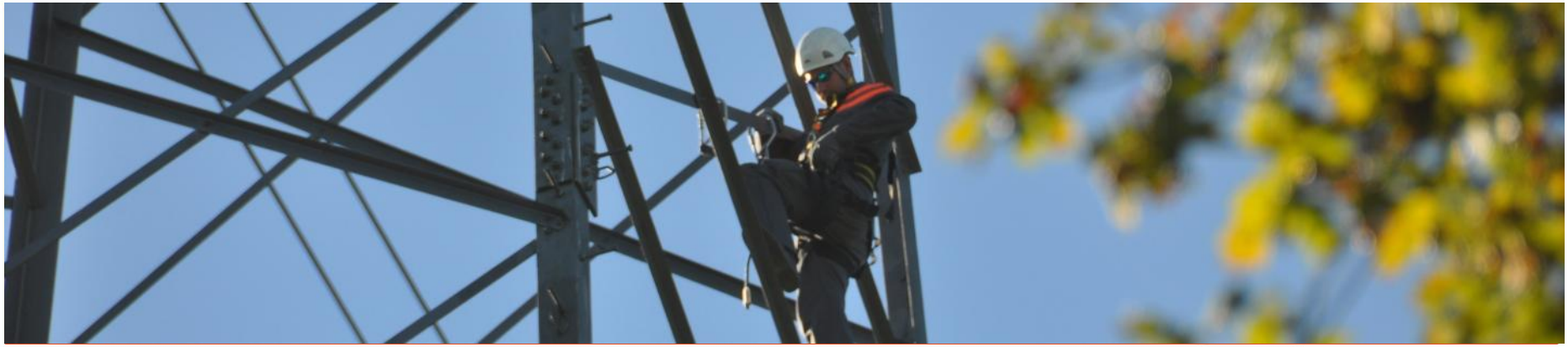


Asset Control Concept

Using Grid Data to empower end to end Asset Health Management

This presentation is intellectual property of Elia NV

Overview

- Introduction Elia
- Our asset management challenges today and tomorrow
- Our approach - solution
- How ACC contributes in facing our challenges
- The role of Osisoft Pi
- Examples

Introducing Elia

Elia Group : profile

Two major TSO‘s

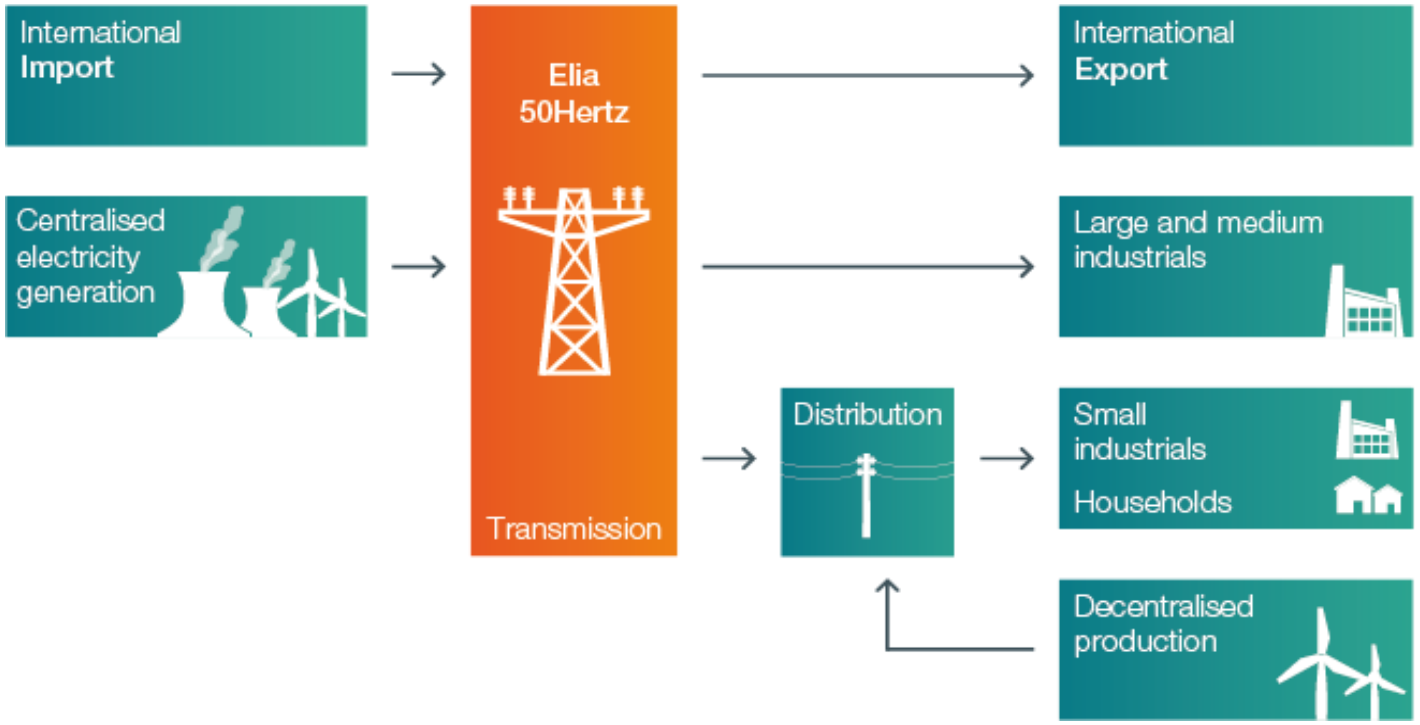
- Belgium: Elia Transmission
- Germany: 50Hertz Transmission

Top 5 in Europe

- Certified as **fully unbundled** TSO‘s
- **Operate independently** from electricity generators & suppliers

Elia Group ensures supply of electricity to **30 million people** in Belgium and Germany.

