Opus Suite Conference | STOCKHOLM

2024-04-09 | Stockholm

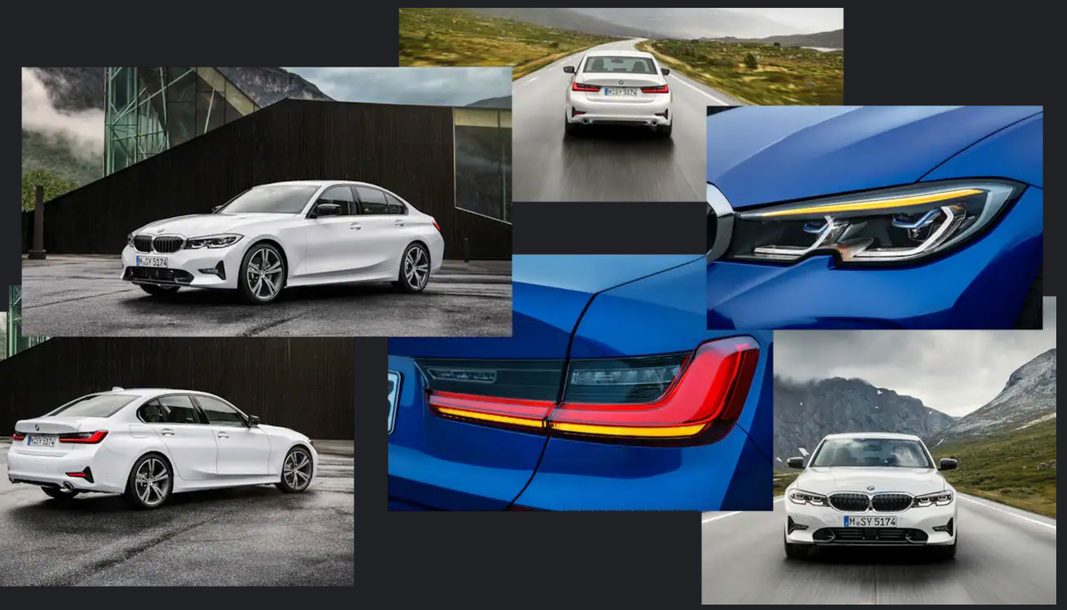
Improved Support for LCM Analytics

Ahmed Hatem
Customer Success & Product Expert

by Systecon opus suite

Systecon

>50 years of engineering excellence



Source: https://www.bmw.com/en/automotive-life/bmw-3-series-generations.html

Systecon

>50 years of engineering excellence

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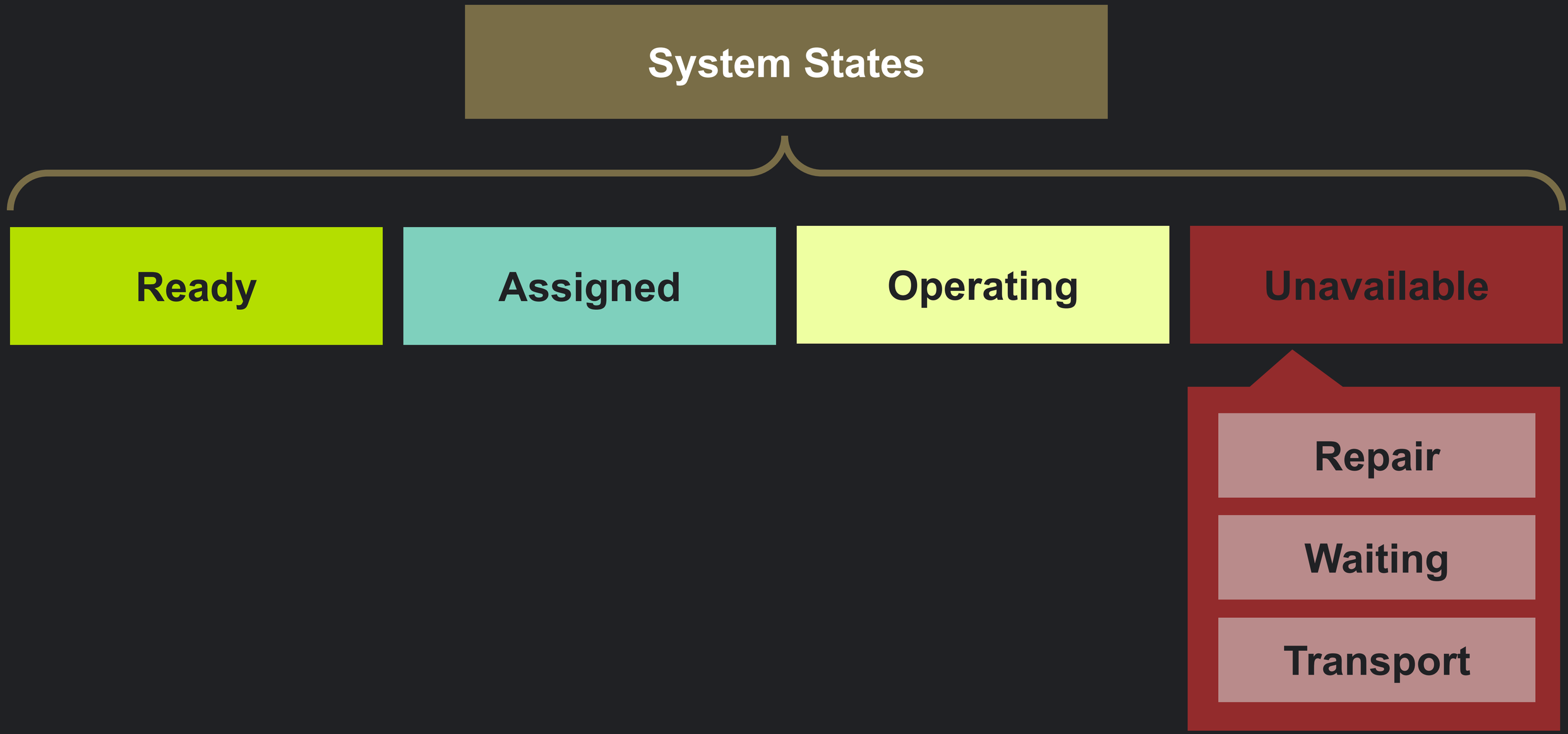
Mission Capability


System States
Ready
Assigned
Operating
Unavailable
Repair
Waiting
Transport

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System States

- Ready
- Assigned
- Operating
  - Capable
  - Not Capable
- Unavailable
  - Repair
  - Waiting
  - Transport

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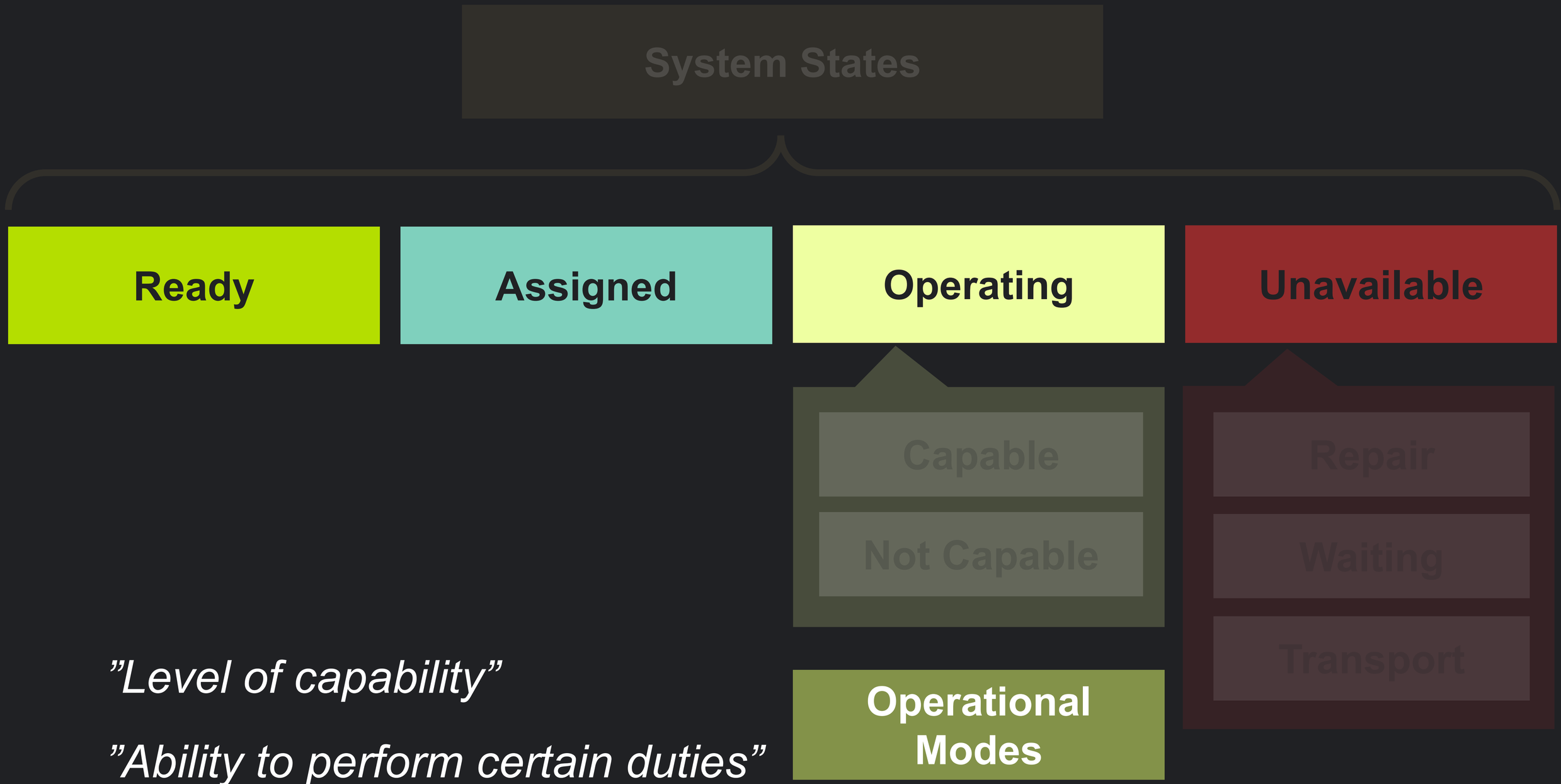
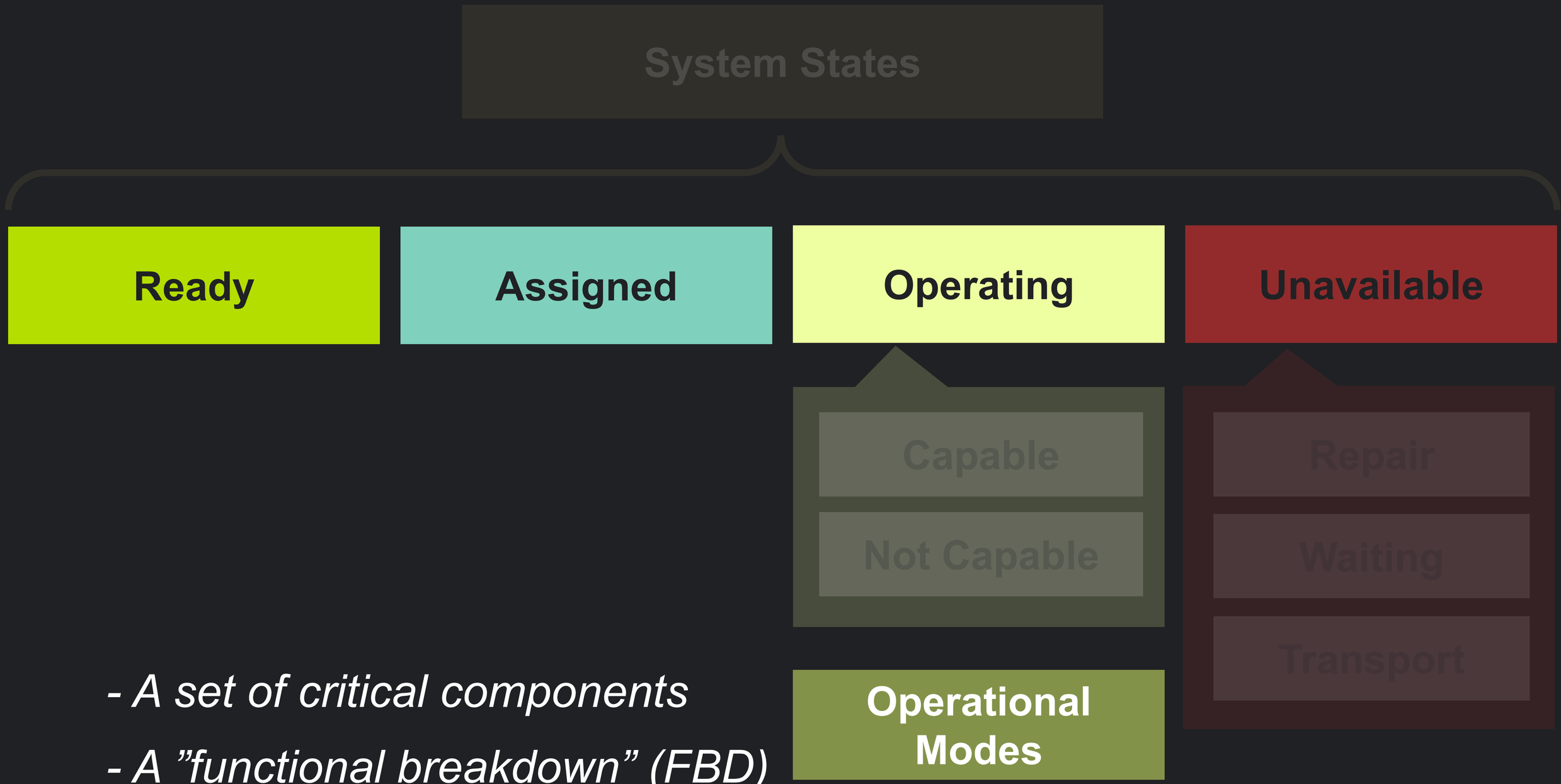
Jack H. Lucas (DDG-125) underway in the Gulf of Mexico in April 2023. HII Photo

Jack H. Lucas (DDG-125) underway in the Gulf of Mexico in April 2023. HII Photo


System States
Ready
Assigned
Operating
Unavailable
Capable
Not Capable
Repair
Waiting
Transport
”Level of capability”
”Ability to perform certain duties”
Operational Modes


System States
Ready
Assigned
Operating
Unavailable
Capable
Not Capable
Repair
Waiting
Transport
- A set of critical components
- A ”functional breakdown” (FBD)
Operational Modes

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Jack H. Lucas (DDG-125) underway in the Gulf of Mexico in April 2023. HII Photo

