by Systecon

# opus suite

## Overview

Systecon

# The Opus Suite Model

by Systecon
opus suite

## OPUS10 – Logistic support optimization
Optimal assortment II Repair strategy II Supply logistics

## CONNECT – Data Ingestion
INTEGRATION || LSAR II
S3000L II ERP

## CATLOC – Cost analysis
Life Cycle Cost II Budgeting & forecasting II
Cost driver identification

## INSIGHTS – Dashboard

## SIMLOX – Performance simulation
Operational availability II Resource utilization II
Dynamic scenario assessment

## EVO – Enhanced Optimizer
Optimal Dimensioning II Optimal Design

Concept | Design | Production | Sustain | Termination

Systecon

# The Opus Suite Model

by Systecon

opus suite

## OPUS10 – Logistic support optimization

Optimal asso… …gistics

- Based on mathematical algorithms
- Uses distributions and probabilities
- Analyzes cost and performance
- Optimizes Spare Parts Assortments
- Optimize Location of Repair

## CATLOC – Cost analysis

Life Cycle Cost…

Cost driver ide…

- Based on a user defined cost model
- Calculates total Life Cycle Cost
- Compare alternatives
- Simulate different cost outcome
- Analyze and identify cost drivers

## SIMLOX – Per…

Operational ava…

Dynamic scenari…

- Based on simulation
- Time dependent simulation
- Expanded and detailed scenario
- Generates averages and confidence intervals
- Evaluate different alternatives

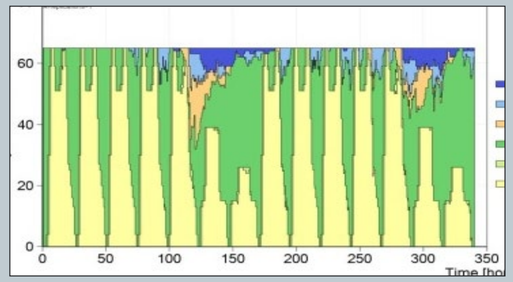
Concept → Design → Production → Sustainment → Termination

Systecon

# THE OPUS SUITE
## STRATEGIC ANALYSIS FOR DECISION SUPPORT

**RESOURCES**

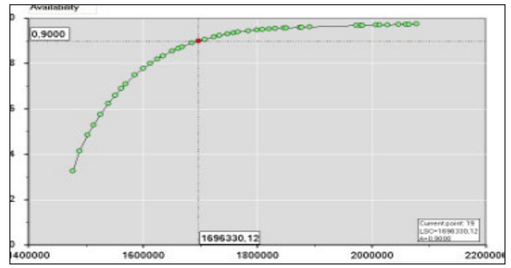
- Performance over time
- Use of resources (shops, personnel, equipment…)
- Dynamic scenarios




**SPARES**

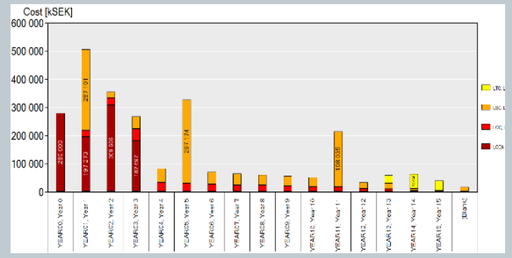
- Cost/Effectiveness
- Stock allocation
- Repair strategy
- Logistic support solution

**INPUT DATA**




**COSTS**

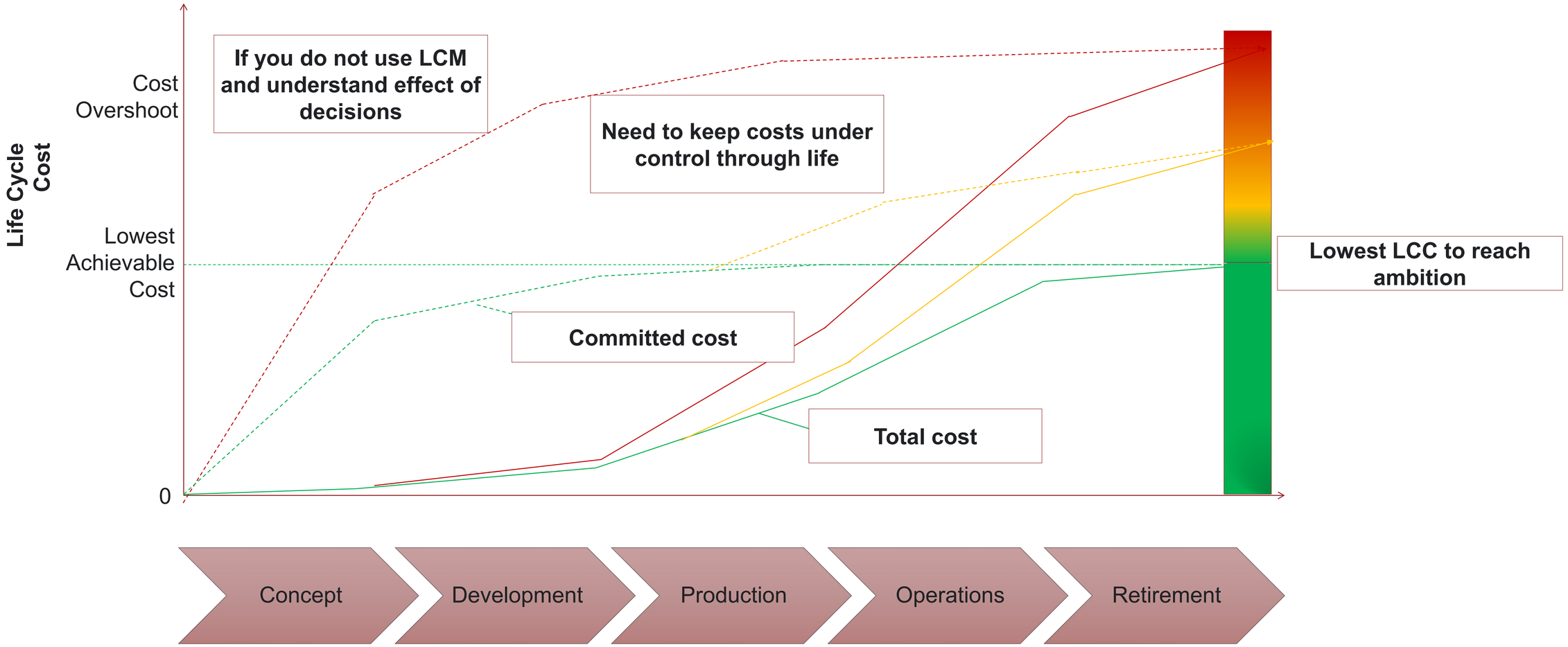
- Life Cycle Cost / Life Cycle Profit
- Budget and forecastes
- Identify cost drivers




