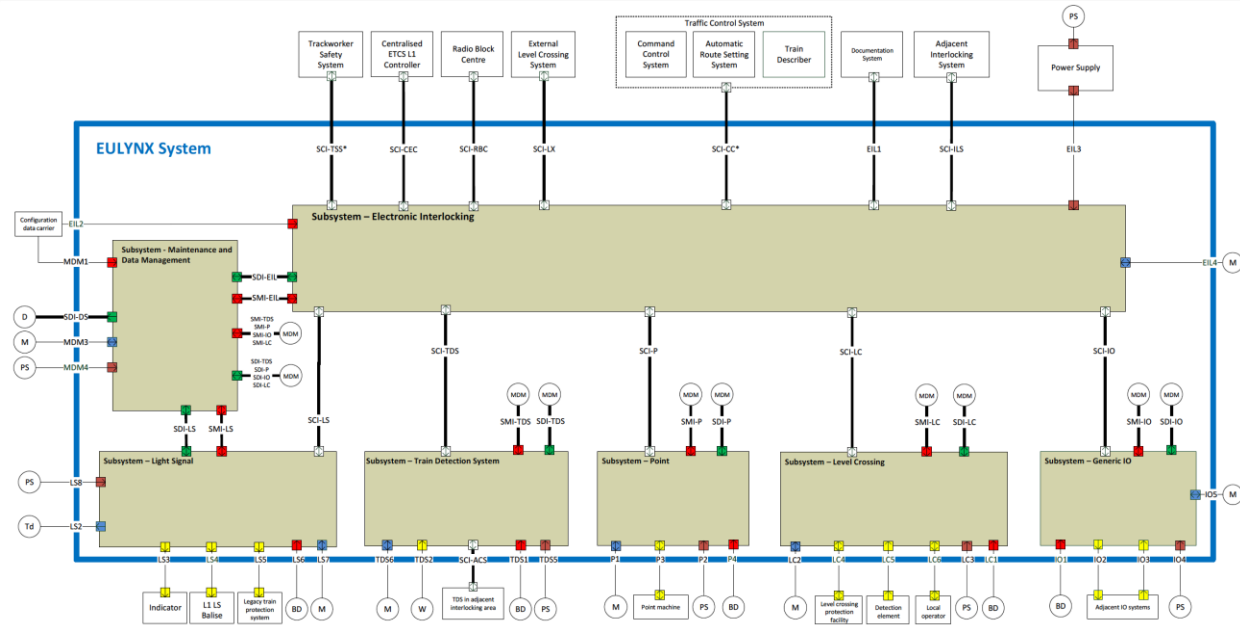


MBSE applied for the EULYNX-NL system architecture *dd. 2021-04-16*





WHY THIS PROJECT

Reasoning behind the project

- Rail infrastructure assets in Netherlands
 - Managed & operated by ProRail
 - Few components originate from the early 20th century
 - ‘Marshall Plan’ resulted in wide spread US-based wired concepts in the rail infrastructure that are still applied
 - Copper theft is a real threat to safe and continuous operation
- EULYNX is aiming for an IP based control system
- Reference: EULYNX B3R5
 - The European Union has defined this EULYNX version, for synchronized definition of rail control systems in countries.
- EULYNX was defined using MBSE methods. ProRail uses this project as an experiment to apply MBSE to model the architecture of the EULYNX-NL safety systems.