Fully functional → No amphibious support

Jack H. Lucas (DDG-125) underway in the Gulf of Mexico in April 2023. HII Photo

Fully functional → No amphibious support → Degraded ASW

Jack H. Lucas (DDG-125) underway in the Gulf of Mexico in April 2023. HII Photo

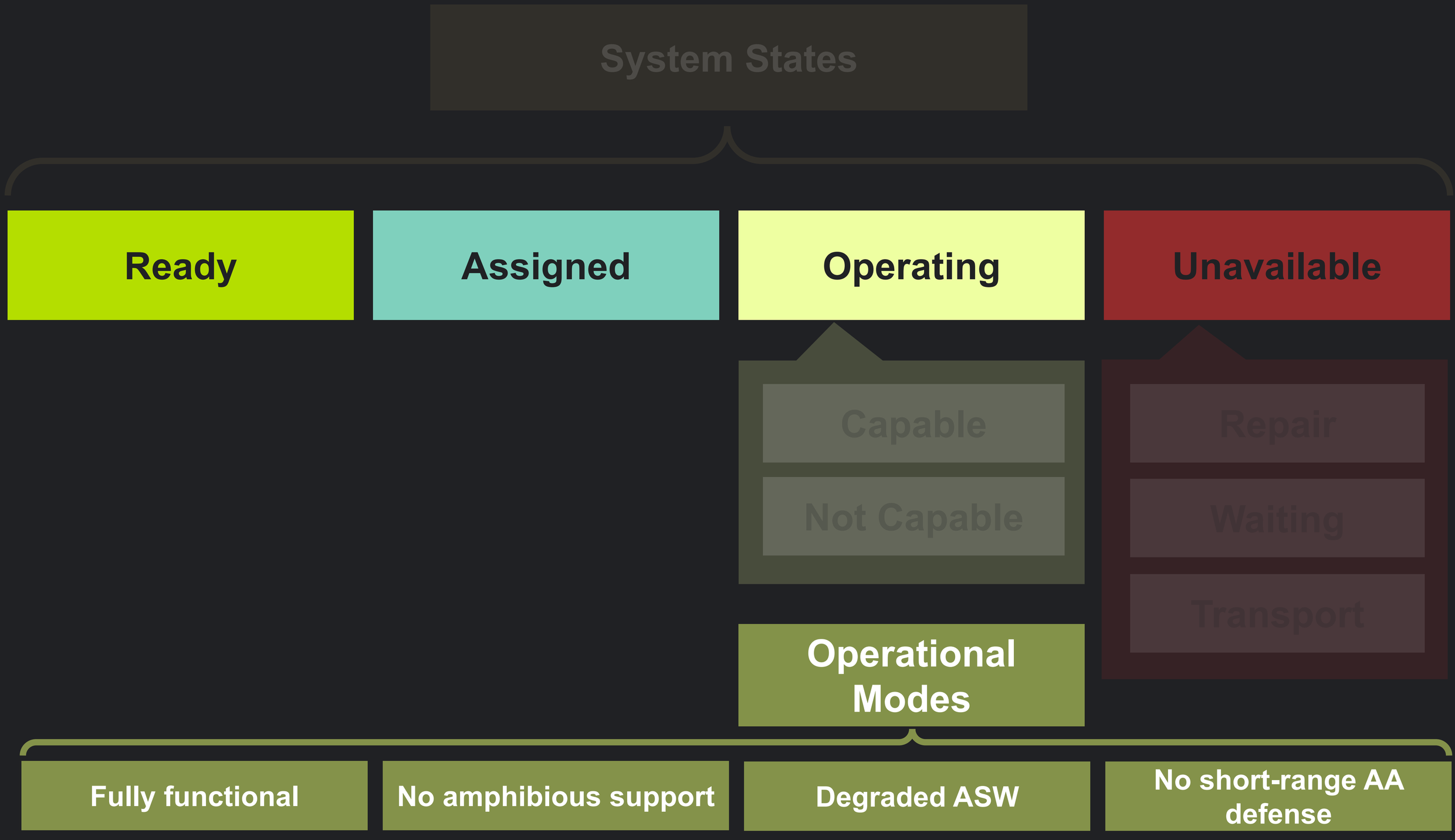
Fully functional

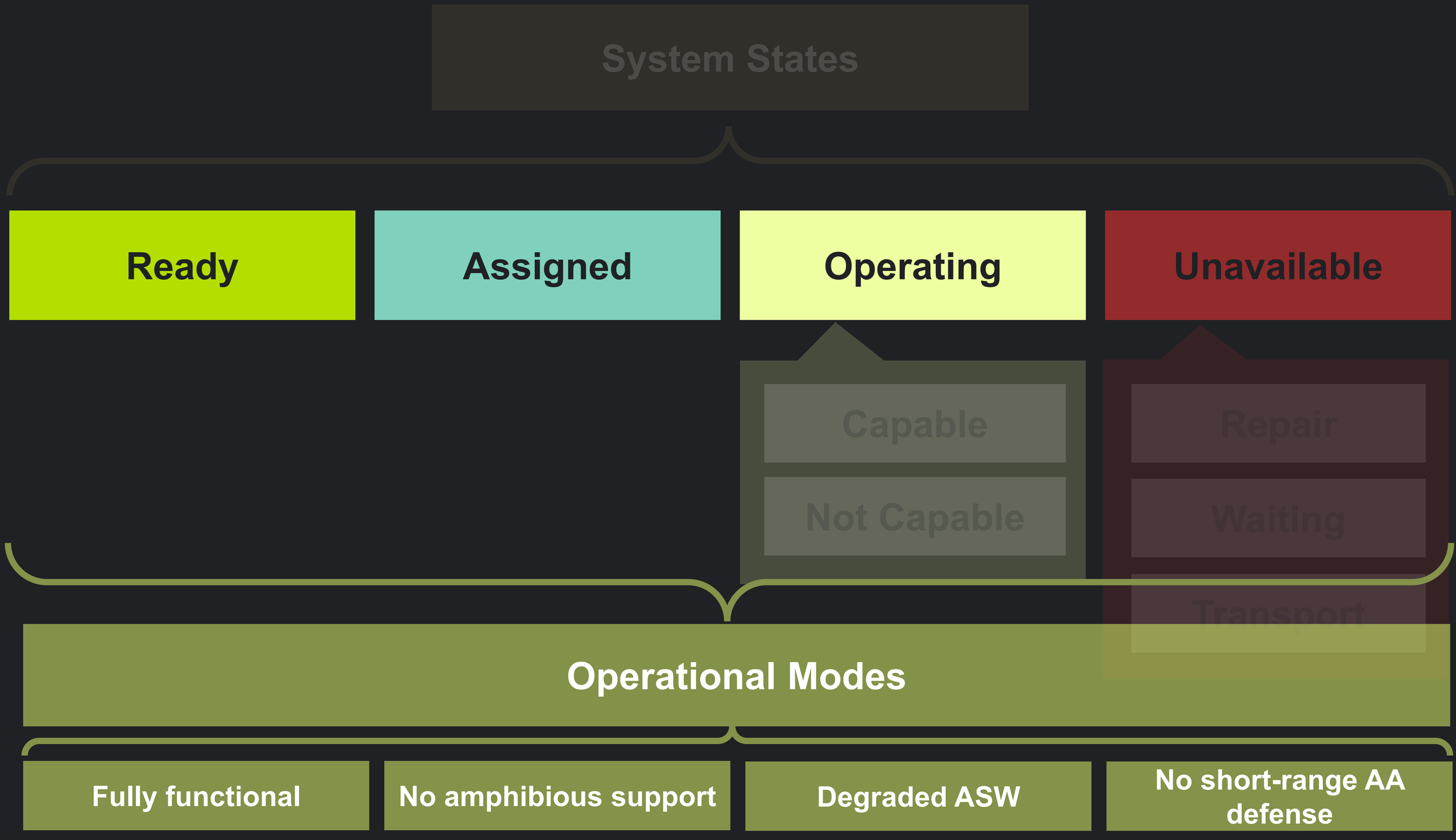
No amphibious support

Degraded ASW (1/2)

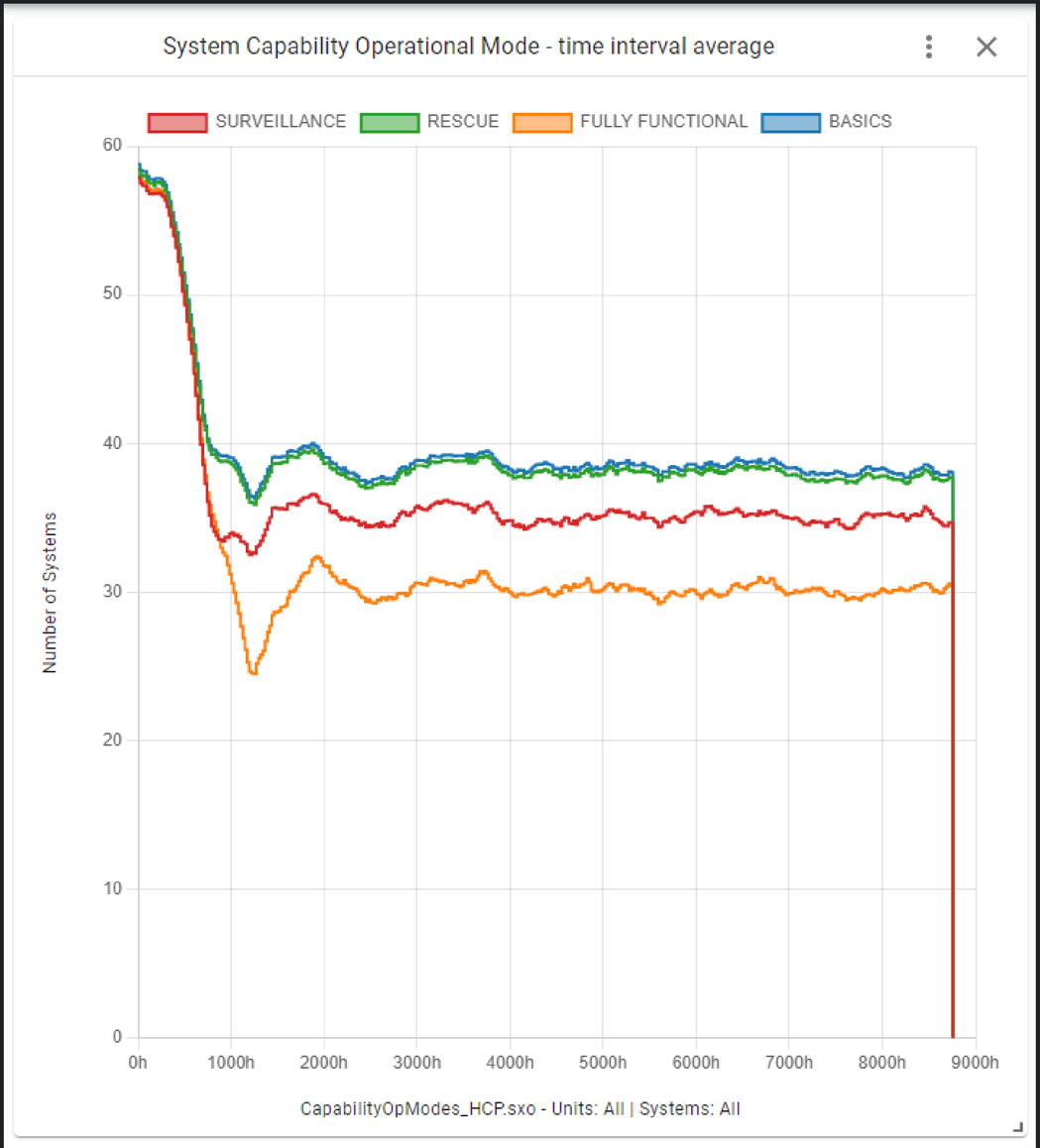
No short-range AA defense

Jack H. Lucas (DDG-125) underway in the Gulf of Mexico in April 2023. HII Photo

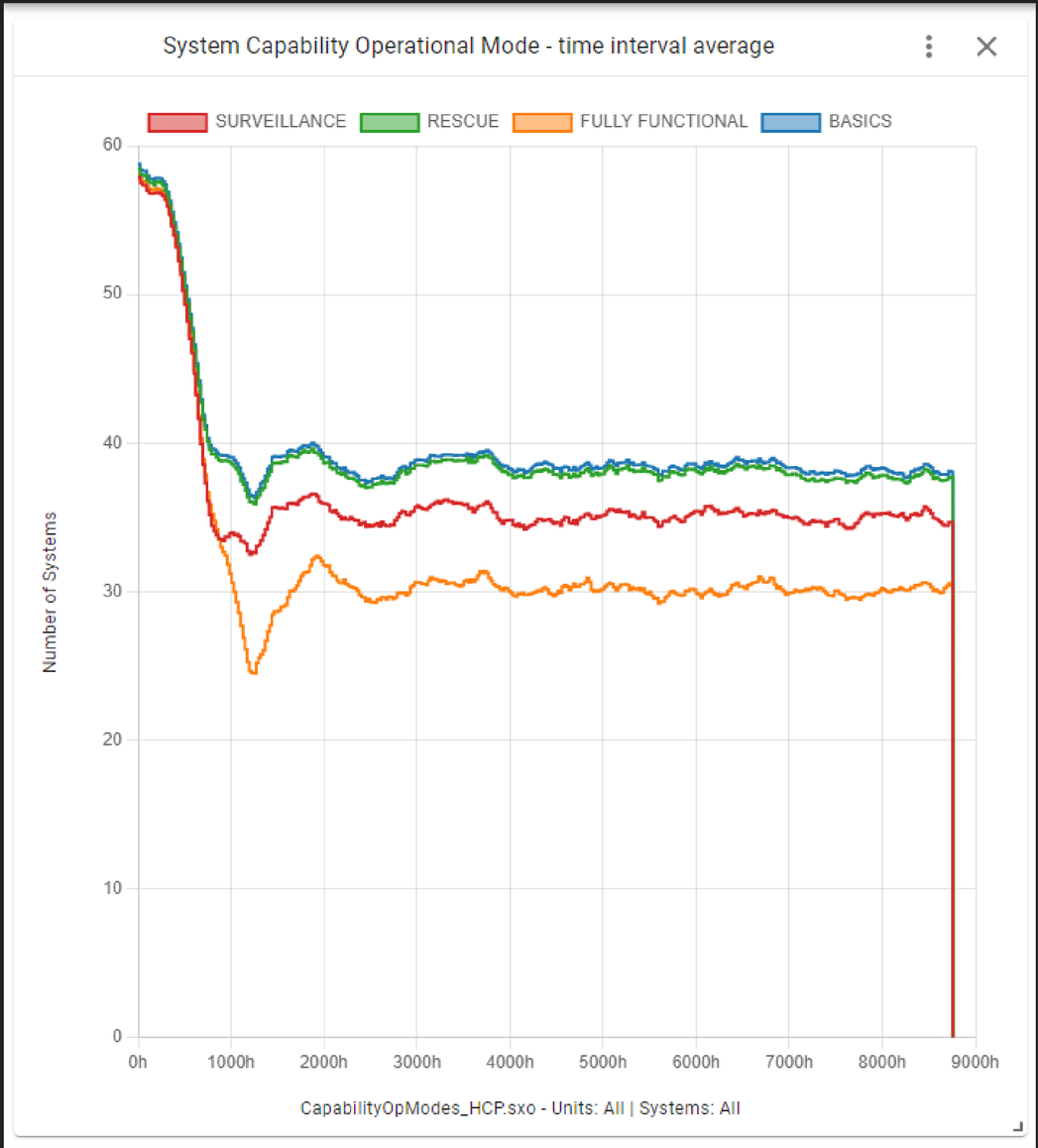

System States
Ready
Assigned
Operating
Unavailable
Capable
Not Capable
Repair
Waiting
Transport
Operational Modes
Fully functional
No amphibious support
Degraded ASW
No short-range AA defense

