



bSDD at FTIA: Background, status and perspectives

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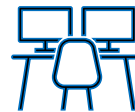
About me



Marion
Schenkwein



Civil Engineering (2004)
Industrial Engineering (2023)



InfraBIM Specialist



Finnish Transport Infrastructure Agency (FTIA)
bSI Infra Domain Steering Committee
bSF Infra Domain Chair

7.9.2023

What does the Finnish Transport Infrastructure Agency (FTIA) do?

- **We focus on designing, developing, and maintaining road, rail, and maritime transport routes, arranging winter navigation, as well as on coordinating transport and land use.**
- We strive to ensure that transport networks meet the needs of our citizens and businesses alike – promoting Finland’s competitive edge.
- **FTIA**, in cooperation with the ELY Centres, operates as the primary partner of regional councils, municipalities, urban regions, and other operators in the planning of transport systems.
- FTIA is also responsible for organising traffic management according to a service agreement with Fintraffic.
- FTIA operates responsibly by limiting environmental damage.
- FTIA is an expert procurement organisation.





Finnish Transport
Infrastructure Agency

The Finnish Transport Infrastructure Agency's year 2023



Roads

78,000 km



Railways ca.

6,000 km



Railway and
road bridges

17,600



Trade and
maritime routes

4,000 km

44

road, rail and
waterway devel-
opment projects
underway



1,500 km
of new surfacing

New electrified railway lines ca.

215 km



Number of removed
and improved level
crossings

82

Number of repaired bridges on
the road and railway network

100



Delays caused by
track maintenance
in long-distance
traffic

6 %

Satisfaction of citizens in
condition of roads

in winter

3,2/5

in summer

2,9/5



Satisfaction of business
operators with the condition
of road, rail and waterway
network

2,9/5

Number of road accidents
that have led to injuries or
deaths

1,498



Share of the road
network with heavy
traffic that has
poorly surfaced
roads.

1,065 km

The traffic network's
repair backlog

4.0 billion €



Number of vessels
assisted during
the ice-breaking
season

1,300



Number of
personnel

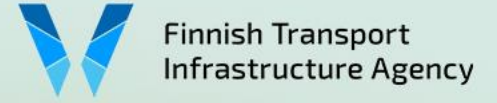
483



Work satisfaction

3.96

A well-functioning and secure transport network facilitates Finland's well-being, competitiveness, security of supply and sustainable growth



