

Opus Suite
Conference

STOCKHOLM

Opus Suite – Nya och förbättrade förmågor i etablerade verktyg

Younes Lousseief, Systecon

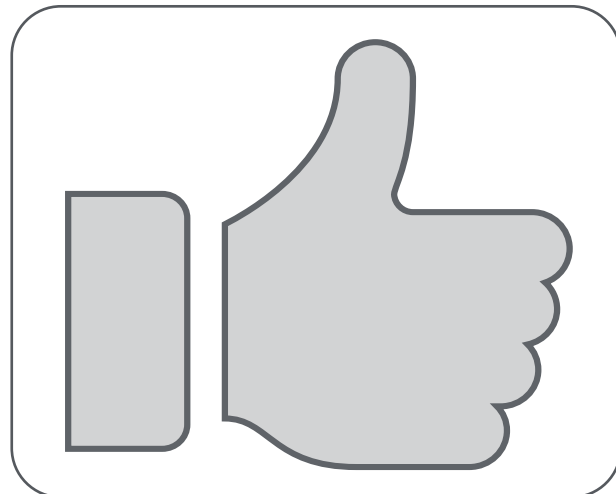
by Systecon
opus
suite

 **Systecon**

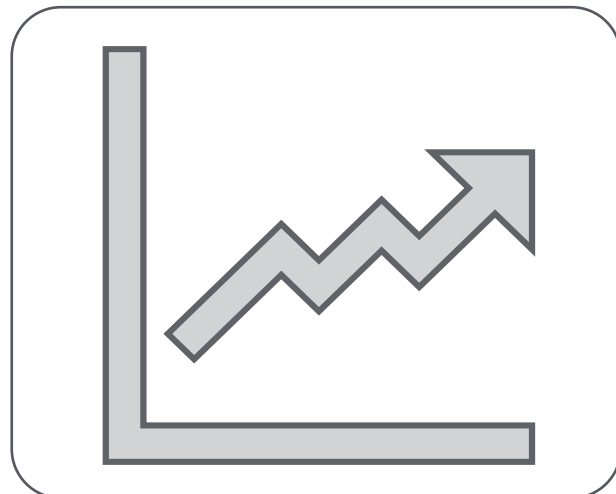
New capability



System functionality modeling



Describes conditions for a system's function.



Improves understanding of system's behaviour and support needs.

System functionality



Foto: Bezav Mahmod/Försvarmakten

<https://www.forsvarsmakten.se/sv/aktuellt/2021/12/luftvarnssystem-103-patriot-ar-nu-operativt/>



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Broken hydraulic motor

- Functional loss
- Default behavior
- Probability





Foto: Bezav Mahmod/Försvarsmakten

<https://www.forsvarsmakten.se/sv/aktuellt/2021/12/luftvarnssystem-103-patriot-ar-nu-operativt/>

Failing APU chip detector

- Time until functional loss
- Fixed or random value
- Operation or calendar





Foto: Bezav Mahmod/Försvarsmakten

<https://www.forsvarsmakten.se/sv/aktuellt/2021/12/luftvarnssystem-103-patriot-ar-nu-operativt/>

Broken tow hitch locking system

- No functional loss
- Fixed before next mission





Foto: Bezav Mahmod/Försvarsmakten

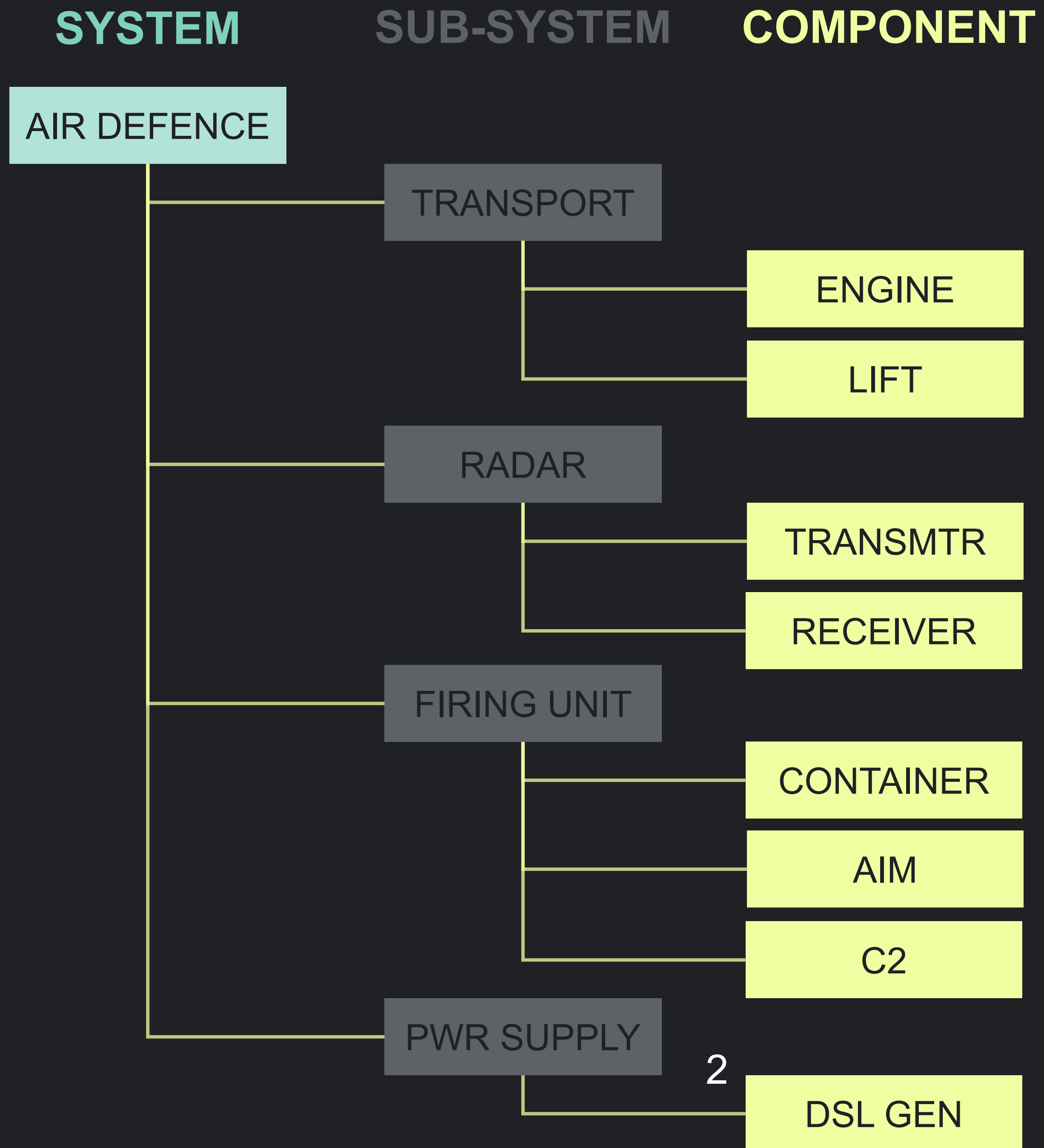
<https://www.forsvarsmakten.se/sv/aktuellt/2021/12/luftvarnssystem-103-patriot-ar-nu-operativt/>

