Workshop

Synchronization of operations, maintenance & spares planning

27-02-2019
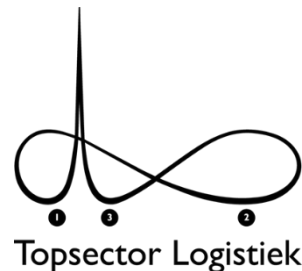
Agenda for today

13:00 – 13:15	Opening
13:15 – 13:30	Arnout Oosterhof (Loodswezen)
13:30 – 15:30	Workshop:

- *13:30 – 13:45* ▪ *Explanation planning process challenges*
- *13:45 – 14:30* ▪ *Demo by Ben Vermeulen/Jelmen Grundel*
- *14:30 – 14:45* ▪ *Coffee break*
- *14:45 – 15:30* ▪ *Discussion*

15:30 – 16:30	Guided tour (in two groups)
16:30 – 17:00	Closing event

Introduction Loodswezen

By: Willem Bentinck

Gordian Logistic Experts bv

Workshop "Synchronization operations, maintenance and spare planning"
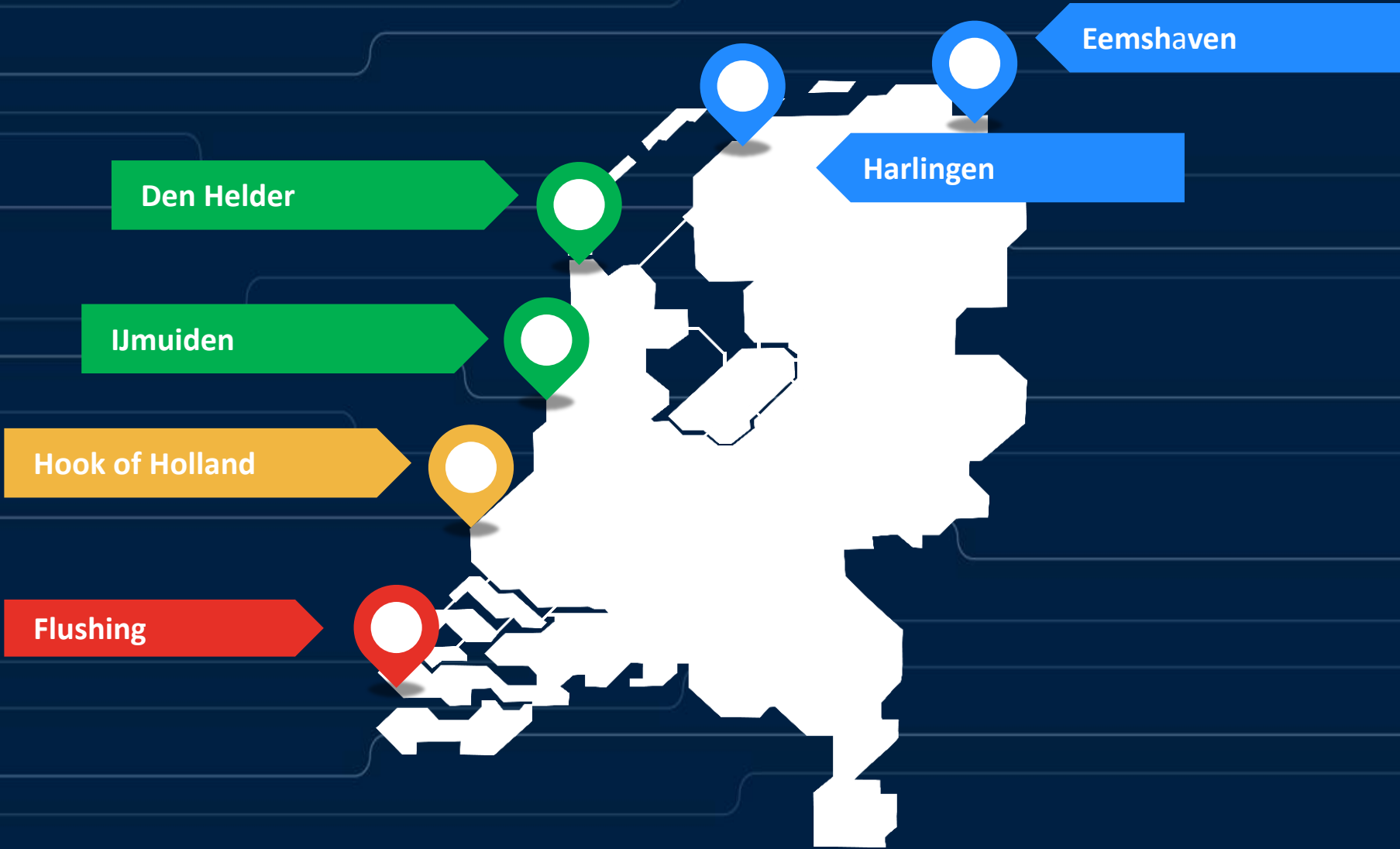
Arnout Oosterhof

Loodswezen

Equipment

3 Pilot Station Vessels, 18 Tenders (4 different types), 2 Swaths, 8 Fast Launch Craft.

Loodswezen

Ports of operation of our tender-fleet

Eemshaven

Harlingen

Den Helder

IJmuiden

Hook of Holland

Flushing

Loodswezen

Goals for today

Get a better understanding of the planning process

Pinpoint challenges and room for improvement
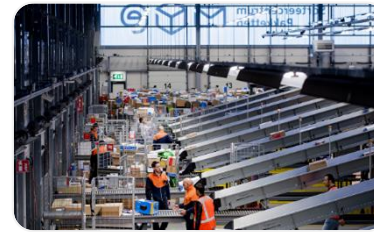
Assess the potential for presented application

