



### Client Challenge

- As global player in transportation, client needed resource and method support in safety-management to catch up with market demands in segment of medium and light-rail vehicles
- Separation of IGBT-based electr. propulsion-system into generic multi-architecture platform and individual customer-applications
- Complex network of safety-cases, due to system-hierarchy/ nesting, interacting subsystems and platform/application splitup
- Wide variety of architectures, electrical operation modes and system releases/upgrades combined with document revisions in varying quality/maturity/DBs made safety-approval challenging

### Activity

- Review of existing safety-related documents for platform and various legacy and ongoing application projects acc. CENELEC
- Execution and updating of hazard and safety analyses
- Updating/Adapting of safety-requirements and SIL-classification
- Deriving interface-requirements to forward to other systems (TCMS, vehicle, ...) and SRACs for operators
- Safety-case authoring incl. acquisition of referred documents and closure of open issues if required incl. communication with Independent Safety Assessor (ISA), assuring clean release order
- Drafting and implementing a technical and organisational process for more consistent and easy document referencing within DOORS, incl. DXL-script for Word-export in clean style

### Benefit

- Compiled list of reviewed workproduct reference-documents in DOORS-database, incl. consolidated status information, allowing quick selection and tracing between docs in projects
- Delivery of DOORS-based mechanism for more efficient and consistent referencing of proper input docs and automatic export of required reference table in respective workproduct
- More Safety-cases approved in time due to higher acceptance of workproducts by ISA and therefore less rework-iterations

### Key Technologies and Methods:

- EN50126 | EN50128 | EN50129
- Electrical propulsion and converter system | LRV
- Functional and Non-Functional Safety-Requirements
- Safety-Analyses | FMEA | FTA
- Safety-Related Application Conditions | SRACs
- Document-Management | Notes
- DXL-Interface | DOORS