Systecon

# THROUGH LIFE ATTENTION – COST CONTROL

## INTEGRATION OF LCM IN ALL PHASES



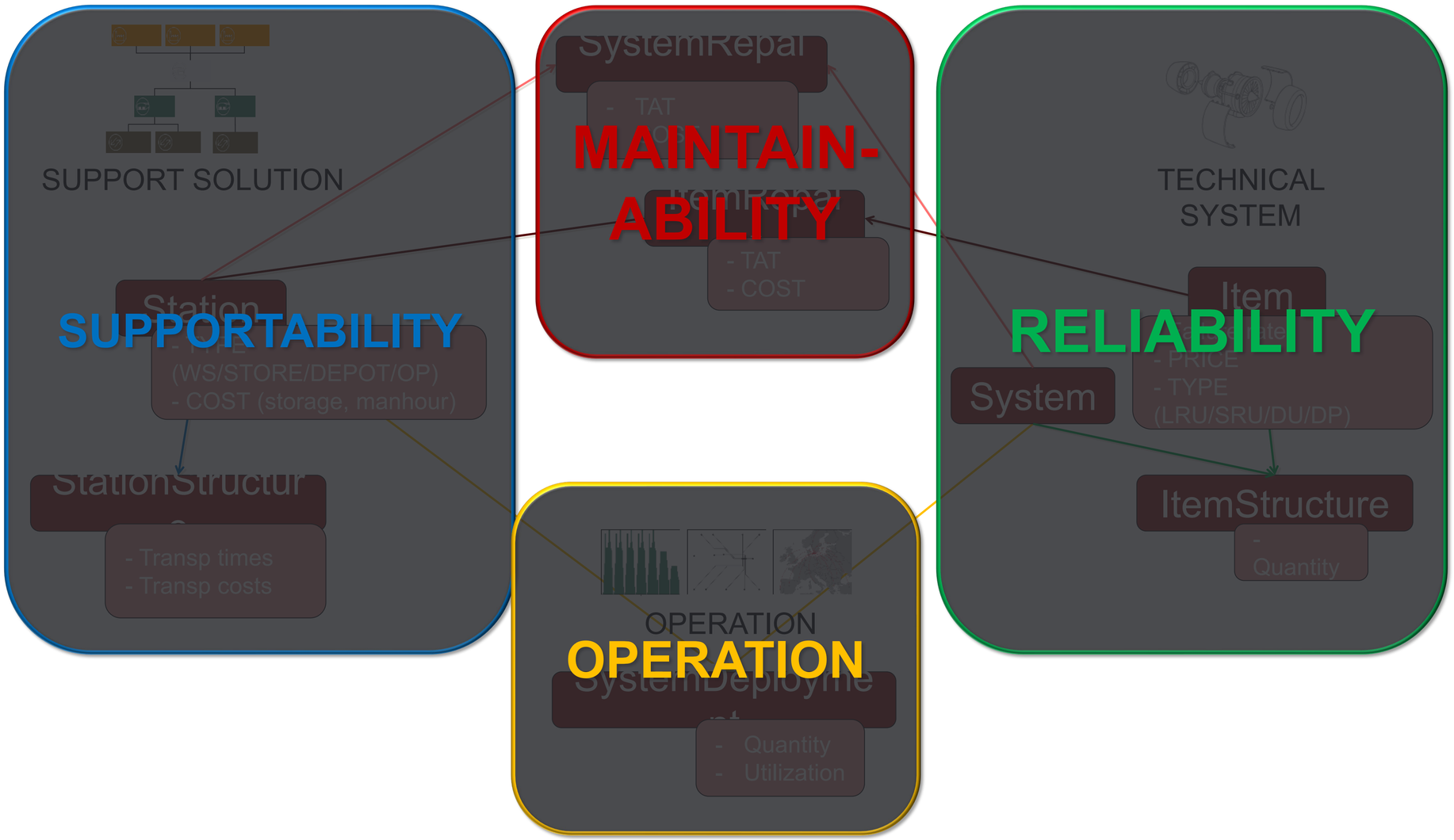

Systecon

# Application Areas – OPUS10

- Spare Parts Optimization
- Optimizing Logistic Support Organization and Resources
- Optimizing System Design
- LSC Analysis of Procurements and Development
- What If and Sensitivity Analysis