Elia Group: a reliable player in the electricity system



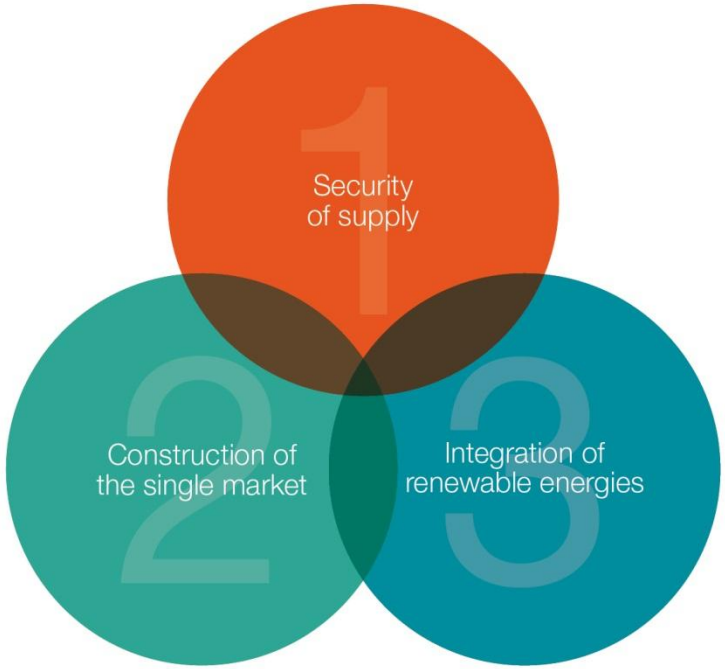
Elia Group is the vital link between electricity producers and consumers.

TNB‘s play a key role in the Energy Revolution

3 activities

- **Infrastructure Management**
- **System operation**
- **Market facilitation**

3 challenges



Elia : high voltage transmission system operator

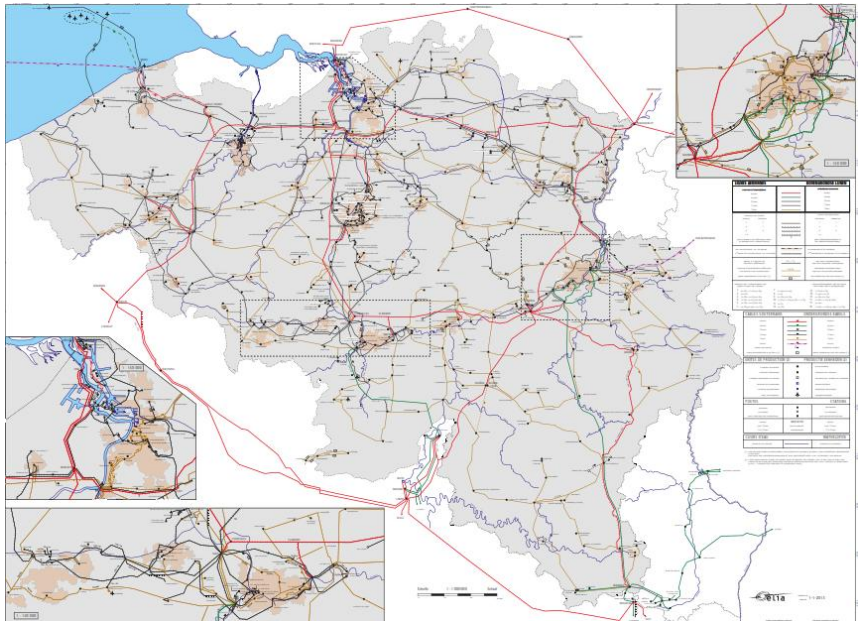
800
high voltage substations

30.000
À / TOT
380.000

22.000
pylons

5.560
km overhead lines

2.800
km underground cables

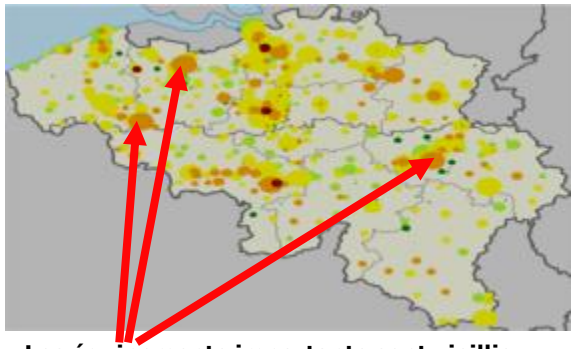


Elia is Belgium's
high-voltage transmission system operator (30 kV to 380 kV),
operating **over 8,400 km** of lines and underground cables

