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An Integrated, Holistic, Stochastic Analysis Approach for Evaluating the impact of new technologies and process improvements on overall outcomes

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Purpose

Analyzing the impact that lower-level changes have in higher-level outcomes and thereby improving the decisions regarding which lower-level changes to make

Using Stochastic Analysis to Make Better Decisions and Achieve Better Outcomes

Agenda

- Explain and Discuss Discrete Event & Monte Carlo Simulation, the difference between deterministic and stochastic analysis and provide examples
- Explain and Discuss the concept of Integrated and Holistic Analysis
- Explain and Discuss how to conduct Integrated and Holistic Analysis employing Discrete Event and Monte Carlo Simulation and provide an example

Discrete Event Simulation

- **Deterministic**
- **Stochastic**

Demonstration Using ProcessModel™

Monte Carlo Simulation

- **Single Variable**
- **Multi Variable**

Demonstration Using Risk Solver™

Integrated and Holistic Analysis

- **Integrated Analysis – utilizing and bringing together *insights gained* from several analysis methods**

- **Holistic Analysis – ensure that your analysis approach is broad enough so that you consider impacts to the *most relevant outcomes***

Example

- We have a set of fixed-wing, rotary-wing and surface truck assets that we use to move personnel and cargo between various points. We have limited funding but we can invest in one of three options to help improve the reliability and maintainability of either the fixed-wing, rotary-wing or surface truck assets.

GOAL – Improving the Operational Availability of our Assets

Background Information

Current Operational Availability:

- Fixed Wing – 85%
- Rotary Wing – 75%
- Surface – 60%

Potential Options (all cost relatively the same):

- Invest in automated maintenance management system to reduce Repair Turn-Around time of Fixed Wing aircraft
- Replace engines in surface trucks to improve reliability
- Stock more spares to reduce Requisition Response Time for Rotary Wing aircraft

Question

Which option should we pursue, given we can only pursue one?

Analysis Question

Which change will yield the greatest improvement in asset operational availability?

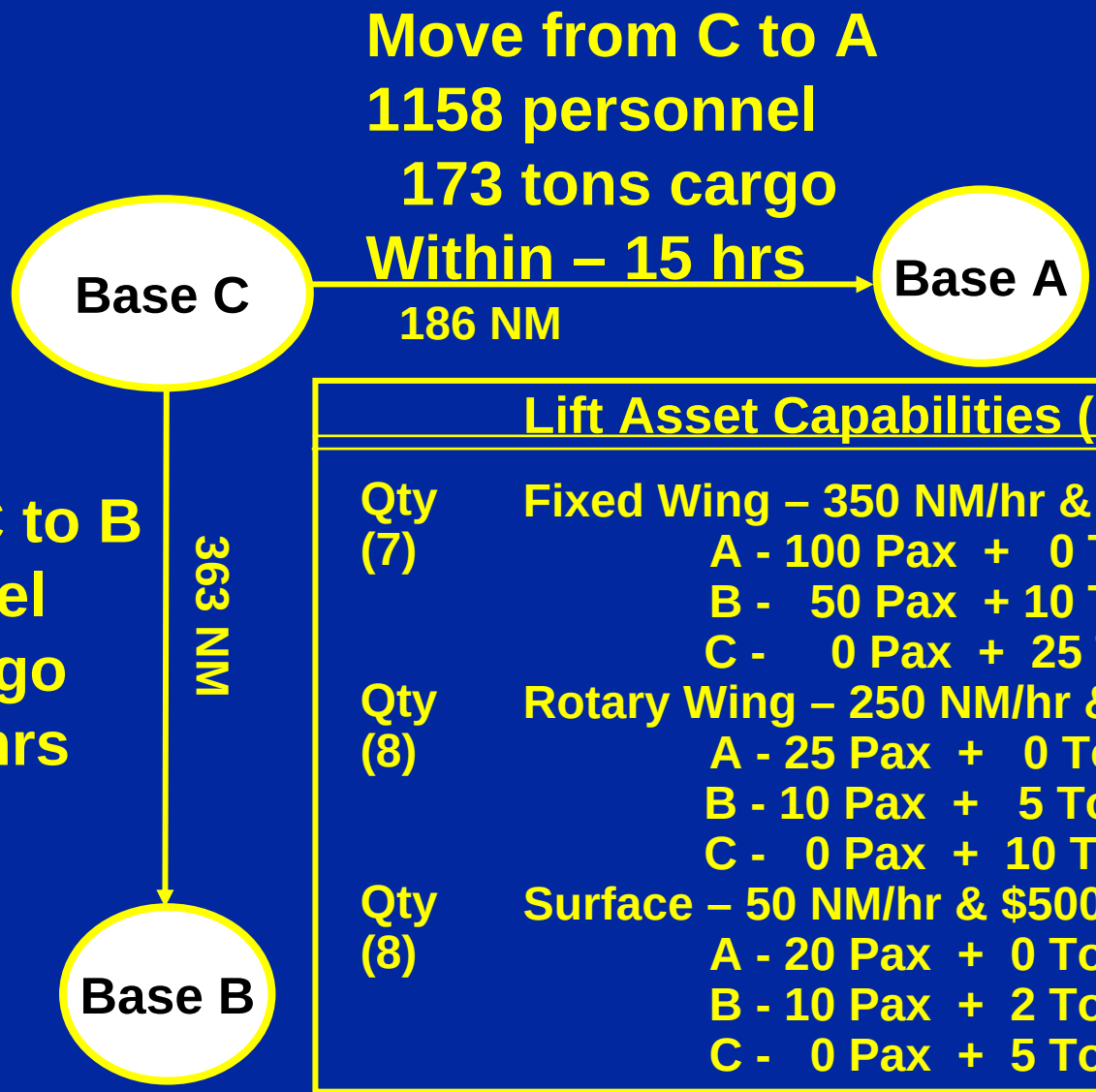
Demonstrate Output from making proposed changes

So, which option should we pursue, given we can only pursue one?

Better Analysis Question

What change will yield the greatest improvement in overall outcomes?

Desired Outcome - Meet Mission Requirements at Least Cost



Lift Asset Capabilities (Base C)

Qty (7)	Fixed Wing – 350 NM/hr & $10,000/hr
	A - 100 Pax + 0 Tons
	B - 50 Pax + 10 Tons
	C - 0 Pax + 25 Tons
Qty (8)	Rotary Wing – 250 NM/hr & $12,000/hr
	A - 25 Pax + 0 Tons
	B - 10 Pax + 5 Tons
	C - 0 Pax + 10 Tons
Qty (8)	Surface – 50 NM/hr & $500/hr
	A - 20 Pax + 0 Tons
	B - 10 Pax + 2 Tons
	C - 0 Pax + 5 Tons

Analysis Approach

Show LP set up

Experiment with different potential failures and determine sensitivity on feasibility of meeting mission requirements

Show Operational Availability break down

Experiment with different potential improvements and determine expected overall impact on available assets and then overall impact on meeting mission requirements

So, now which option should we pursue, given we can only pursue one?

Discussion