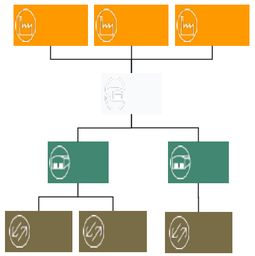
Systecon

# OPUS10 – INPUT DATA



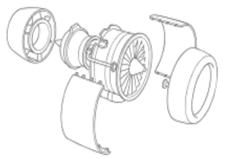

Systecon

# OPUS10 – INPUT DATA



SUPPORT SOLUTION

**SystemRepair**
- Time
- Cost



TECHNICAL SYSTEM

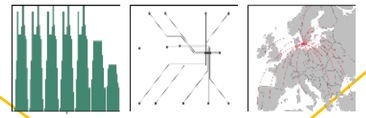
**ItemRepair**
- Time
- Cost

**Station**
- Type (WS/STORE/DEPOT/OP)
- Cost (storage, manhour)

**Item**
- Failure rate
- Price
- Type

**System**

**StationStructure**
- Transp times
- Transp costs



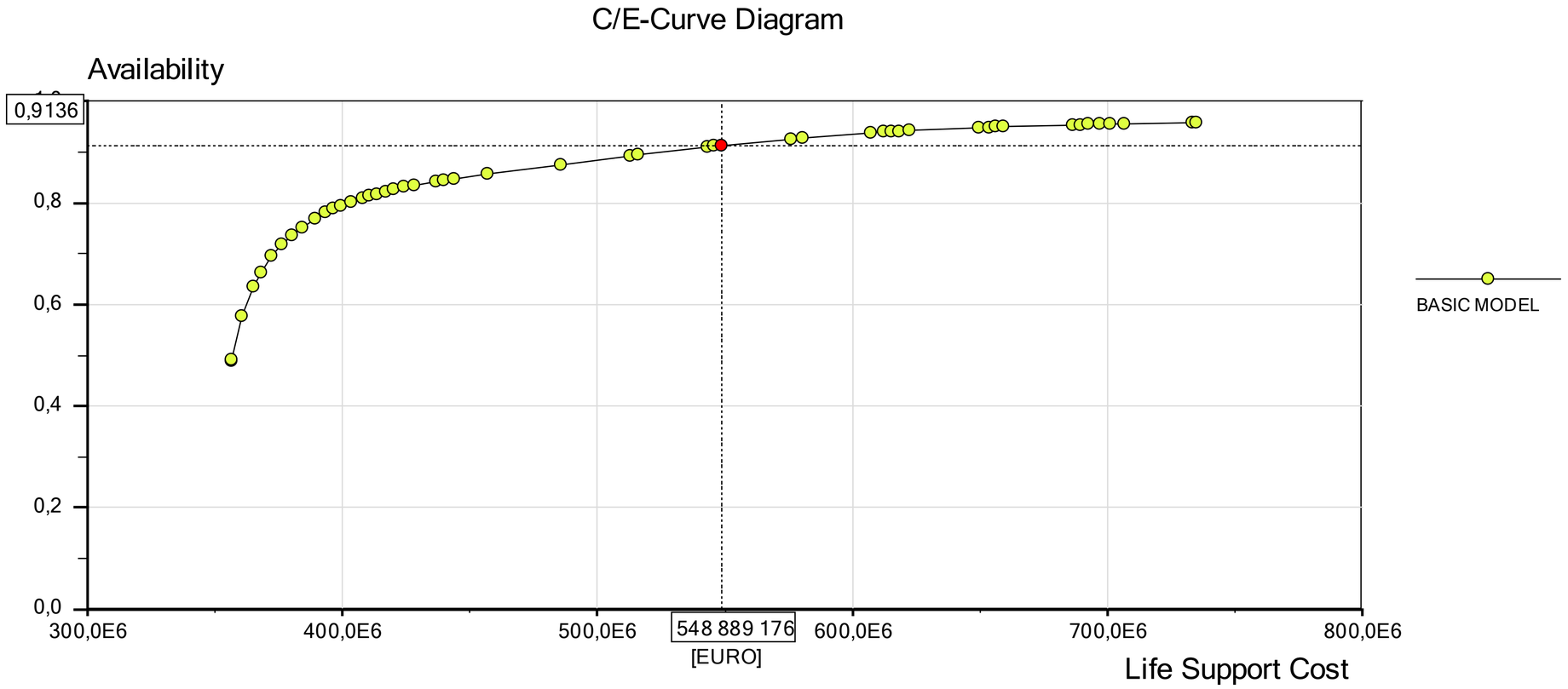
OPERATION

**ItemStructure**
- Quantity

**SystemDeployment**
- Quantity
- Utilization

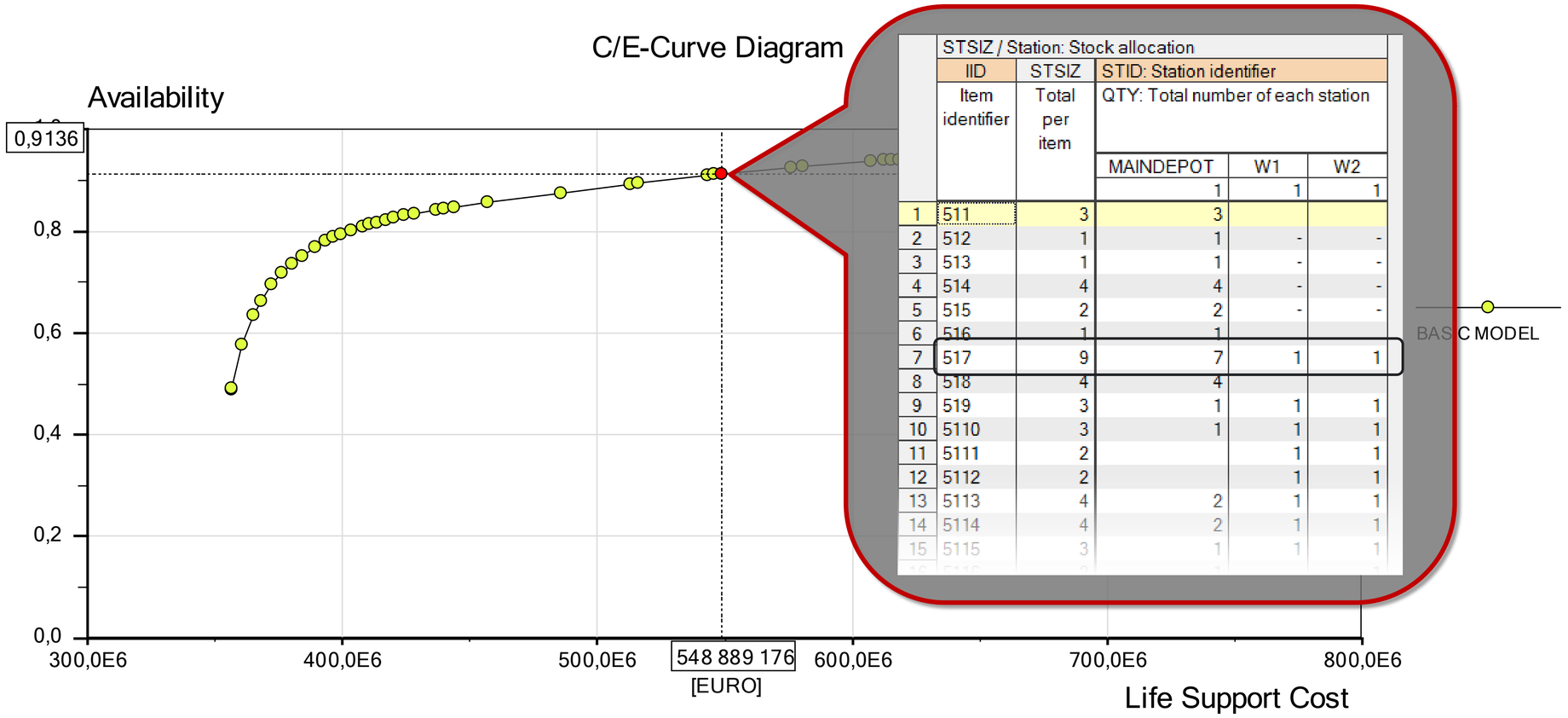
Systecon

# OPUS10 MAIN RESULT – C/E DIAGRAM




Systecon

# OPUS10 – REPORT

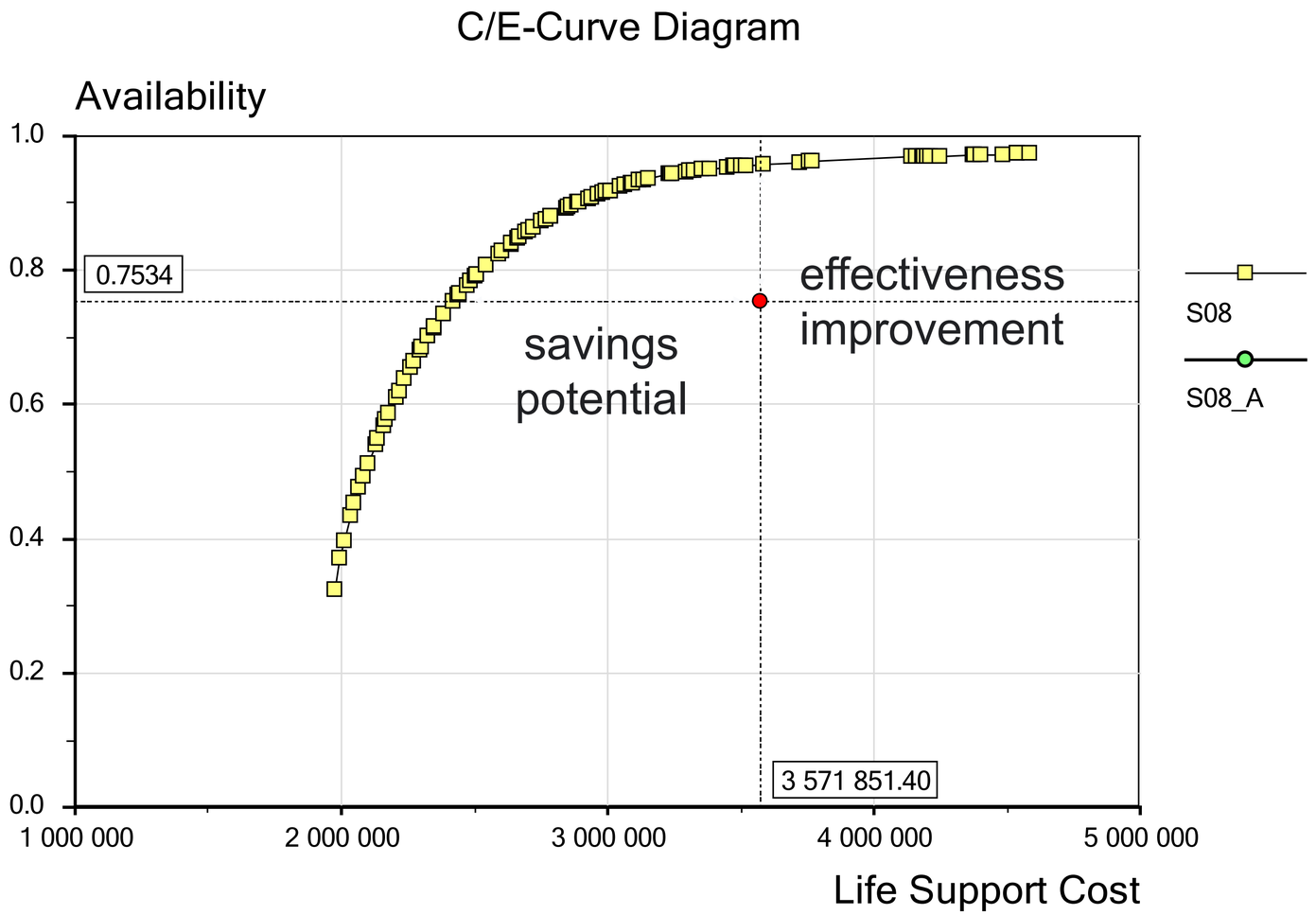



STSIZ / Station: Stock allocation

| | IID | STSIZ | STID: Station identifier | | |
|---|---|---|---|---|---|
| | Item identifier | Total per item | QTY: Total number of each station | | |
| | | | MAINDEPOT | W1 | W2 |
| | | | 1 | 1 | 1 |
| 1 | 511 | 3 | 3 | | |
| 2 | 512 | 1 | 1 | - | - |
| 3 | 513 | 1 | 1 | - | - |
| 4 | 514 | 4 | 4 | - | - |
| 5 | 515 | 2 | 2 | - | - |
| 6 | 516 | 1 | 1 | | |
| 7 | 517 | 9 | 7 | 1 | 1 |
| 8 | 518 | 4 | 4 | | |
| 9 | 519 | 3 | 1 | 1 | 1 |
| 10 | 5110 | 3 | 1 | 1 | 1 |
| 11 | 5111 | 2 | | 1 | 1 |
| 12 | 5112 | 2 | | 1 | 1 |
| 13 | 5113 | 4 | 2 | 1 | 1 |
| 14 | 5114 | 4 | 2 | 1 | 1 |
| 15 | 5115 | 3 | 1 | 1 | 1 |

Systecon

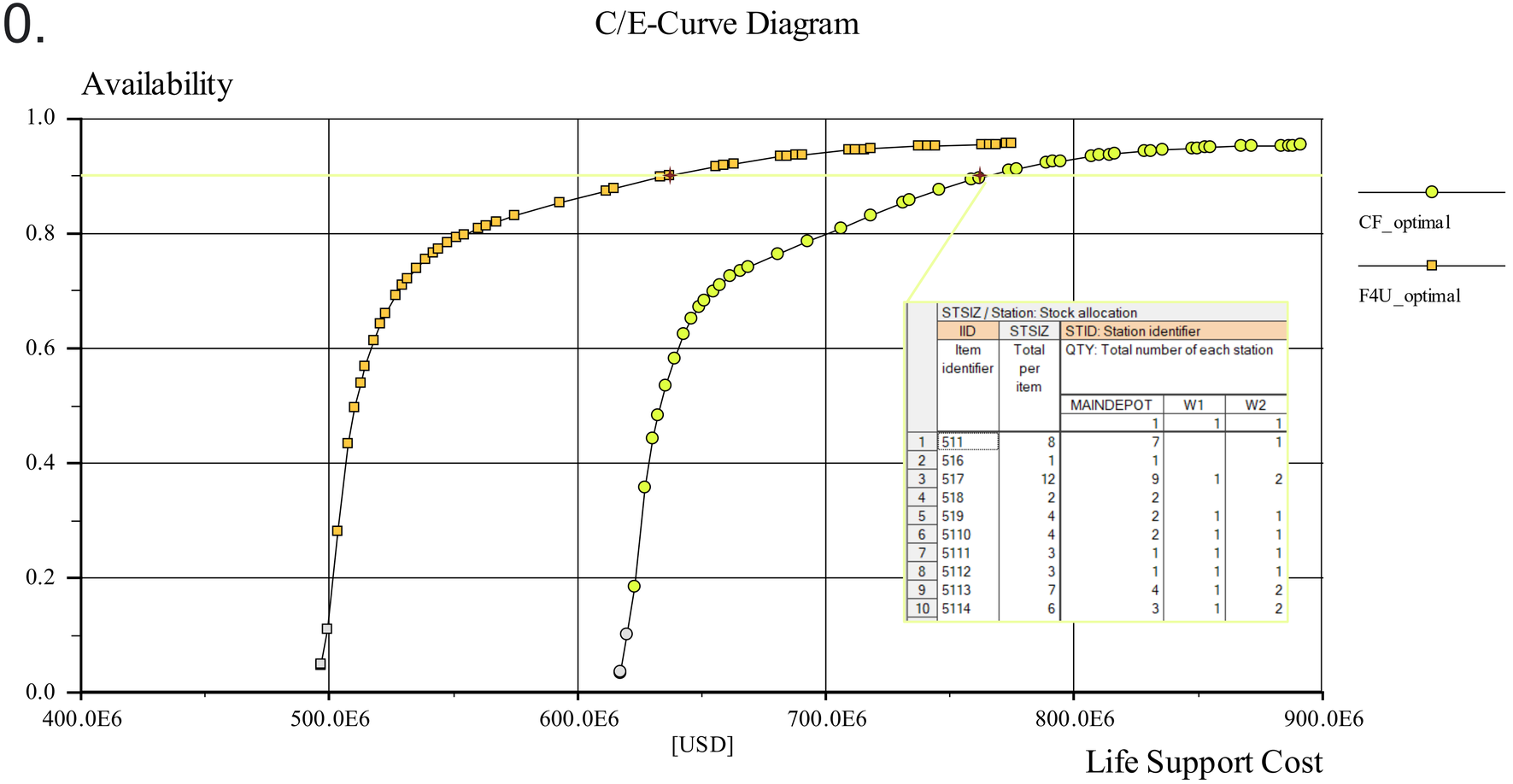
# OPUS10 ANALYSES - EXAMPLE




Systecon

# Evaluation of Alternatives

- Compare alternative platforms and support systems for Cost & Availability in OPUS10.