The project

Project funders

Develop basic demonstrator

Run pilots at companies

Loodswezen

postnl

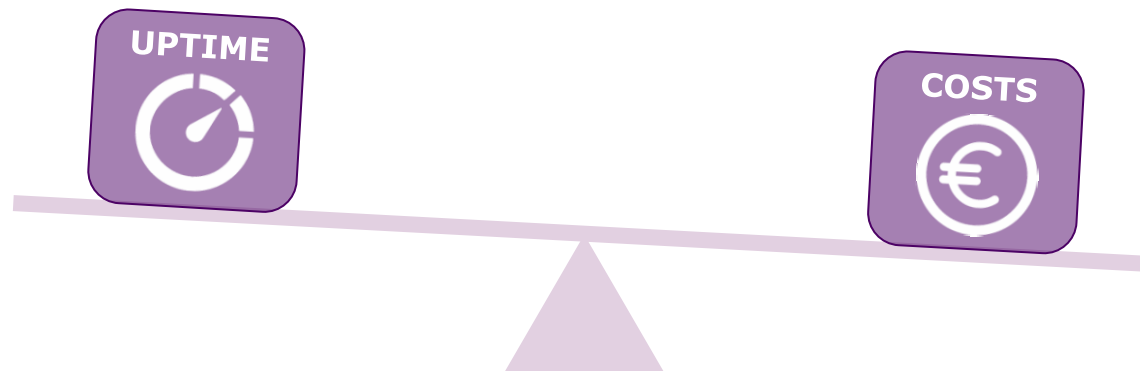Develop