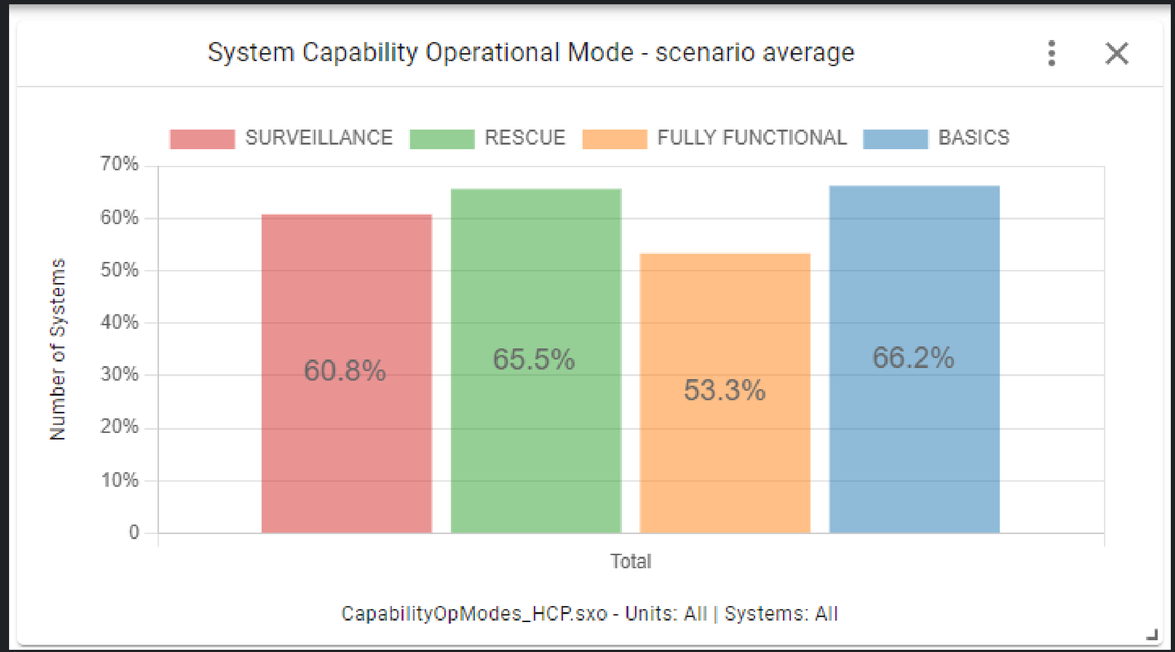

System States
Ready
Assigned
Operating
Unavailable
Capable
Not Capable
Repair
Waiting
Transport
Operational Modes
Fully functional
No amphibious support
Degraded ASW
No short-range AA defense

Result Result Viewer



Result Result Viewer





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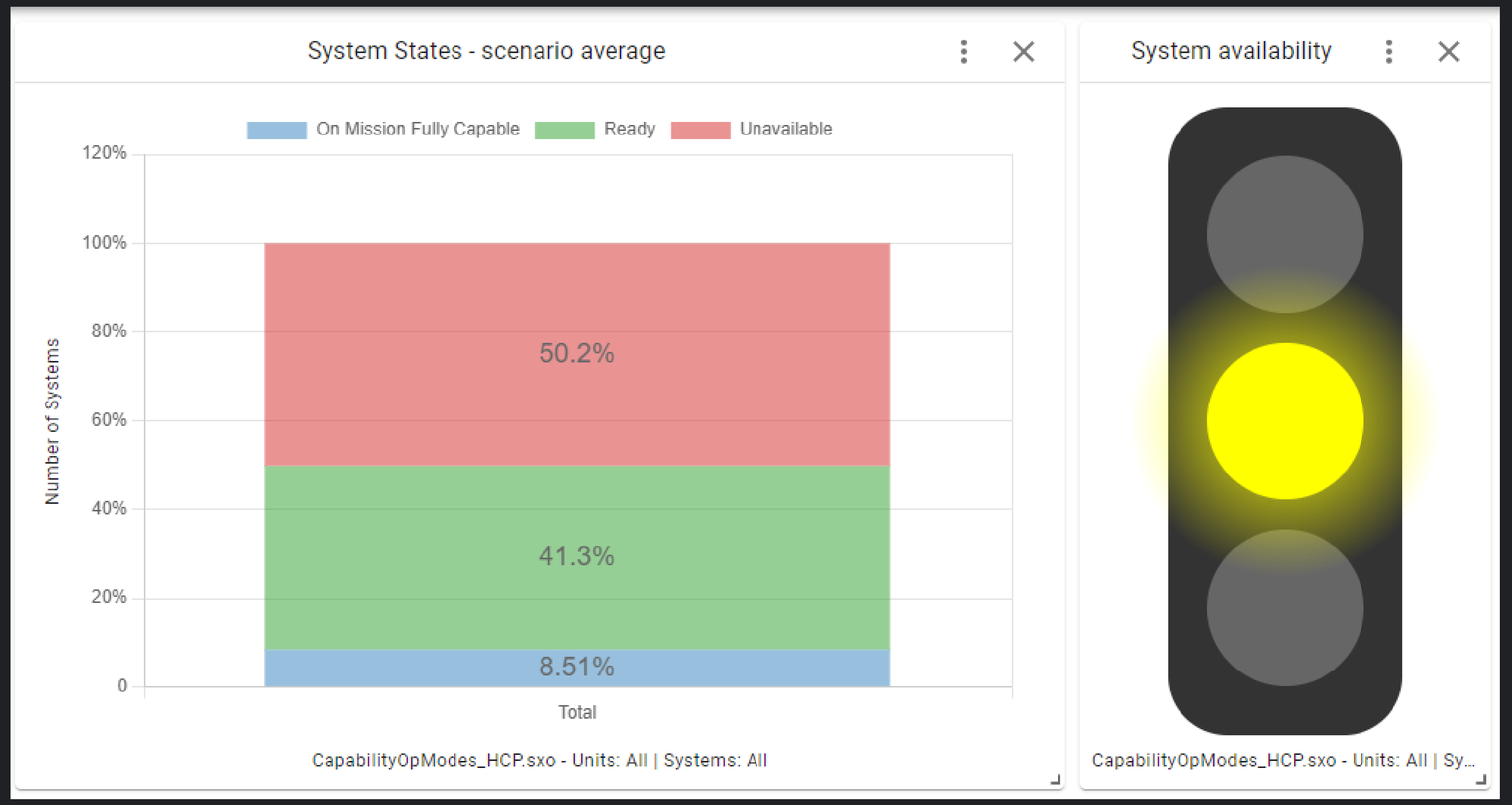
Result Result Viewer



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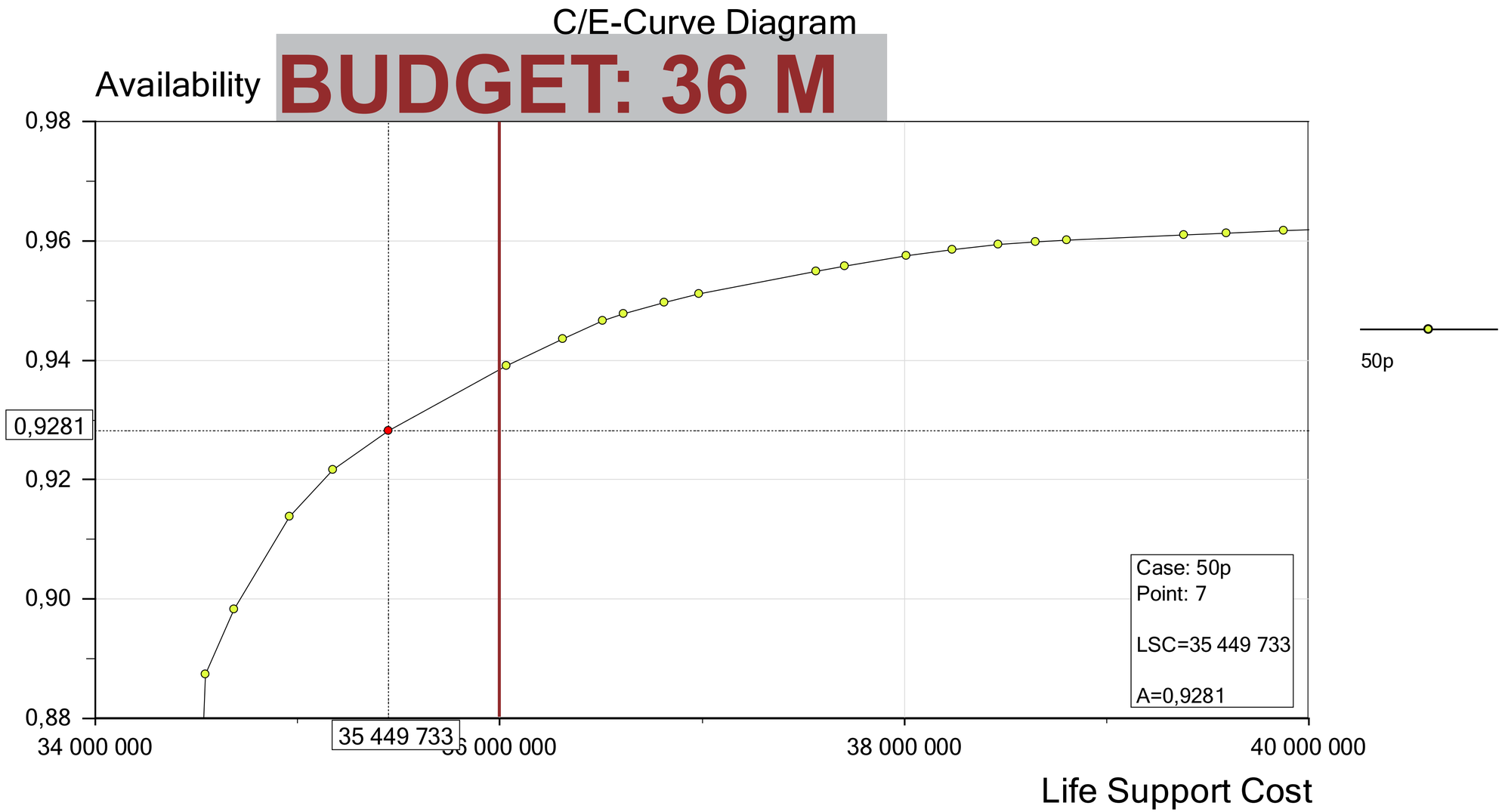
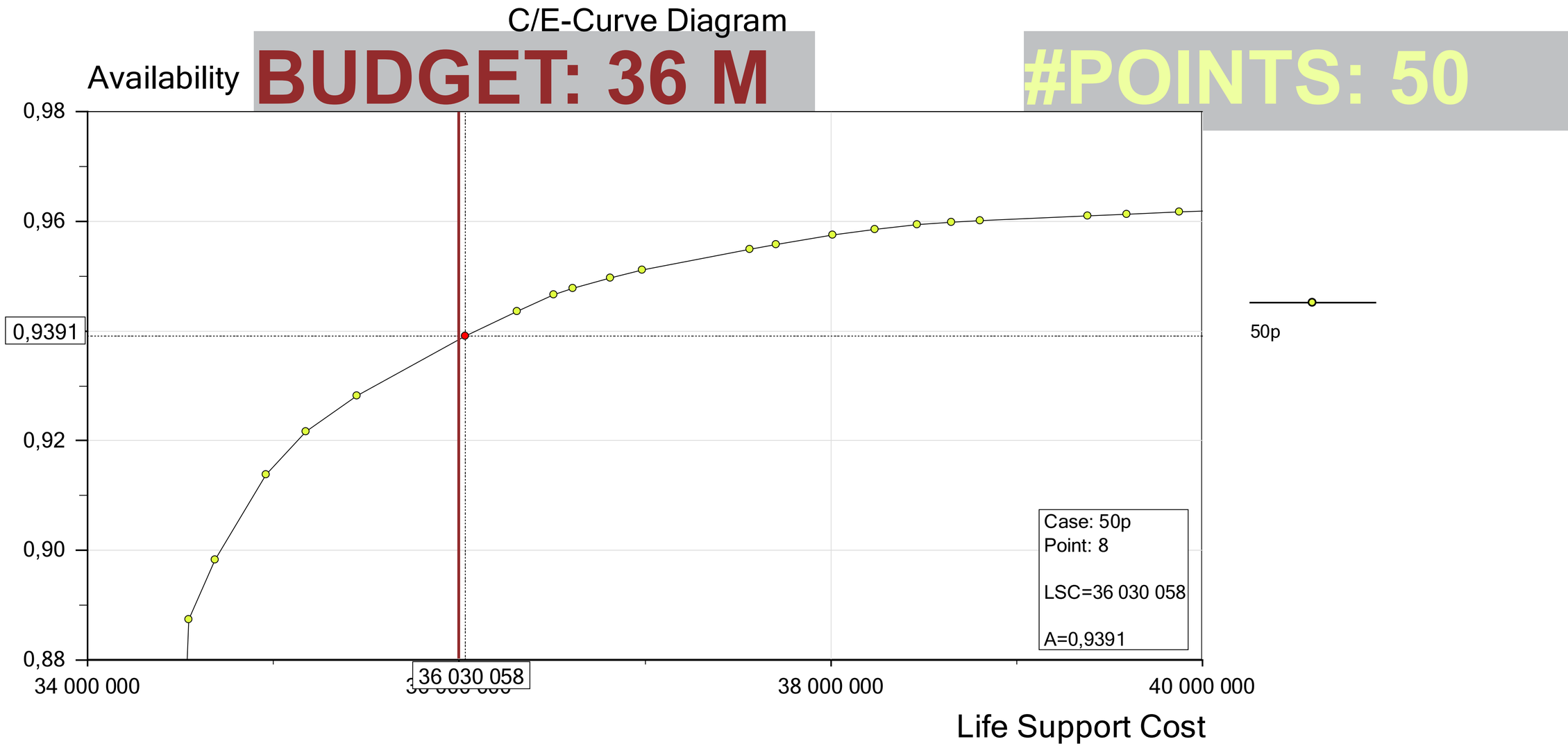
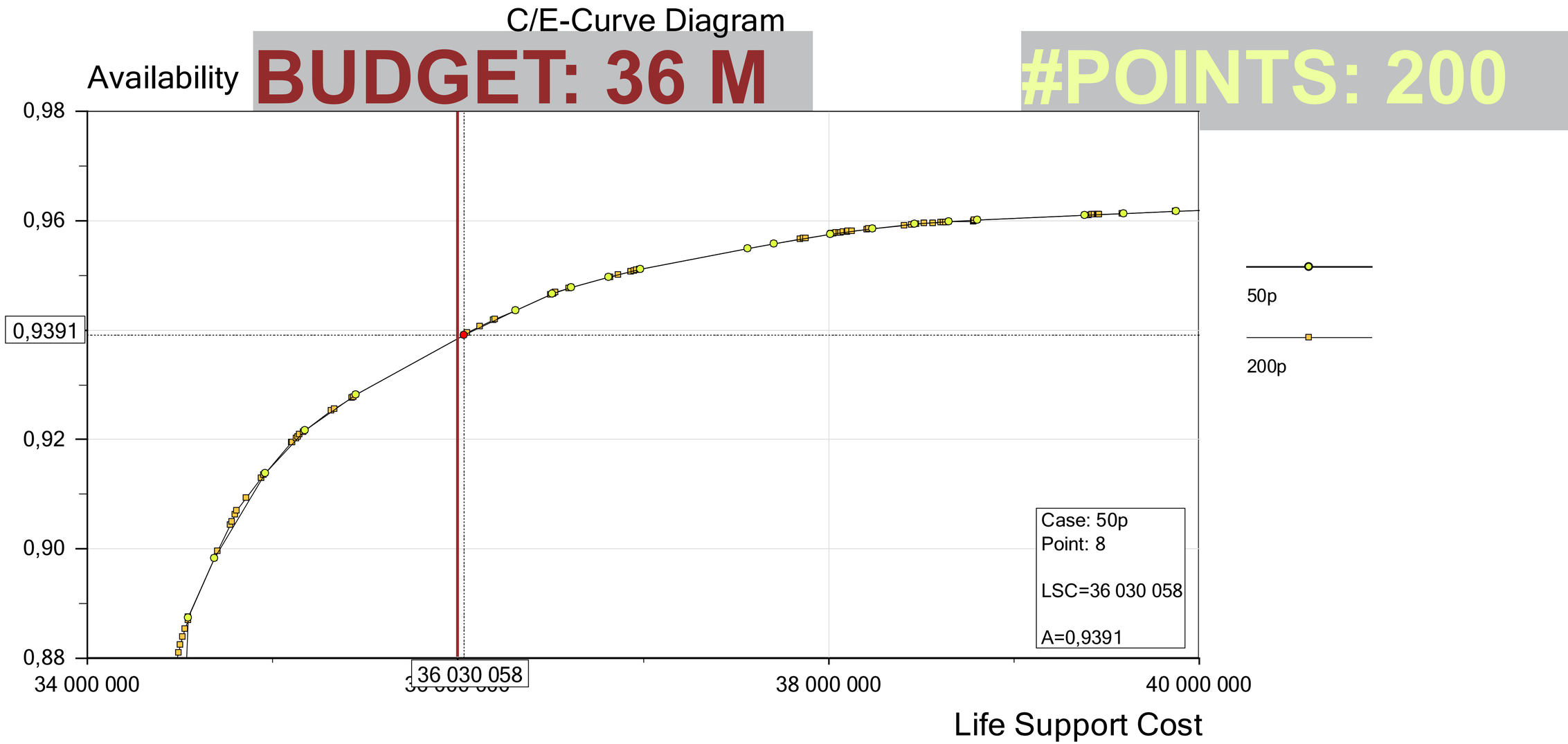
Optimizing the Optimization Part 1