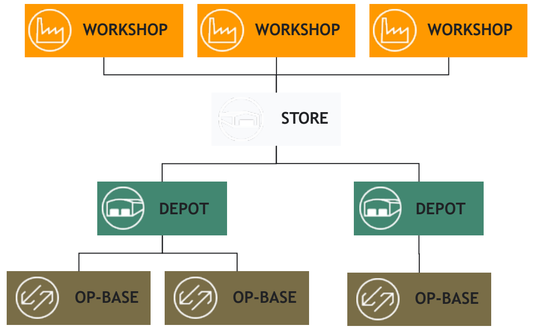

STSIZ / Station: Stock allocation

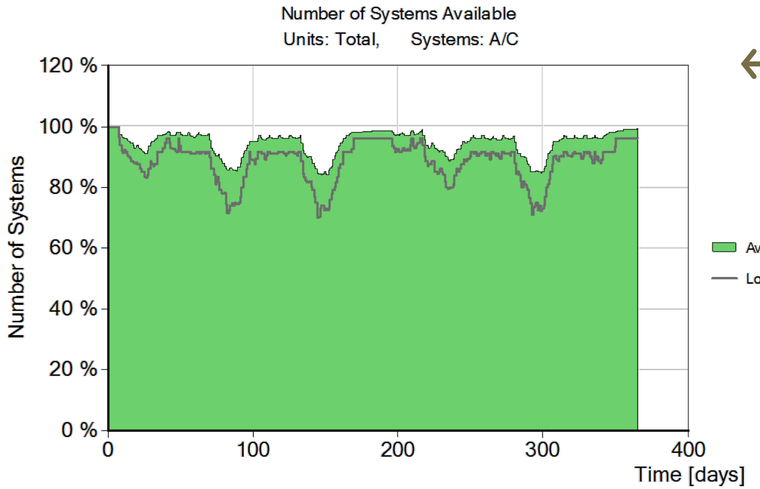
| | IID Item identifier | STSIZ Total per item | STID: Station identifier QTY: Total number of each station | | |
|---|---|---|---|---|---|
| | | | MAINDEPOT | W1 | W2 |
| | | | 1 | 1 | 1 |
| 1 | 511 | 8 | 7 | | 1 |
| 2 | 516 | 1 | 1 | | |
| 3 | 517 | 12 | 9 | 1 | 2 |
| 4 | 518 | 2 | 2 | | |
| 5 | 519 | 4 | 2 | 1 | 1 |
| 6 | 5110 | 4 | 2 | 1 | 1 |
| 7 | 5111 | 3 | 1 | 1 | 1 |
| 8 | 5112 | 3 | 1 | 1 | 1 |
| 9 | 5113 | 7 | 4 | 1 | 2 |
| 10 | 5114 | 6 | 3 | 1 | 2 |