Broken diesel generator

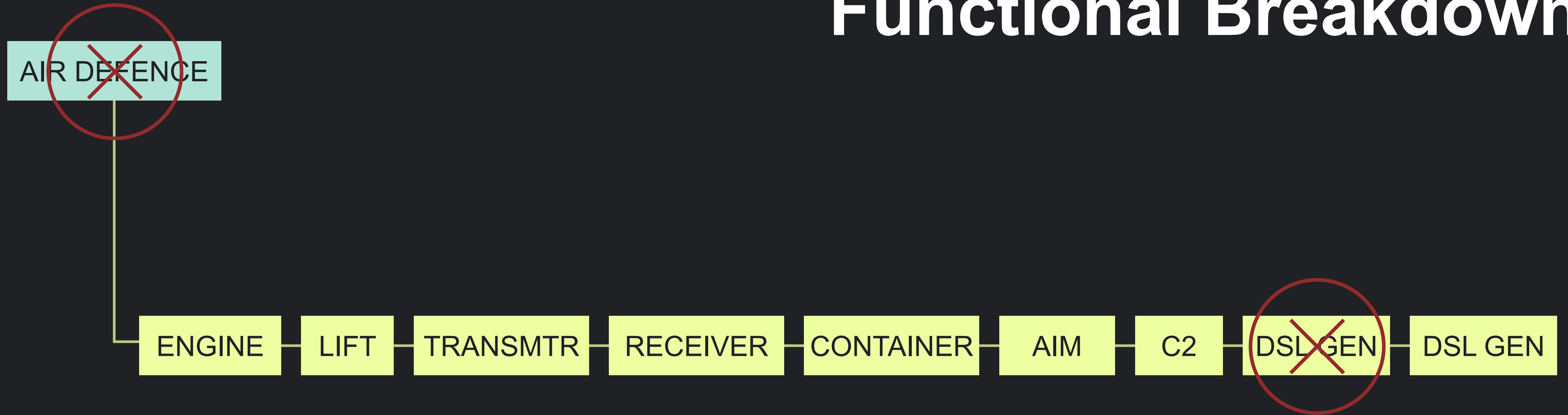
- Functional loss of the component
- Still able to operate