C/E-Curve Diagram
Availability
BUDGET: 36 M
0,98
0,96
0,94
0,9281
0,92
0,90
0,88
34 000 000
35 449 733
36 000 000
38 000 000
40 000 000
Life Support Cost
Case: 50p
Point: 7
LSC=35 449 733
A=0,9281
50p

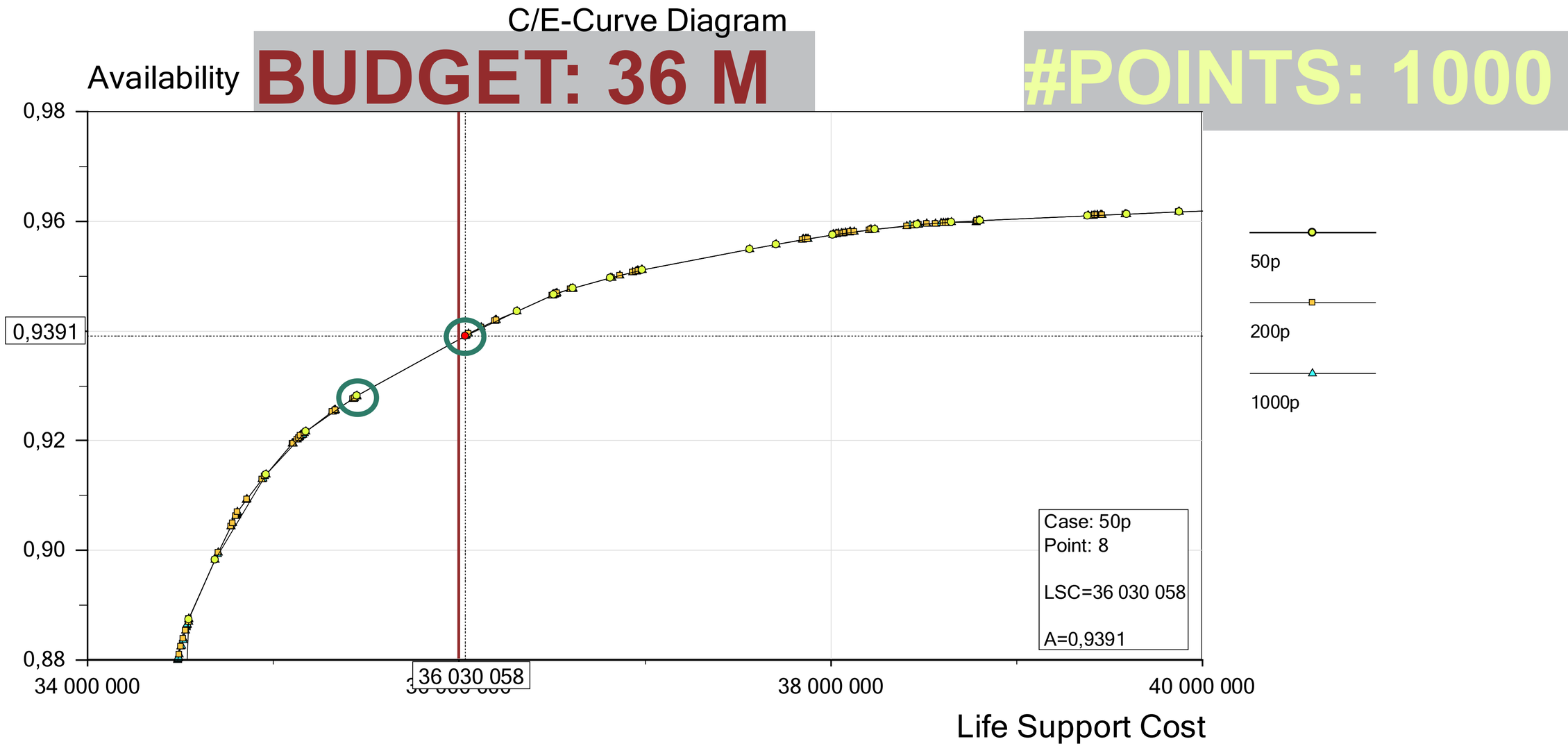
Systecon


C/E-Curve Diagram
Availability
BUDGET: 36 M
#POINTS: 50
0,98
0,96
0,9391
0,92
0,90
0,88
34 000 000
36 030 058
38 000 000
40 000 000
Life Support Cost
Case: 50p
Point: 8
LSC=36 030 058
A=0,9391
50p

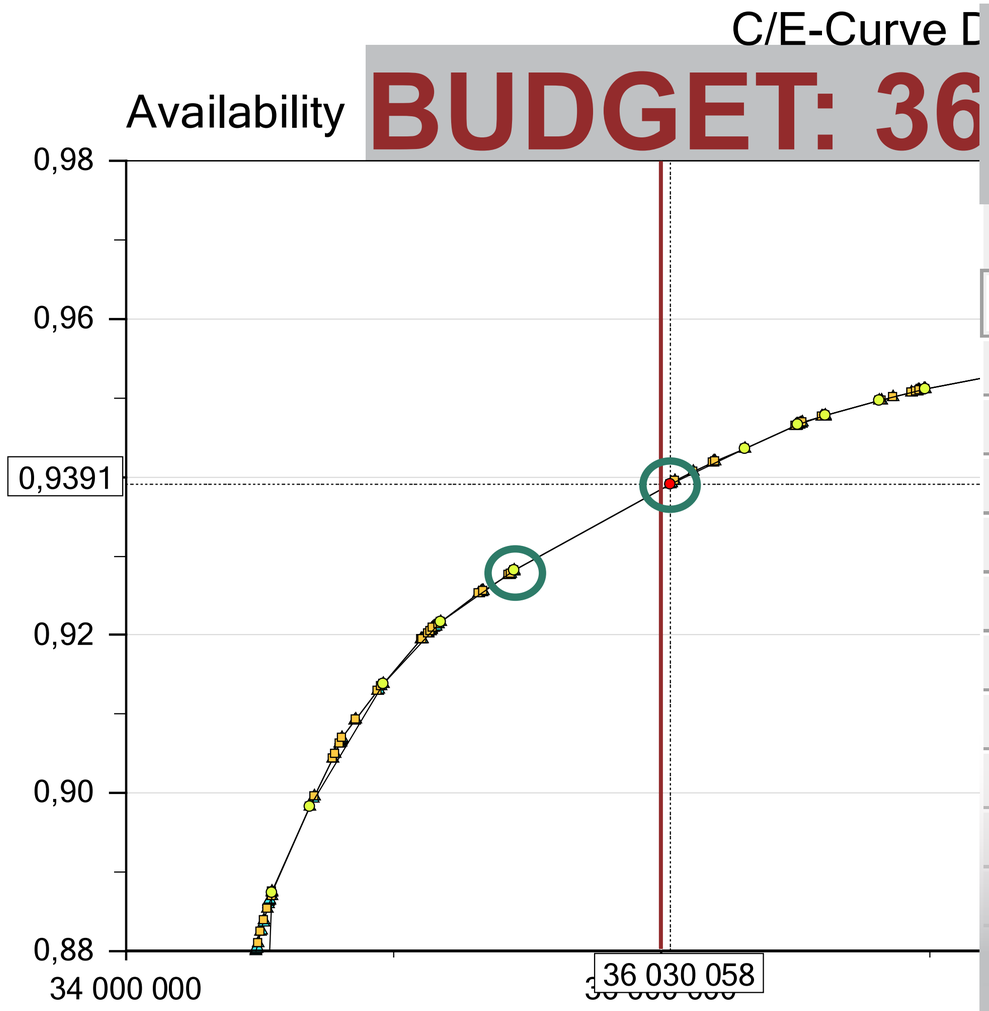
Systecon


C/E-Curve Diagram
Availability
BUDGET: 36 M
#POINTS: 200
0,98
0,96
0,9391
0,92
0,90
0,88
34 000 000
36 030 058
38 000 000
40 000 000
Life Support Cost
50p
200p
Case: 50p
Point: 8
LSC=36 030 058
A=0,9391

Systecon


C/E-Curve Diagram
Availability
BUDGET: 36 M
#POINTS: 1000
0,98
0,96
0,9391
0,92
0,90
0,88
34 000 000
36 030 058
38 000 000
40 000 000
Life Support Cost
50p
200p
1000p
Case: 50p
Point: 8
LSC=36 030 058
A=0,9391