Tooling to model EULYNX-NL

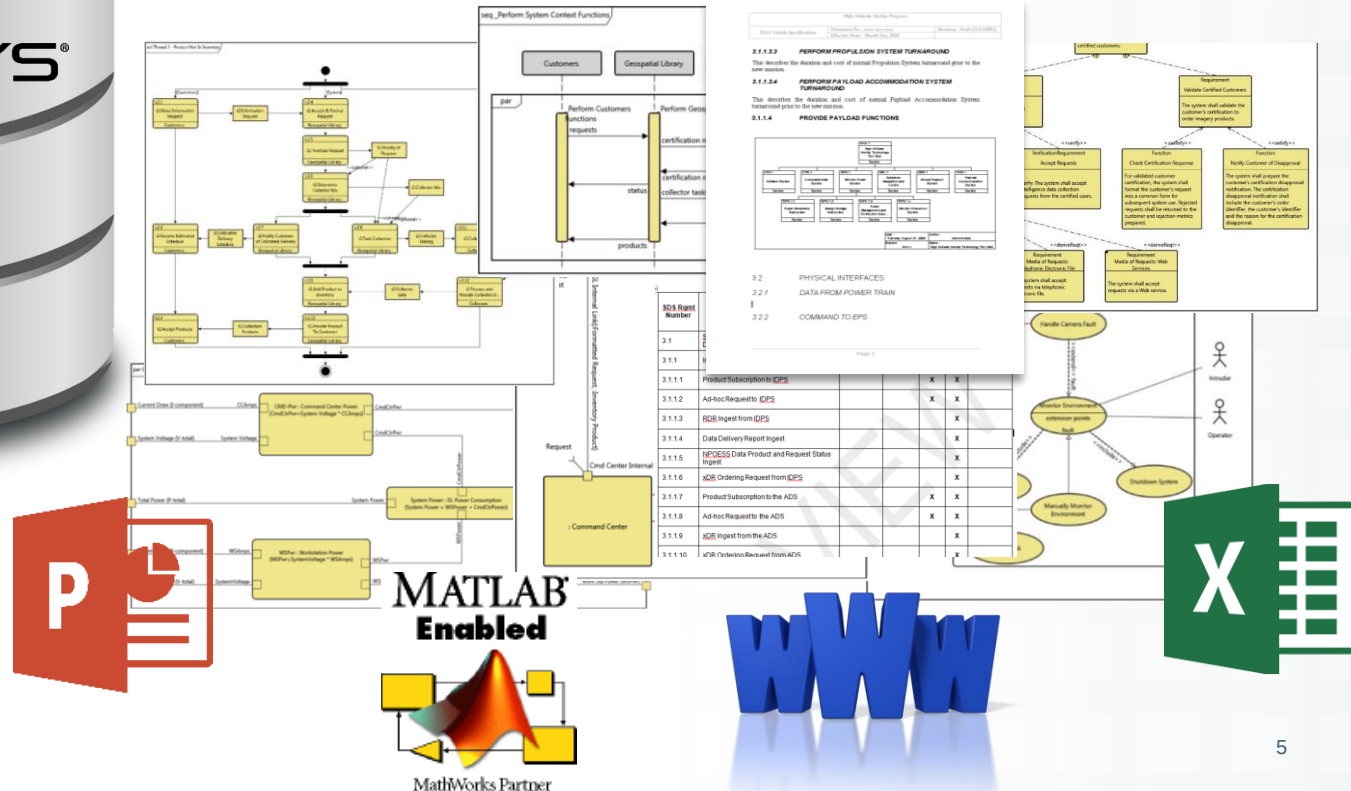
- At EU level, PTC software was used to model EULYNX
- In this presentation we use Vitech Genesys as MBSE tool for modelling the EULYNX-NL system architecture