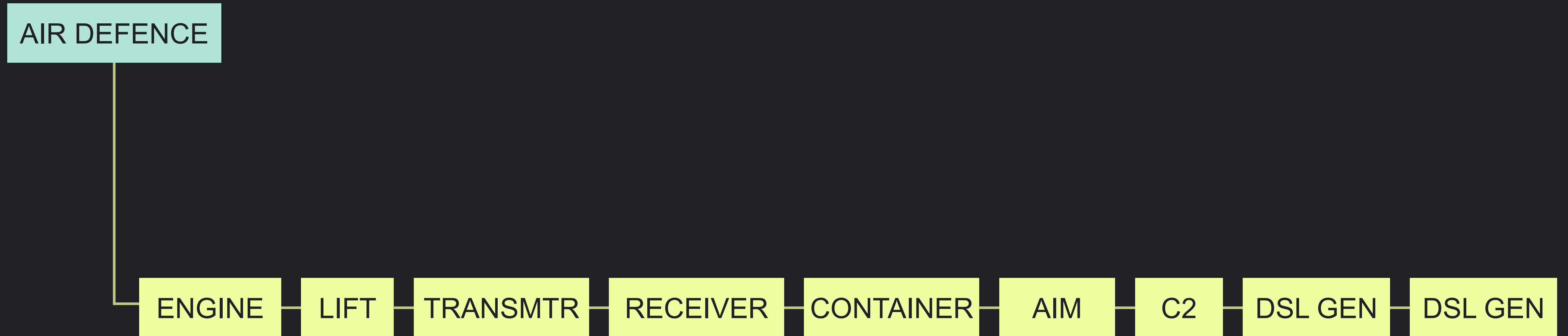
Product Breakdown



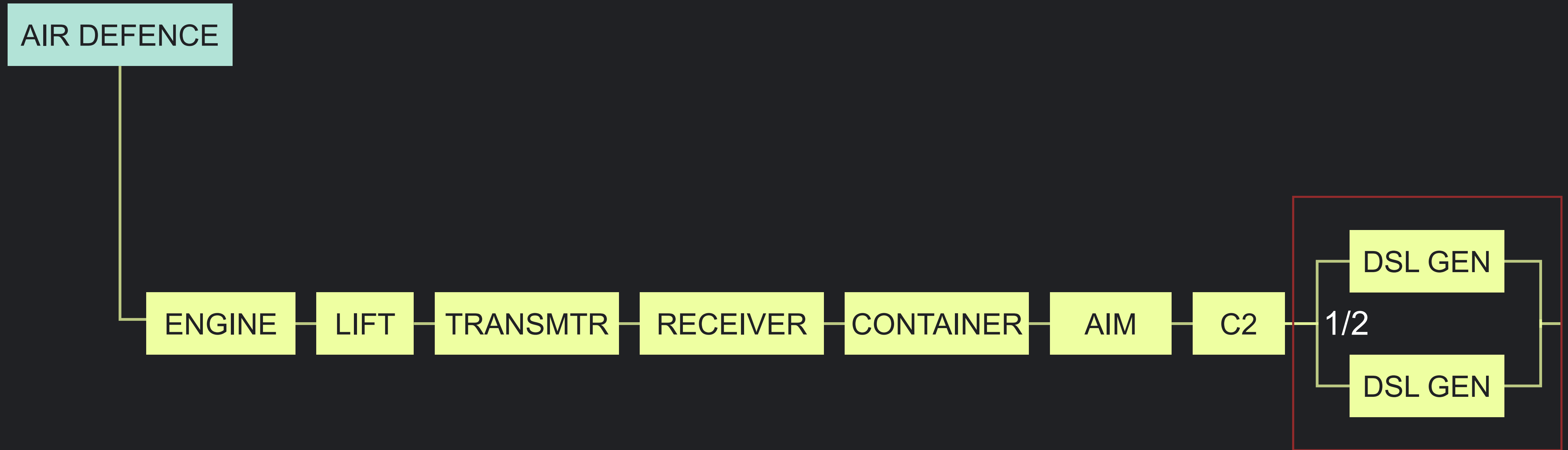
Functional Breakdown



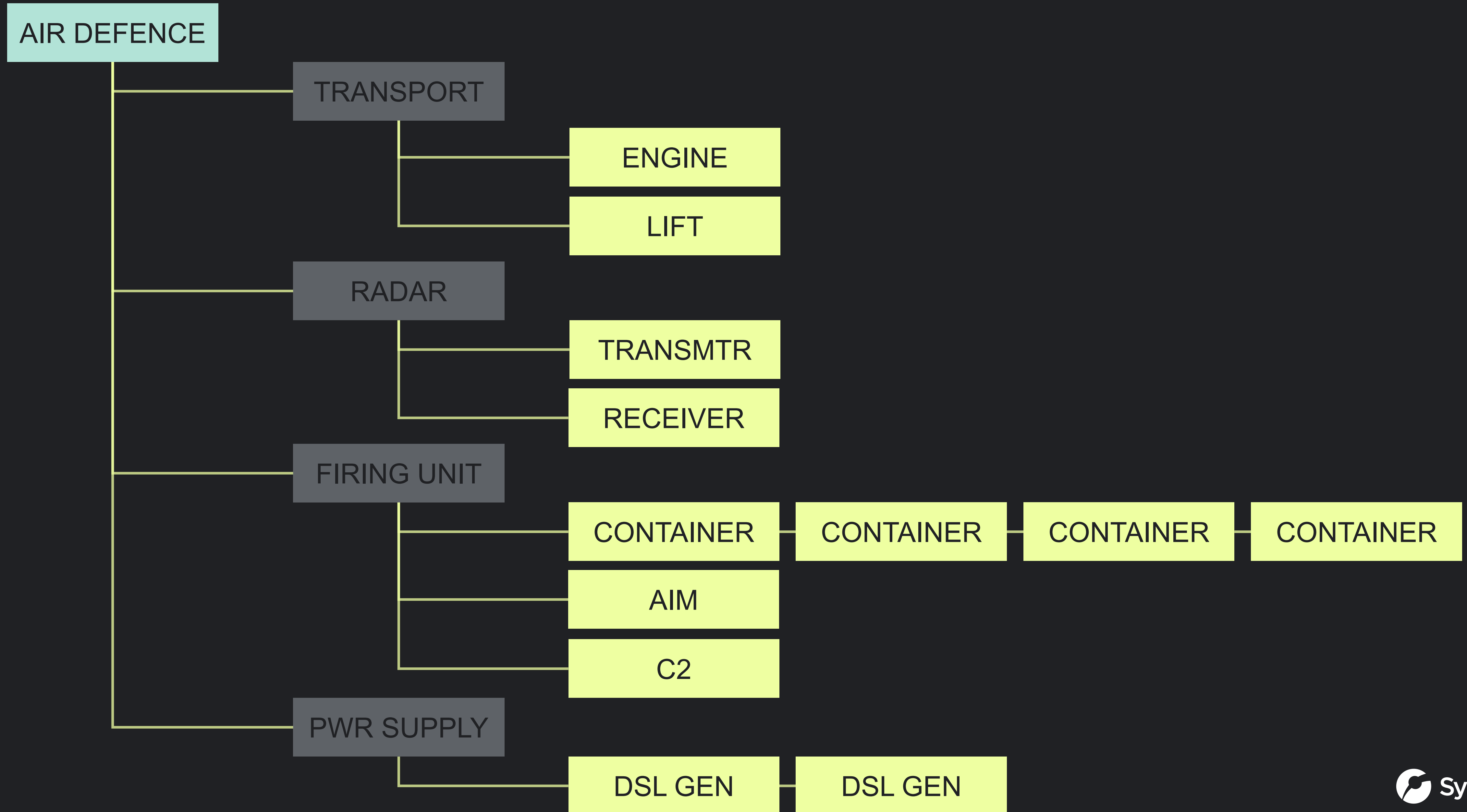
Functional Breakdown



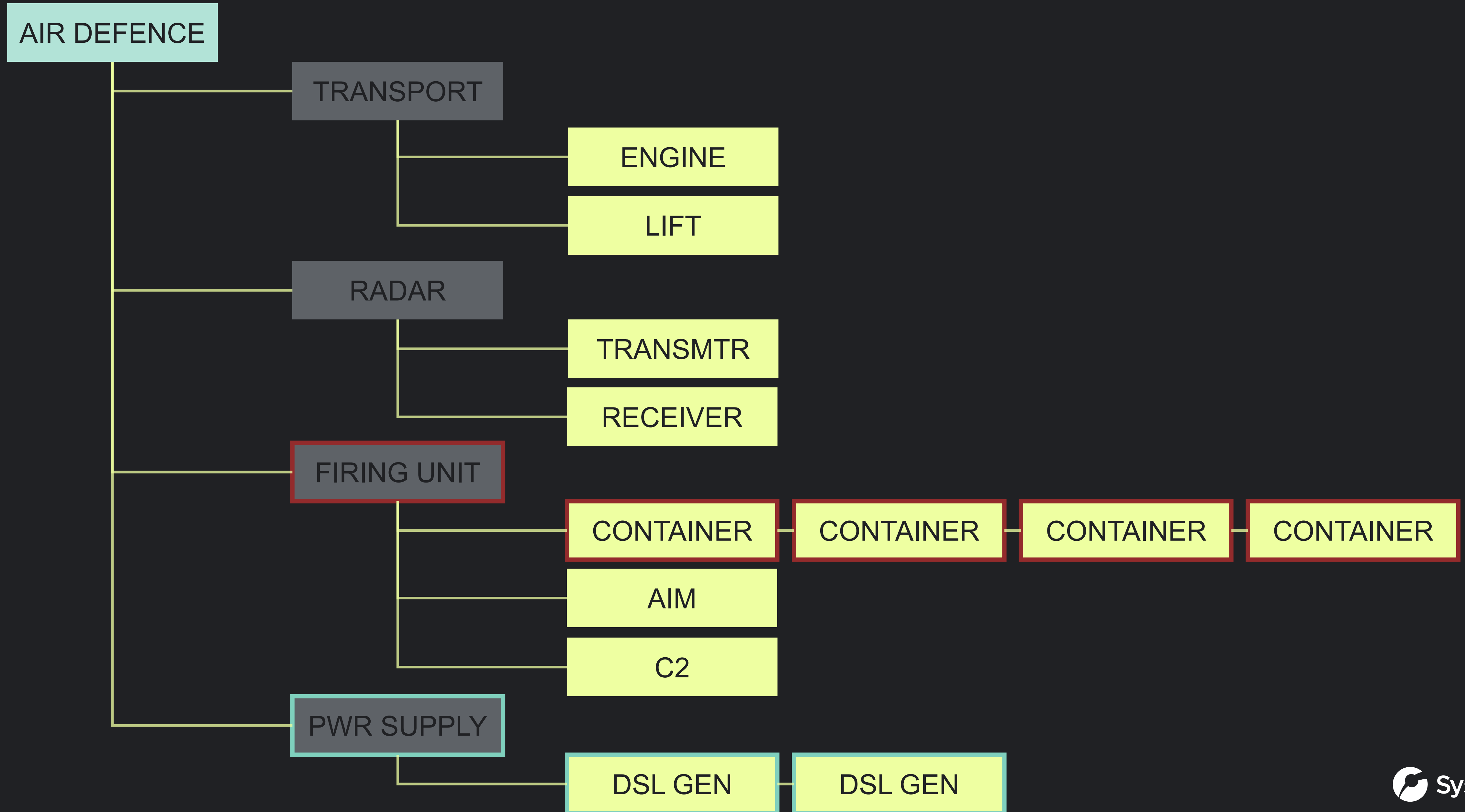
Functional Breakdown