advanced demonstrator

January   February   March
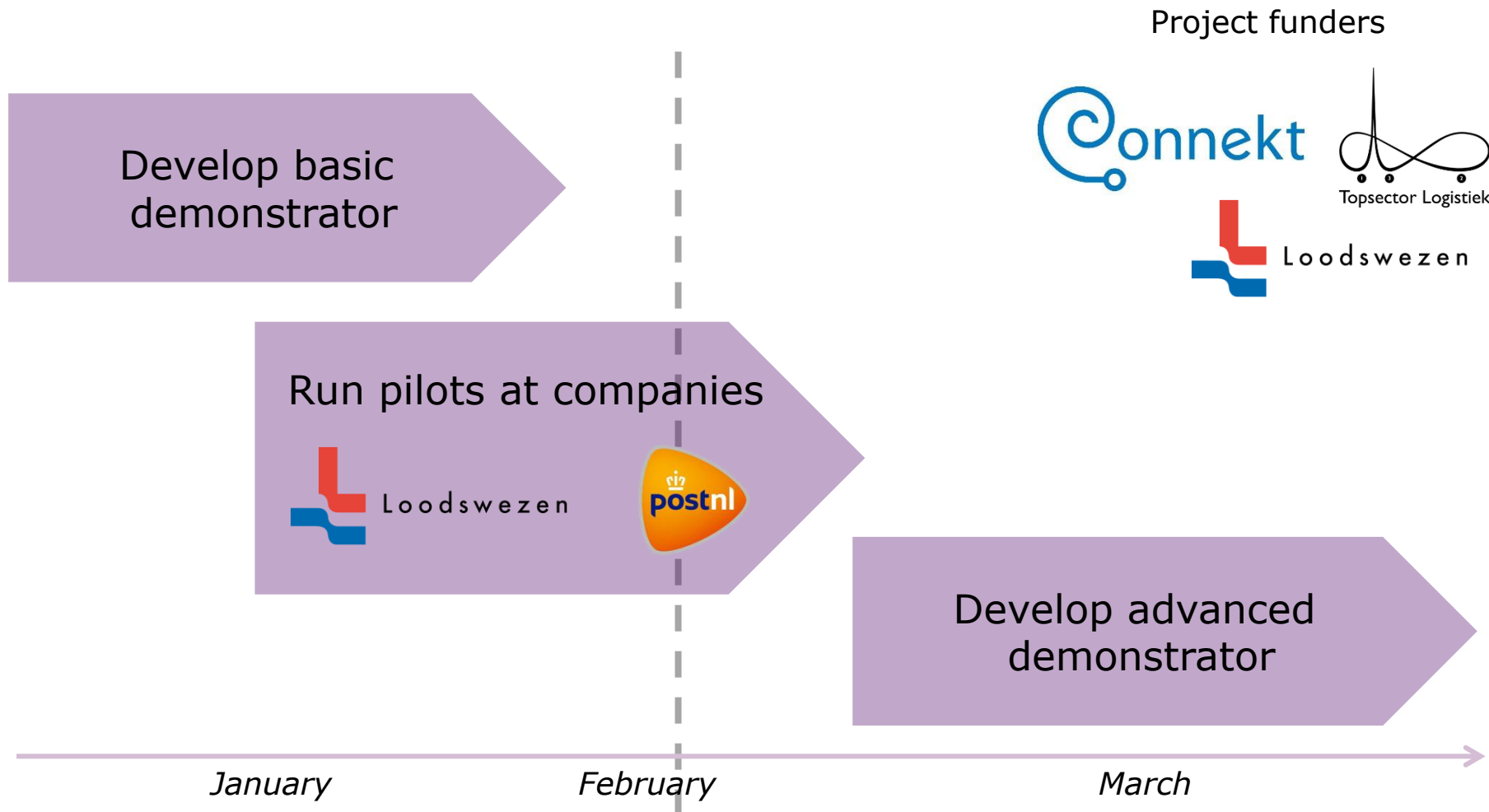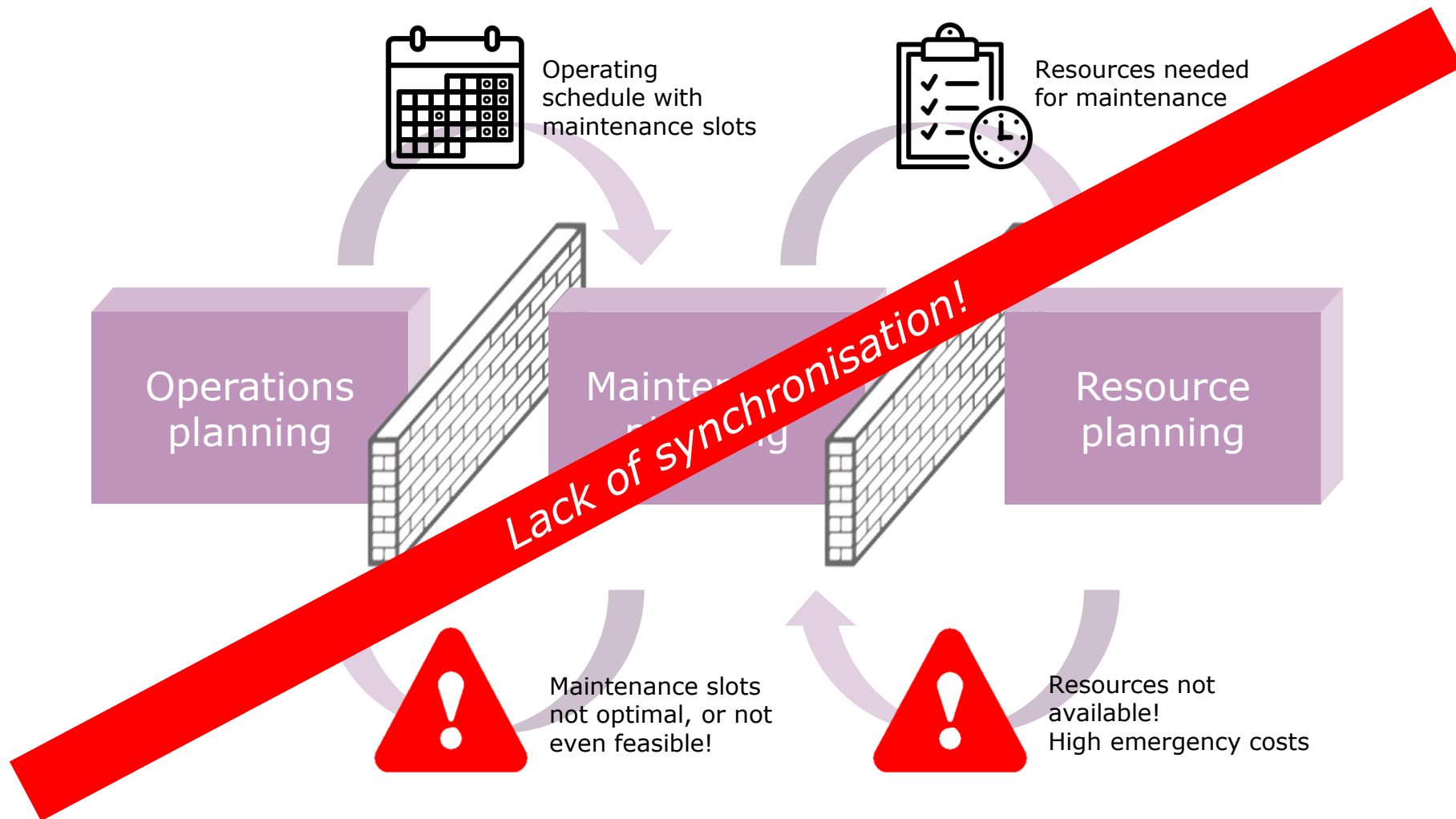
The 'arena'