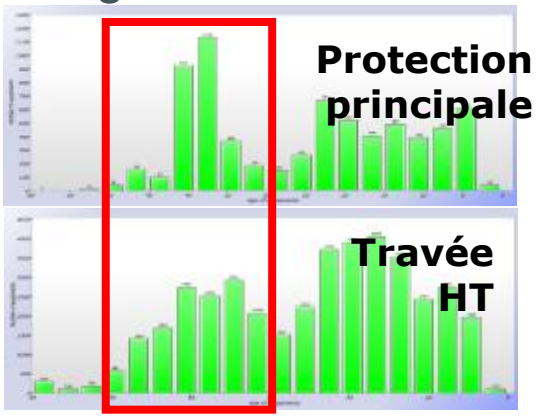
Our asset management challenges of tomorrow

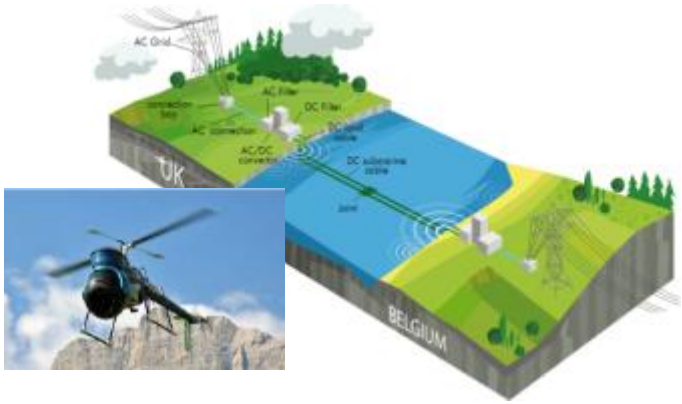
Background

Future challenges for management of assets



Les équipements importants sont vieillis



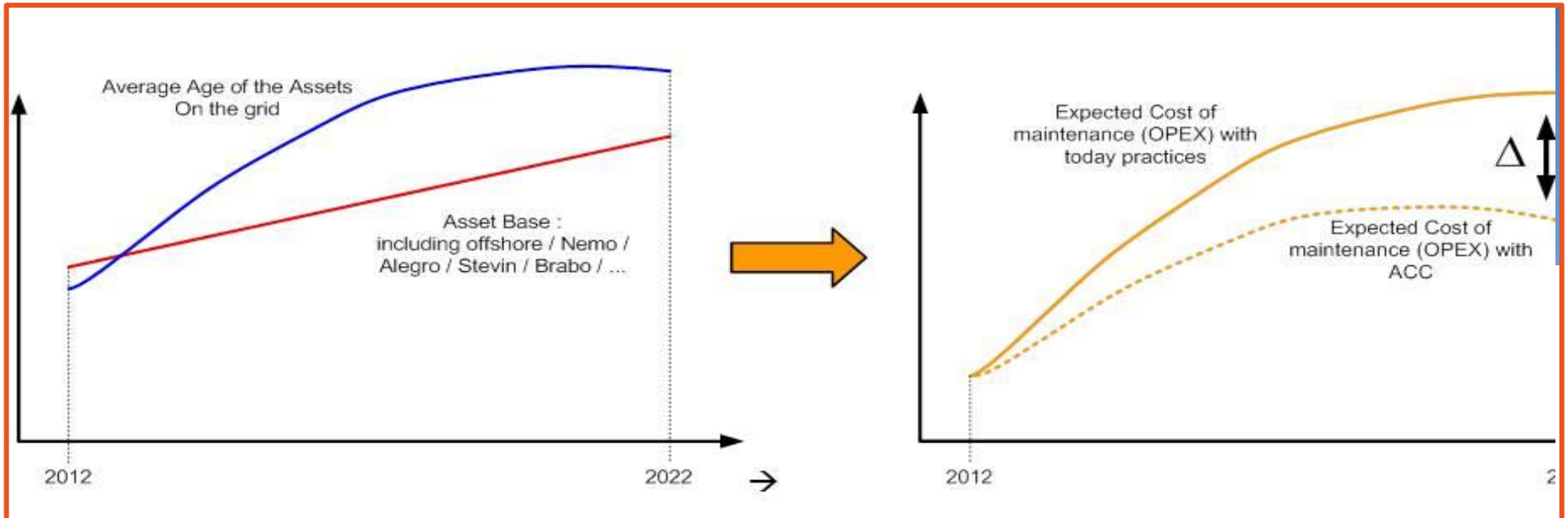


Aging Assets (risks):

- Specific knowledge & competences
- Actions to extend their lifetime
- Regulatory framework Y2

New Technologies

- Learn new technologies (25%)
- Apply new working methods (75%)



Background
Future challenges for management of assets

- Legal / enviromental obligations
  - New regulation concerning DV switching duration – to be monitored once a year
  - New regulation concerning SF6 losses
  - ACC will offer possibilities to reduce imposed operational costs for extra monitoring/measurements imposed by the government

Asset Risk vs Grid Risk

- Better decision support
  - More details of the actual state of the (families of) assets will provide better input for replacement and maintenance policies
- Market evolution
  - IED's, broadband networks, substation automation, … are becoming more and more reliable. International standards are taking form and these technologies are more and more de-facto included in new equipments by our regular suppliers
  - In the market survey a number of suppliers are offering ACC services to other TSO's or starting up business lines to do so, indicating there is a demand for these activities
  - …

How ACC can help us to face our challenges?