Systecon

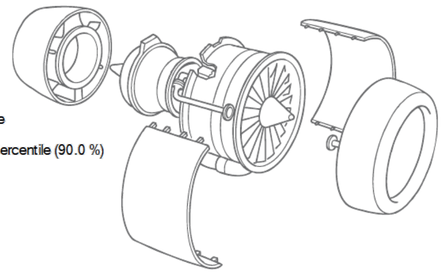
# SIMLOX – PERFORMANCE OVER TIME

SUPPORT SOLUTION →

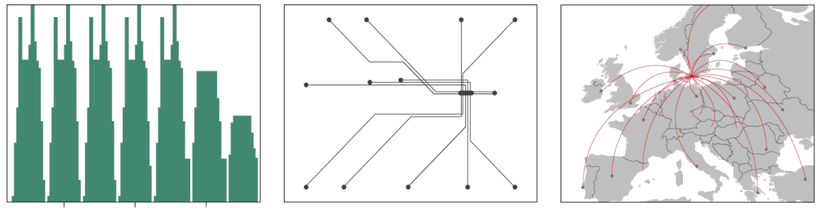



← TECHNICAL SYSTEM



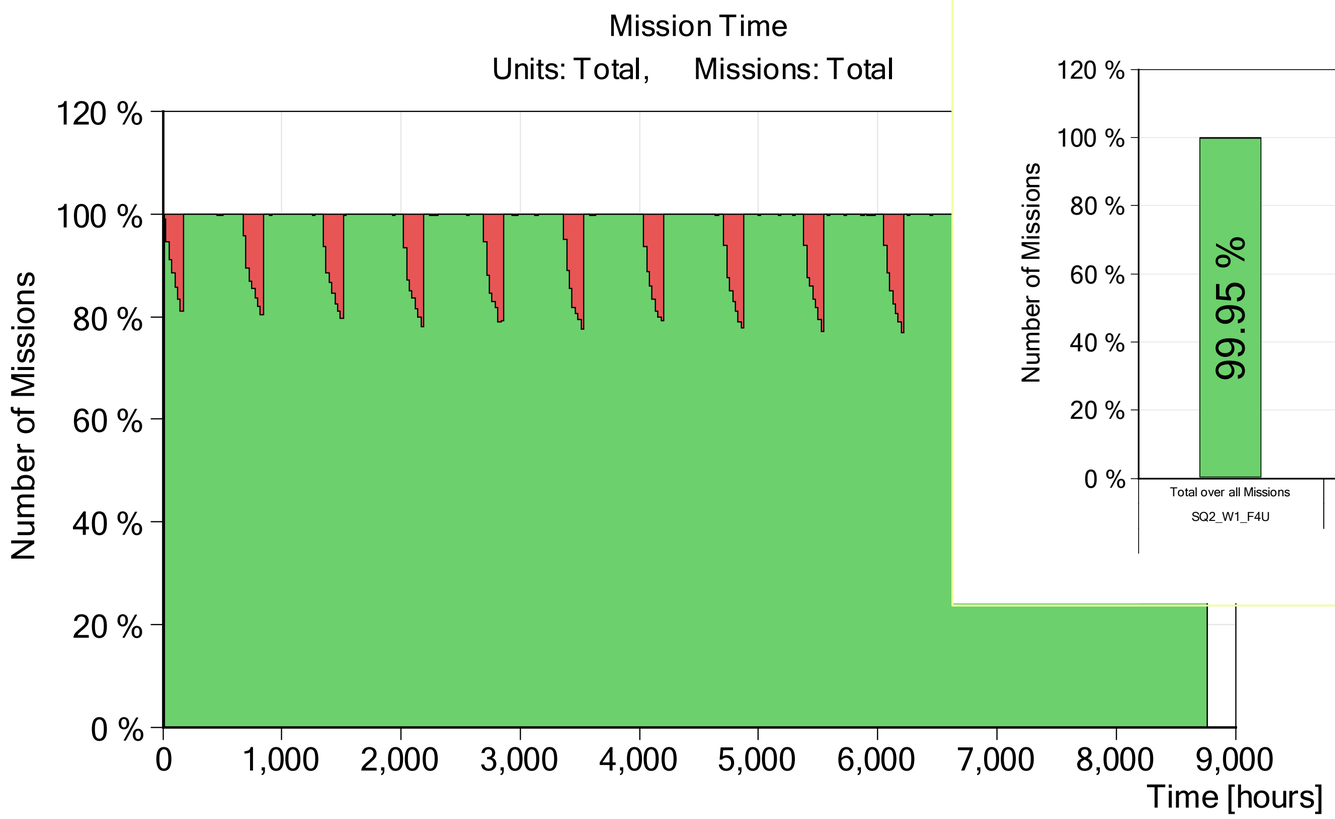
↑ OPERATION

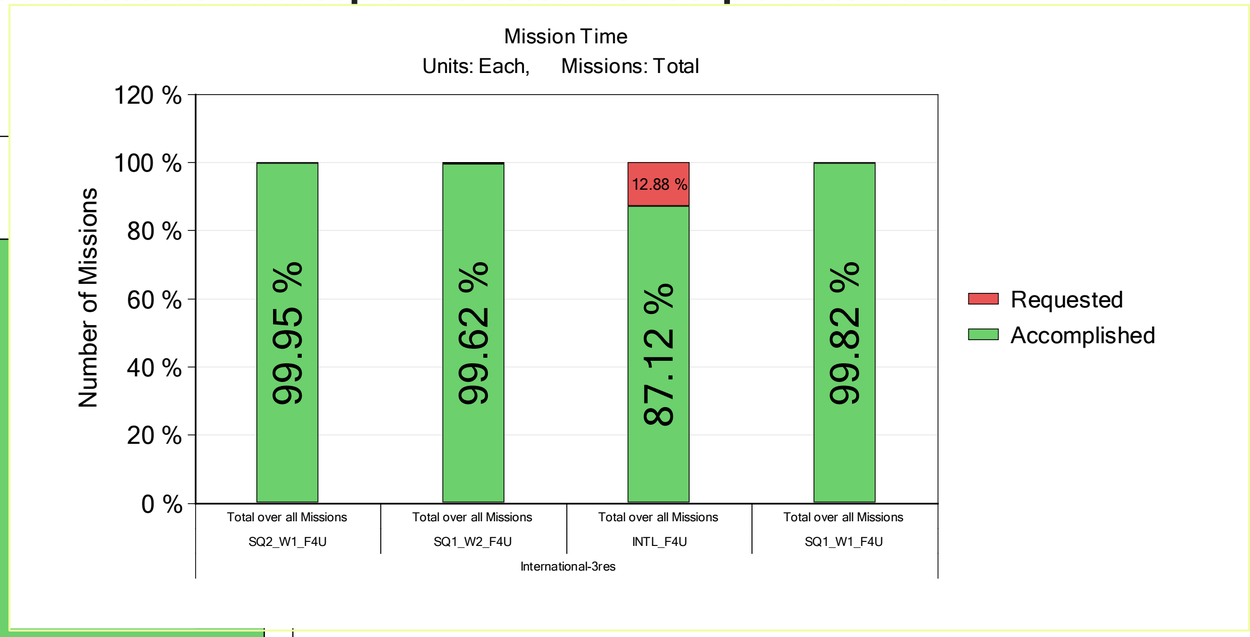


Systecon

# Simulation of Operational Performance in Complex Scenarios

- OPUS10 provides a solution that is static in time. How well does an OPUS10 solution perform over set timeframes with complex mission profiles?




Systecon

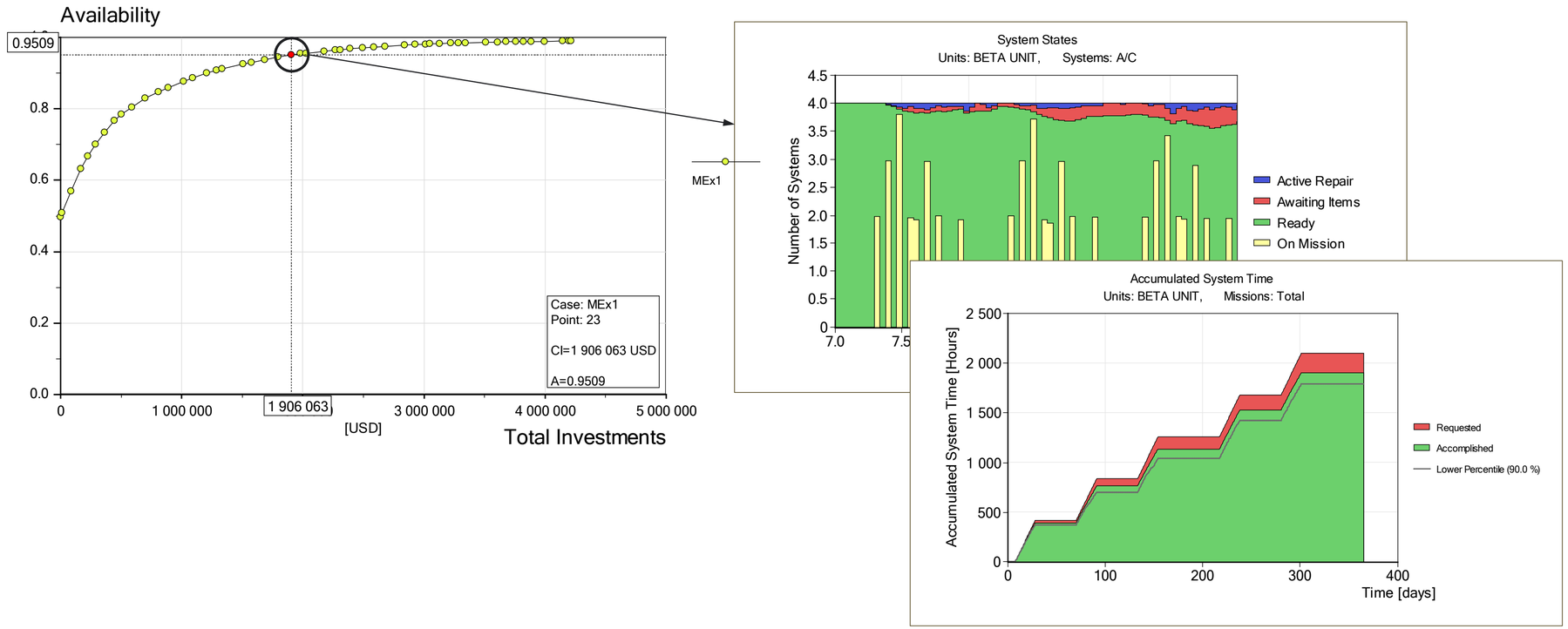
# OPUS10 vs SIMLOX – SCOPE

## OPUS10

- Optimizes
  - generates good solutions
- Effectiveness vs cost
- Mean values
  - for several MoE (typically support-oriented)

## SIMLOX

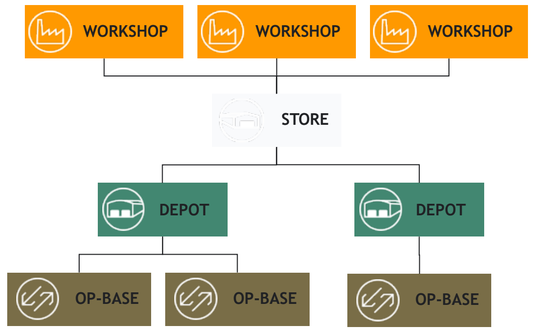
- Evaluates
  - studies one solution
- Effectiveness over time
- Mean values and percentiles
  - for several MoE (also operations-oriented)