We have a pool of assets…

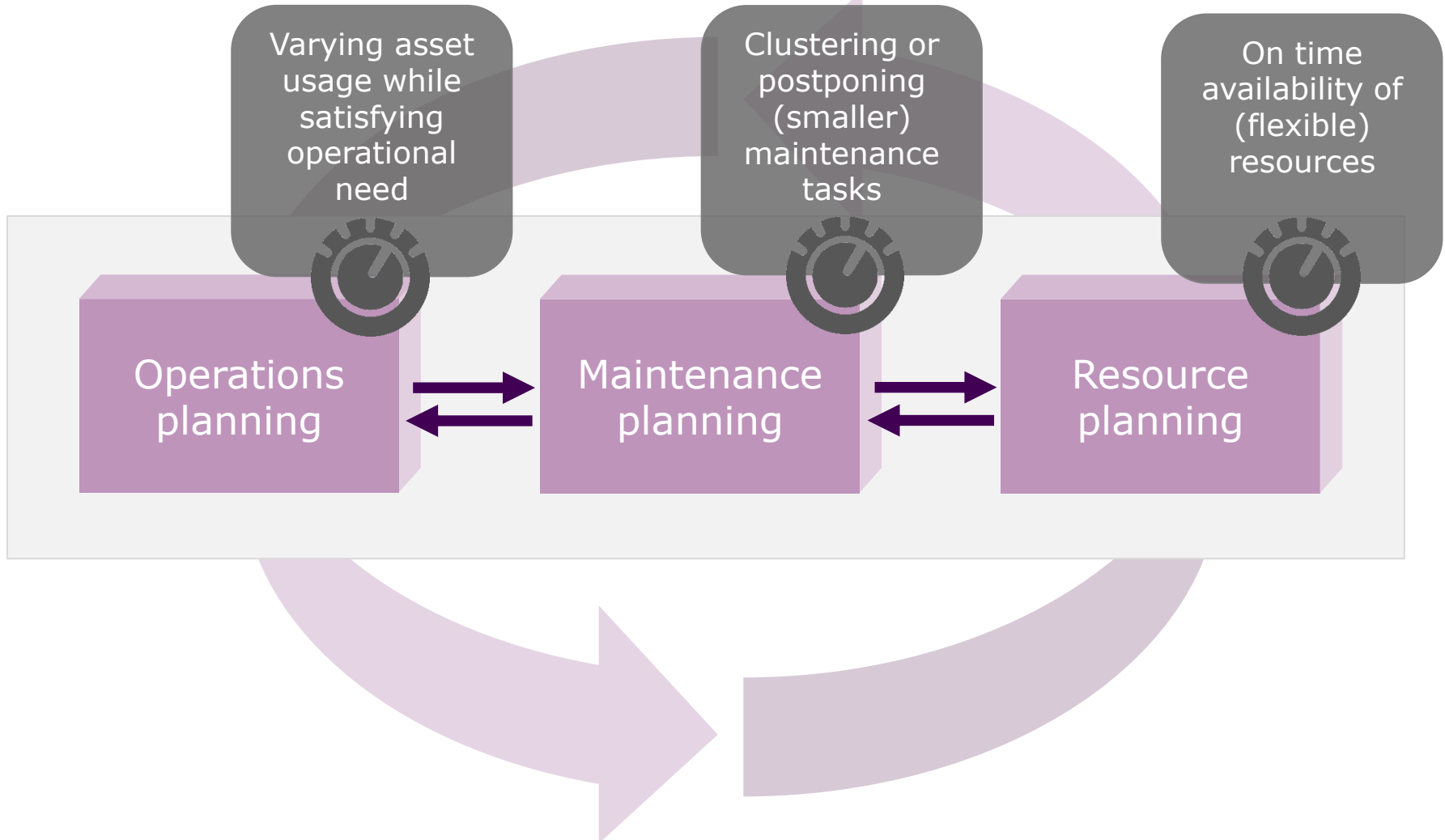That need to operate according to a certain desired operating schedule against the lowest possible cost of ownership
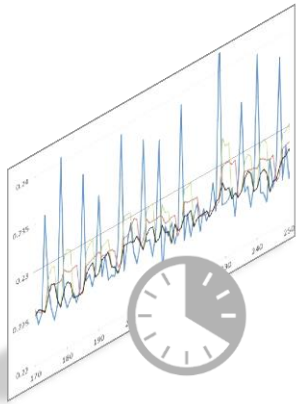
From seperate worlds...

Operating schedule with maintenance slots

Resources needed for maintenance

Operations planning

Maintenance planning

Resource planning

Lack of synchronisation!

Maintenance slots not optimal, or not even feasible!

Resources not available! High emergency costs

Towards synchronisation...

Varying asset usage while satisfying operational need

Clustering or postponing (smaller) maintenance tasks

On time availability of (flexible) resources

Operations planning
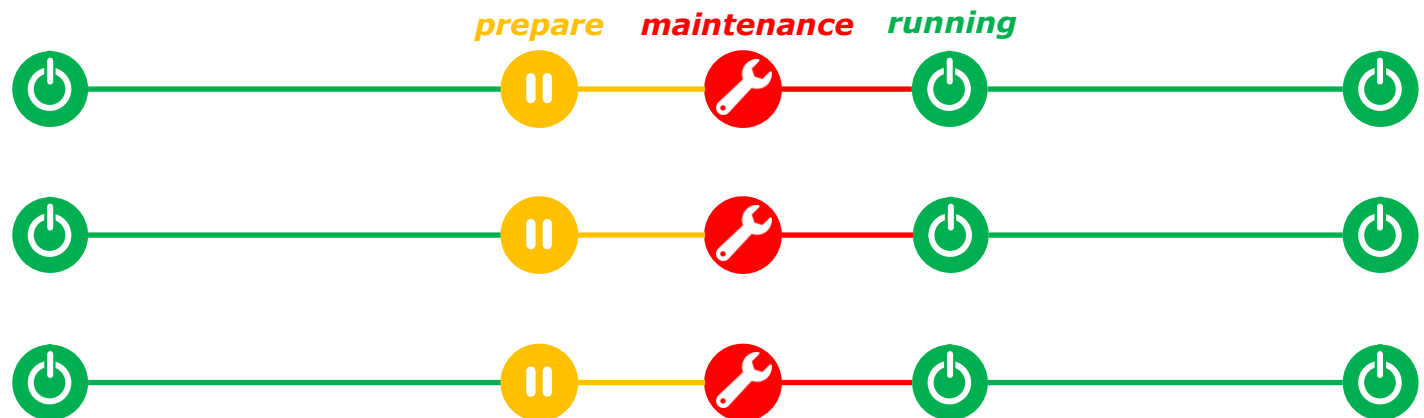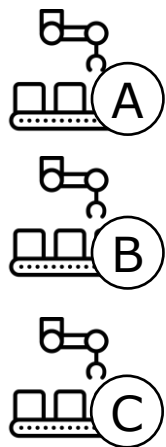
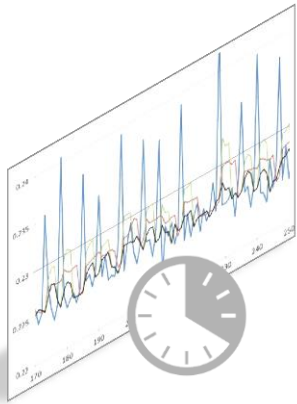Maintenance planning

Resource planning

But how?