ACC definition

ACC will make a contribution towards the challenges of tomorrow

- **Follow « the real age » of an high voltage equipment**
  - Review replacement policies in function of the history of an equipment instead of the theoretical age
- **Condition based monitoring: schedule maintenance based upon measures instead of time based maintenance**
  - Maintenance based upon a number of switches, current values, temperature, gas quality,…
- **Automatic warnings**
  - Real-time « Health » dispatching : for High
  - Voltage equipment's
  - Automatic warnings in case of problems
  - Automatic fault location
  - Supervision of IED's

Timeframes:
- Just after incident
- Short term forecasting
- Condition based maintenance
- Long term experience feedback

- **Mandatory, due to necessary remote management of BOG and Stevin (TBD how ACC should be linked with Nemo en Alegro)**

Our approach/solution

Goal of POC – Proof of Concept

ACC

Set up an Asset Control Concept, with focus on innovative competences, contributing to cost efficiency and high quality asset management activities

- **Test technical feasibility**

Can the data, sensors, processes and software be combined into a reliable and secure chain of information to base a decision upon?

- **Verify financial feasibility**

Are the assumptions concerning the implementation of an ACC (software costs, hardware costs, workload, cost reductions…) realistic?

- **Refine cost allocation**

Allocate the costs directly to asset classes

- **Start development of competences**

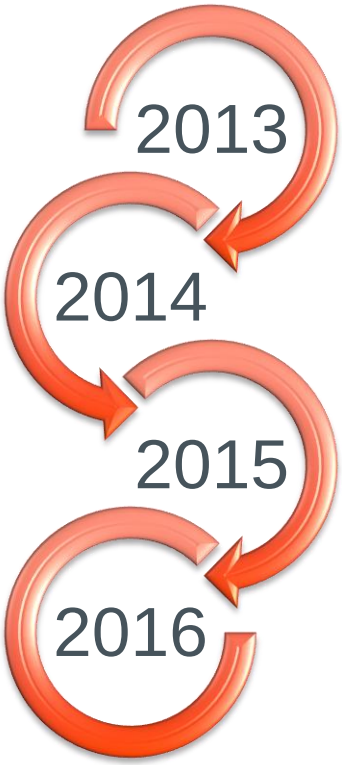
Detect business rules and best practices (implementation/operational)

- **Foster innovation**

The ACC team is convinced that the ACC combined with the introduction of IED's and broadband networks in our installations will inspire Elia Asset Management to detect innovative opportunities to increase the quality of our services combined with better cost and risk management