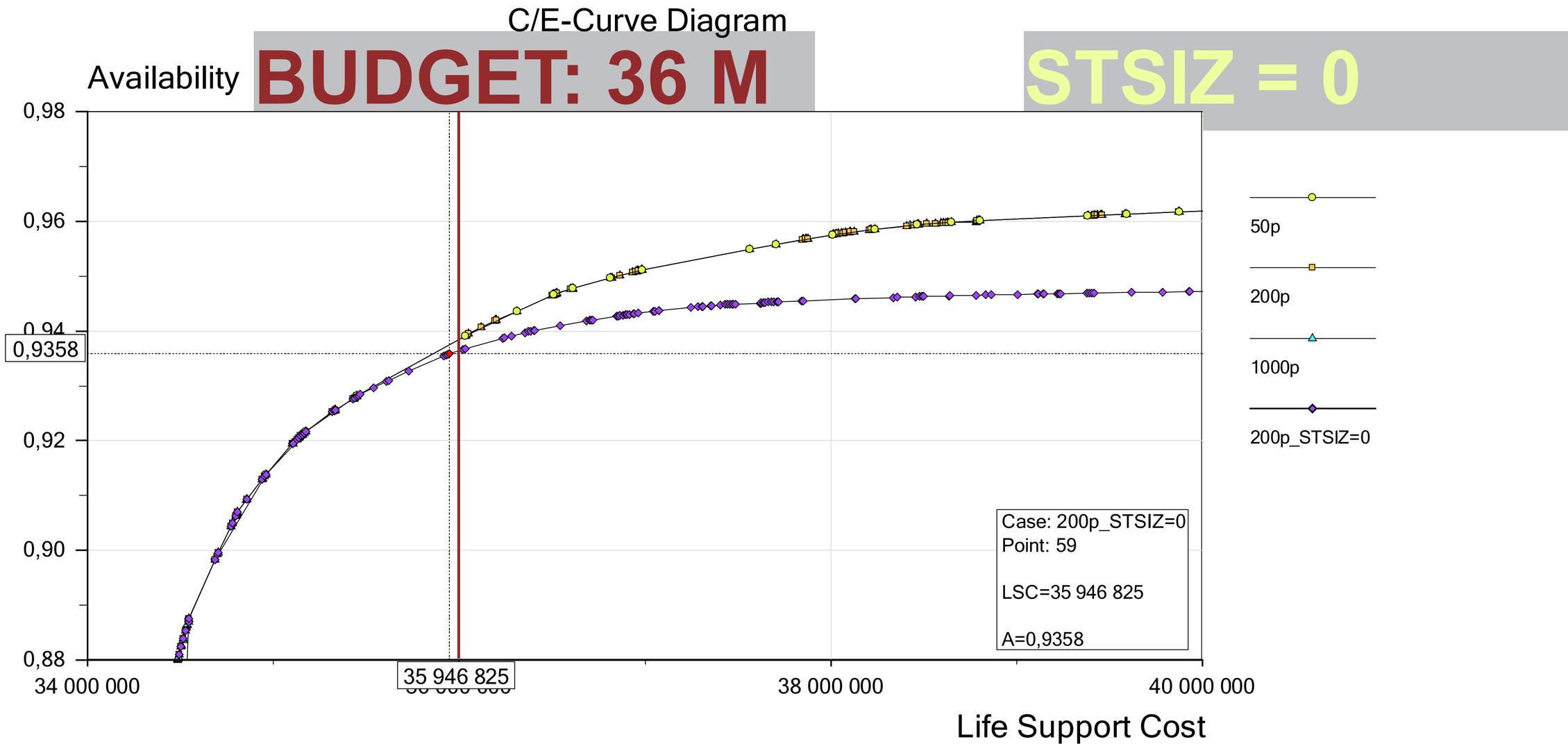
Systecon



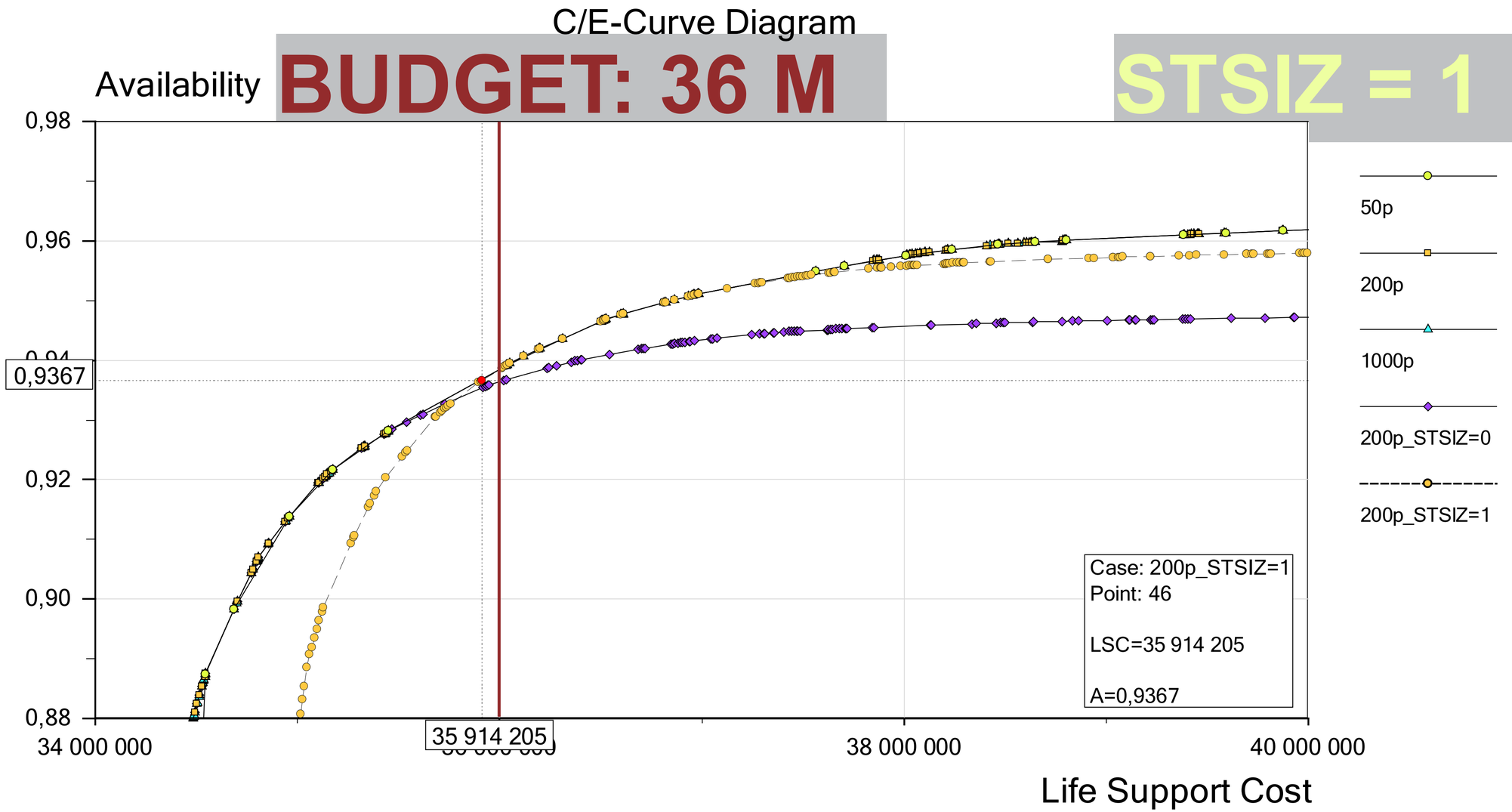
Set a fixed stock size!

	Item	P	CII *	CII *	Δ CII *
1.	05B0		0	580 325	580 325
2.	11G		0	0	0
3.	07F		0	0	0
4.	11F		0	0	0
5.	13D		0	0	0
6.	05A0		280 385	280 385	0
7.	11K		0	0	0
8.	03C		139 322	139 322	0
9.	12E		0	0	0
10.	11J		0	0	0

Systecon


C/E-Curve Diagram
Availability
BUDGET: 36 M
STSIZ = 0
0,98
0,96
0,94
0,9358
0,92
0,90
0,88
34 000 000
35 946 825
38 000 000
40 000 000
Life Support Cost
50p
200p
1000p
200p_STSIZ=0
Case: 200p_STSIZ=0
Point: 59
LSC=35 946 825
A=0,9358

Systecon


C/E-Curve Diagram
Availability
BUDGET: 36 M
STSIZ = 1
0,98
0,96
0,9367
0,92
0,90
0,88
34 000 000
35 914 205
38 000 000
40 000 000
Life Support Cost
50p
200p
1000p
200p_STSIZ=0
200p_STSIZ=1
Case: 200p_STSIZ=1
Point: 46
LSC=35 914 205
A=0,9367

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Item = 05B0
Station = Main Dep
STSIZ = [0; 1]

COMB = 2

Item = [05B0; 03A2]
Station = [Main Dep; Local Dep]
STSIZ = [0; 1; 2]

COMB = 81

Item = [05B0; 03A2; 07B1]
Station = [M Dp; L Dp; Base1; Base2]
STSIZ = [0; 1; 2]

COMB = 531 441

CFILL – Curve Filling

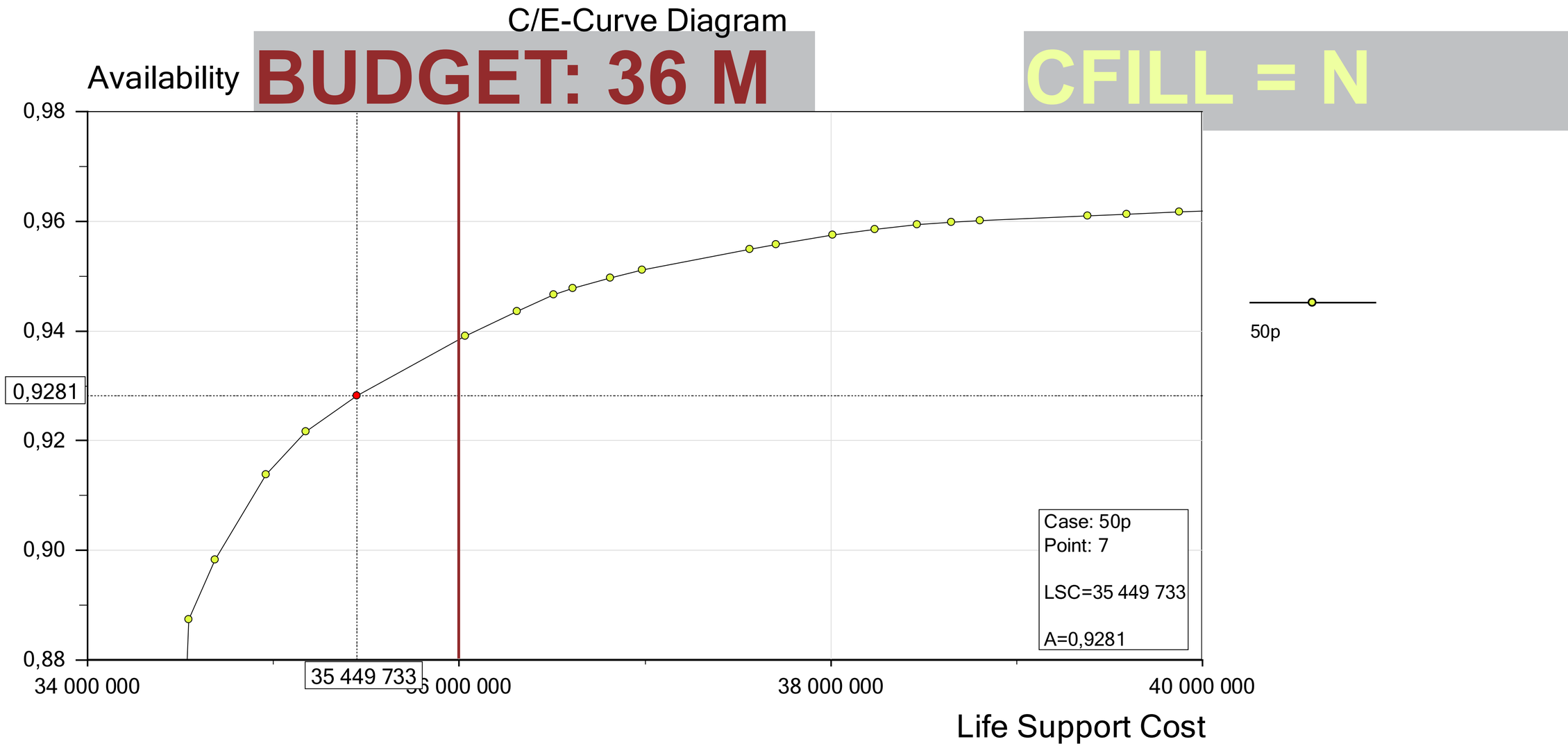
ON/OFF

Systecon

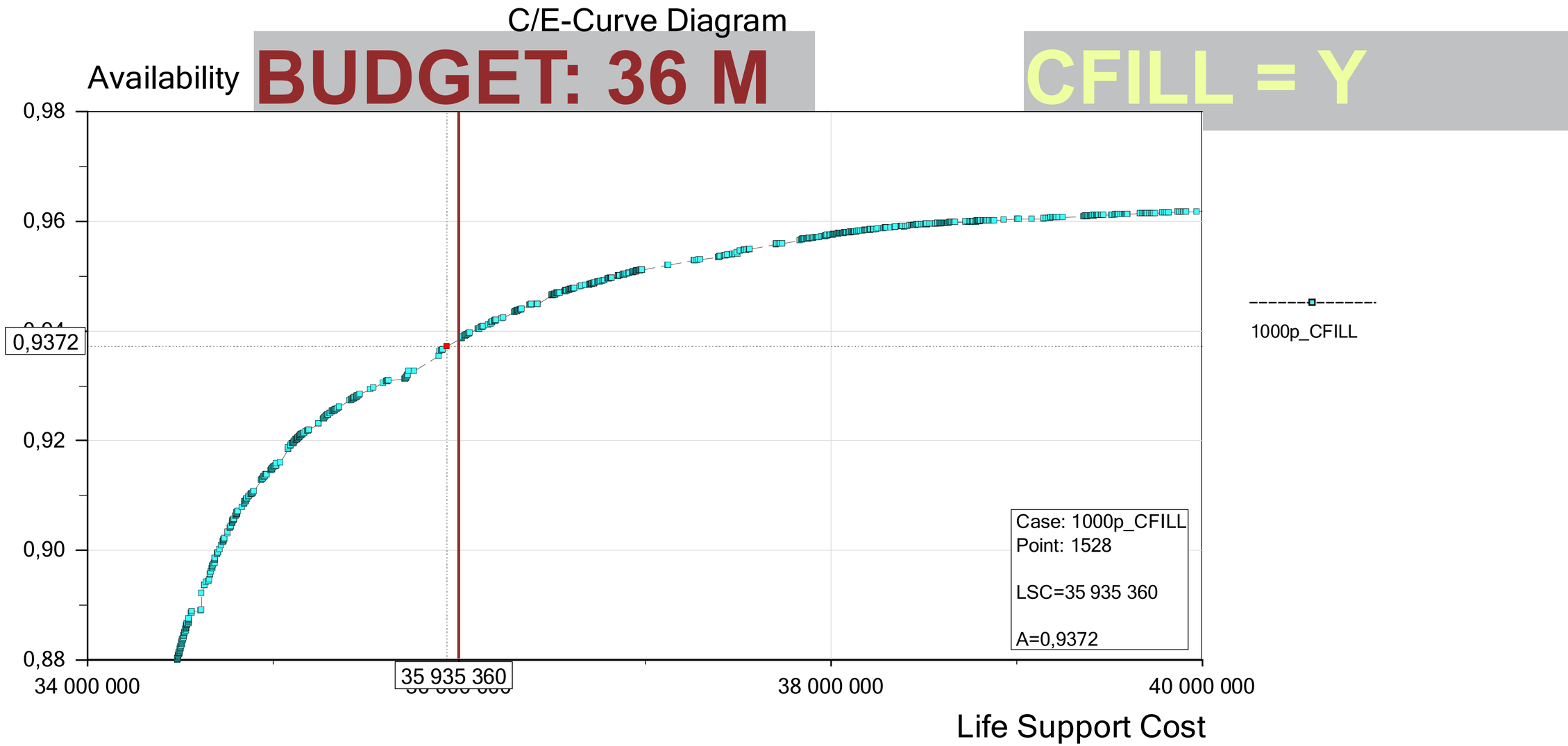
CFILL – Curve Filling

ON/OFF

Systecon


C/E-Curve Diagram
Availability
BUDGET: 36 M
CFILL = N
0,98
0,96
0,94
0,9281
0,92
0,90
0,88
34 000 000
35 449 733
36 000 000
38 000 000
40 000 000
Life Support Cost
Case: 50p
Point: 7
LSC=35 449 733
A=0,9281
50p

Systecon


C/E-Curve Diagram
Availability
BUDGET: 36 M
CFILL = Y
0,98
0,96
0,9372
0,92
0,90
0,88
34 000 000
35 935 360
38 000 000
40 000 000
Life Support Cost
1000p_CFILL
Case: 1000p_CFILL
Point: 1528
LSC=35 935 360
A=0,9372

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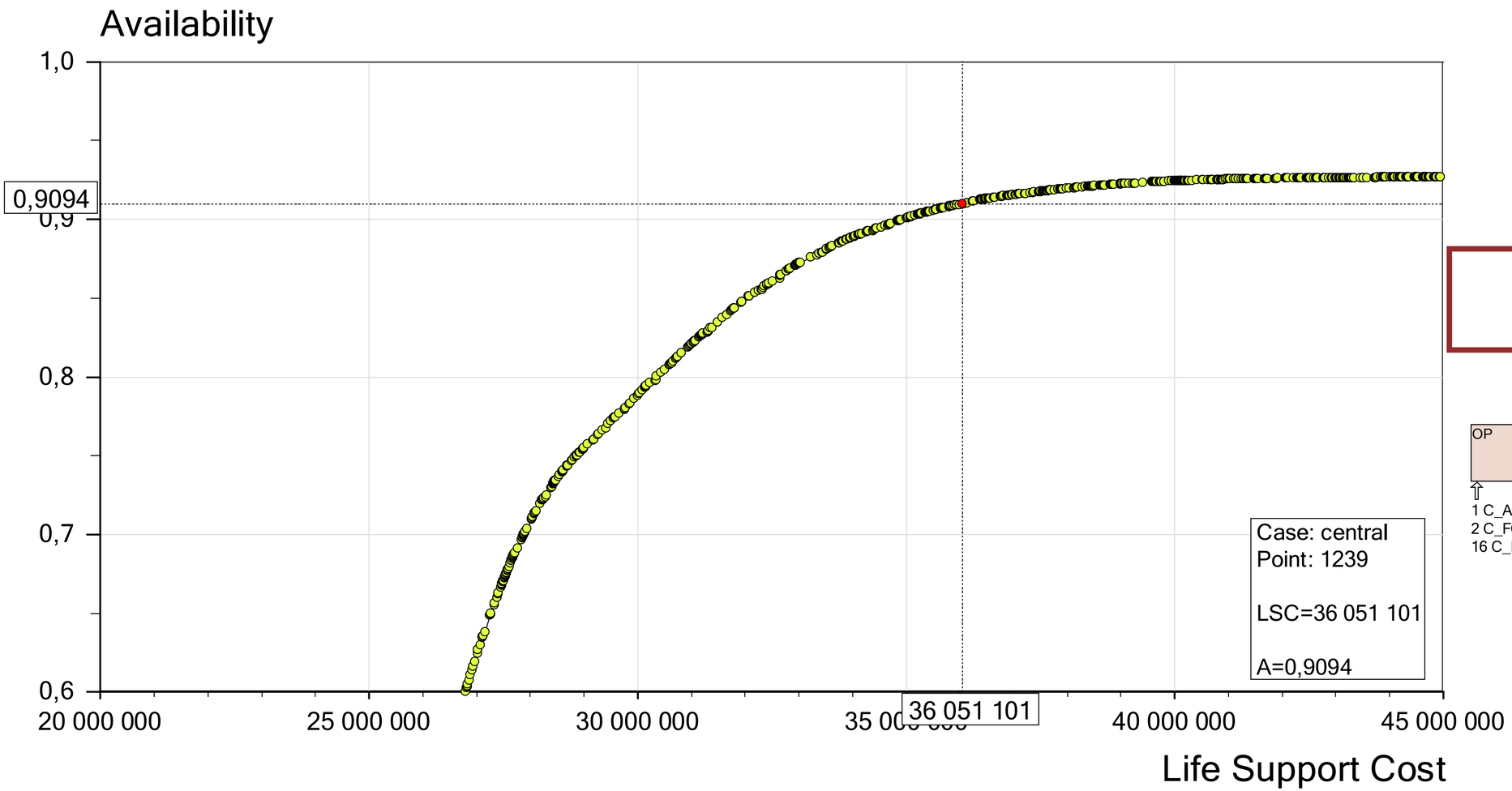
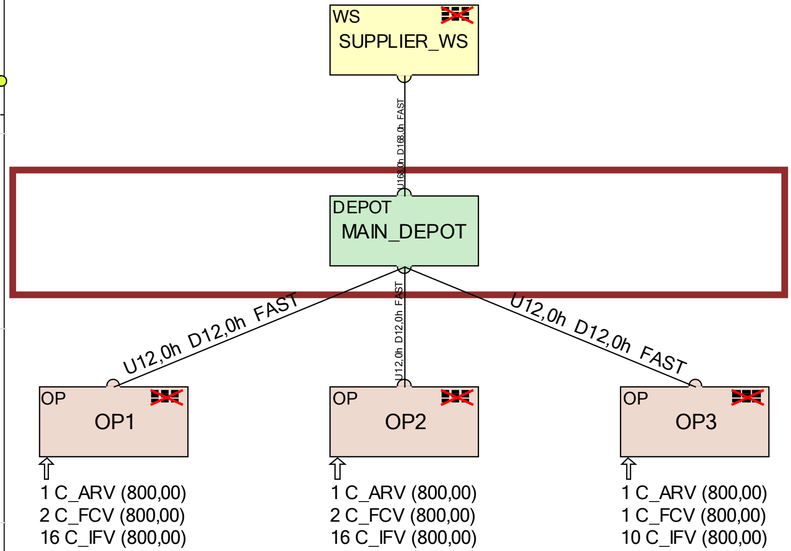
Optimizing the Optimization Part 2