The transport network meets the needs of customers and society

Our activities are based on high-quality information and its utilisation

Transport infrastructure management is efficient and sustainable

We operate transparently, consistently and in a spirit of cooperation

Expertise

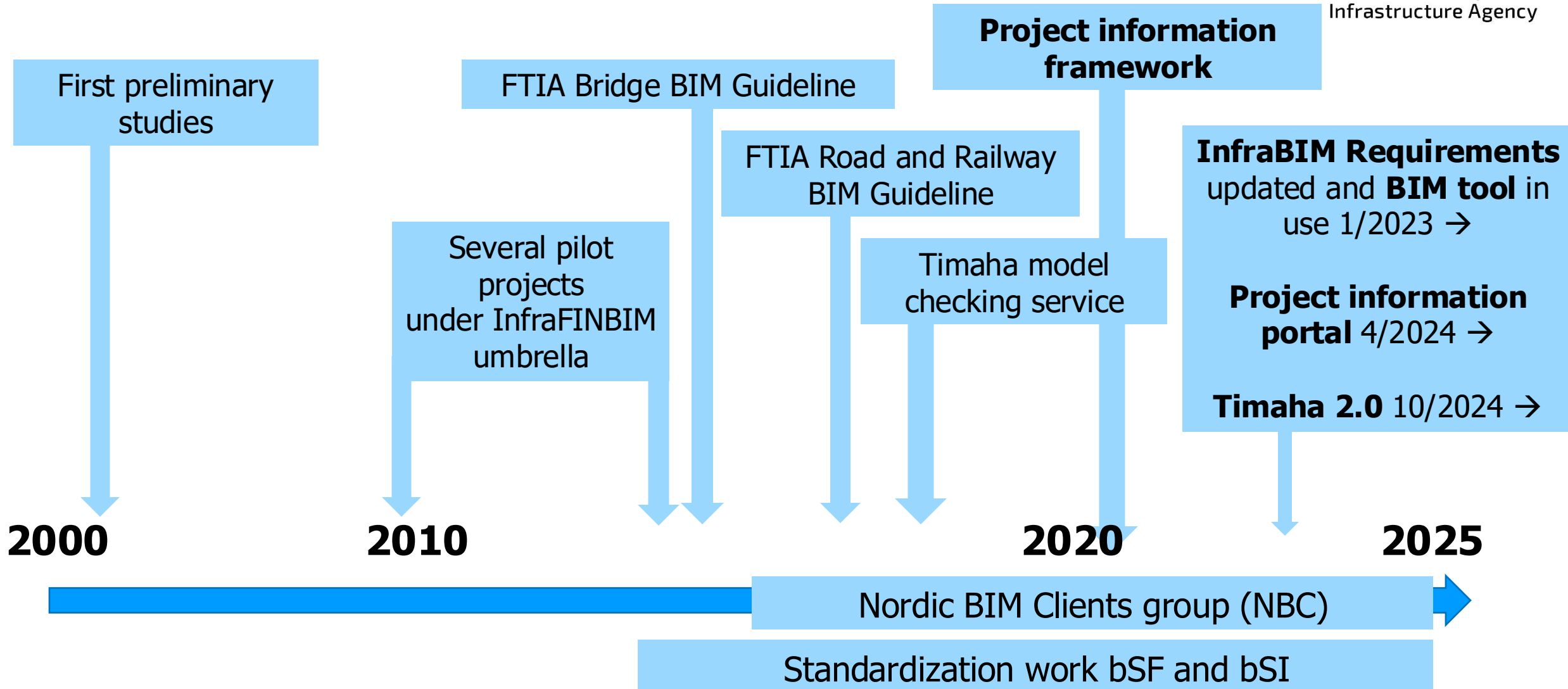
Efficiency

Cooperation

Trust



Timeline - InfraBIM at FTIA

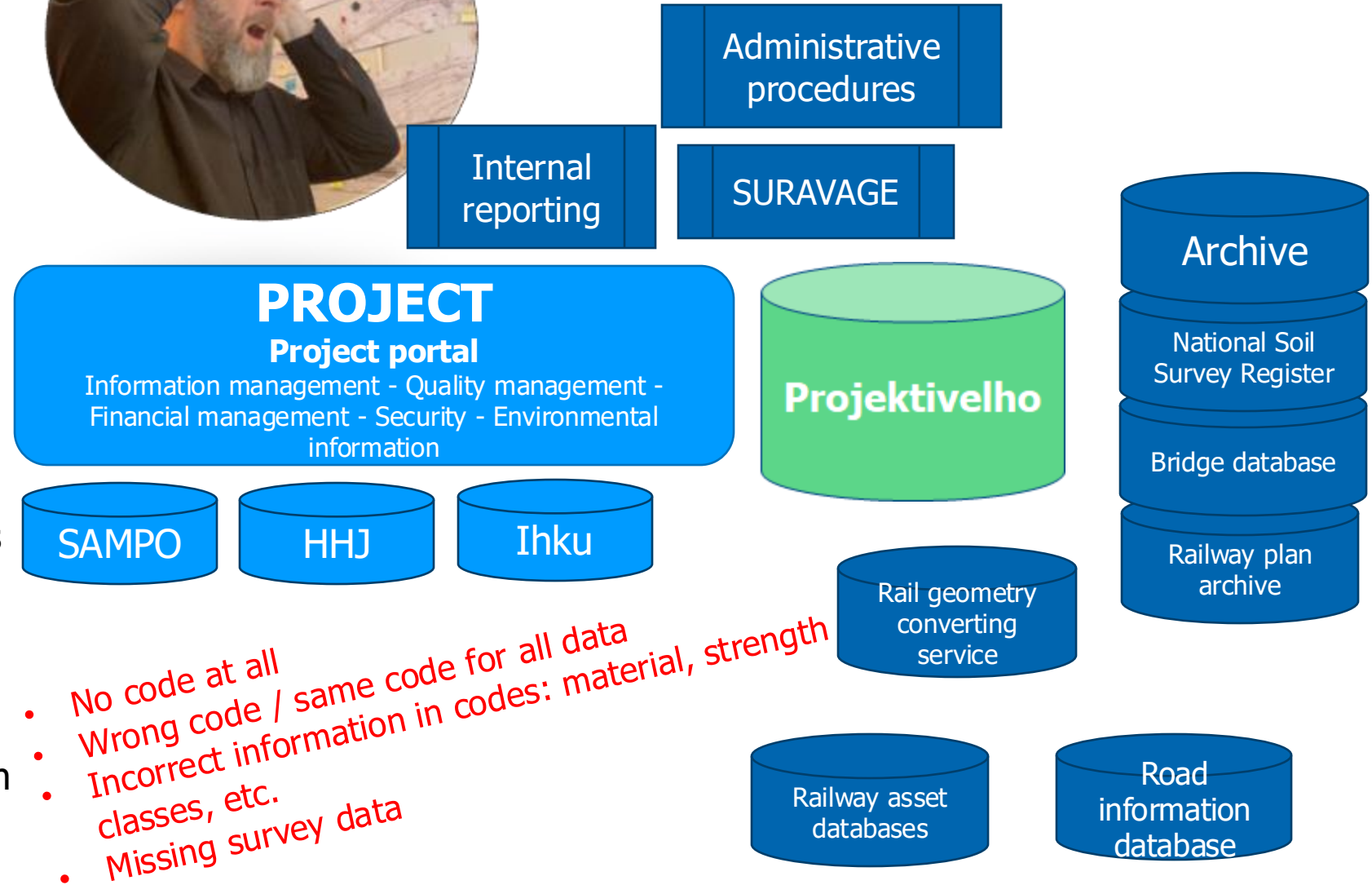


Status

- More than 300 guidelines and requirement documents: Velho, archiving, inventory, engineering structures database, risk assesment, railway design guidelines etc.
- Contracts, terms of reference, project plans
- Different practices for different project phases and different forms of transport
- Old templates, own habits and practices
- "This is the way it has always been done..."



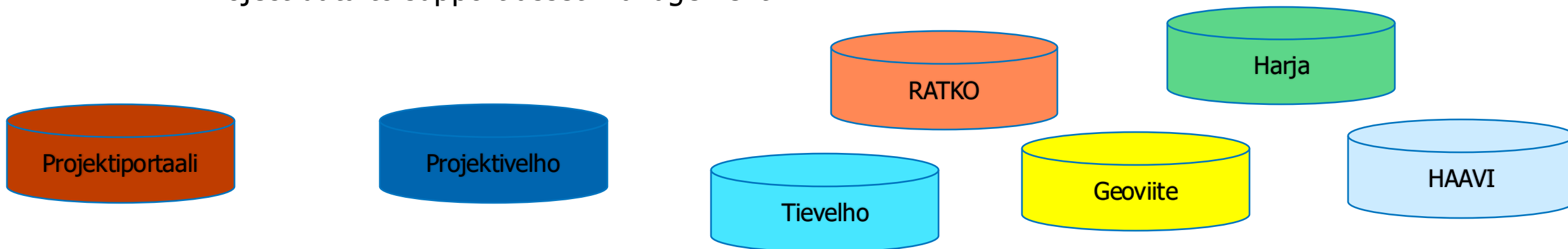
ERRORS IN HANDOVER DOCUMENTATION



FTIA's vision/objective: digital twin and real-time asset management

Consistent and enriched information from design and construction to maintenance and asset management systems

- Identical project requirements, high quality operation during the project and timely information transfer to the client
- From stand-alone data to linked data and digital twin
- Project data to support asset management



“External” incentives

Performance targets for set by the Ministry of Transport and Communications:

- The overall impact of FTA’s activities on productivity in the sector has been proven
- The necessary developments in asset management systems have been implemented to allow for the flow of design and as-built information (transfer of information from one phase of the project life cycle to another)
- Key asset and impact information on the transport network has been seamlessly integrated into maintenance processes and programming of maintenance activities

→ 2027!