Approach

Timing of the ACC project



- Ideas - scope – analyses of potential
- Market survey – First tests - models

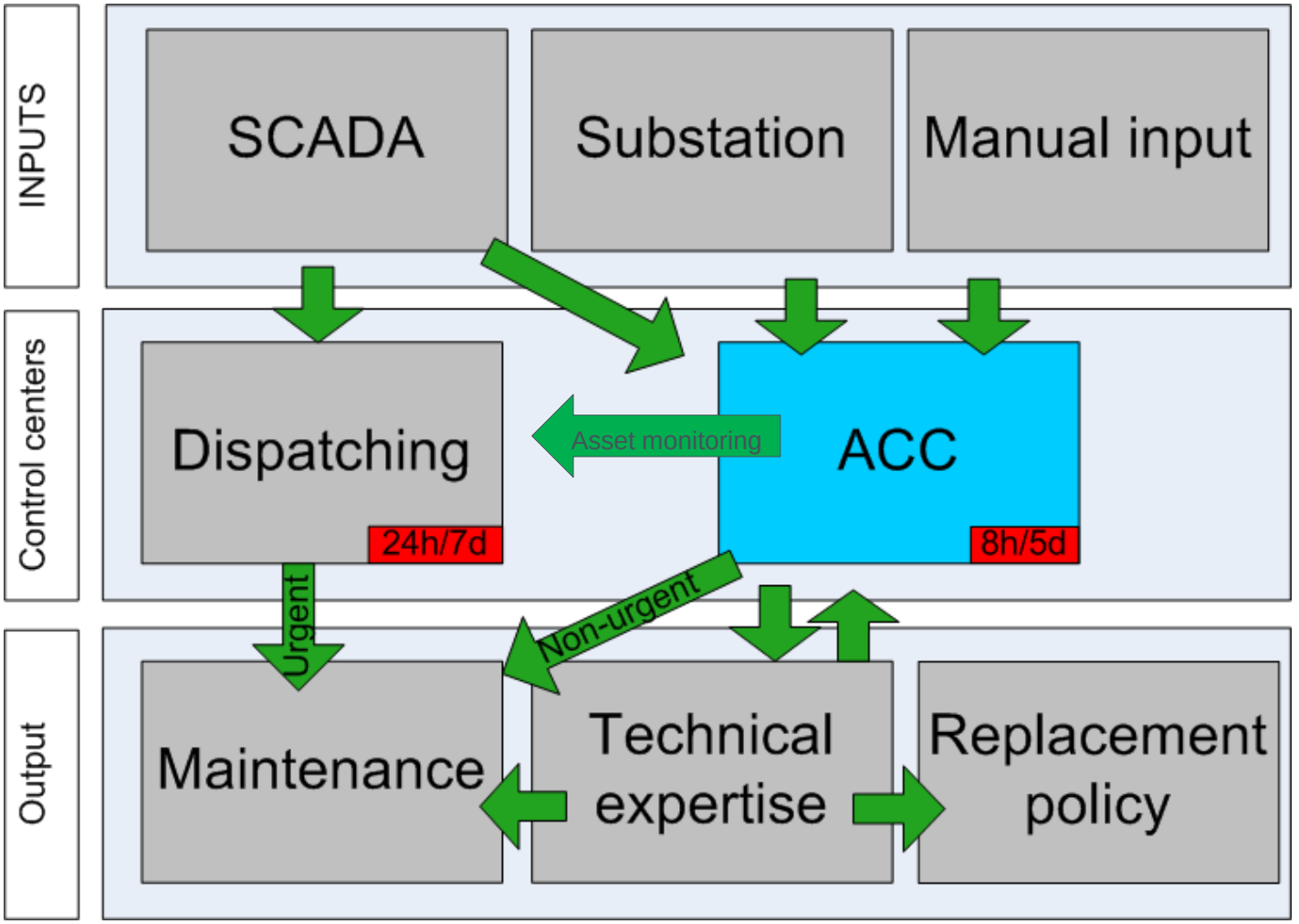
- Development of POC
- Kickoff of POC

- End of POC
- Feedback – final business case

- Kickoff Final ACC

Approach

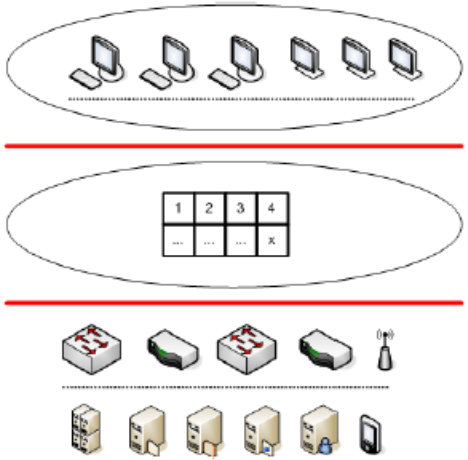
Organisation of the ACC activities



The role of Osisoft

The role of Osisoft PI

Q2 2013: IDEA



Q4 2015: reality

Interface server

SNMP	Universal File Loader	MODBUS	SISCO IEC61850
Rectifiers	SCADA snapshot files EMS snapshot files Small development	DGA probe Lixhe/ZANDV (operational)	DGA probes Waiting for equipment STEEL/ MTE
Temperature and humidity sensors Lint	SCADA Logbook EMS logbook Small development	Other DGA probes (configuration done)	Connect to C264 in labo (reading of records + comtrade retrieval)

PI Server (PI SYSTEM MANAGEMENT TOOL)

Definition of interfaces	Creation of PI TAGS	PI IT administration

PI AF (PI SYSTEM EXPLORER)

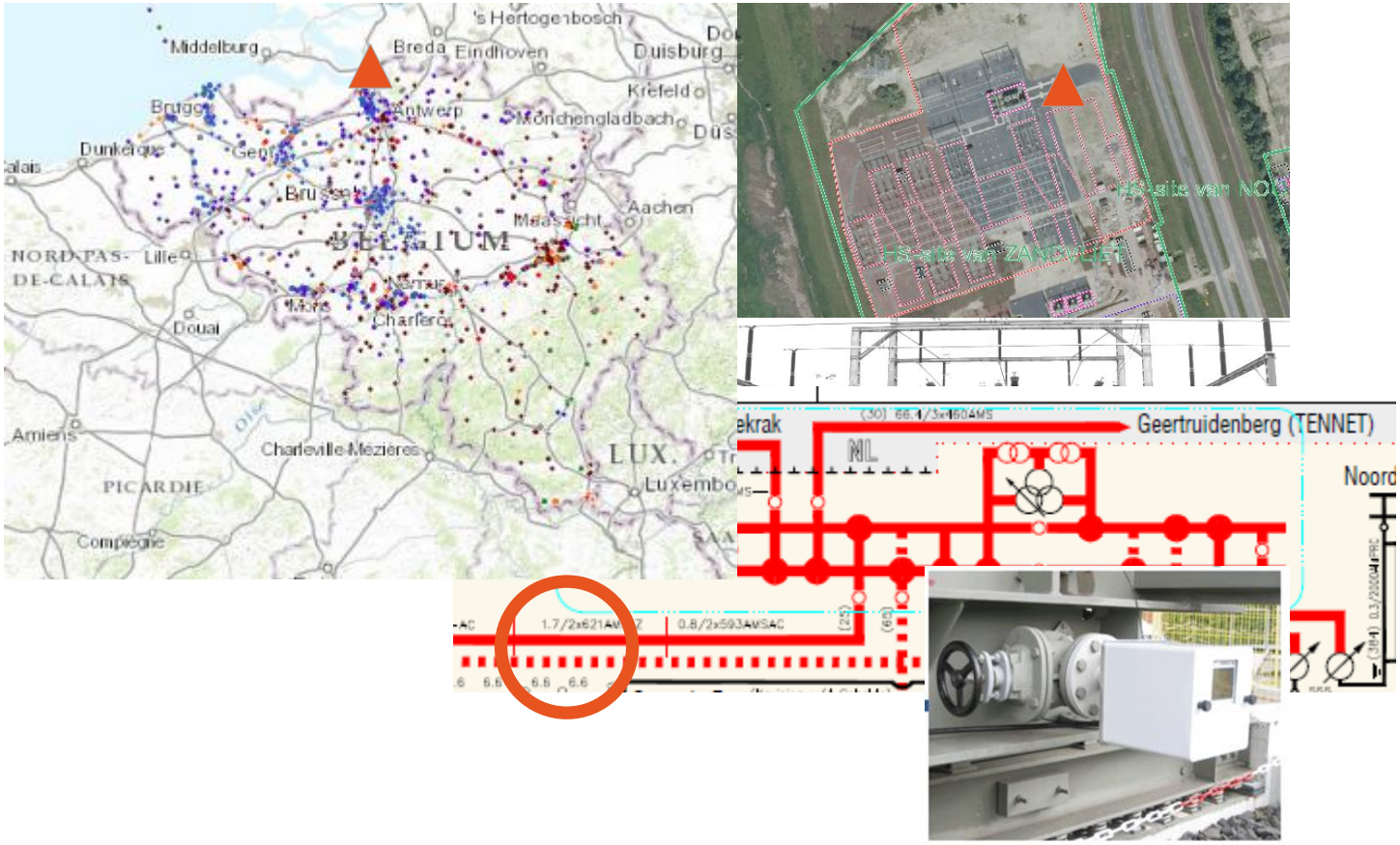
(asset) templates	Asset structure	References to PI TAGS
Analysis	Event frames	Notifications (alarms)