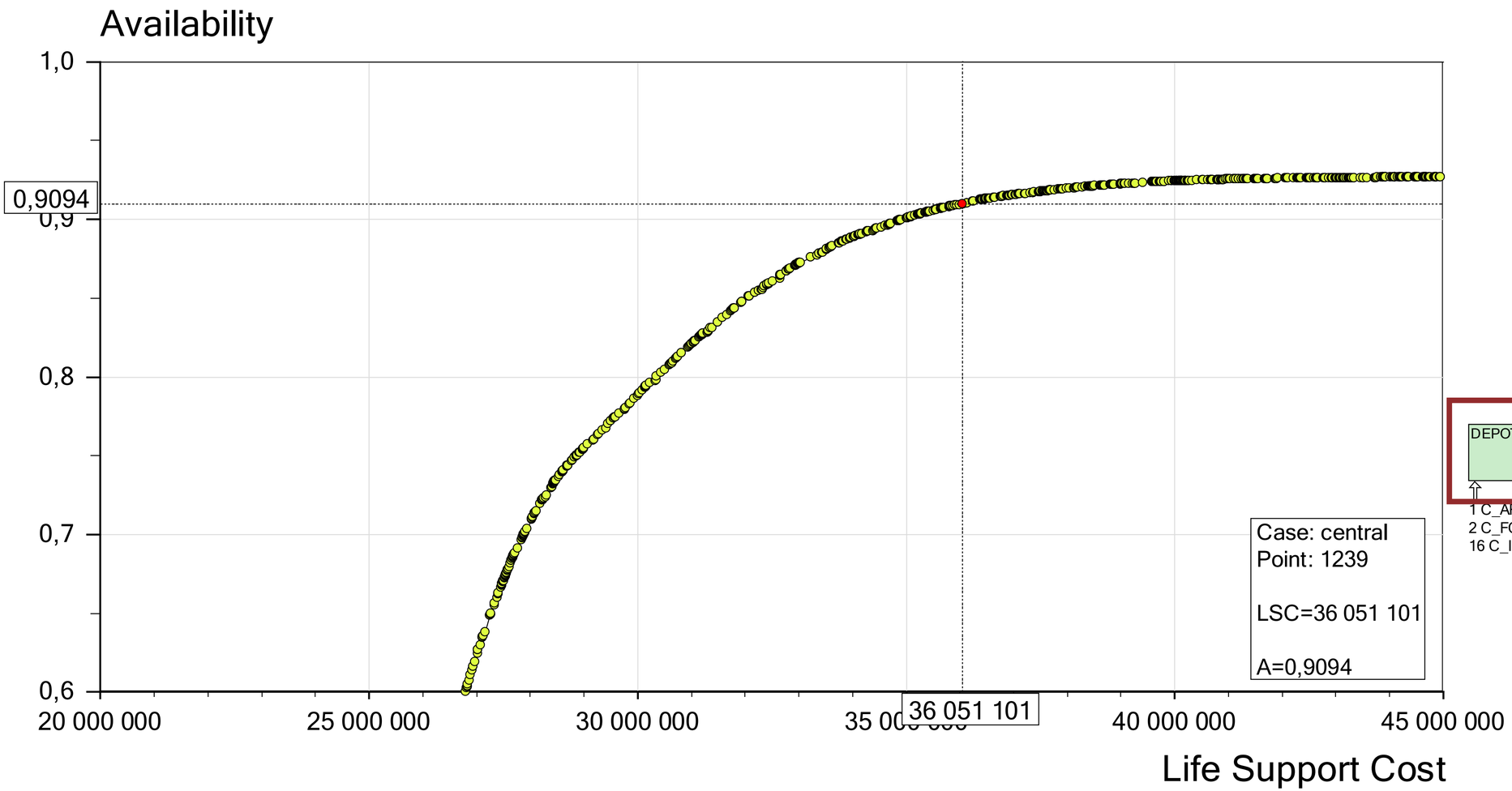
C/E-Curve Diagram

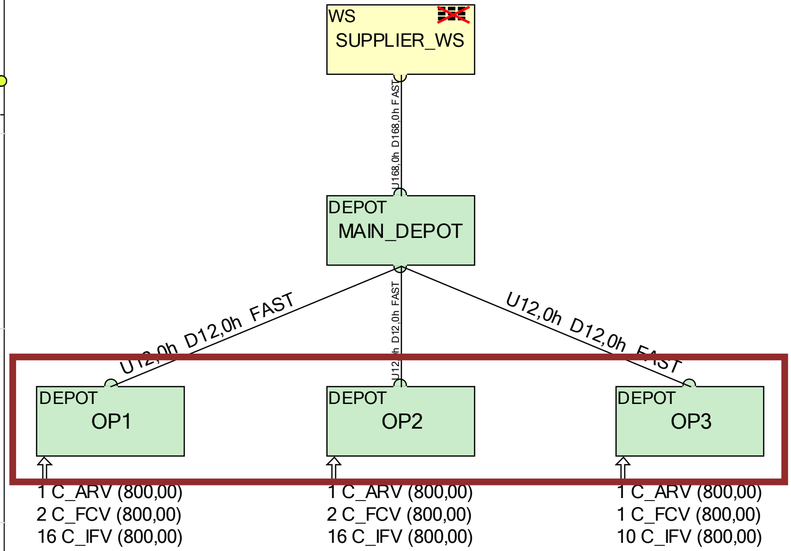




Systecon

C/E-Curve Diagram





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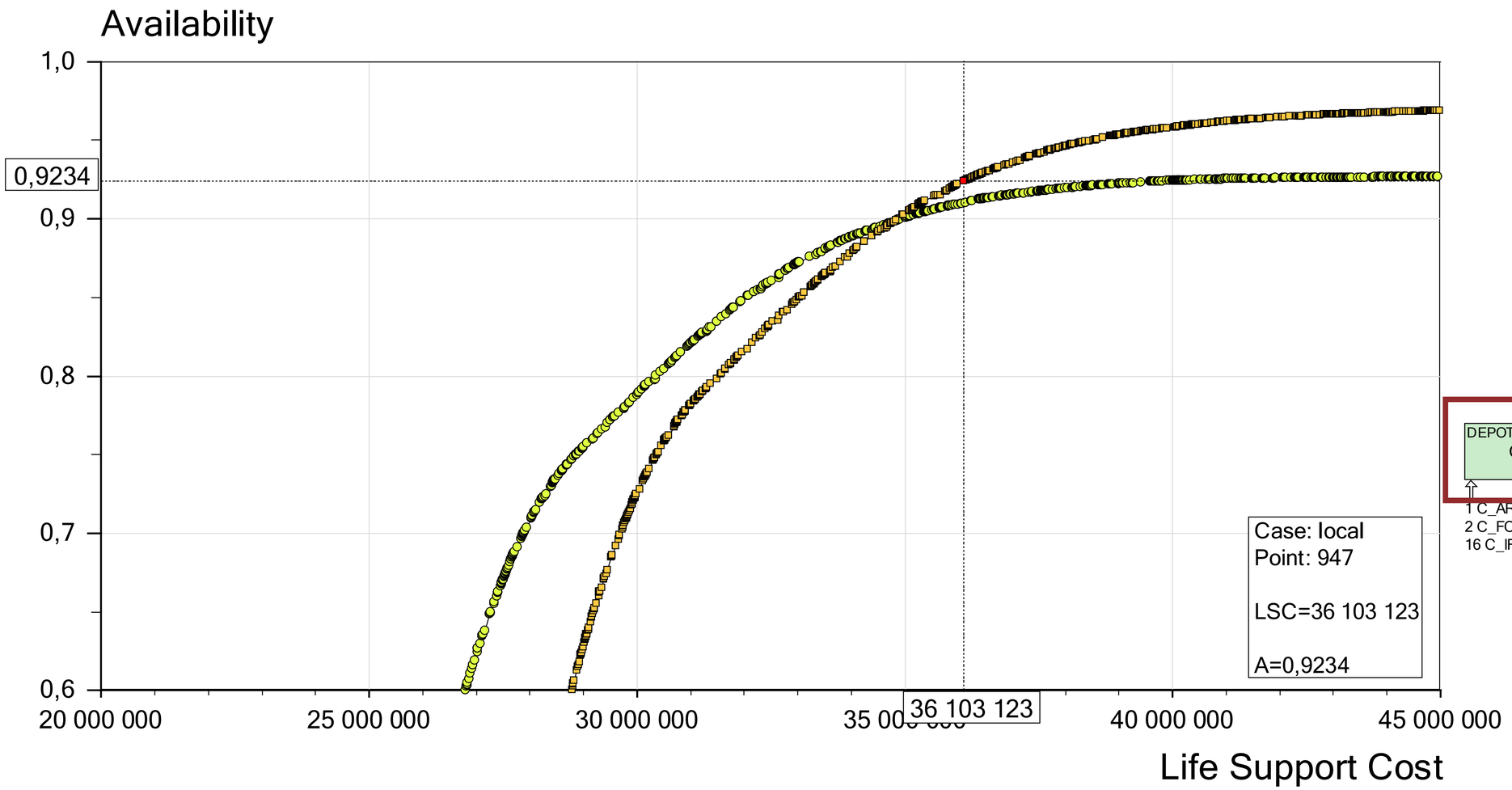
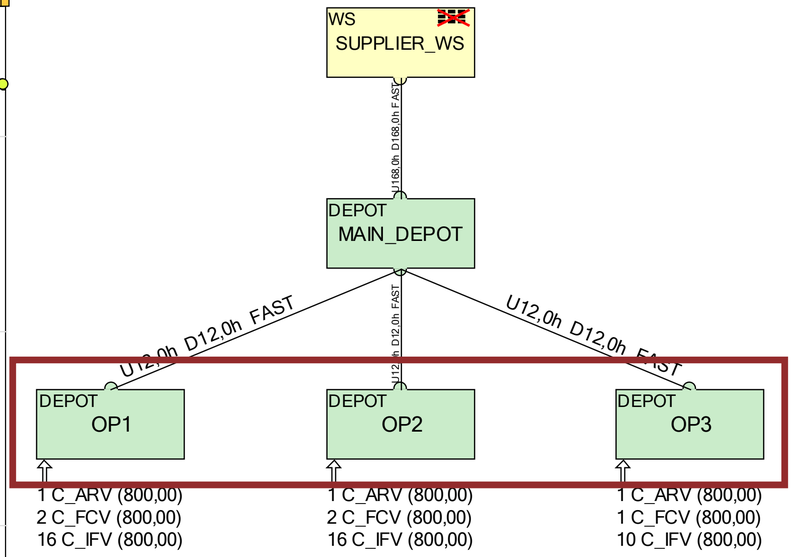
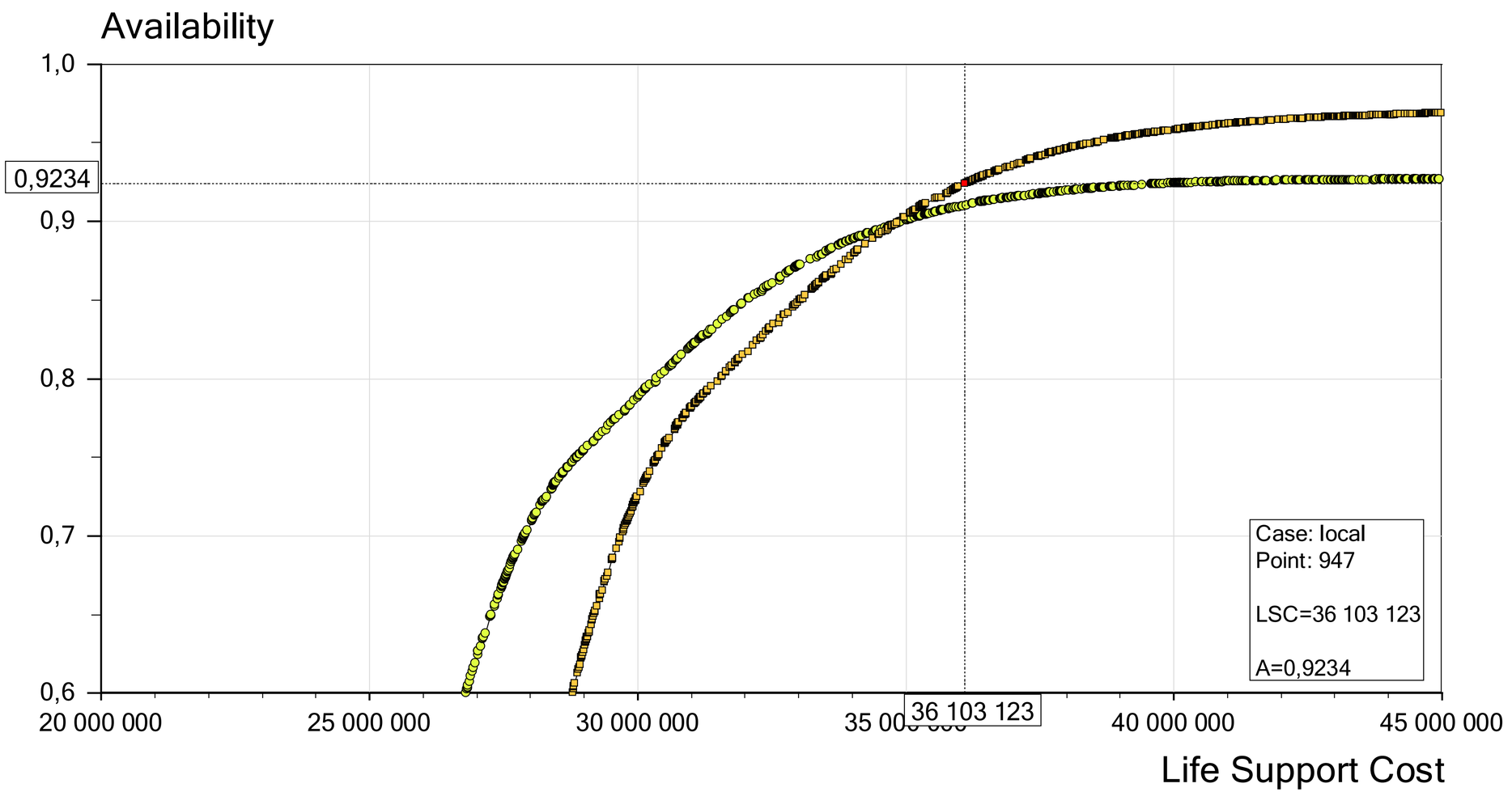
C/E-Curve Diagram