The maintenance of a pool of assets (say A, B, and C) is subject to usage based maintenance with drivers e.g.:

- Operating hours
- Fuel consumption
- …

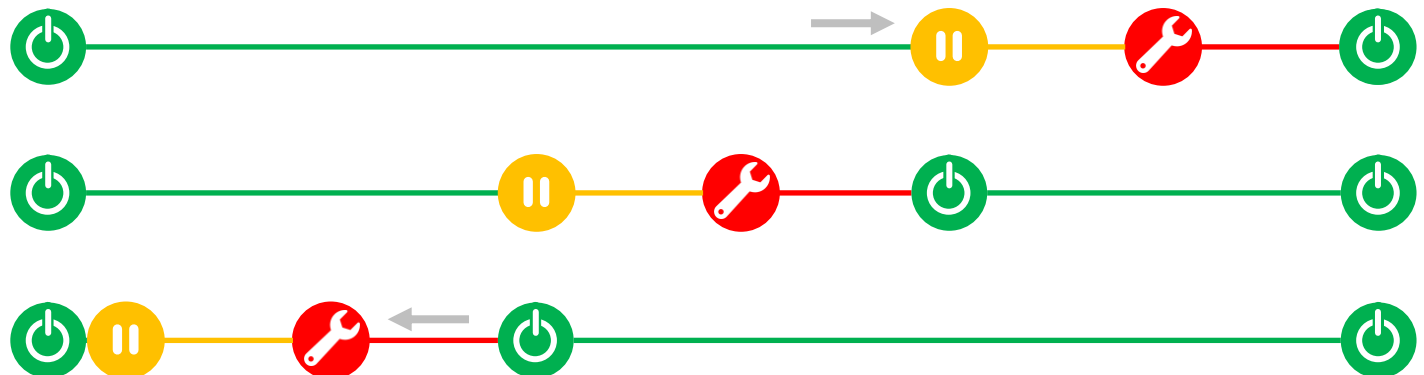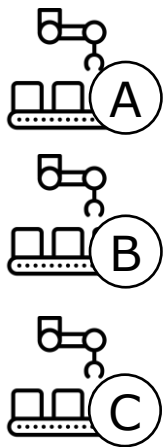*prepare* *maintenance* *running*

A

B

C

But how?

Using these drivers, we can shift maintenance towards more cost efficient moments in time, while still satisfying the required operating schedule

For example, by staggering maintenance (often used in practice). The effect of this on operations and resources planning is directly visible.
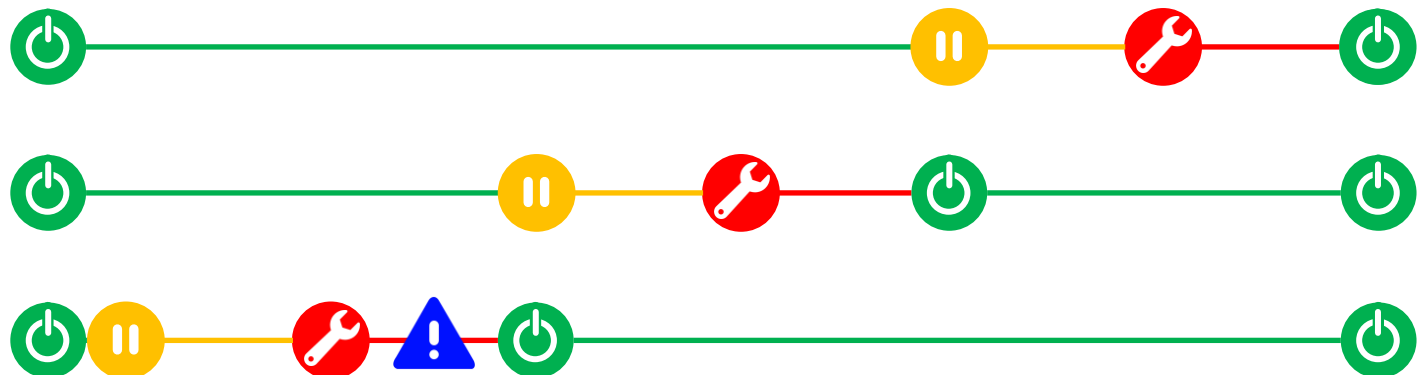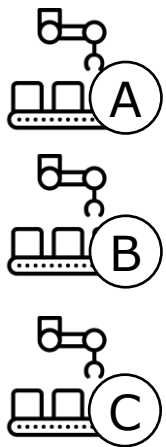
But how?

But still, unavailability of resources may require rescheduling of maintenance tasks.