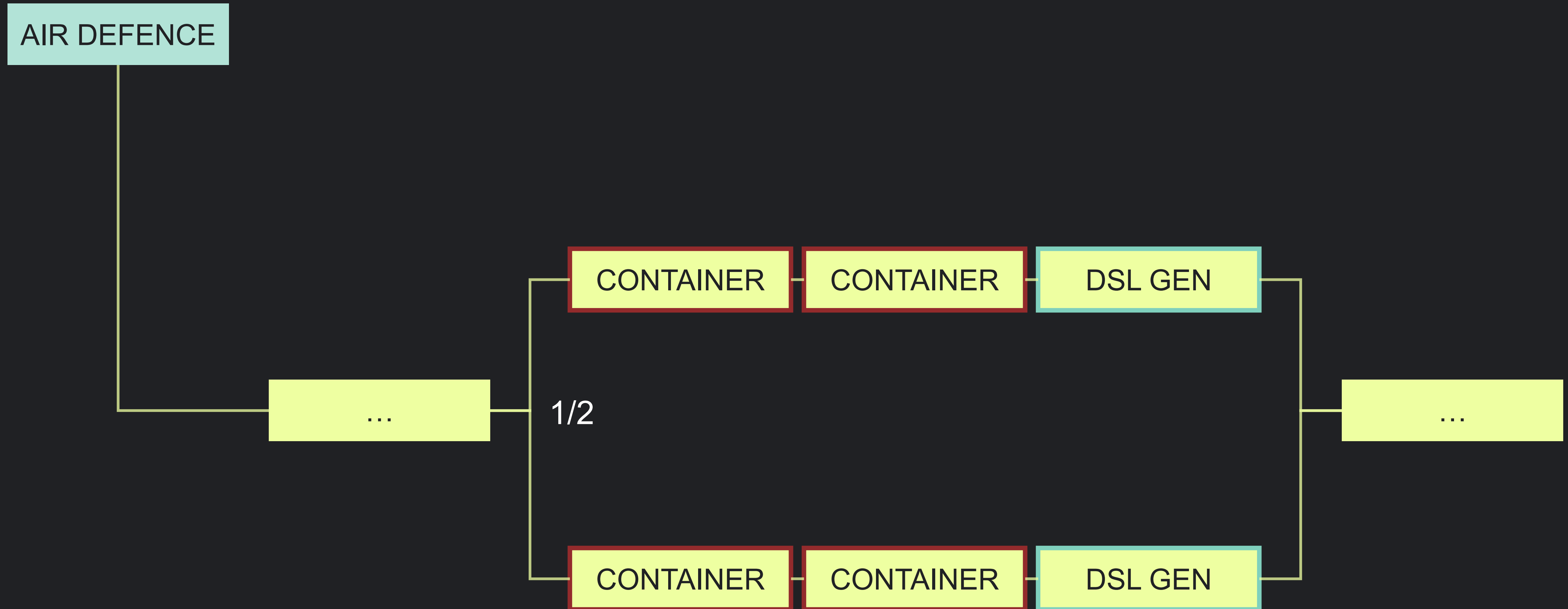
Product Breakdown



Product Breakdown



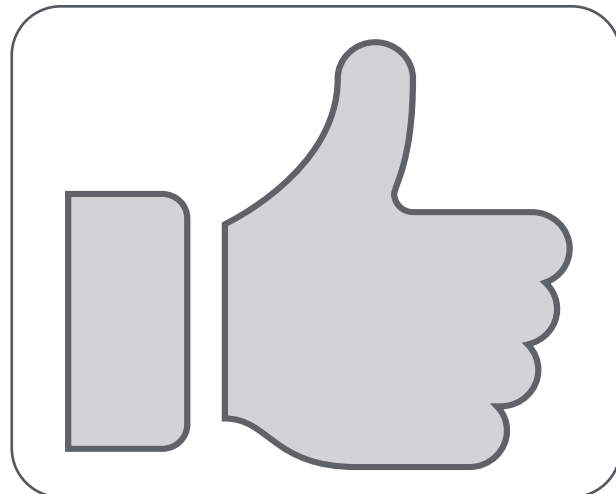
Functional Breakdown



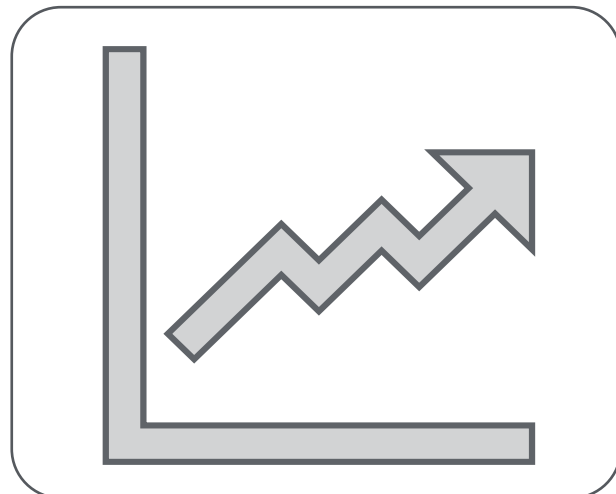
Enhanced capability



Assigning of preventive maintenance plans & Initial state.