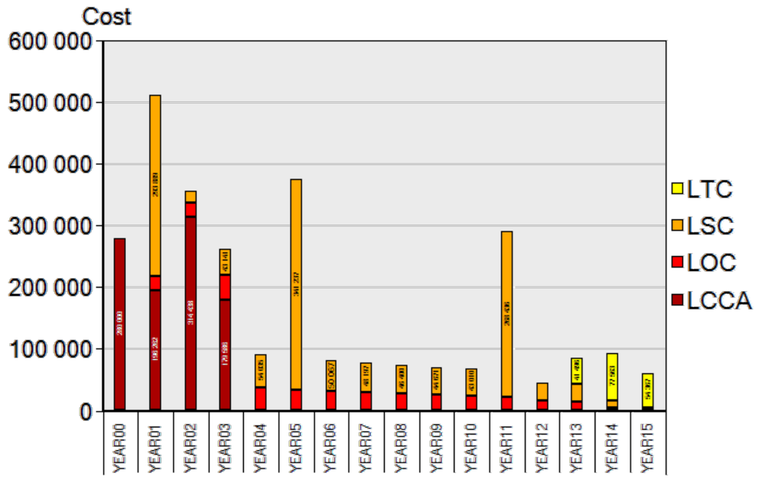



Systecon

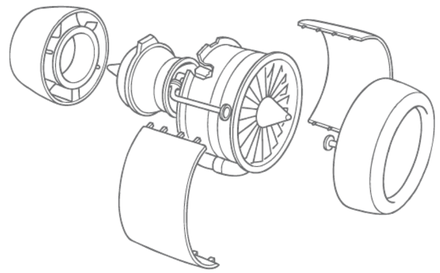
# CATLOC – Detailed Cost Analysis

SUPPORT SOLUTION →

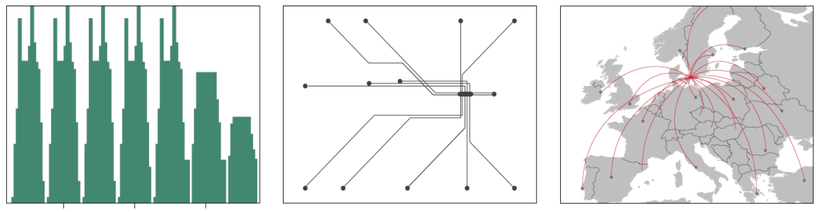



← TECHNICAL SYSTEM

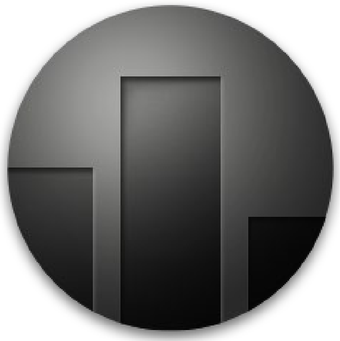


↑ OPERATION



Systecon

# INPUT AND OUTPUT



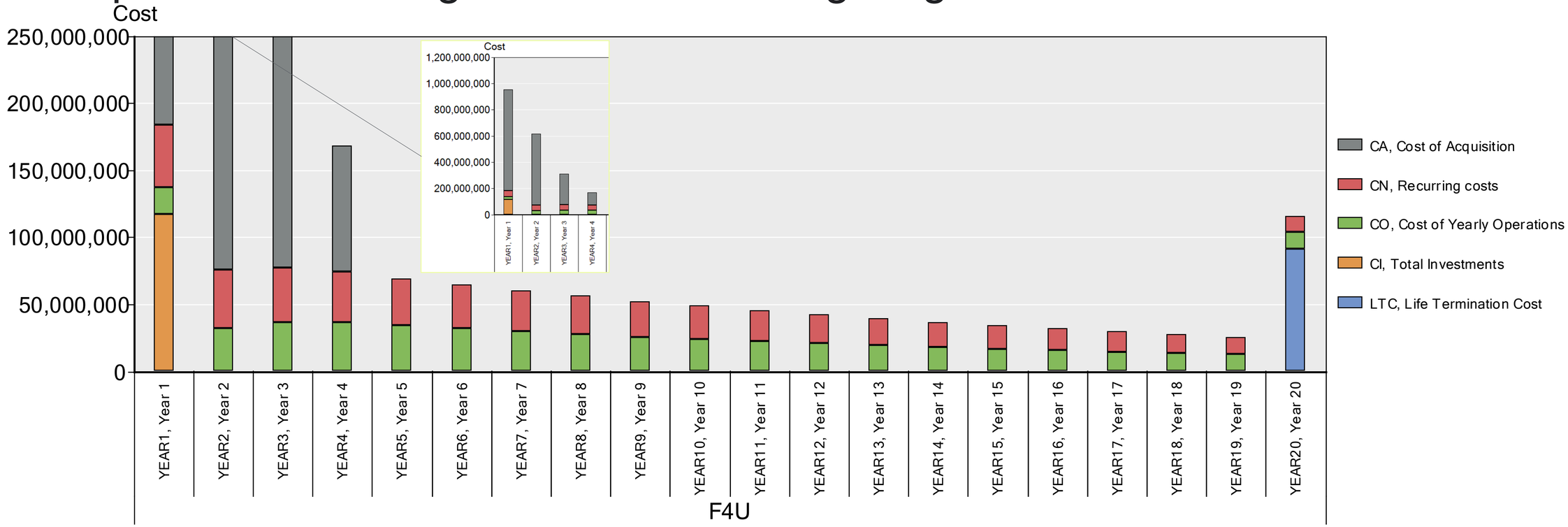
- OPUS10/SIMLOX
- Scenario
  - systems and items
  - stations
  - resources
  - tasks
  - time period
- Parameter values

- LCC - life cycle cost
- Cost elements
- Cost driver analysis
- Sensitivity analysis
- Reports

Systecon

# Informed Lifecycle Cost Decision Making

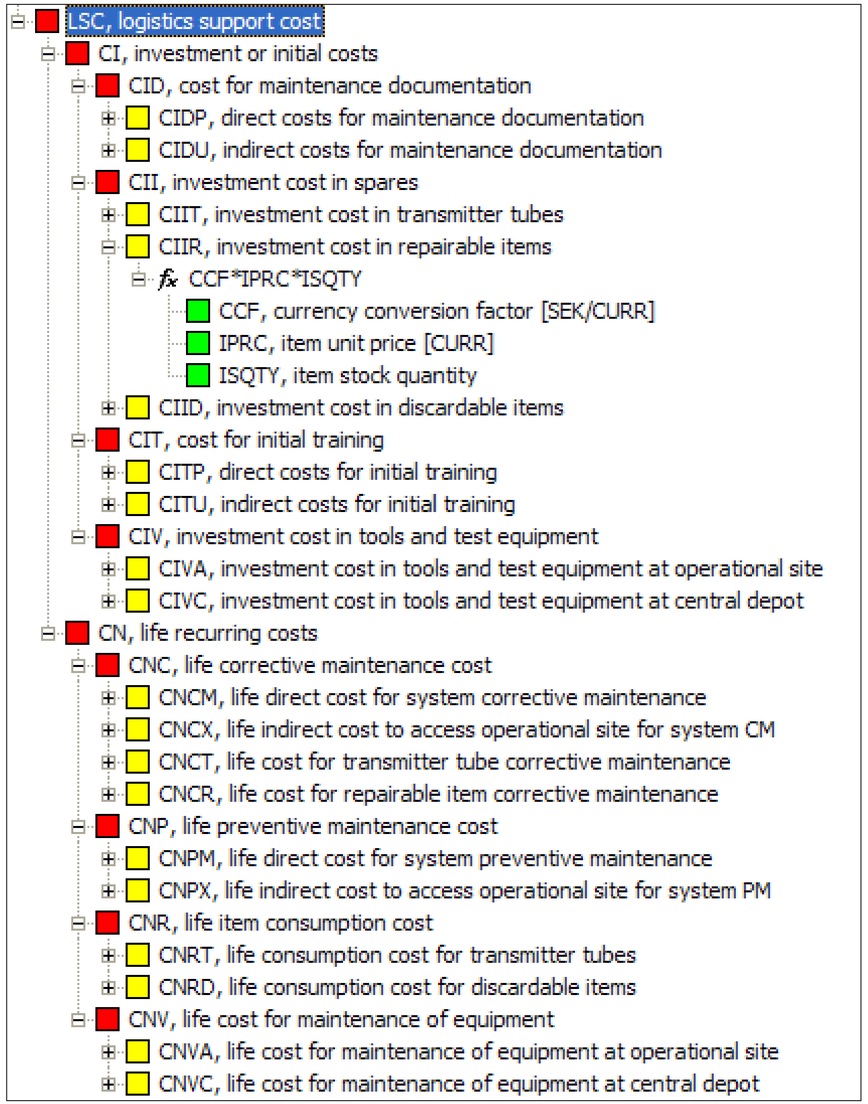
- CATLOC is used to understand the LCC magnitude and profile over a project and implications for long term defence budgeting.




Systecon

# COST TREE
## EXAMPLE

- Top node: LSC
  - LSC = CI + CN
- Cost aggregate: CI
  - CI = CID + CII + CIT + CIV
- Cost aggregate: CII
  - CII = CIIT + CIIR + CIID
- Cost atom: CIIR
  - CIIR = CCF*IPRC*ISQTY
  - formula
- Parameters: CCF, IPRC, ISQTY




Systecon

# What Problems can the OPUS Suite Address?

- Comparison of Alternatives
- Translate Operational needs into requirements on Reliability and Availability.
- Platform Design
- Support System Design (E.G Alternative Maintenance Concepts, Repair or Discard policies)
- Spares Optimisation
  - Initial Procurement during Acquisition
  - In Service Procurements or replenishment
  - Evaluation of Recommended Spares solutions from 3rd parties.
- Evaluation of In Service Support System Organisation.
- Simulation of Operational performance in complex detailed Scenarios/Mission Profiles.
- Life Cycle Cost Modelling & Analysis
- Inform What If Questions and decision making regarding Platform and Support System Design.
- Platform and Support System Phasing Scenarios (E.G Disposal).
- Sensitivity Analysis

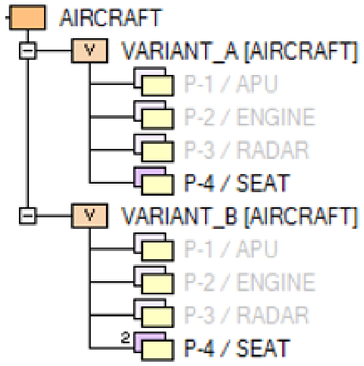
Bottom Line

Lifecycle Cost Management from concept through to disposal to maximise operational effectiveness whilst minimising cost.

