The Family Tree of Success

- **Transparency** is the mother of trust
- **Trust** is the mother of cooperation
- **Cooperation** is the mother of success
- So transparency is the great grandmother of success
buildingSMART Spain | IFEMA Madrid | 15. January 2020

winfried.stix@buildingSMART.co.at  Christian.Erismann@Applitec.ch
Chair of Railway Room
Project Leader ifcRail Project
BIM-Basics for Railway Infrastructure

First Steps in the D.A.CH Region

buildingSMART International

ifcRail Project

Deliverables from Phase 1

Next Steps
ifcRail

BIM-Basics for Railway Infrastructure

First Steps in the D.A.CH Region

buildingSMART International

ifcRail Project

Deliverables from Phase 1

Next Steps
First Ideas in the D.A.CH Region
2015-2017

Ensure and distribute:

• **Digital Representation**
  completely | comprehensive | applicable

• **Entire Railway Eco System**

• **Entire System Lifecycle**

Ensure and distribute:

- **Entire Railway Eco System**
BIM@rail Maturity Level Cube
Focus on Open Standards
ifcRail

BIM-Basics for Railway Infrastructure

First Steps in the D.A.CH Region
buildingSMART International
ifcRail Project
Deliverables from Phase 1
Next Steps
One Year from Signing the MoU until the Start of ifcRail Project & Railway Room

Signing MoU ifcRail at bSI Summit Barcelona 04/2017

Foundation of RWR and signing ifcRail Project at bSI Summit Paris 03/2018

Swedish and Finish Transport Agencies

Research Group of French Transport Sector

Railway Infrastructure Owners
Scope | Railway: System of Systems

Railway System

Level 1: Rail System
- Infrastructure (INF)
- Energy (ENE)
- Command, Control & Signaling (CCS)

Level 2: Structural Rail Subsystems
- Civil Engineering
- Tunnel
- Bridge

Level 3: Rail Domains
- Infrastructure (INF)
- Energy (ENE)
- Signaling (Signaling System)
- Telecommunication (Telecom)

Level 4: Rail Components
- Road
- Station (Buildings)

Shared Elements
- Track
- Energy
- Signaling
- Telecom

Common Schema
- Geography, Alignment, Topology, etc.
- Safety (incl. Security), Reliability and Availability, Health, Environmental Protection, Technical Compatibility, Accessibility

IFC RAIL ORG LEVEL

Common Systems Shared Elements

Contributions to IFC Common Schema and other IFC Projects

Winfried Stix | Chair of bSI Railway Room
ifcRail Project in Numbers

2018 – 2019 | 24 Months

Cash €2’500’000 EUR

In-kind 3’500+ Tage

8 Stakeholders

100+ Domain & Technical Experts
bSI Infrastructur Projects

ifcRail

BIM-Basics for Railway Infrastructure

First Steps in the D.A.CH Region
buildingSMART International
ifcRail Project
Deliverables from Phase 1
Next Steps
Projekt Governance | bSI Standardisation Process

- Standards Committee
  - Consult
  - Vote
  - Endorse WG
- SC Executive (SCTE)
- Room Steering Committee
  - Advise SCE
- Room Project Steering Committee
- Working Group / Project Team
  - Propose new activity
  - Full project proposal
  - Manage project (Dashboards)
  - Execute project
  - Review project content
  - Software validation
- Project Expert Panel
  - Rail Project Team (maybe extended)
- Actual Project Status & Workflow
  - Publish bSI Candidate Standard
  - Publish bSI Final Standard

25. October bSI Summit Beijing
Deliverables ifcRail | Phase 1

In total 589 pages official documents submitted

IFC schema and specification

Other deliverables:
- Project guideline
- Modeling guideline
- Software prototypes
- Sample files
- Draft MVDs
- Data dictionary

Submitted

To be Submitted

Partly delivered
Prioritised Use Cases
6 von 38

1. Existing Condition Modeling
2. Railway Design Modeling
   (Feasibility Studies for Railway and Railway Intermediate Design Modeling)
3. Interference and Coordination Management
   (Physical Interface, 3D coordination and clash detection, Signal Visibility Checking)
4. 3D Visualization
5. Quantity Take Off
6. Handover from Builder to Maintainer
Requirement Analysis Report

- Scope of railway domains
- Process Map
- **38 Use cases**
- Common requirements
  - Alignment requirements
  - Network specification
  - Linear Positioning
  - Spatial Structure
  - Geometric representations
- Model View Definitions

**Distance along:** 300.00 m

**Lateral Offset:** +5.00 m

**Position Reference Axis**

**Elevation Offset:** +2.25 m
Data Requirements Report

- Domain specific requirements
  - Track
  - Energy
  - Telecom
  - Signalling

- In total 2534 properties defined for railway objects!!!
Conceptual Model Report

- Classes: 677 (all), 453 (Priority 1)
- Properties: 2534
- Divided by domains:
  - Classes:
    - Track: 67
    - Energy: 143
    - Signalling: 80
    - Telecom: 101
    - Shared: 62
  - Properties:
    - Track: 809
    - Energy: 1011
    - Signalling: 284
    - Telecom: 430
IFC Specification | ifcDoc

- New Alignment extension
- Spatial Structure
- Domain specific entities and types
- To be harmonized with other IFC infra projects
Prototyp Implementation

Use Case: simple switch connection on a two track line
Conclusion ifcRail

• Challenge | Railways as a "system of systems"
• Challenge | intercultural project team
• Solution | diversity in the management team
• Increase in market power | international cooperation
• Standardization process | buildingSmart
  IFC-Rail> ISO> CEN> national standardization institutes
• Essential basis for "openBIM“
• Learning from each other
• Further steps are required
ifcRail

BIM-Basics for Railway Infrastructure

First Steps in the D.A.CH Region
buildingSMART International
ifcRail Project
Deliverables from Phase 1
Next Steps
7 Work Packages ifcRail Phase 2

1+2 Vendor Involvement

3 Data Dictionary

4 Extend Phase 1

5 Other Initiatives

6 Finalise MVD

7 Document and Communicate
ifcRail Project Phase 2

- **2020 – 2021 | 24 Months**
- **Cash**
  - Est. 2-3 M€
  - Est. 350 T€/Stakeholder
- **In-kind**
  - Est. 4'500+ Tage
- **6-8 full Stakeholders**
- **100+ Domain & Technical Experts**
The Sunsystem of ifcRail
The Galaxy of IFC 4
On our way into the open BIM Universe

... There is a lot to do
Can You Imagine the Future of Rail

REMARK: THIS IS NO IMPLEMENTATION, IT IS DESIRE 🎞️
Scene from the Italian movie (1984)
"NON CI RESTA CHE PIANGERE"
Winfried Stix  
Chair of bSI Railway Room  
Chair of bSAT WG Infrastructure  
Member of PMO ifcRail Project  
winfried.stix@stixnet.at  
winfried.stix@buildingsmart.co.at  
+43 699 19298717

Christian Erismann  
Project Leader ifcRail Project  
christian.erismann@applitec.ch  
+41 79 3402470
thank you
xiè xiè ni
grazie
merci
kiitos
gracias
tack
dankeschön

Winfried Stix
Chair of bSI Railway Room
Chair of bSAT WG Infrastructure
Member of PMO ifcRail Project

winfried.stix@stixnet.at
winfried.stix@buildingsmart.co.at
+43 699 19298717

Christian Erismann
Project Leader ifcRail Project

christian.erismann@applitec.ch
+41 79 3402470