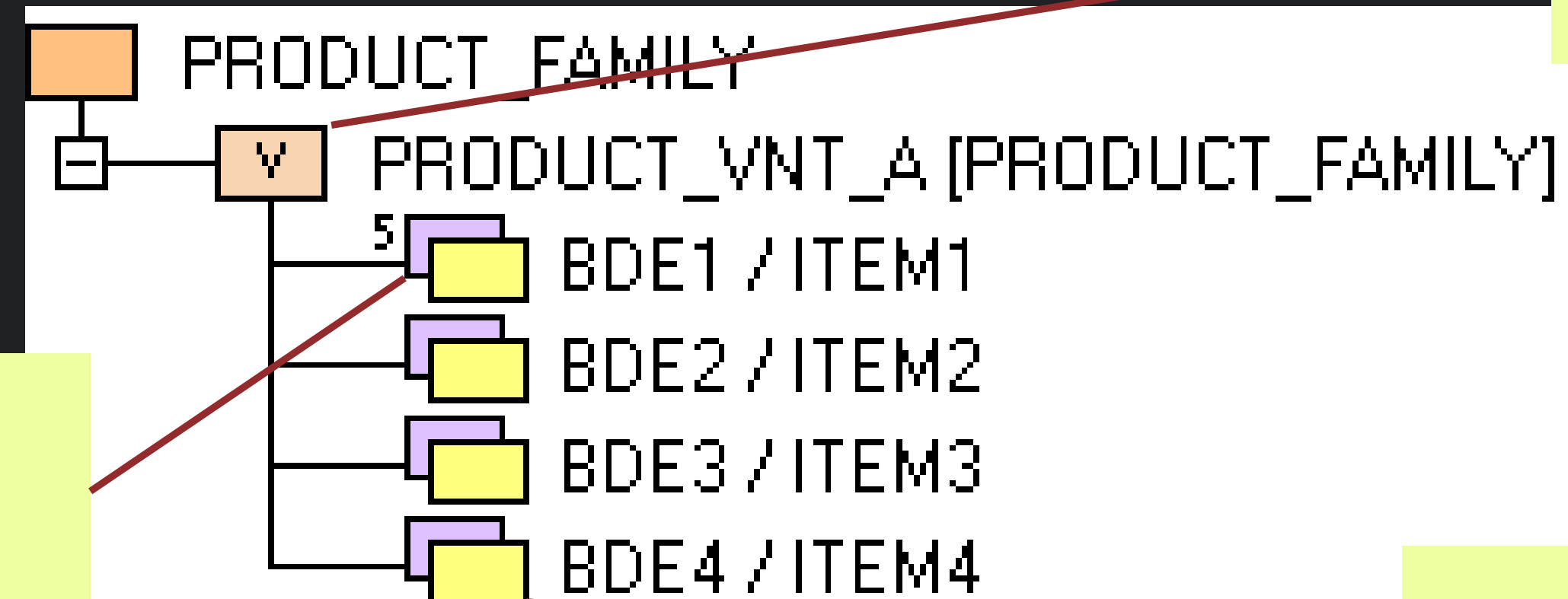
Right equipment carrier of the maintenance and is assigned the right age.



More accurate modeling of preventive maintenance.

Assigning PM plans

Scheduled maintenance



PM plan on
variant

Counter on
variant

PM plan on
element

Counter on
element

PM plan on
item

Counter on
item

Initial state

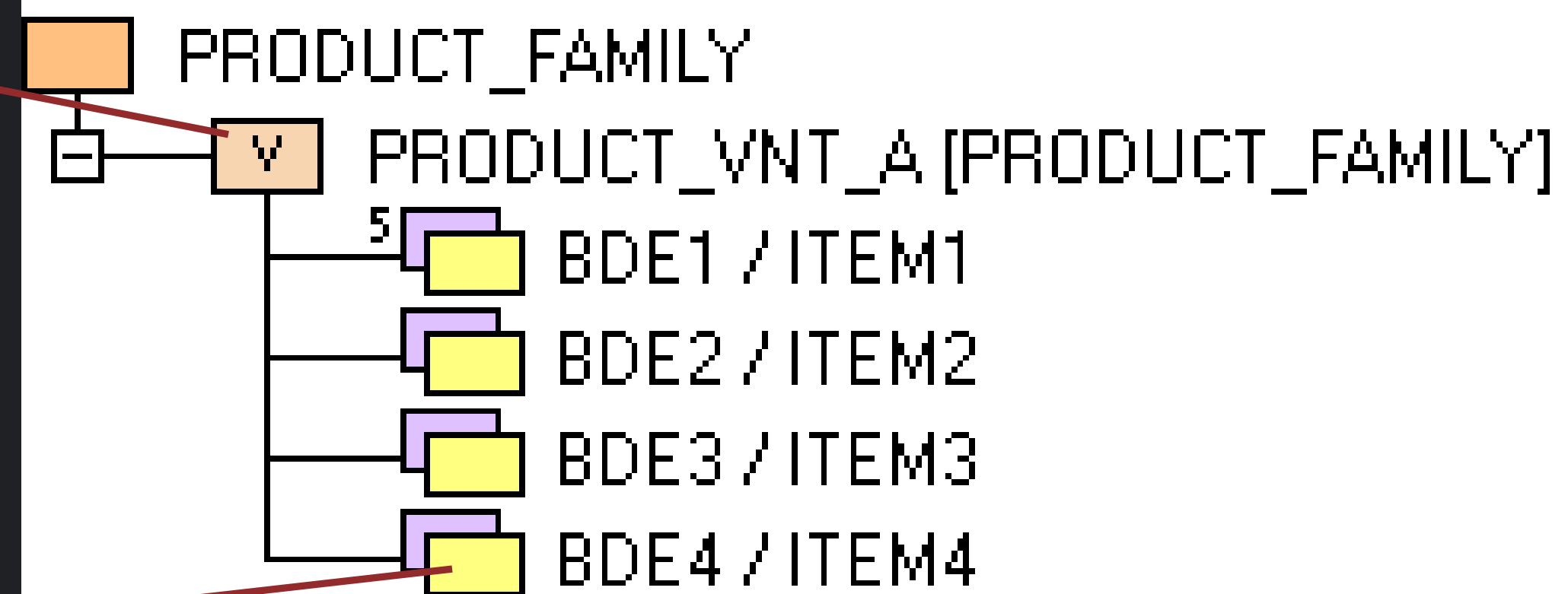
Status at start of the simulation
Given in any operation parameter

System
deployment

Age of deployed
systems

System
realization

Age of
installed items



Stock
allocation

Age of
items in stock

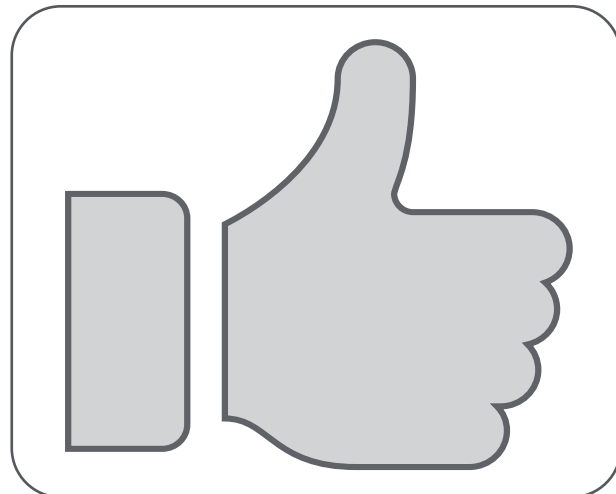
Transfer

Age of
systems/items
transferred in

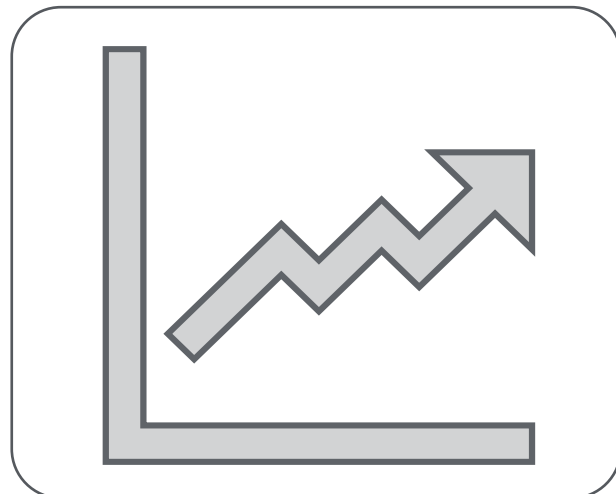
Enhanced capability



Time dependant input data.