For example, a consumable part is not available on time for maintenance on asset C.
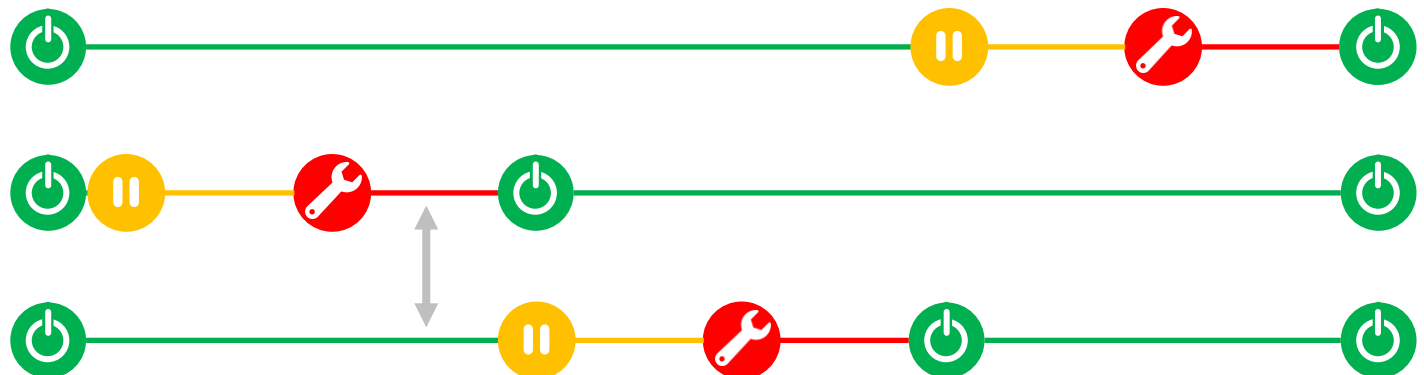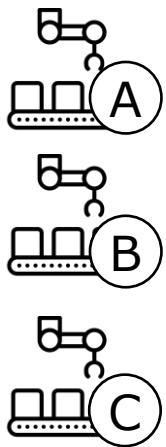
Consumables

Part not available!

But how?

But still, unavailability of resources may require rescheduling of maintenance tasks.

Solution? Switch maintance tasks when maintenance on B requires different parts. Therefore the part required on C can be ordered and received in time!

Consumables

*Note: consumables required **after the lead time** can always be ordered in time!*

But how?

In case of repairables we need to check if a repaired part is available from stock on time in full, that is: a defect part needs to be available in time for repair!

Repairables

repair time

No defect part available!

Repaired part needed

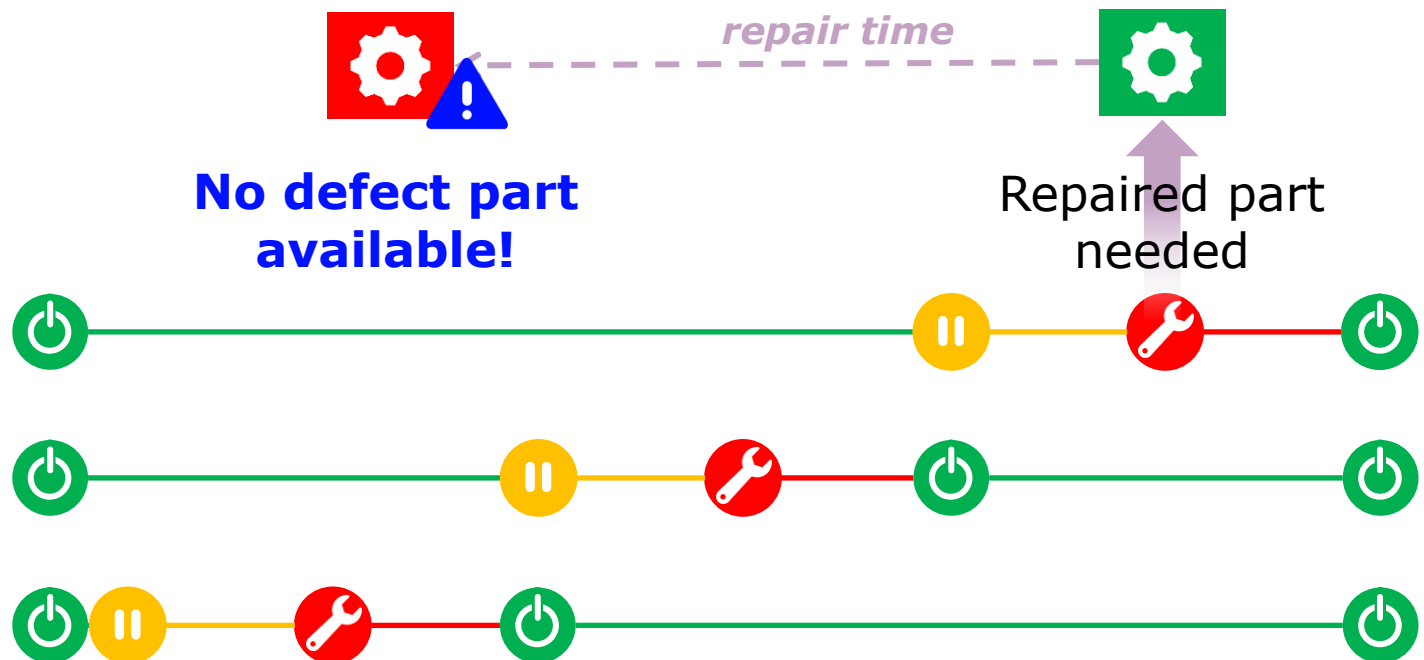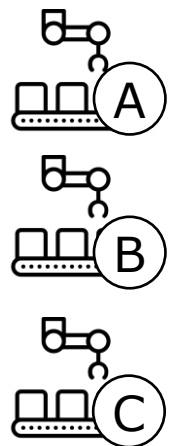*Note: for repairables, availability **after the repair lead time** is not obvious!*

But how?

In case of repairables we need to check if a repaired part is available from stock on time in full, that is: a defect part needs to be available in time for repair!