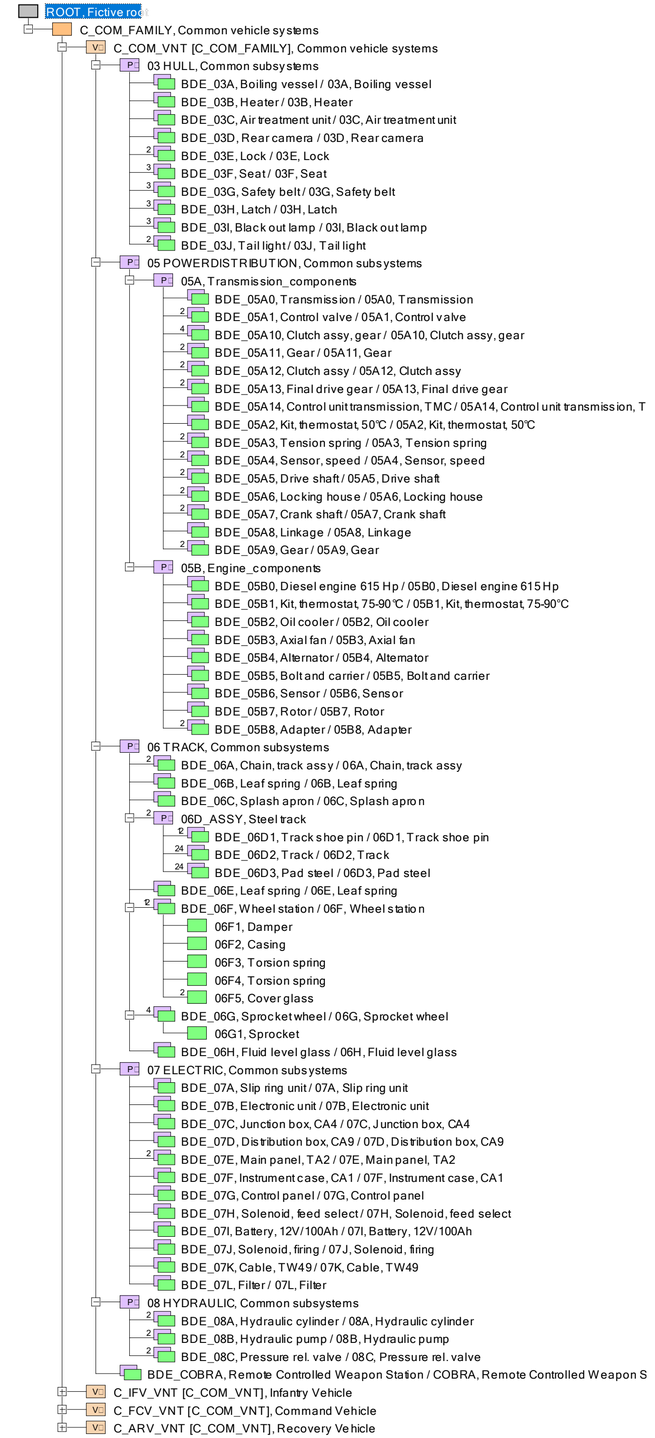


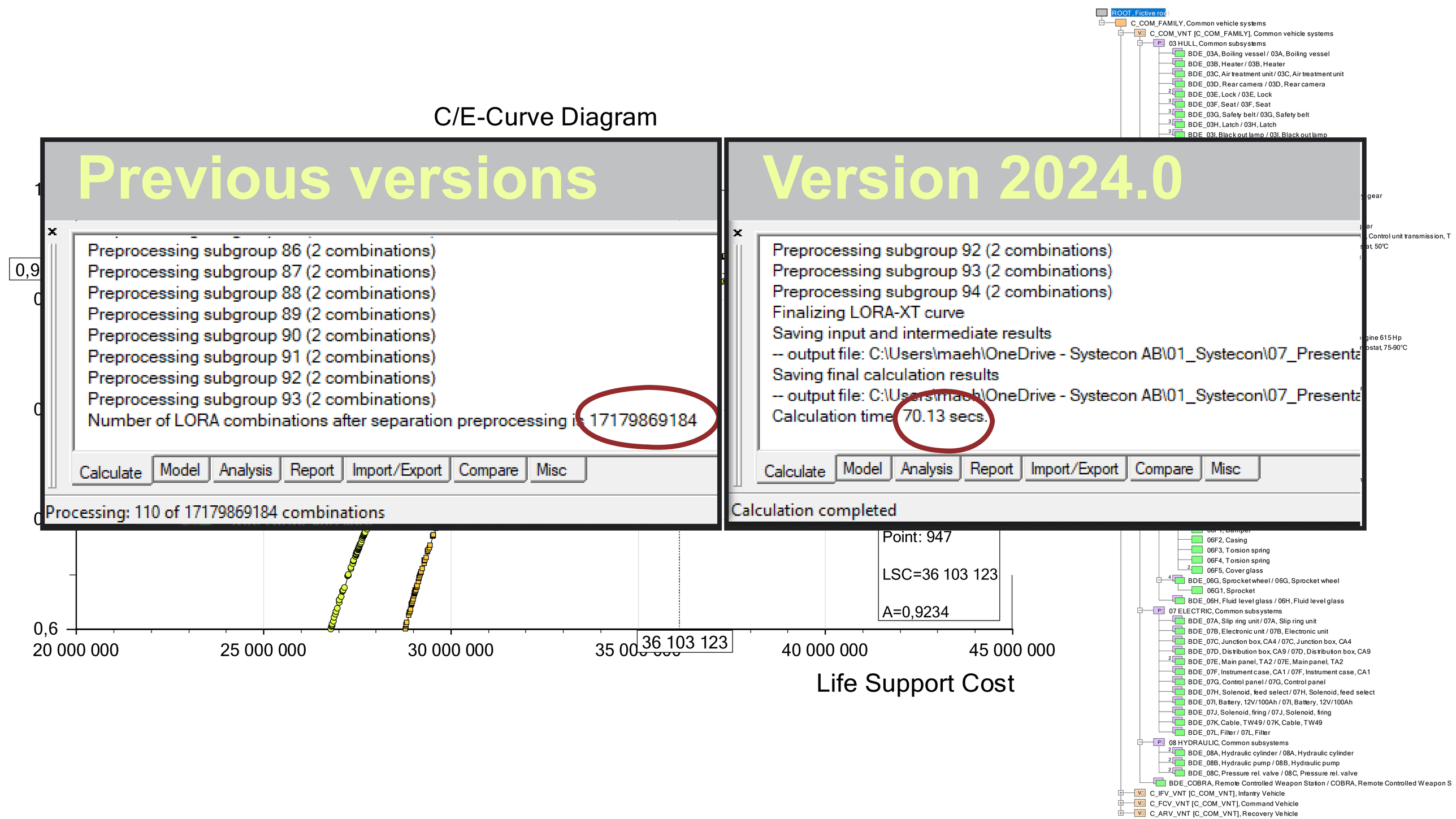


Systecon

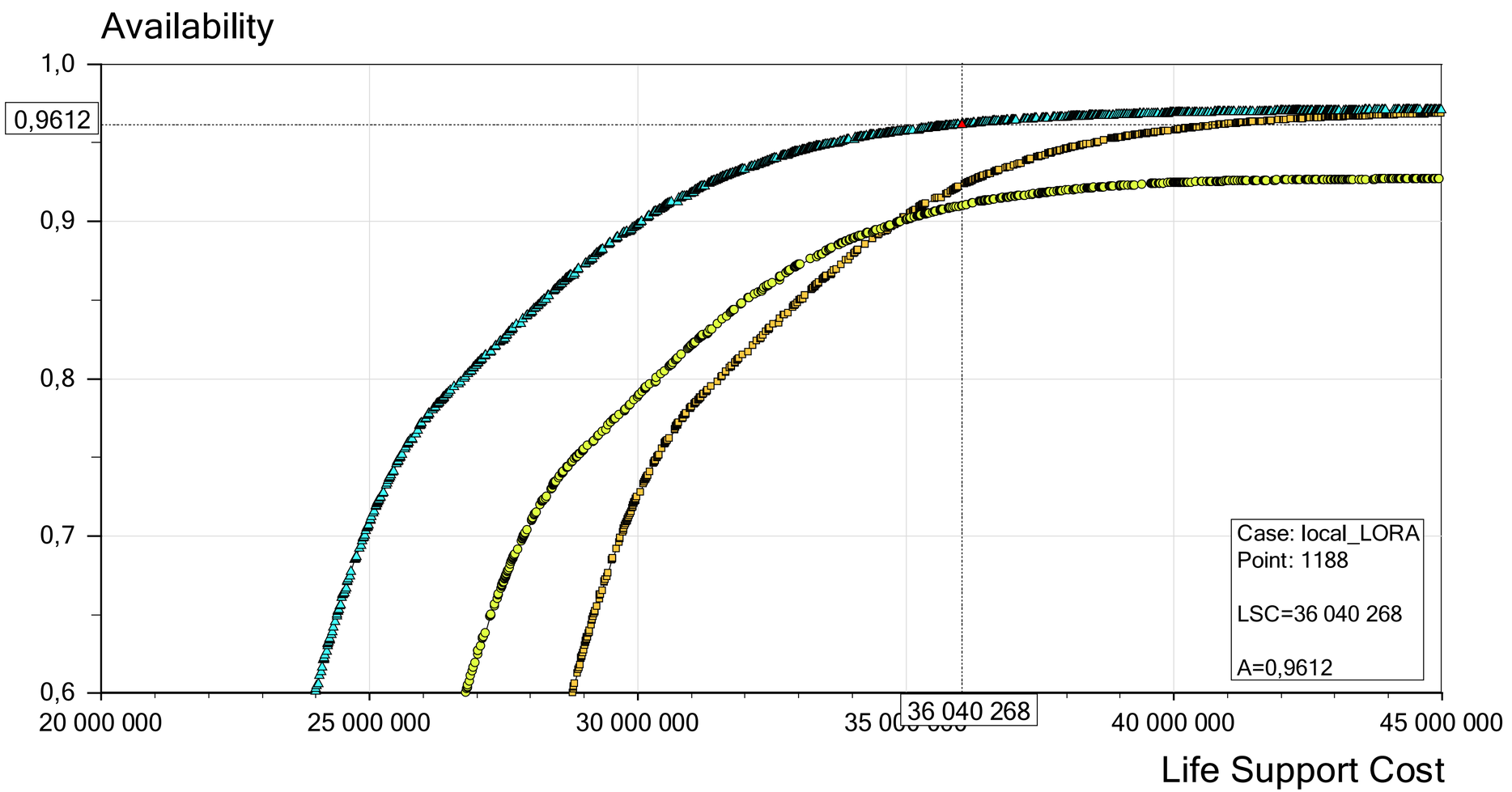
C/E-Curve Diagram

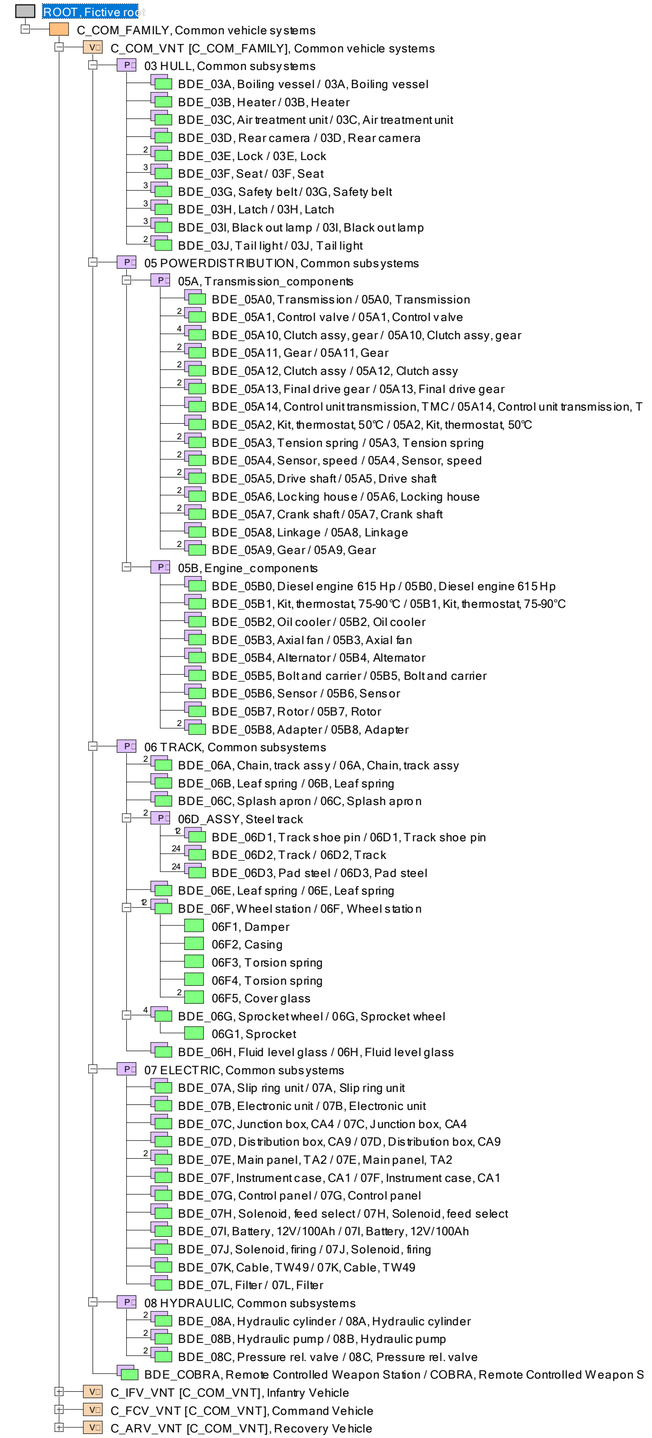


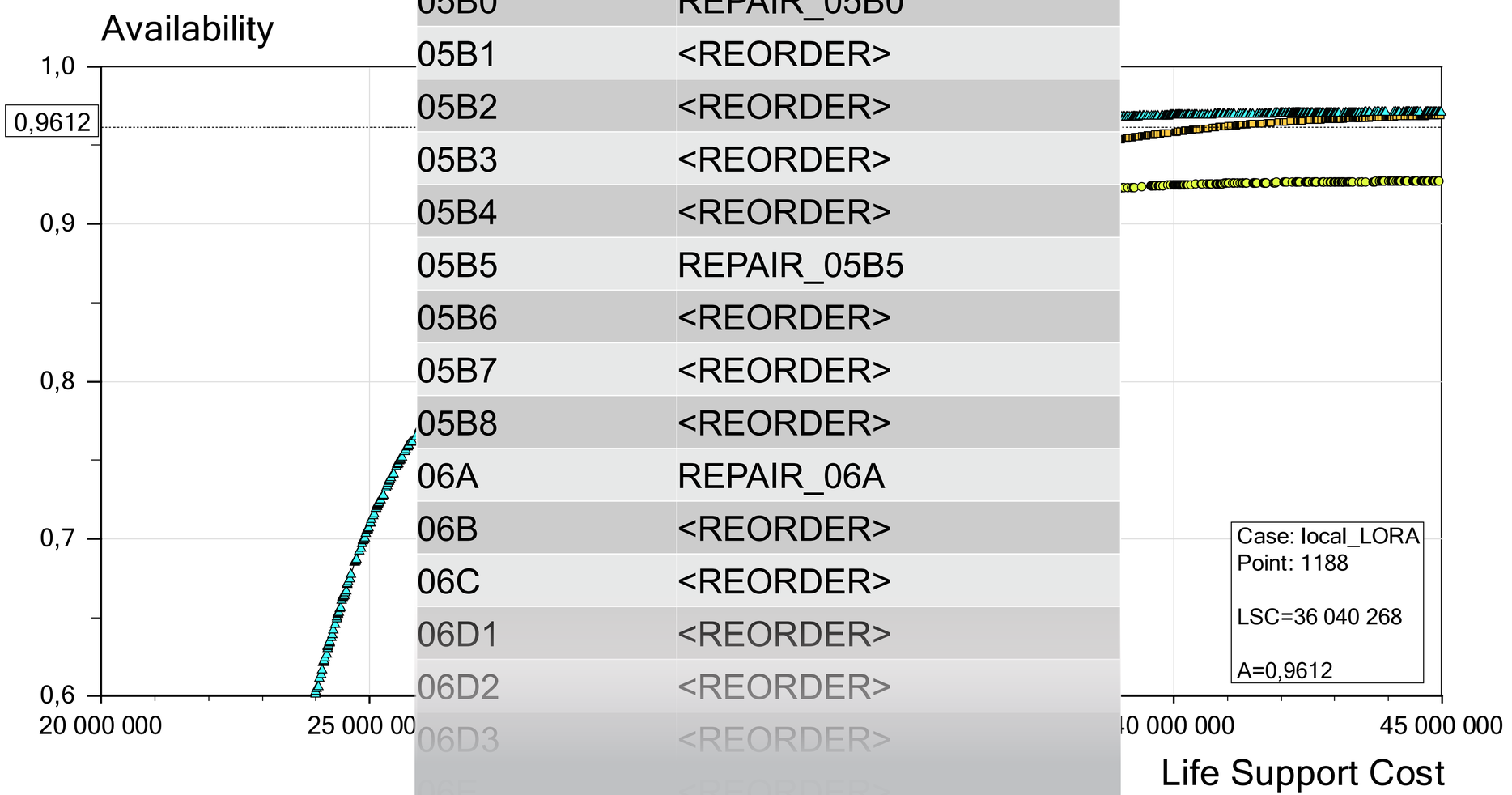



C/E-Curve Diagram
Previous versions
Preprocessing subgroup 86 (2 combinations)
Preprocessing subgroup 87 (2 combinations)
Preprocessing subgroup 88 (2 combinations)
Preprocessing subgroup 89 (2 combinations)
Preprocessing subgroup 90 (2 combinations)
Preprocessing subgroup 91 (2 combinations)
Preprocessing subgroup 92 (2 combinations)
Preprocessing subgroup 93 (2 combinations)
Number of LORA combinations after separation preprocessing is 17179869184
Calculate
Model
Analysis
Report
Import/Export
Compare
Misc
Processing: 110 of 17179869184 combinations
Version 2024.0
Preprocessing subgroup 92 (2 combinations)
Preprocessing subgroup 93 (2 combinations)
Preprocessing subgroup 94 (2 combinations)
Finalizing LORA-XT curve
Saving input and intermediate results
-- output file: C:\Users\maeh\OneDrive - Systecon AB\01_Systecon\07_Presenta
Saving final calculation results
-- output file: C:\Users\maeh\OneDrive - Systecon AB\01_Systecon\07_Presenta
Calculation time: 70.13 secs.
Calculate
Model
Analysis
Report
Import/Export
Compare
Misc
Calculation completed
Point: 947
LSC=36 103 123
A=0,9234
0,6
20 000 000
25 000 000
30 000 000
35 000 000
36 103 123
40 000 000
45 000 000
Life Support Cost
ROOT, Fictive root
C_COM_FAMILY, Common vehicle systems
C_COM_VNT [C_COM_FAMILY], Common vehicle systems
03 HULL, Common subsystems
BDE_03A, Boiling vessel / 03A, Boiling vessel
BDE_03B, Heater / 03B, Heater
BDE_03C, Air treatment unit / 03C, Air treatment unit
BDE_03D, Rear camera / 03D, Rear camera
BDE_03E, Lock / 03E, Lock
BDE_03F, Seat / 03F, Seat
BDE_03G, Safety belt / 03G, Safety belt
BDE_03H, Latch / 03H, Latch
BDE_03I, Black out lamp / 03I, Black out lamp
06F2, Casing
06F3, Torsion spring
06F4, Torsion spring