Captures changes of input data over time.



Study the impact the changes has on performance and system states.

Time dependent input data

- Task duration
- Failure rate
- Reorder lead time
- Reorder size



Time dependent input data

Modeling
element

Task

Time Dep.
Value ID

Time of
change

Value or
Distribution

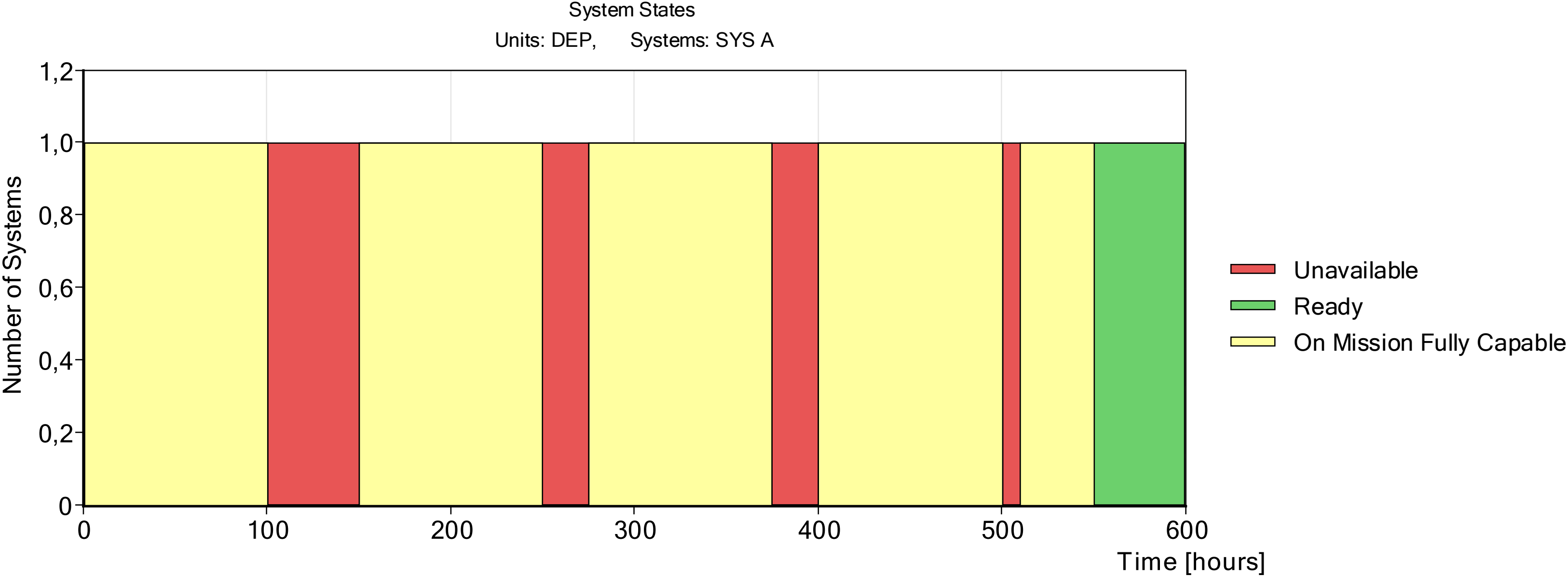
Input
example 1

Overhaul A
(every 100 oph)

TAT A

0; 200; 400

50; 25; 10 (h)



Time dependent input data

Modeling
element

Task

Time Dep.
Value ID

Time of
change

Value or
Distribution

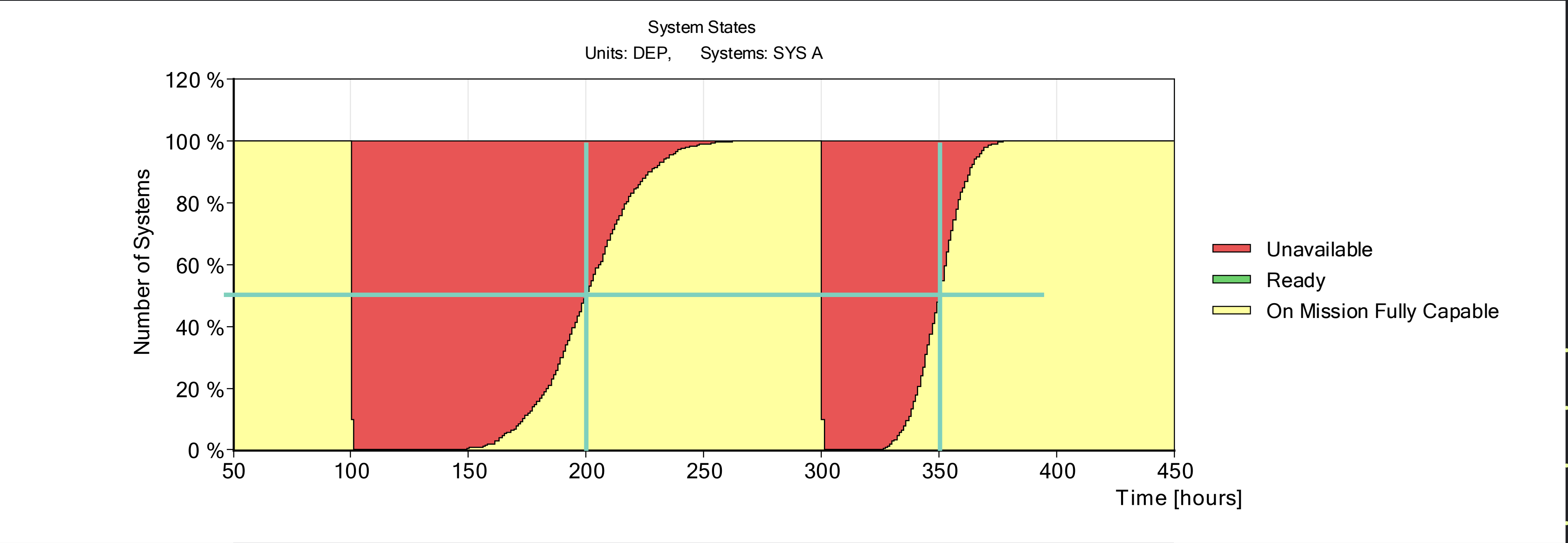
Input
example 2

Rectify A
(at T=100; 300)