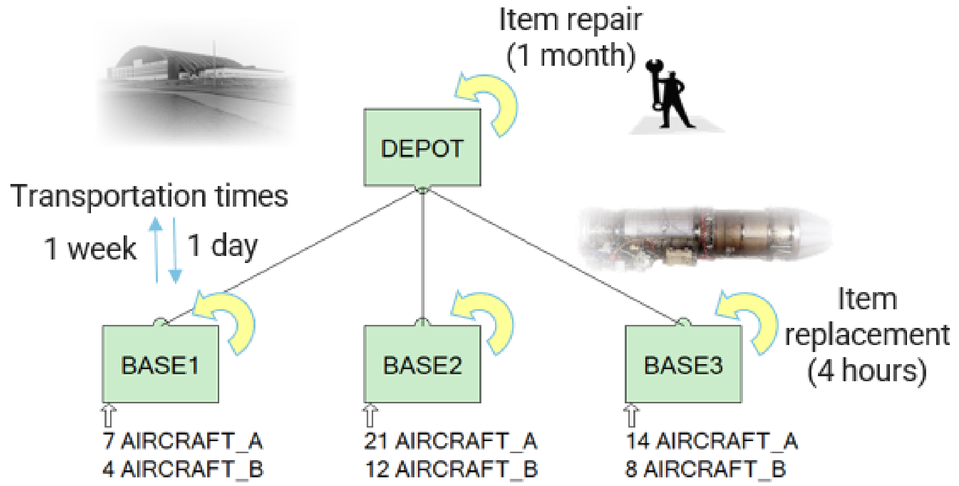
Systecon

# Complexity Example – Don’t Guess, Know!

## Technical System comprising 4 Items…




## Support Org with 4 stations to hold spares…

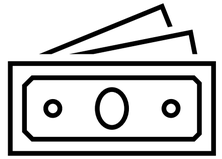



## 4 Items with unique prices and failure rates…

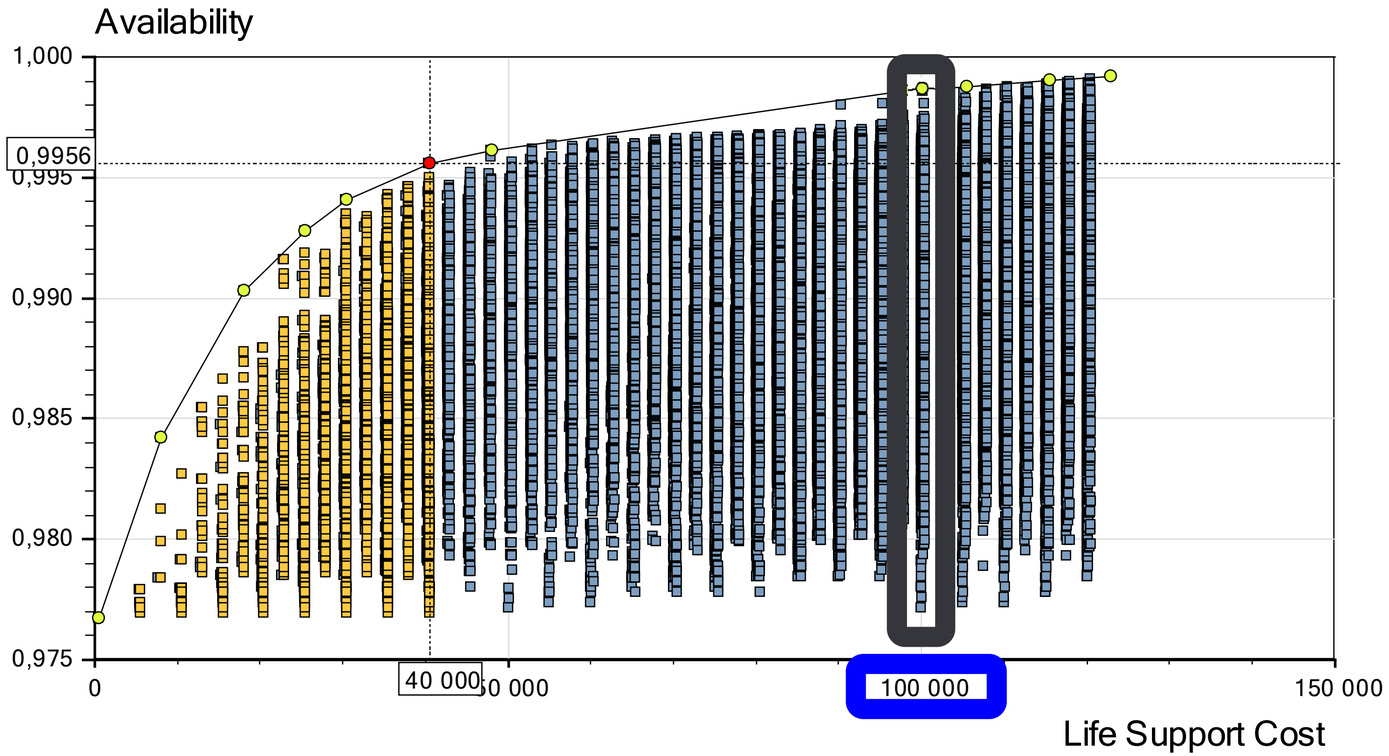
| | IID<br>Item identifier | DESCR<br>Description | PRICE<br>Unit price |
|---|---|---|---|
| 1 | APU | | 10 000 |
| 2 | ENGINE | | 50 000 |
| 3 | RADAR | | 5 000 |
| 4 | SEAT | | 7 500 |

| | FRID<br>Failure identifier | OPID<br>Operation parameter identifier | FRT<br>Failure rate [1/MOPIDs] |
|---|---|---|---|
| 1 | FAILURE_APU | <OPHOURS> | 300 |
| 2 | FAILURE_ENGINE | <OPHOURS> | 100 |
| 3 | FAILURE_RADAR | <OPHOURS> | 50 |
| 4 | FAILURE_SEAT | <OPHOURS> | 300 |