06F5, Cover glass
BDE_06G, Sprocket wheel / 06G, Sprocket wheel
06G1, Sprocket
BDE_06H, Fluid level glass / 06H, Fluid level glass
07 ELECTRIC, Common subsystems
BDE_07A, Slip ring unit / 07A, Slip ring unit
BDE_07B, Electronic unit / 07B, Electronic unit
BDE_07C, Junction box, CA4 / 07C, Junction box, CA4
BDE_07D, Distribution box, CA9 / 07D, Distribution box, CA9
BDE_07E, Main panel, TA2 / 07E, Main panel, TA2
BDE_07F, Instrument case, CA1 / 07F, Instrument case, CA1
BDE_07G, Control panel / 07G, Control panel
BDE_07H, Solenoid, feed select / 07H, Solenoid, feed select
BDE_07I, Battery, 12V/100Ah / 07I, Battery, 12V/100Ah
BDE_07J, Solenoid, firing / 07J, Solenoid, firing
BDE_07K, Cable, TW49 / 07K, Cable, TW49
BDE_07L, Filter / 07L, Filter
08 HYDRAULIC, Common subsystems
BDE_08A, Hydraulic cylinder / 08A, Hydraulic cylinder
BDE_08B, Hydraulic pump / 08B, Hydraulic pump
BDE_08C, Pressure rel. valve / 08C, Pressure rel. valve
BDE_COBRA, Remote Controlled Weapon Station / COBRA, Remote Controlled Weapon S
C_IFV_VNT [C_COM_VNT], Infantry Vehicle
C_FCV_VNT [C_COM_VNT], Command Vehicle
C_ARV_VNT [C_COM_VNT], Recovery Vehicle

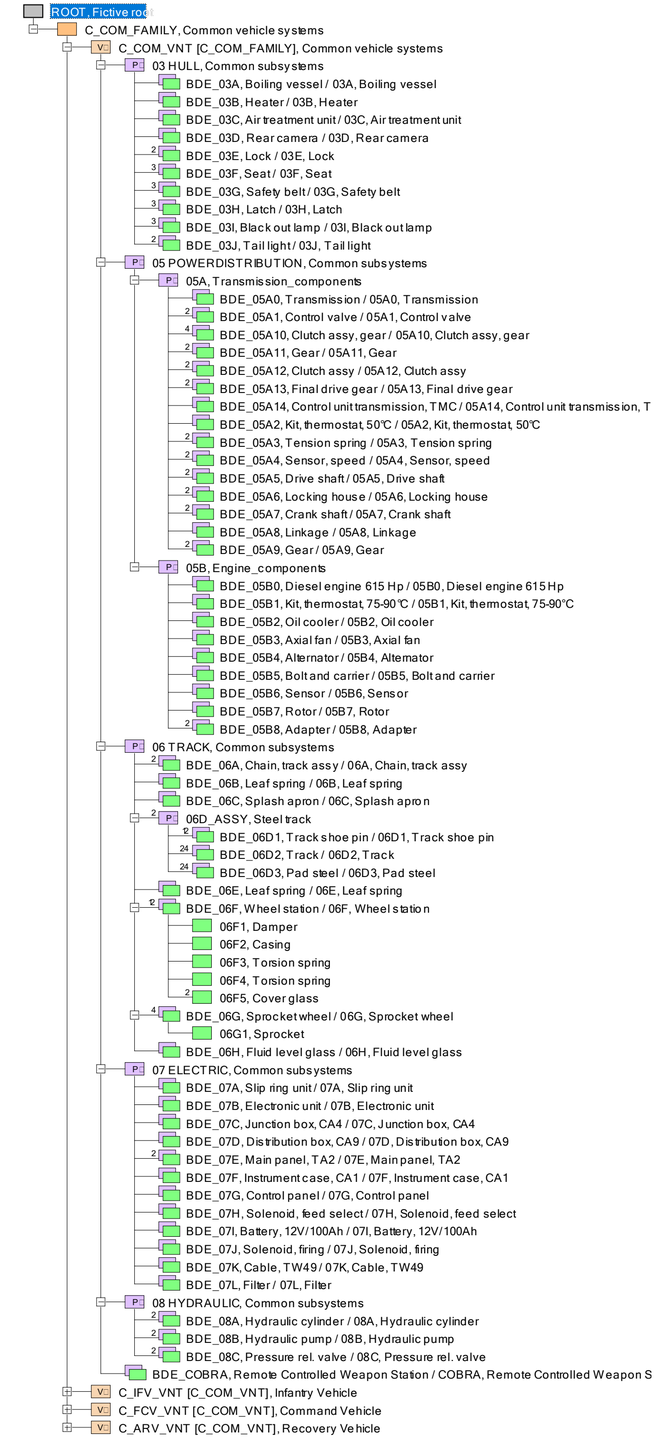
C/E-Curve Diagram







Item ID	Maintenance strategy
05B0	REPAIR_05B0
05B1	<REORDER>
05B2	<REORDER>
05B3	<REORDER>
05B4	<REORDER>
05B5	REPAIR_05B5
05B6	<REORDER>
05B7	<REORDER>
05B8	<REORDER>
06A	REPAIR_06A
06B	<REORDER>
06C	<REORDER>
06D1	<REORDER>
06D2	<REORDER>
06D3	<REORDER>
06E	<REORDER>
06F	REPAIR_06F
06F1	<REORDER>



Summary

- Refinement of results in SIMLOX
  - Added readiness-level
  - New visualisation window
- Streamlined optimization
  - Faster & more capable

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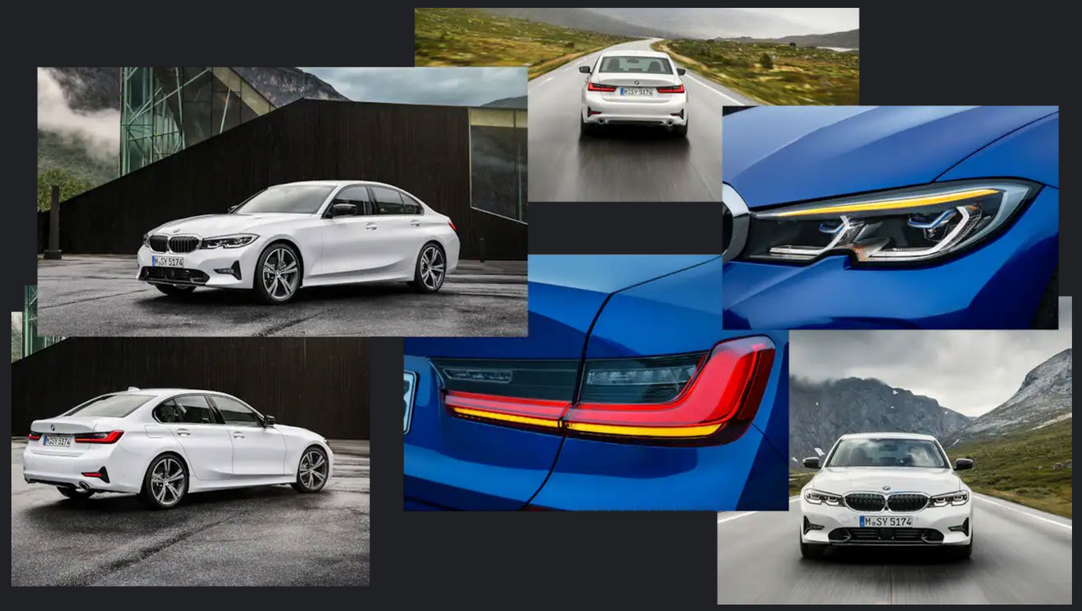

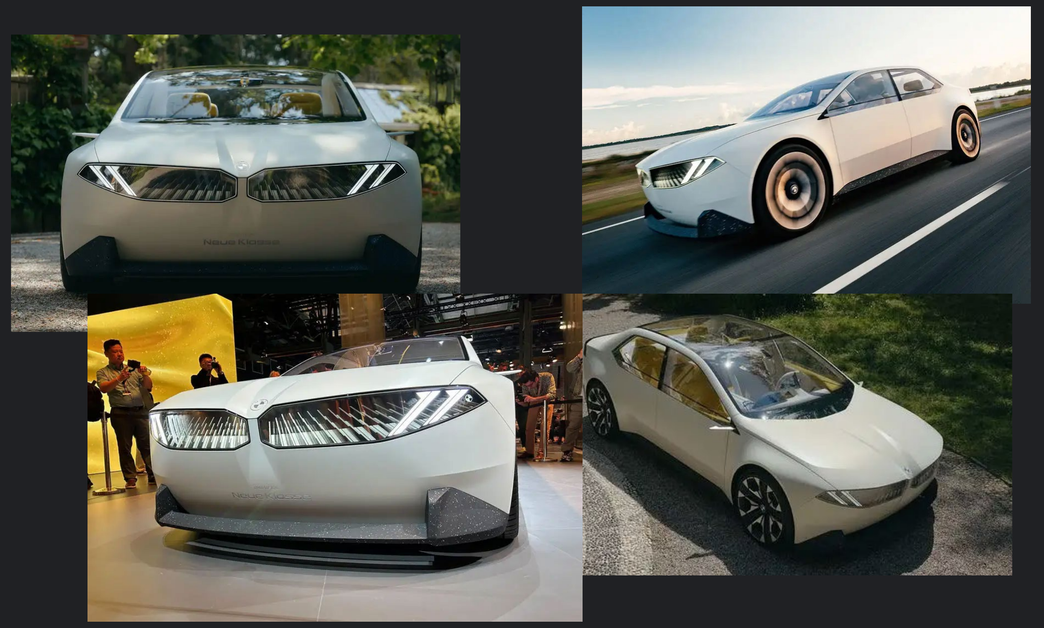

Source:
https://www.bmw.com/en/automotive-life/bmw-3-series-generations.html
https://www.autocar.co.uk/car-news/new-cars/bmw-neue-klasse

Systecon

Thank you.

Systecon