RECT A

0; 280

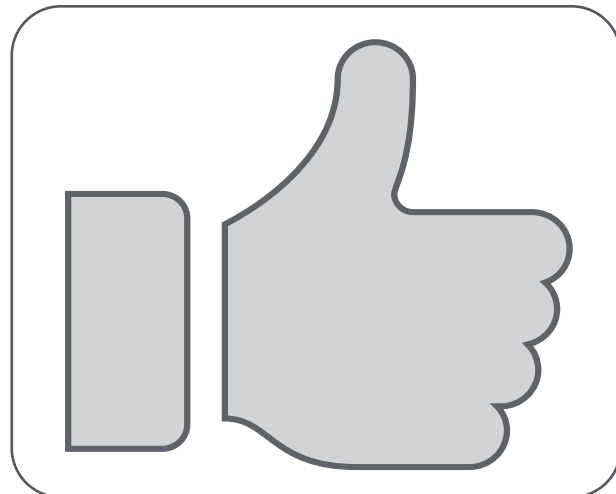
$N(100,20)$;
 $N(50,10)$



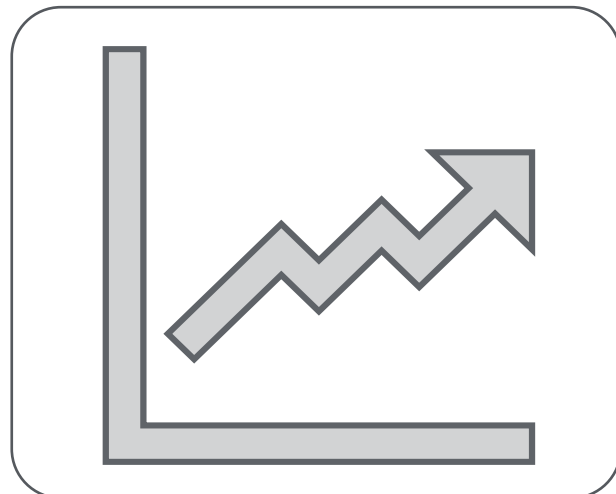
New capability



Task results from simulation



Information on tasks on event, place, materiel etc.



Detailed follow-up and prediction of task volumes and costs.

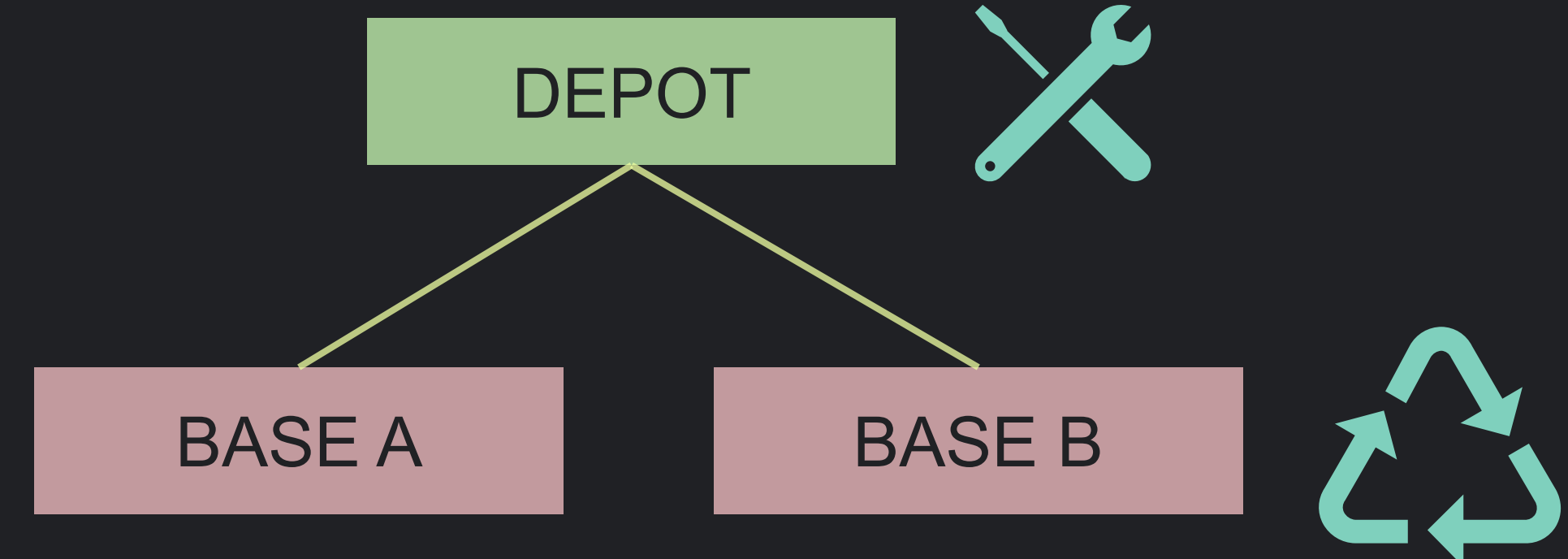
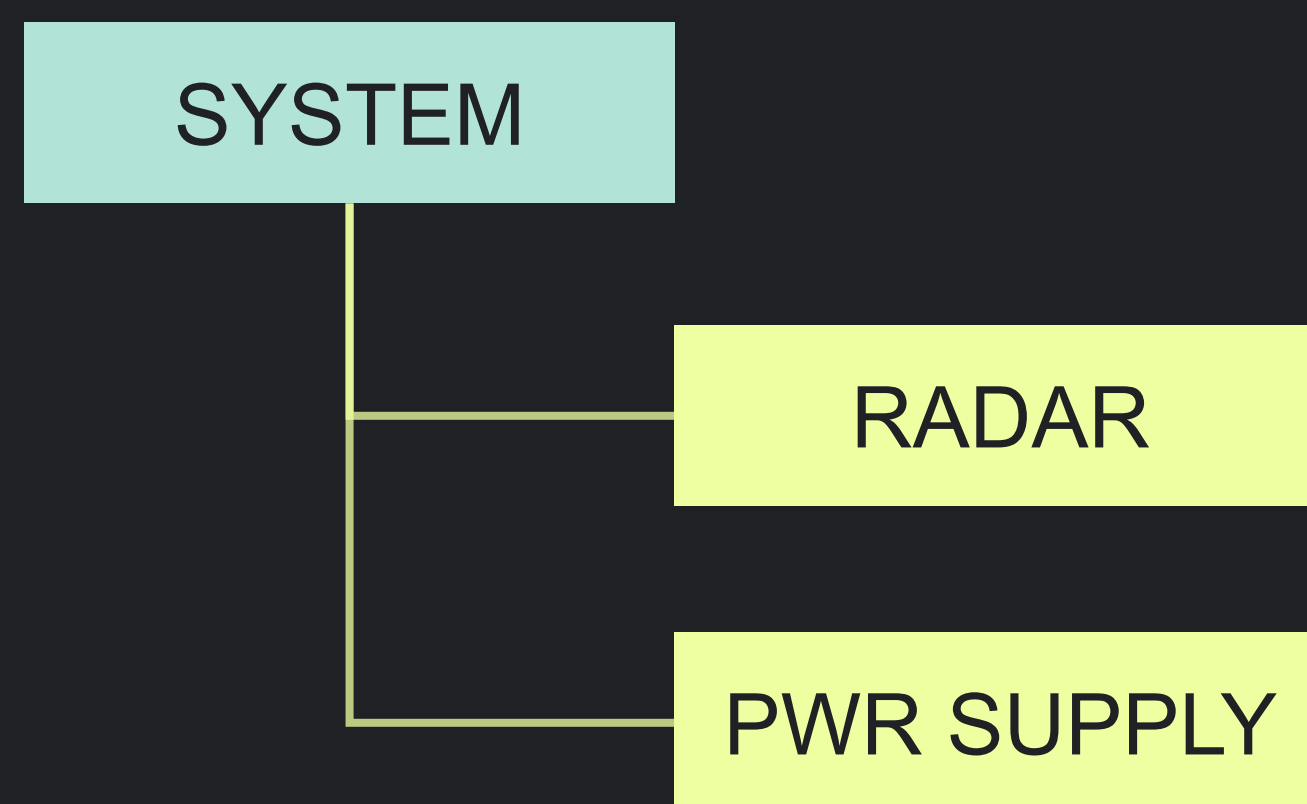
Task results