Finnish Transport
Infrastructure Agency



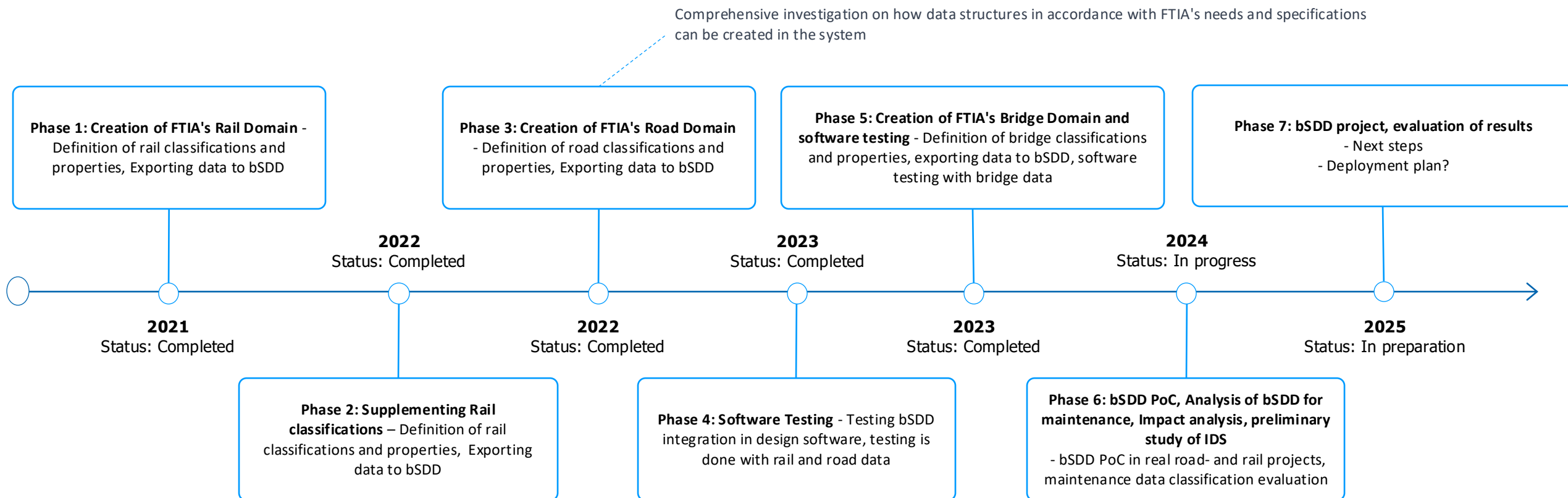
Enriching the handover material

Consistent and enriched information

- In order to make effective use of information at different stages of the life cycle and for asset management, we need machine-readable and harmonised information
- Requires: definition and standardisation of transferable data content → operating models based on international standards
- A digital channel through which standardised information is easily accessible to different stakeholders in a machine-readable format



Timeline - bSDD at FTIA



FTIA road-, rail- and bridge information in bSDD



Finnish Transport
Infrastructure Agency

Aidat
Arinarakenteet
Erotusalue
Hoitourakoiden poikkeusjärjestelyt
Infraniikkeistöluokitus
Jakava kerros
Kaista
Kaiteet
Kaivot
Kantava kerros
Kasvillisuusrakenteet
Keskialue
Kunnossapitovastuu
Kunto- ja vauriotiedot
Ladottavat pintarakenteet
Levikkeet
Liikennemerkit
Luiska
Muut pintarakenteet
Ojan pohja
Päällysrakenteen lujitteet
Paaluperustukset
Penkereet
Perustiedot
Piennar
Pintaukset
Pistemäinen sijainti
Pohjamaa
Kunnossapitovastuu poikkeus
Portaalit
Portaat
Portit
Puomit, sulkulaitteet ja pollarit
Putket, johdot ja kaapelit
Pylväät
Rakenteelliset ominaisuudet
Reuna-alue
Reunapaalut
Reunatuet
Rumpuputket
Sidotut päällysrakenteet

Sirtymäkilat
Sijaintitarakenne
Sitomattomat pintarakenteet
Suodatinrakenteet
Suojaukset ja eristykset
Tasanne
Täytöt (alusrakenne alla)
Tiealueen poikkileikkauksen kaltevuustiedot
Tiealueen poikkileikkauksen leveystiedot
Tiealueen poikkileikkaustiedot
Tienrakennetiedot
Tienvarsikalustet
Tienvarsimainokset
Toimenpiteet
Toiminnalliset ominaisuudet
Vahvistetut maarakenteet
Valaistukset
Välisijainti
Varusteet (varusteiden yhteiset ominaisuudet)
Varustetiedot
Pistemäiset varustetoimenpiteet
Pistemäiset varustevauriot
Versioitu
Varusteiden ja laitteiden yhteiset ominaisuudet