Solution? We have three options:
1. *Increase turn around stock to increase long-term availability*
2. *On time notification to repair shops for emergency repair*
3. *Combination of the above*

Repairables
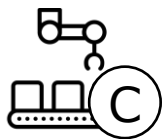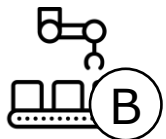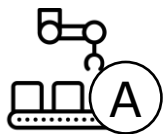
But how?

The synchronisation between operations, maintenance and resources results in an operationg schedule with a cost efficient maintenance planning for which resources are available

The applications and their use

Operations planning

Maintenance planning

Spare parts planning

STORM
Trade-off downtime and maintenance (set-up) costs, under time-phased availability (0/1) of spares

Spare Parts Management Studio
Trade-off spares availability and costs

Tactical

- Define operating schedule
- Schedule mid-term asset and rotables usage
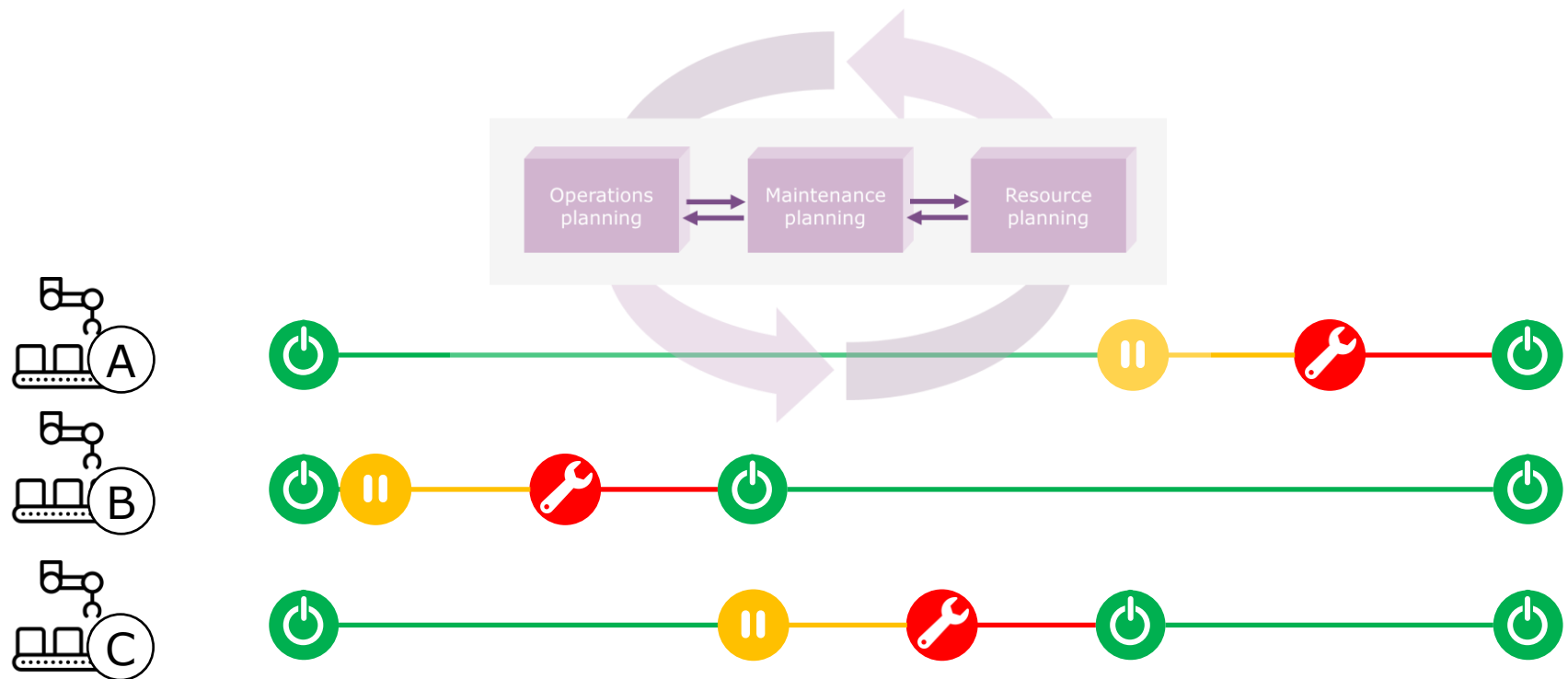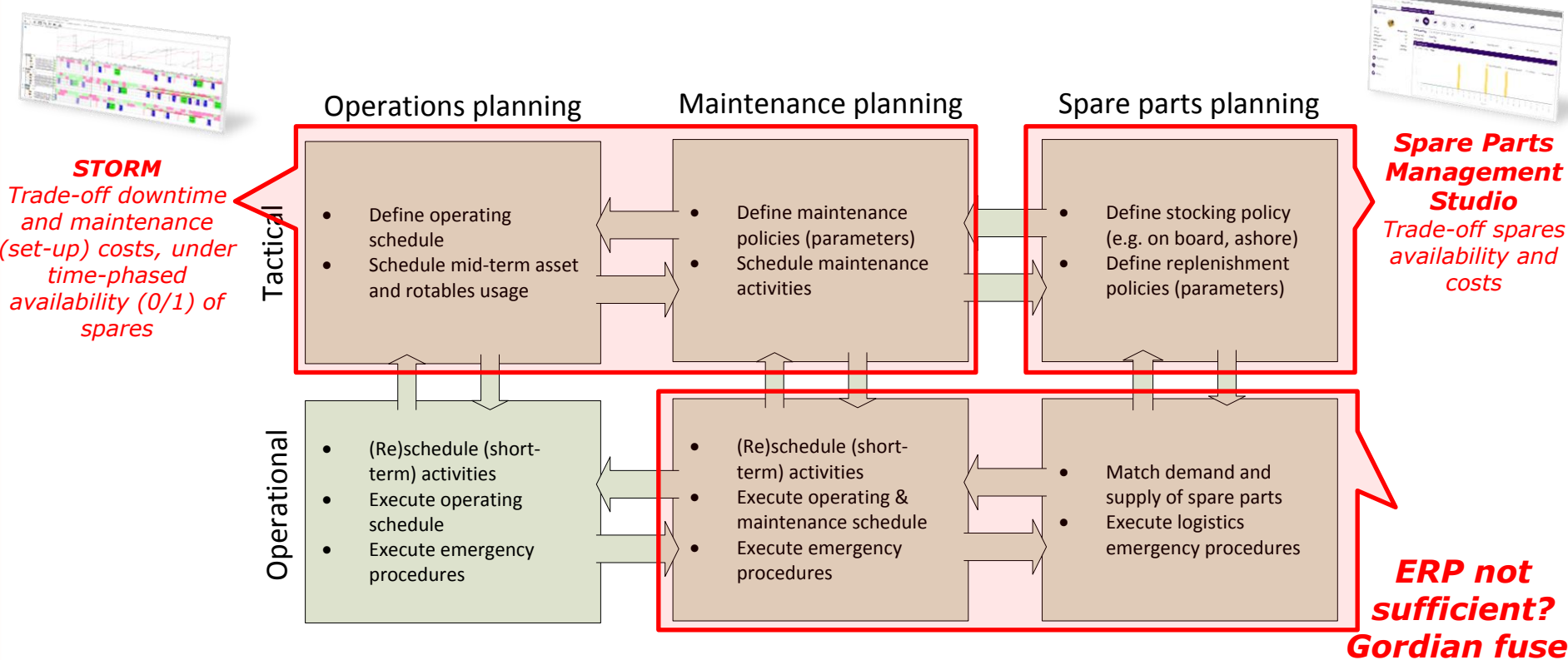
- Define maintenance policies (parameters)
- Schedule maintenance activities

