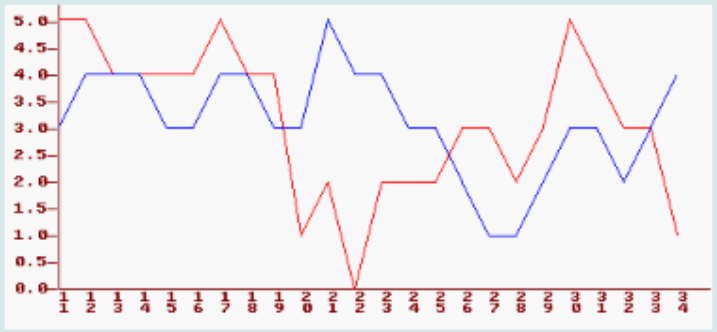
In_PrevMaint

Option 3 - 3,000 Op Hrs Managed

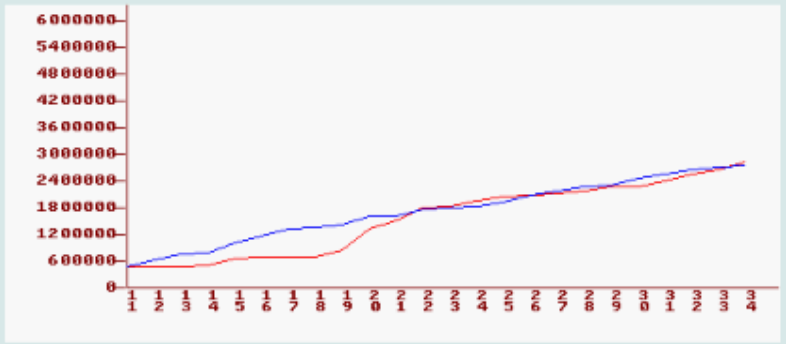
Available_For_Use

In_PrevMaint

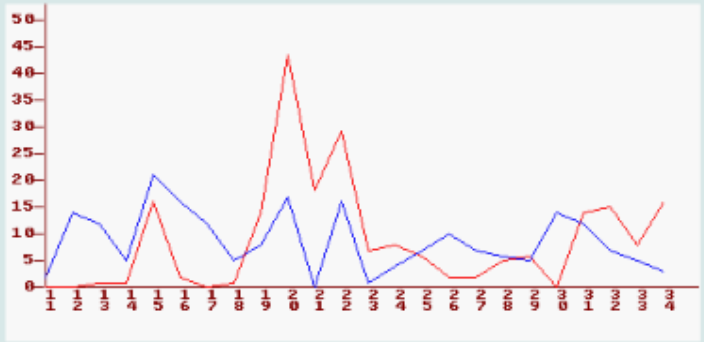
Sys_Available



Cost



Staff_Utilisation



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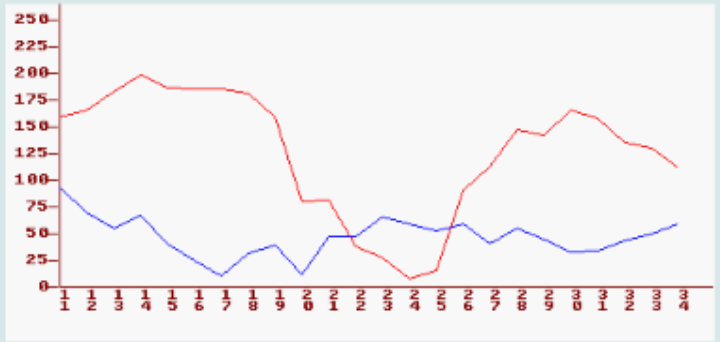

- The Option 1 Maintenance Plan was adjusted to address the issues and a new option (3) was established. The revised maintenance plan for Option 3 showed:
  - Increased aircraft availability
  - Improved staff utilisation for Depth maintenance
  - Reduced stock holding

Simulation Benefits

- Ability to adjust plans in virtual environment
  - No exposure to cost & risk
- Randomisation of:
  - Flying hour profiles – fleet and individual aircraft
    - Analyse flying hour bandwidth / surge
  - Maintenance planning - within approved schedule tolerances
  - Manpower availability
  - Facility utilisation
  - Spares failure rates
  - Obsolescence
- Closer to a ‘reality’ view of events

In-service Phase

- Deployment Planning
  - Address interactions & dependencies
  - Visualise timeline
- Support operation adjustment
  - Feedback from actual operations
  - Re-model areas of issue or concern
  - Address different questions
  - Use modelling outputs to inform adjustments
    - ‘Fine tuning’

Modelling Benefits

- Clarify scope and responsibilities
- Aid optimisation of operations
- Enable a focus on areas of uncertainty
- Aids answering questions such as;
  - Can required capability & availability be achieved?
  - Can expectations and budget be met?

- Reduces risk
  - The plan will work
  - Availability/Capability can be achieved
  - Confidence in the estimated cost

Prediction with Confidence

Presentation Summary

- Need for Enhanced Planning
- Support Service Design
- Deployment Planning
- Modelling
  - Demonstration
- Benefits
- Techniques & tools proven – future use

Questions?

- Julian Dayment & Mark Atton
- More information - Persides stand

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Value.

"Consistently deliver innovative value added solutions across each of our service offerings."

Trust.

Excellence.

"Create Persides culture that is challenging, creative, professional, rewarding and continually strives for excellence."