Road Dictionary

- 65 Classes
- 280 propertysets
- Origin of data content specification: *Road information database*

<https://search.bsdd.buildingsmart.org/uri/FTIA/FTIA-Road/1.0>

Ajolanka
Eristysjatkos
Erotusjako
Etujatkosalue
Kääntöavustin
Kääntölaite
Kääntöorsi
Kannatin
Kielen valvontakosketin
Kiellsovitus
Kiiristyslaitteisto
Kiskoankkuri
Kiskonliikuntalaite
Kiskonvoitelulaite
Kiskotus
Liityntäkisko
Lukituslaite
Lumisuojat ja lumensulatus
Ohjain
Pohjain
Radan kohteiden yleiset tietosisällöt
Radan merkit
Ratajohto
Ratajohtoerotin
Ratapölkky
Ripustin
Ryhmyseristin
Sähköraita-alue
Sidekisko
Suojakisko
Takajako-alue
Tasoristeykselle vievä tie
Tasoristeys
Kansi (tasoristeys)
Tienmerkit (tasoristeys)
Tukikerros
Vaihde
Risteys (vaihte)
Väliskoelementti
Varoitustila
Vastakisko

Rail Dictionary

- 41 Classes
- 192 Propertysets
- Origin of data content specification: *Railway design and maintenance guidelines, expert interviews*

<https://search.bsdd.buildingsmart.org/uri/FTIA/FTIA-Rail/1.0>

Kaidepylväs
Kaiteet
Peruslaatta
Pilari
Pilaristo
Siltakaide
Välituki
Varusteet ja laitteet
Yläjohde

Bridge Dictionary

- 9 Classes
- 42 Propertysets
- Origin of data content specification: *Bridge database*

<https://search.bsdd.buildingsmart.org/uri/FTIA/FTIA-Bridge/1.0>

Our findings so far / bSDD & IDS

buildingSMART Data Dictionary (bSDD)

- The service / platform is fit for purpose for the cases we examined
- Adding content to the library has been largely straightforward
- Good support from bSI

Information Delivery Specification (IDS)

- bSI standard for defining information requirements
- IDS allows automatic compliance checking of IFC models
- Clear guidelines of what needs to be exchanged
- A user of IDS can specify how objects, classifications, materials, properties, and even values should be delivered in an IFC model
- Preliminary study under way



Our findings so far / concepts and requirements

- The FTIA Rail library is not just a replication of the data content required for the register – extending the idea of FTIA bSDD?
- Attribute criticality - is all the information required truly needed?
- Harmonisation of terminology: "material" / "base material"
- How to handle cases such as: *Mandatory information if value x, and if Y is not true*

Our findings so far / PoC

bSDD tested in three projects

- **Railway Preliminary engineering planning Mynämäki - Vehmaa**
 - Level crossing
 - 6 different components / bSDD classifications
 - Software: Bentley OpenRoads
- **Highway construction planning Konginkangas – Kalaniemi**
 - Traffic signs, sub-base layer, railing, gutters
 - Software: Tekla Structures, Trimble Quadri and ACCA Software (bSDD.Editor)
- **Railway construction planning Kiteen vetoraide**
 - Track turnouts (the turnout consists of 13 different components / bSDD classification)
 - Autodesk Civil 3D and a custom tool created on top of Civil 3D software (C programming language)

Our findings so far / PoC

- bSDD and the information it contains are already available in some software, even if it does not yet include ready-made interfaces or functionalities for using bSDD.
- The information contained in bSDD must be able to be narrowed down and managed according to a specific use case, such as the project phase → IDS!
- The software or tools used in all tested approaches were able to retrieve all data contents of the tested structures from bSDD.

Our findings so far / PoC

- A large part of the data to be produced can be incorporated into a single IFC model → production of data according to the approaches tested is meaningful and straightforward
- The required information can be retrieved directly from the bSDD, so that the needs and requirements of the client are clear, and no time is wasted in defining or clarifying them.
- At present, the practical use of bSDD still requires the introduction of a new tool or software into the design process → requires learning and may, in the worst case, make the design process unnecessarily complex

Summary





Väylävirasto
Trafikledsverket