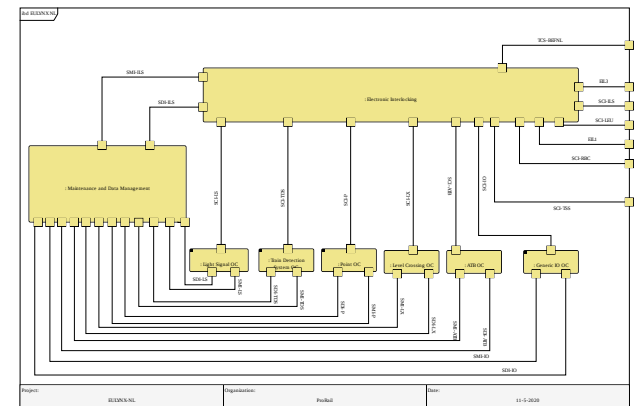


The Power of GENESYS

Capture the what and why of design

Visualize your information your way



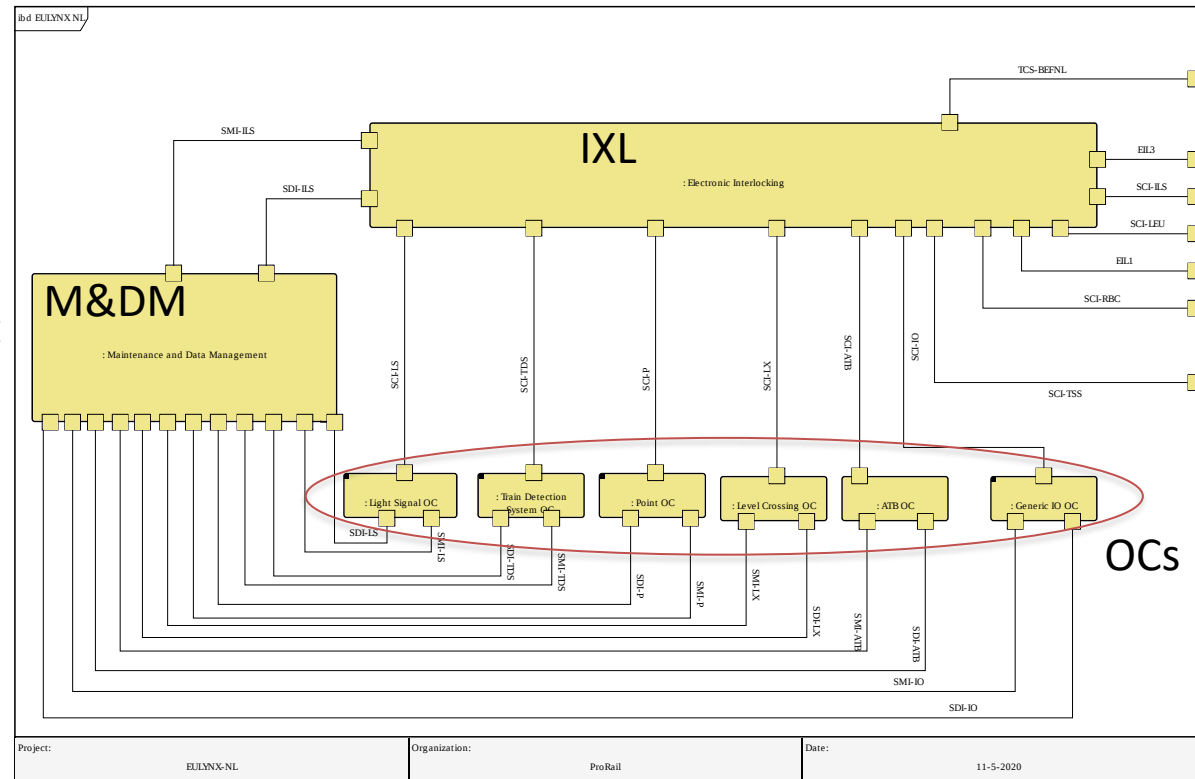


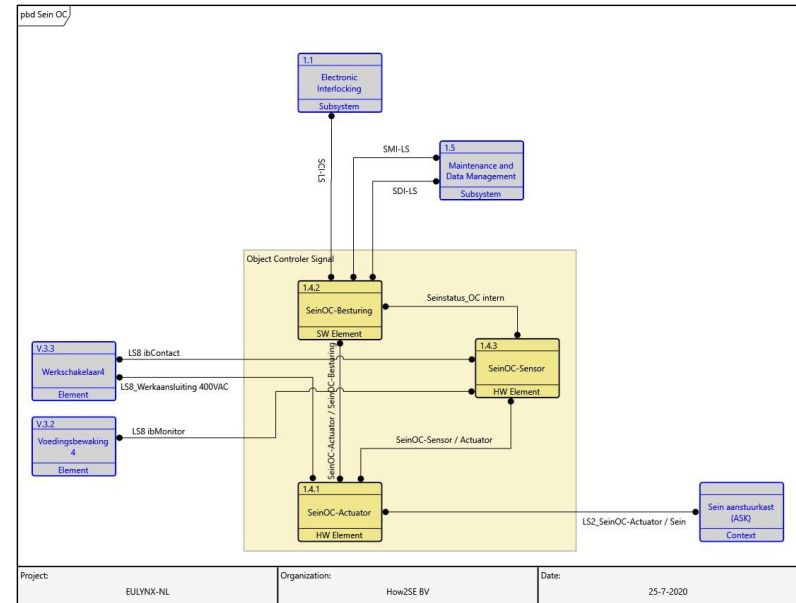
EULYNX-NL SYSTEM ARCHITECTURE

EULYNX-NL Concept

The concept is similar to the EULYNX architecture.

- The Interlocking (IXL) is the 'router' between the Traffic Control and the Object Controllers for each type of asset
- The Maintenance and Data Management Block is keeping track of all type and health data of each asset
- 6 Object controllers for each type of asset: Light signal, Level crossing, Point, Train detection, Classic Train Safety system and Generic IO