PI Visualisation tools

Coresight	DATALINK	PROCESSBOOK

Examples

Example : Phase shifter Zandvliet



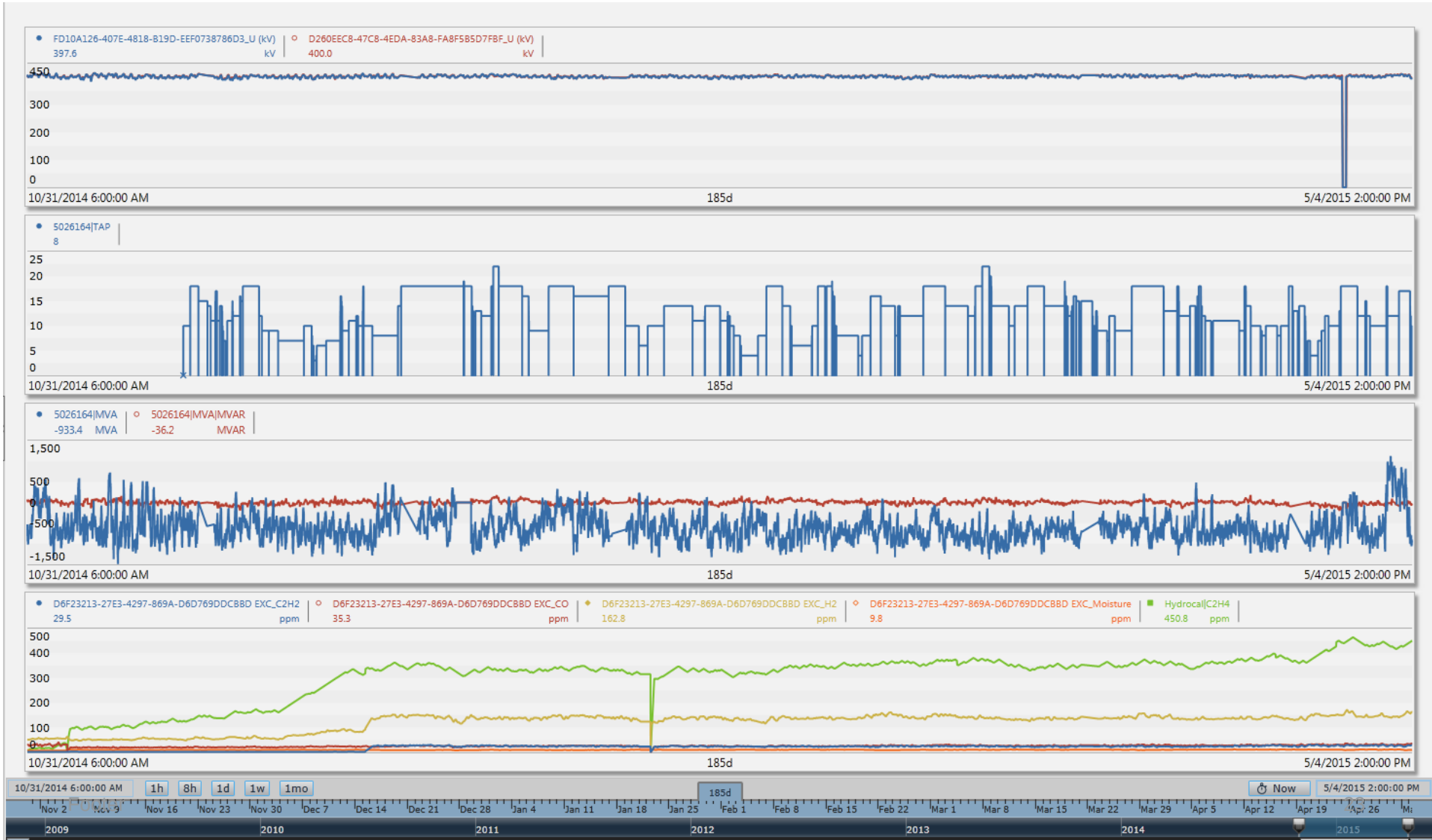
PST Zandv:

- 380kV
- Power: 1400MW
- Weight: 600t
- Oil: 175t
- Hydrocal 1005 DGA probes

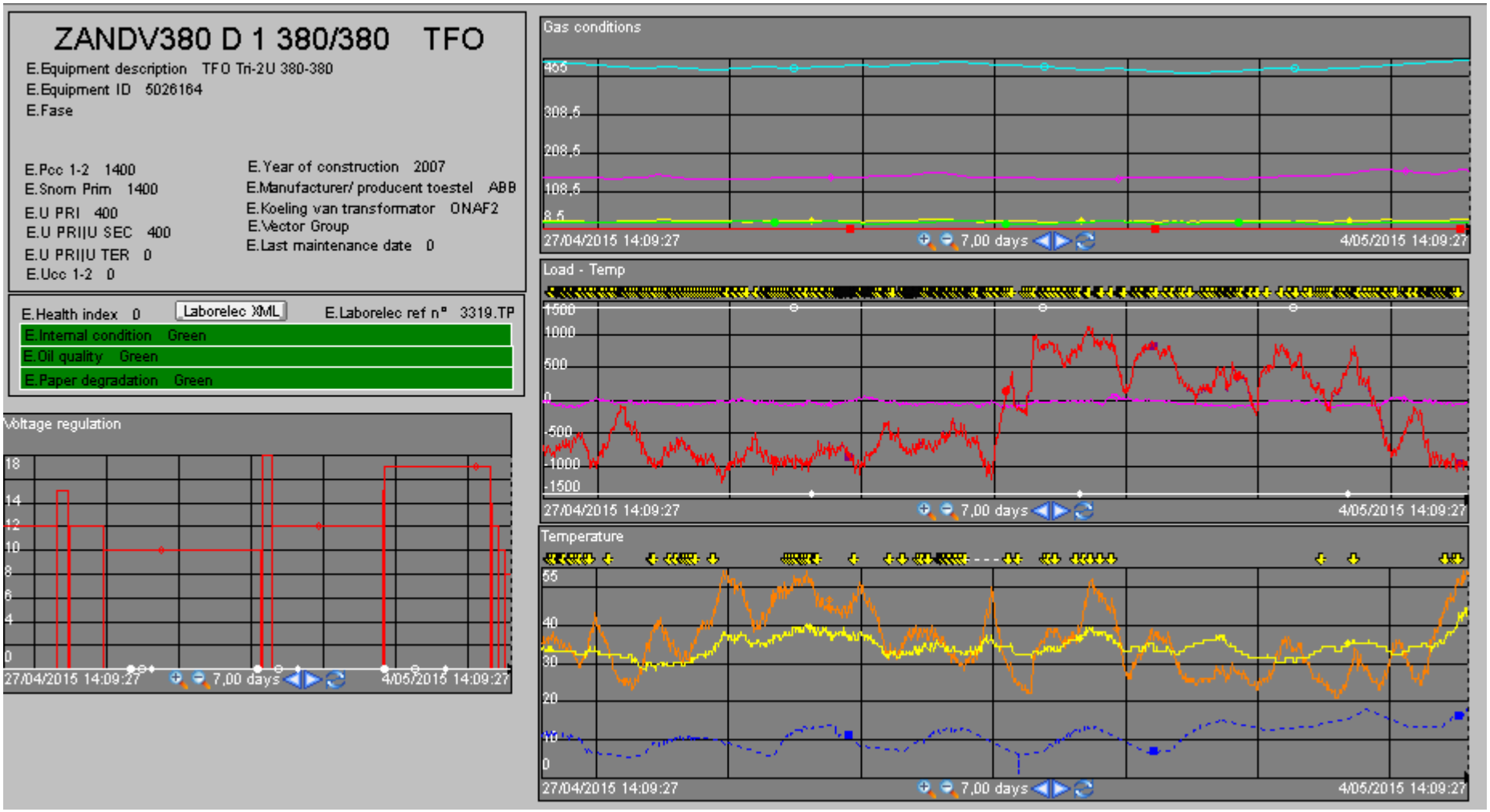
Monitored parameters:

- Dissolved gasses
- T of hotspot
- Load
- Surrounding temperature
- Position OLTC
  - # position switches
  - Avg. Position
  - Last inversor changes