- Number of tasks completed during simulation
- Shows workload on support organization
- Better understanding of the results
- Better understanding of the model
- Performance initiatives implemented



Task results

Example



Total

Task

System/Item

Station

Event

Time

Total: 12

Replace: 6

Radar: 5

Pwr supply: 1

Base A: 3

Base B: 2

Base A: 1

Failure X: 2

Failure Y: 1

Failure X: 2

Failure Z: 1

T=120: 1

T=202: 1

T=88: 1

T=90: 1

T=176: 1

T=150: 1

Rectify: 6

Radar: 5

Pwr supply: 1

Depot: 5

Depot: 1

Failure X: 4

Failure Y: 1

Failure Z: 1

T=132: 1

T=214: 1

T=102: 1

T=182: 1

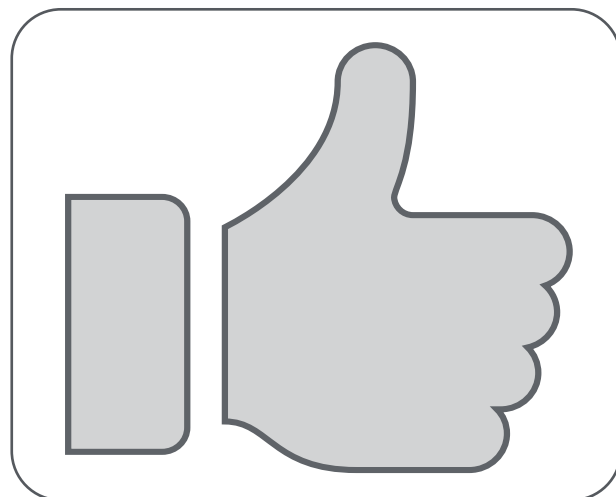
T=100: 1

T=162: 1

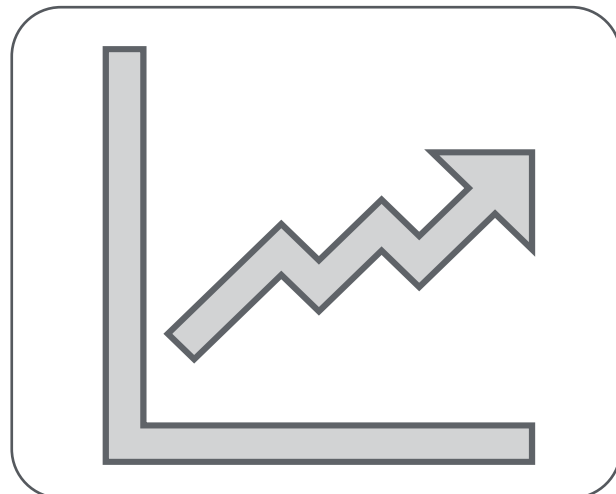
Enhanced capability



Robbing



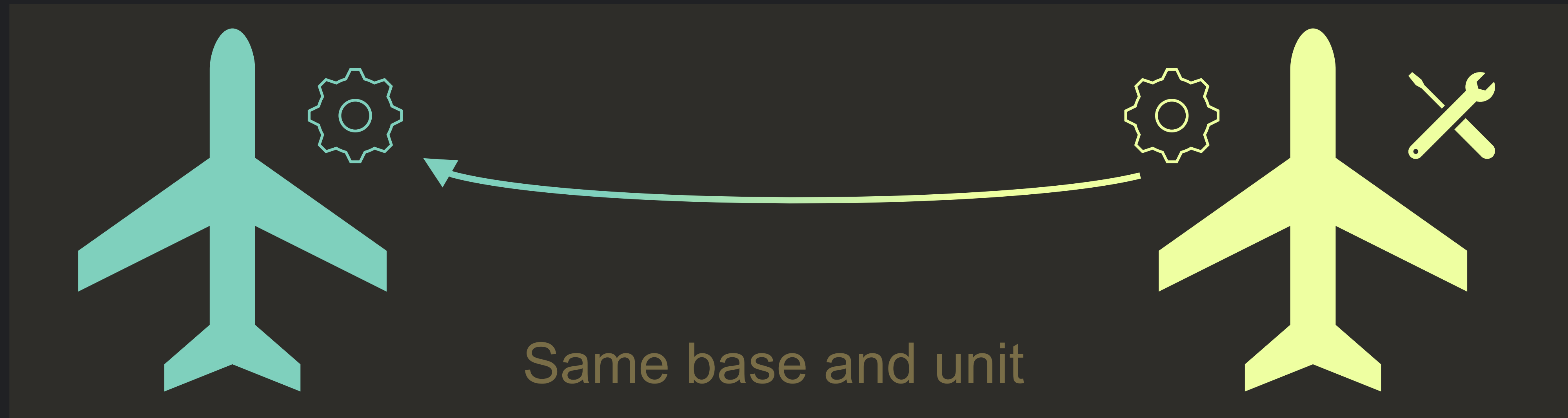
Take an item from another system in maintenance.



Enables tactical decision to reduce system downtime.

Robbing

An attempt to reduce system down time



Robbing replace < Ordinary resupply

Resupply time < Time left



Tutorials

- Functional Breakdowns
 - Functional Configurations
 - FBD Not Following Breakdown Structure
 - Repeated Blocks
- Operational Mode
 - Priorities
 - Downtime Contributors
- Onboard Maintenance
 - At Harbor
 - With Resupply Ship



Tutorials

- Shifts
 - Basics
 - Night Maintenance
- Time Dependent Input Data
- Usage Rates
- Initial Age
- Subsystem Results

Thank you.