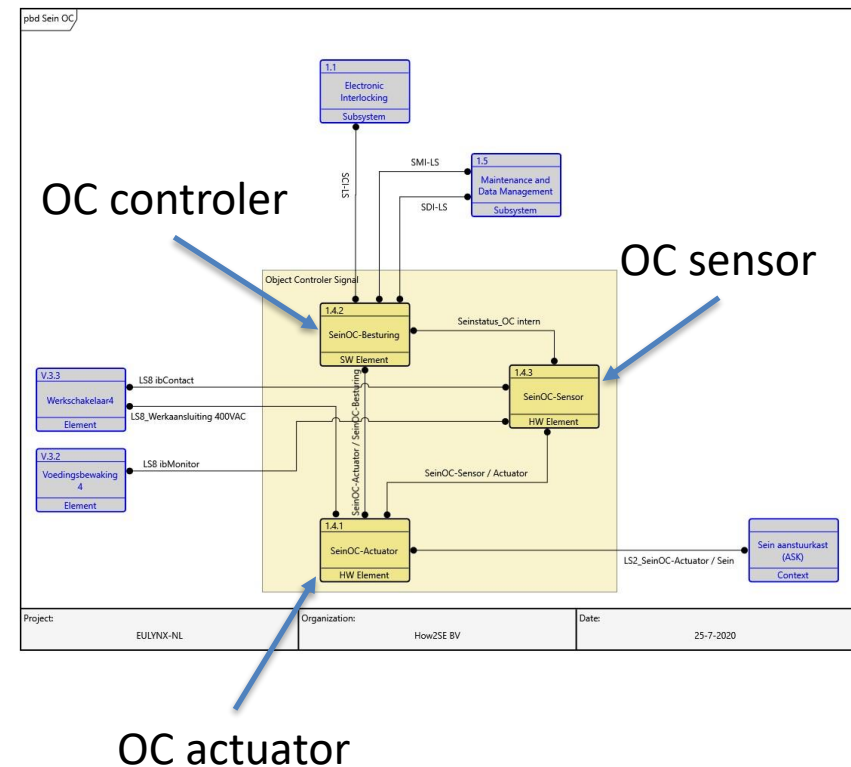




GENERIC SETUP FOR DE OCs

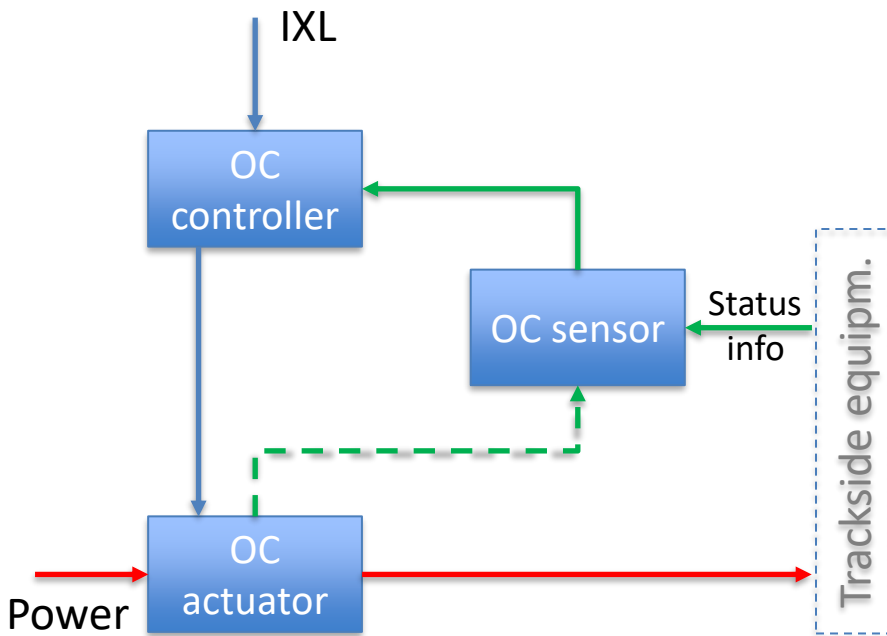
Charakteristics of generic OC

- Generic OC (Patterns)
 - OC controller
 - Digital connection to the interlocking
 - The controller's hart for distributing the OC functions
 - OC actuator
 - “A/D converter” for controlling the track-side equipment
 - Control by means of power supply for the rail infra or by digital control.
 - OC sensor
 - A/D converter for return signal to the controller
 - Receives status info from the infra
 - Optional status info from Actuator