- Define stocking policy (e.g. on board, ashore)
- Define replenishment policies (parameters)

Operational

- (Re)schedule (short-term) activities
- Execute operating schedule
- Execute emergency procedures

- (Re)schedule (short-term) activities
- Execute operating & maintenance schedule
- Execute emergency procedures

- Match demand and supply of spare parts
- Execute logistics emergency procedures

ERP not sufficient? Gordian fuse!

Demo

Demonstration by Ben Vermeulen/Jelmen Grundel

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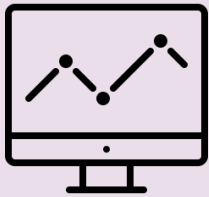
To summarize...

What is the value add?
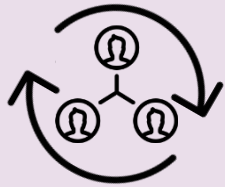
Integrated dynamic planning of operations, maintenance and resources with direct feedback on total cost and feasibility (simulation)

Incorporating data-driven maintenance and resource forecasting in planning process

Optimisation of operations, maintenance, and resource planning in terms of TCO and asset availability

What's next?

Develop advanced demonstrator

- Incorporate advantage of clustering small maintenance tasks within given maintenance periods
- Optimise asset operating schedule

Future?

Marconi!

Developments/application in other markets?!

February | March | April | Future...

Plenary discussion

You have received three coloured cards that we request you to use to answer the following questions.

Note: be prepared for the "Why?" question!

Question 1.

In which setting do you expect the largest value add of the decision support software (to reduce costs/increase asset availability)?

**Large fleet size
(>50 assets)**

**Moderate fleet size
(10-20 assets)**

**Small fleet size
(1-3 assets)**

Question 2.

In which setting do you expect the largest value add of the decision support software (to reduce costs/increase asset availability)?

Asset use is based on a stable operations planning *(e.g. time tables)*

Asset use is based on individual project needs
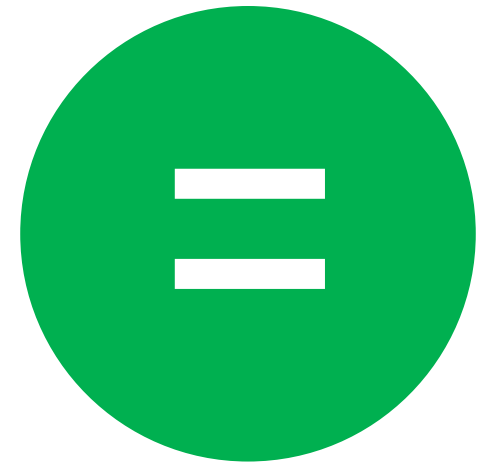
Combination of both

Question 3.

In which setting do you expect the largest value add of the decision support software (to reduce costs/increase asset availability)?

Maintenance and resource supply is done by asset user

Maintenance and resource supply is done by a third party

Both have equal potential

Question 4.

The use of the decision support software to integrate which decisions is most relevant for your company?

Integration of maintenance with operations planning (asset use)

Integration of maintenance with spare parts planning

Both are equally (un)important

Question 5.

Choose the answer that best fits to the following statement: *our company needs decision support like demonstrated today.*

Integrated planning is most probably not beneficial for us (what is missing?)

We already have an ERP-system or add-on to support this

We definitely need decision support software like this!

Plenary discussion

Please feel free to share ideas/suggestions with us!

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