## Spares Budget of $100,000…

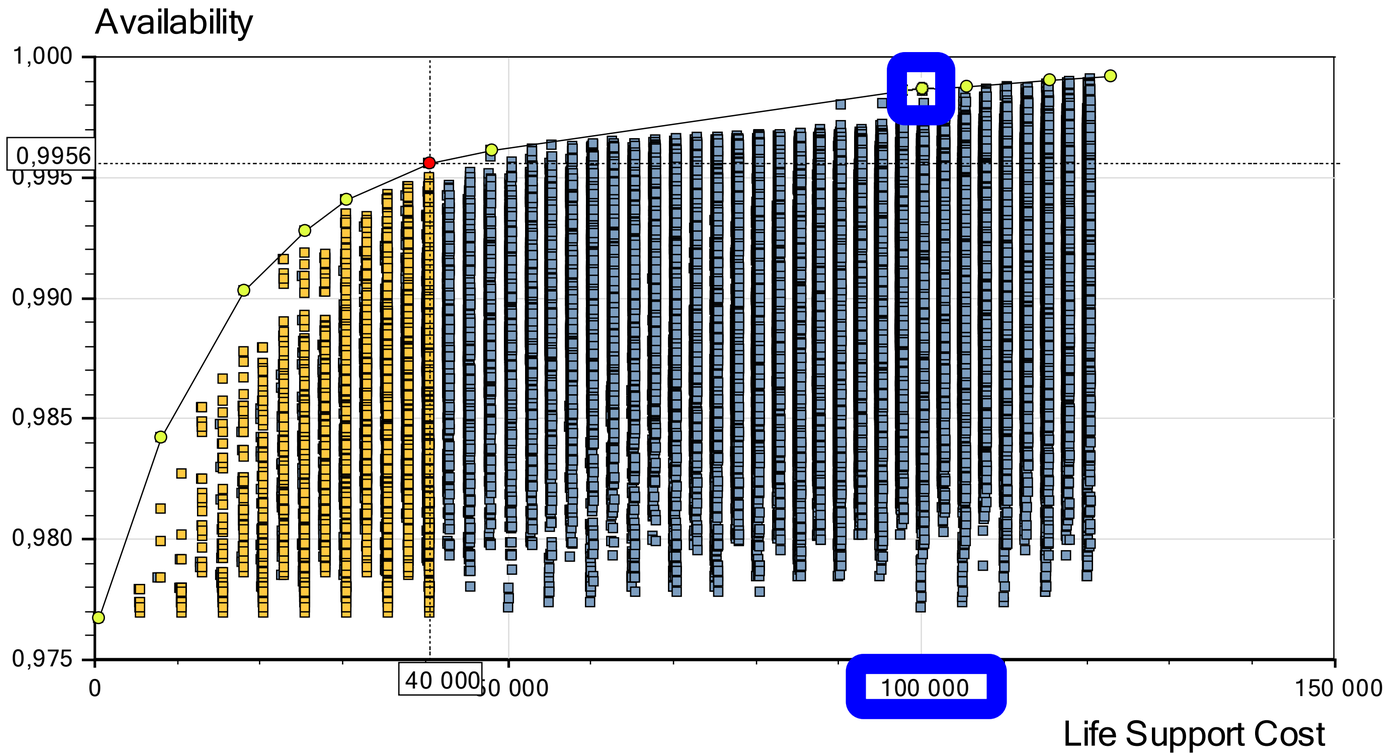


Systecon




**In this extremely simple scenario there's 61,593 solutions that cost <u>exactly</u> $100,000…**

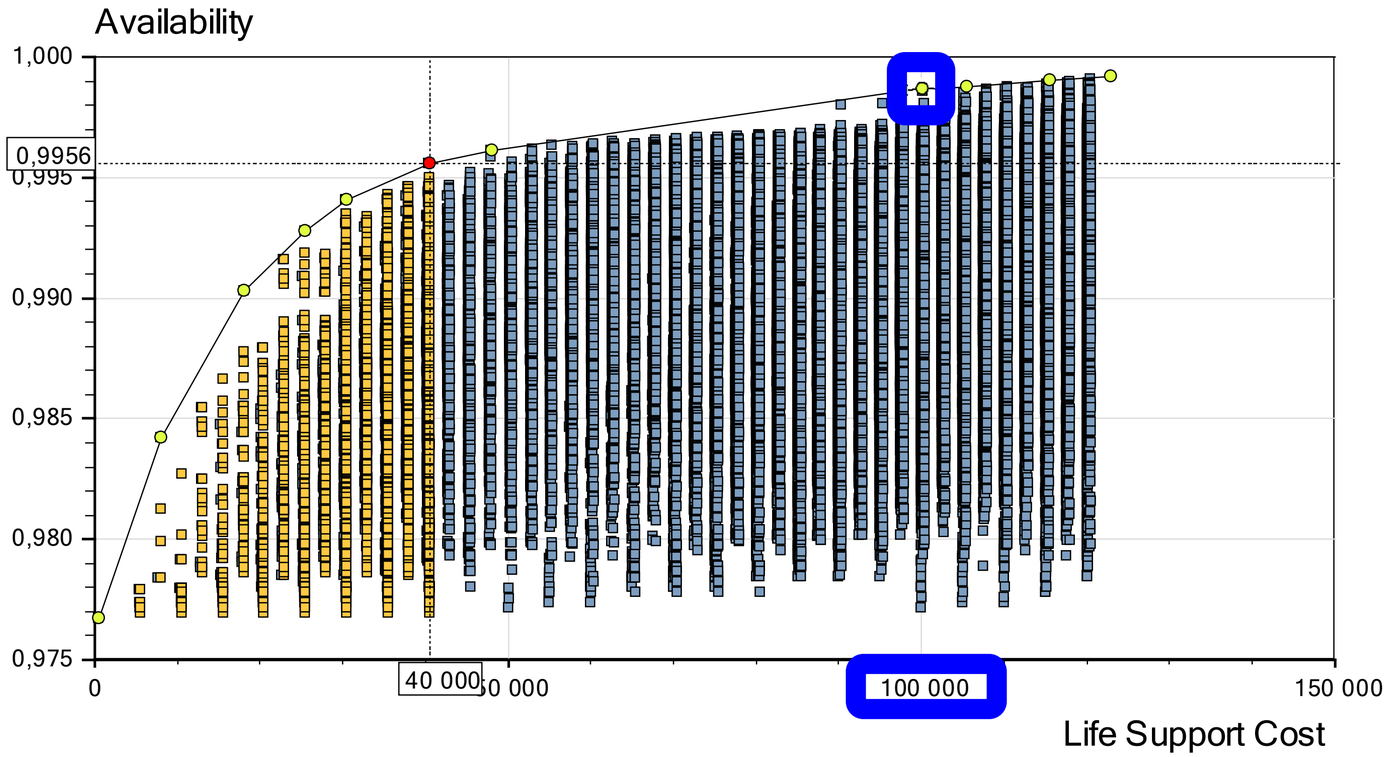
Systecon




**In this extremely simple scenario there's 61,593 solutions that cost <u>exactly</u> $100,000…**

**OPUS10 optimisation algorithm found the most effective Spares solution <u>at</u> our budget of $100,000**

Systecon

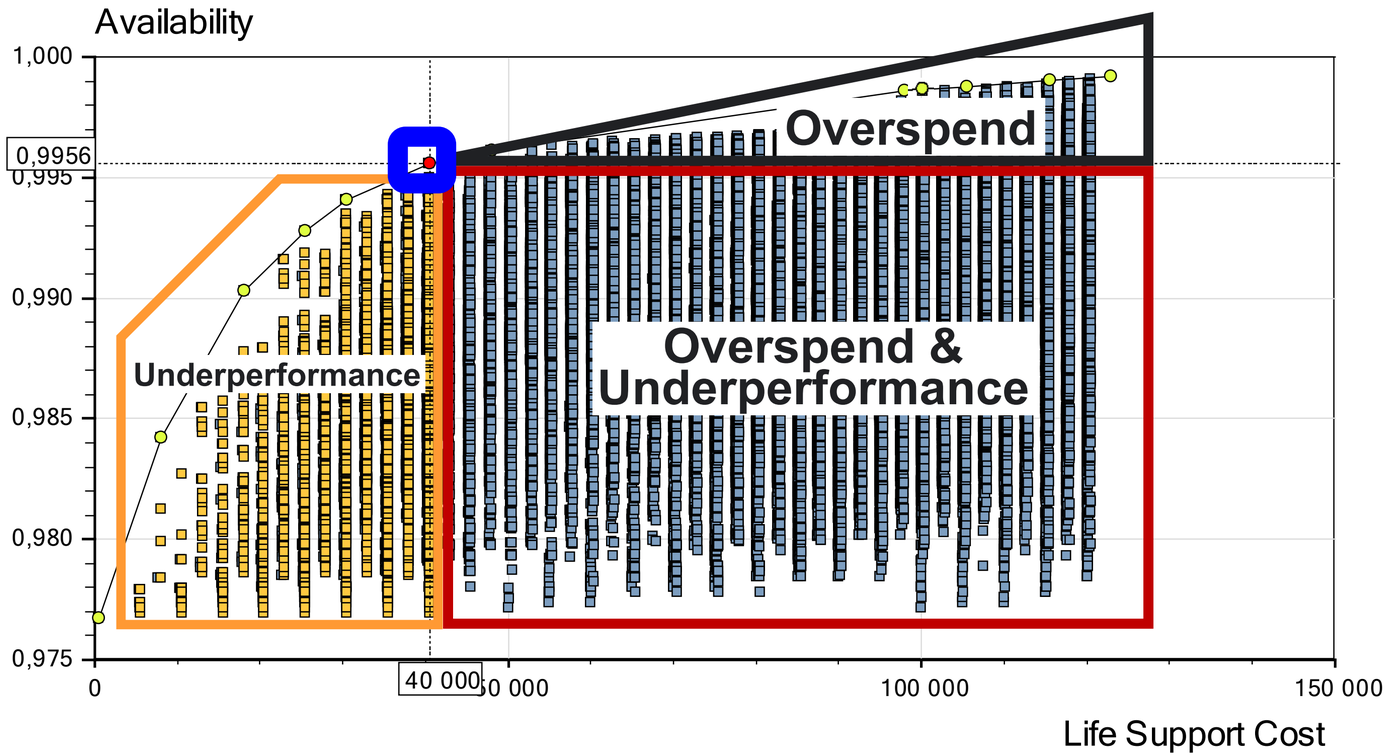



**In this extremely simple scenario there's 61,593 solutions that cost <u>exactly</u> $100,000…**

**OPUS10 optimisation algorithm found the most effective Spares solution <u>at</u> our budget of $100,000**

**There's 8.5 million possible solutions that cost <u>up to and including</u> $100,000…!**

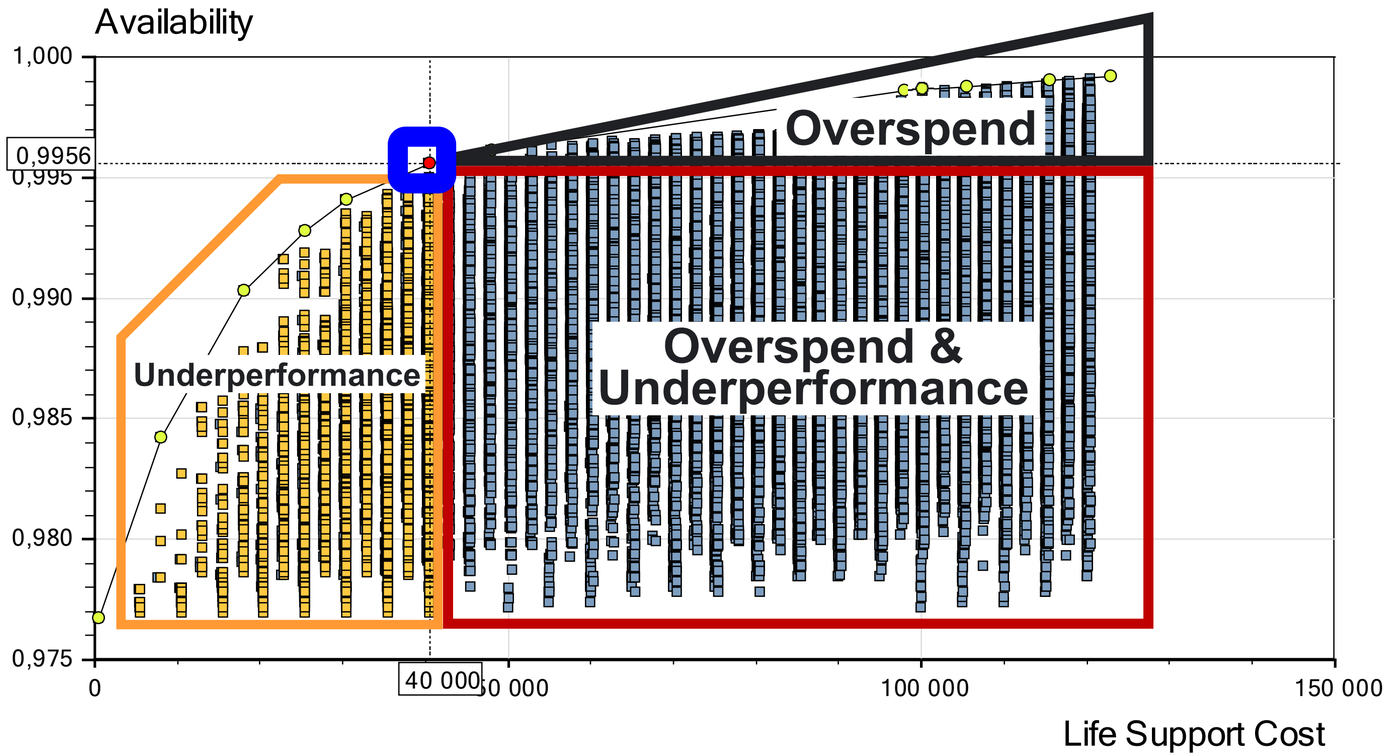
Systecon




**The same principles apply if we needed to meet a certain System availability requirement such as 99.5%**

**There's one optimal solution, and 8.5 million alternatives that either underperform, or overspend, or both!**

Systecon




**If an alternative to OPUS10 is being used…**

**Is the Spares ‘solution’ optimal, or anywhere close to optimal?**

Systecon