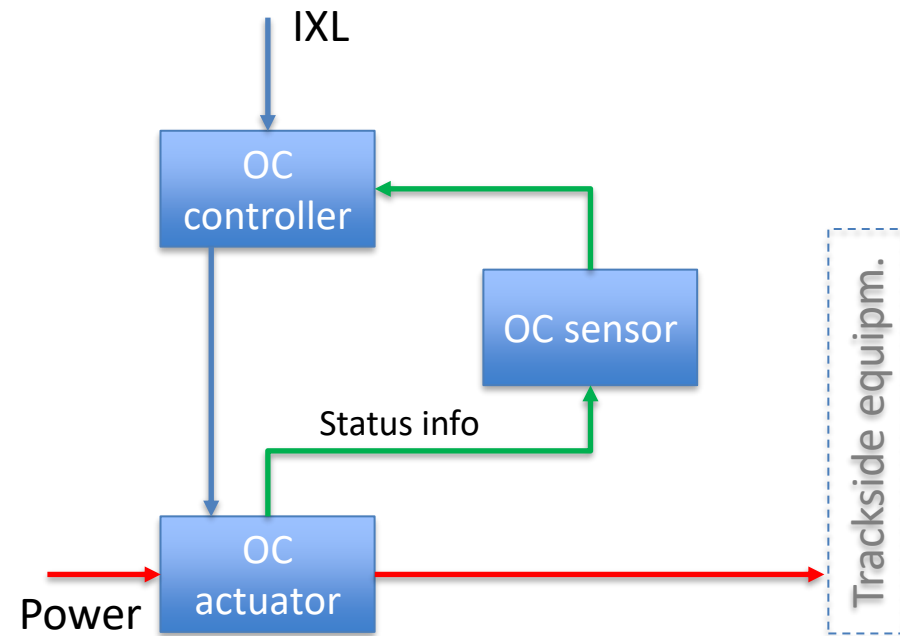


OC main variants

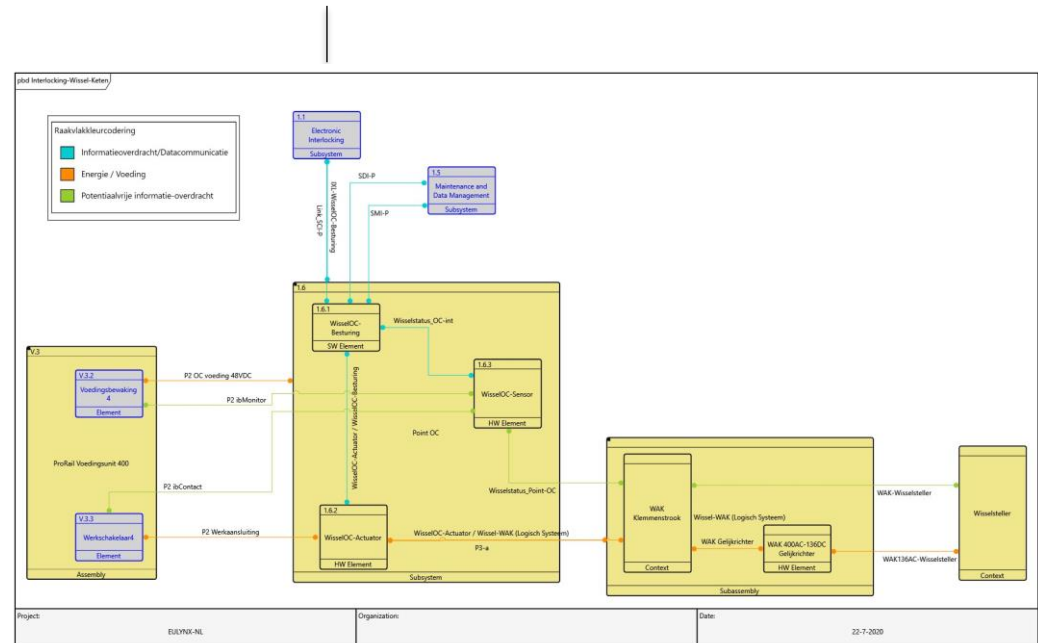
Active feedback sensor



Passive feedback sensor



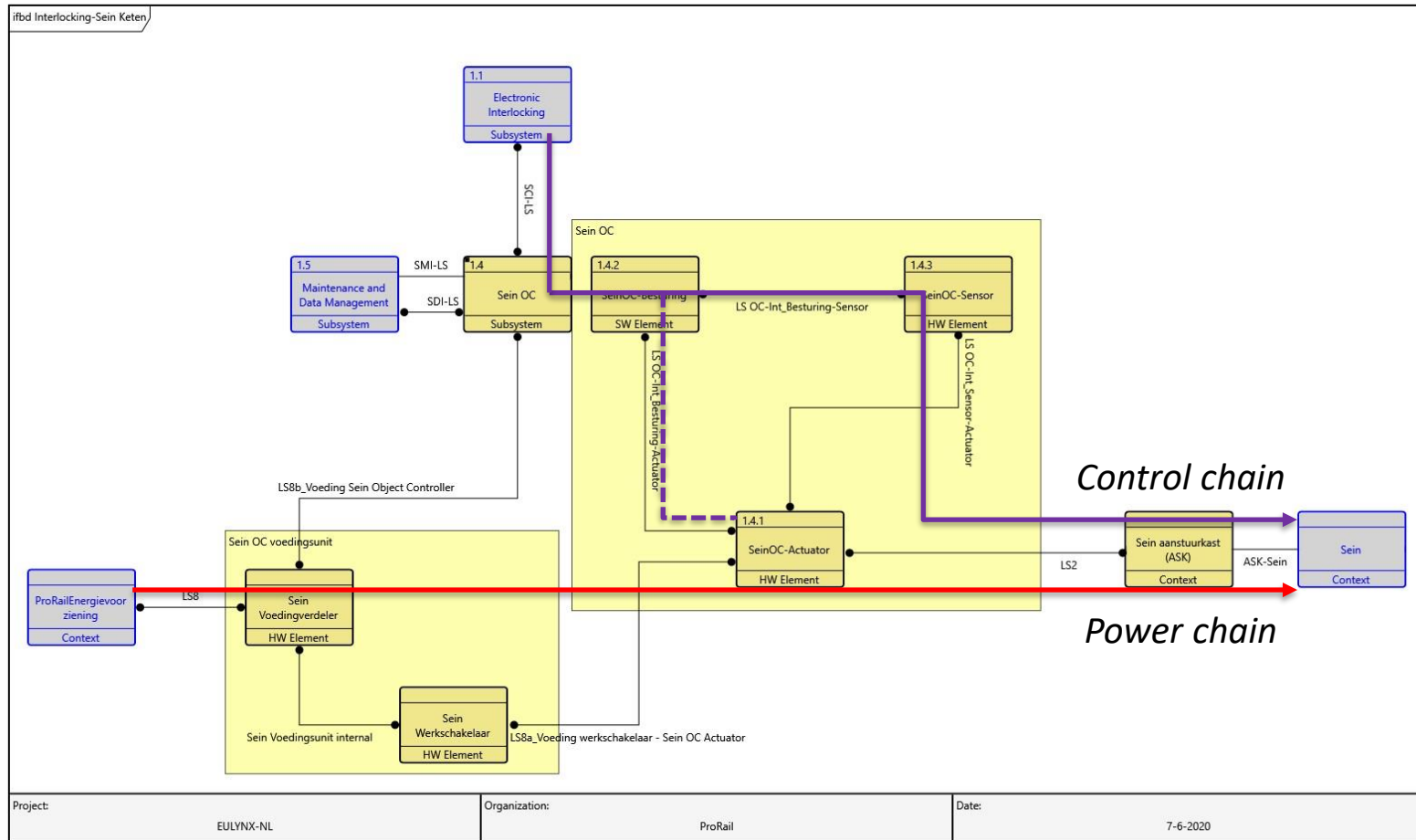
CHAINS



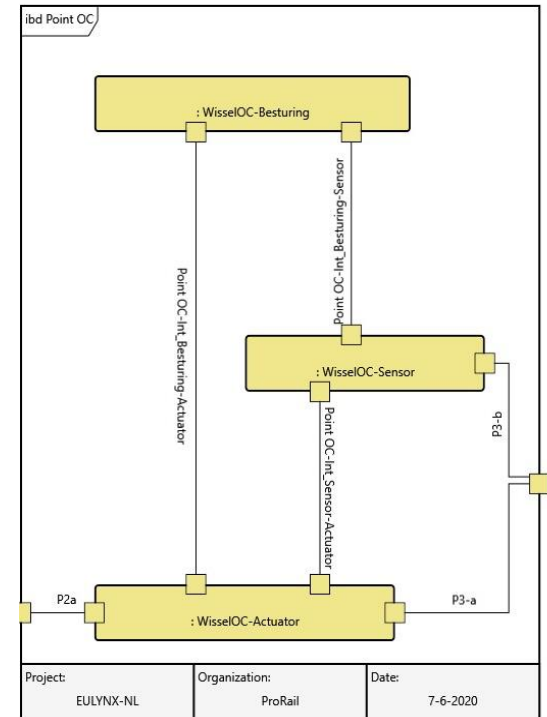
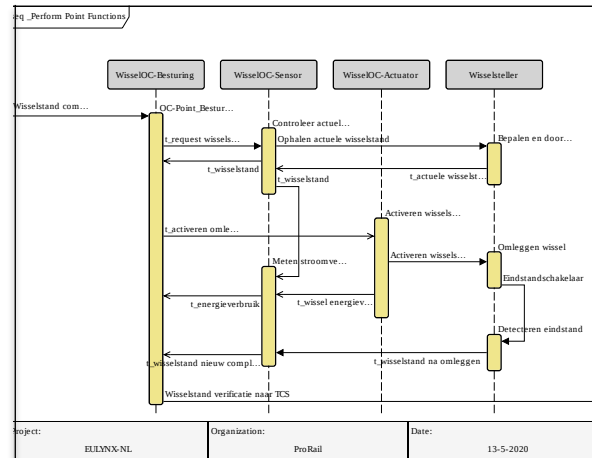
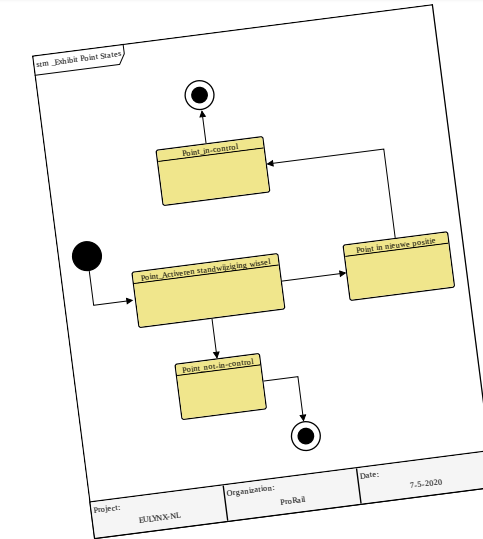
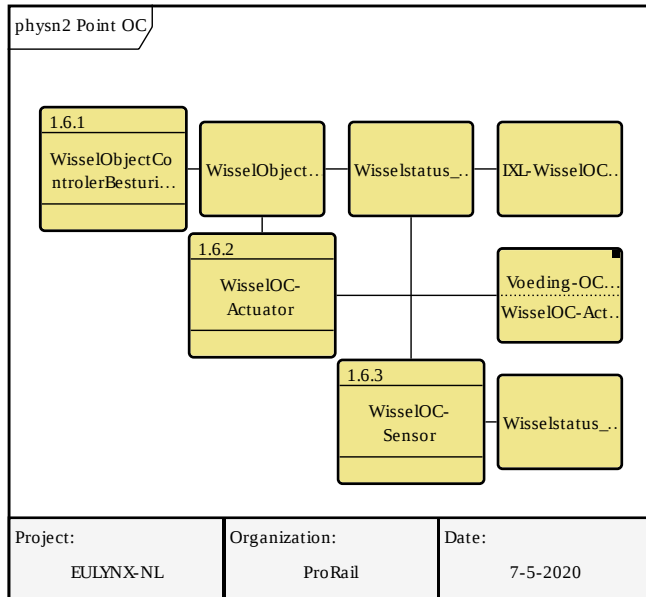
‘Chains’ in the architecture

- Purpose of the chains
 - To illustrate the chain of components related to the key function per OC:
 - Control chain (Traffic control - trackside equipment)
 - Power chain (Power supply - trackside equipment)
- Serves as a cross-section of the system, related to a key trackside equipment functions

Chain: Signal



Other types of relevant views





RESULTS FROM THE MODELING EFFORT

Results

- Consistent information set about EULYNX-NL
- Modeling helped understand the integrated relation with the existing assets
 - First MBSE modeling effort related to safety assets
 - Models created linking pin between EULYNX and assets
 - The chains appealed very much to org. management
 - The modeling exposed omissions in the EU based models
- Basis generated for subcontracting OC design
- Publication 2021Q3 in EU based signaling magazine

Thank you!

transparant en gestructureerd creëren

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