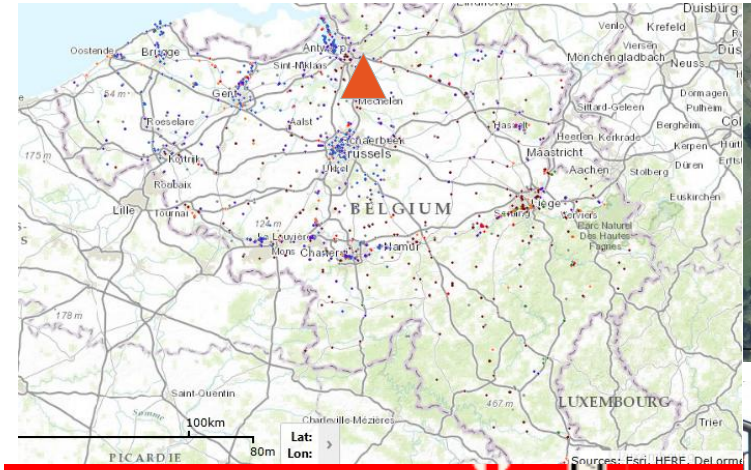
Example : Phase shifter Zandvliet

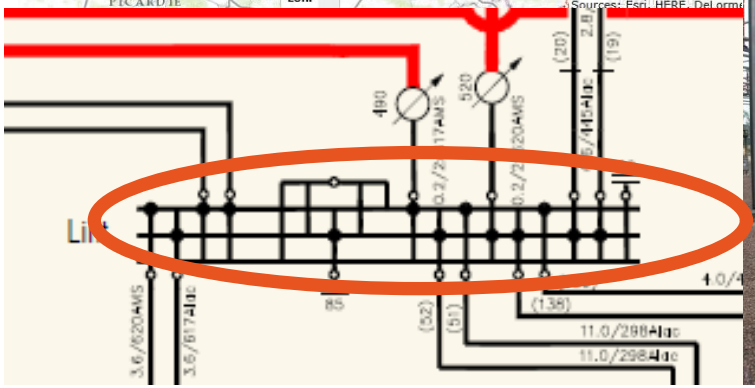


Example : Phase shifter Zandvliet



Example Switches Lint

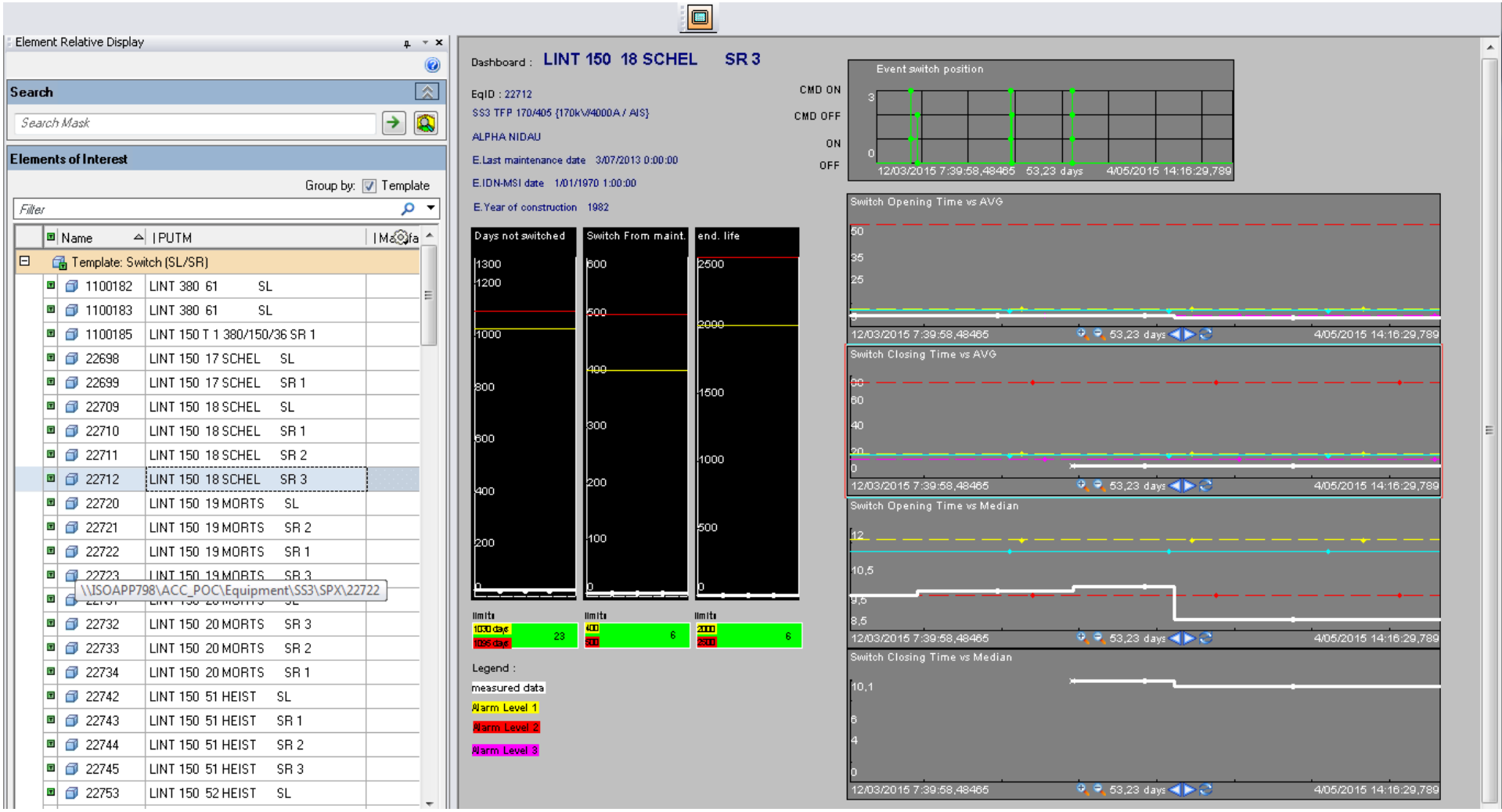




Switches Lint
- 150kV
- 77 switches are monitored

Monitored parameters
- # operations since last maintenance
- Total # operations
- # days since last operations
- Closing duration
- Opening duration

Example Switches Lint



2015 for ACC

ACC 2015 – from pioneers to professional explorers

Our focus in 2015:

- **Integrate ACC by applying all processes and elaborating all the results in further details and continue developing our tools**
- **Further explore this domain for fun and for science (scope!)**
- **Communicate about our discoveries, spread our knowledge**
- **Found strategic partnerships**
- **Prepare ourselves to find funding and resources for a permanent ACC**

Questions

Many thanks for your attention!

Bart De Jong
Bart.dejong@elia.be
+32 475 75 49 88