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# Digital Rail Baltica. How GIS helps manage a greenfield railway megaproject

Vaidas Ulenskas,  
GIS Team Leader at RB Rail AS

18.07.2024

# Vaidas Ulenskas, GIS Team Leader



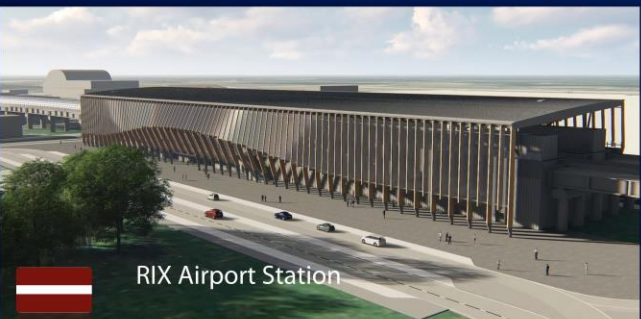
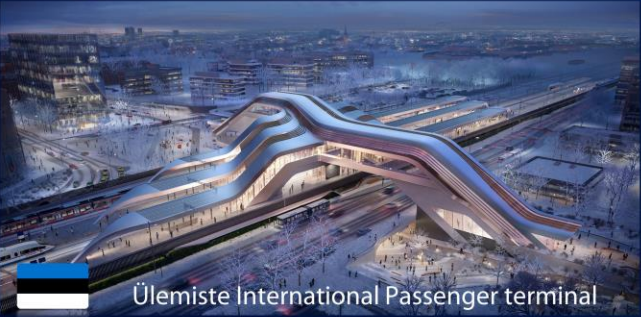
- 2009-2011 Master's Degree, Civil Engineering, Vilnius Tech
- 2011-2019 Work in the field of Spatial Planning
- 2019 Joins Rail Baltica project as GIS and BIM Coordinator, CWS Department
- 2021 GIS Team Leader, VDC Department



# Connected Baltics in a Connected Europe

We are delivering seamless mobility for people, goods and services to accelerate social and economic development in the Baltics and beyond

# A new standard for freight and passenger mobility



- 870 km (~540 miles) greenfield railway infrastructure
- 1435 mm (4 ft 8+1/2 in) Double track
- ERTMS Level 2 + FRMCS\*
- Electrified 2x25kV AC
- Maximum length of freight trains: 1050m (0.65 miles)
- Axle load 25t (~27.5 US tons)
- Design speed: 249 km/h (~155 mph) for passenger trains  
120 km/h (~75 mph) for freight trains
- SE-C (Swedish) loading gauge

\* Subject to confirmation

# Rail Baltica project timeline

2023

- Mainline designs' completion
- Delivery programme 2030
- Market readiness for material supply & logistics (incl. consolidated material procurements)
- New generation Cost-Benefit Analysis and Business Plan
- Decisions to ensure operational readiness (IGA on infra management and exploitation model, rolling stock etc.)

2024-2027

- Construction!



2028-2030

- Testing
- Validation
- Operations & full interoperability ensured
- New economic and security network corridor developed

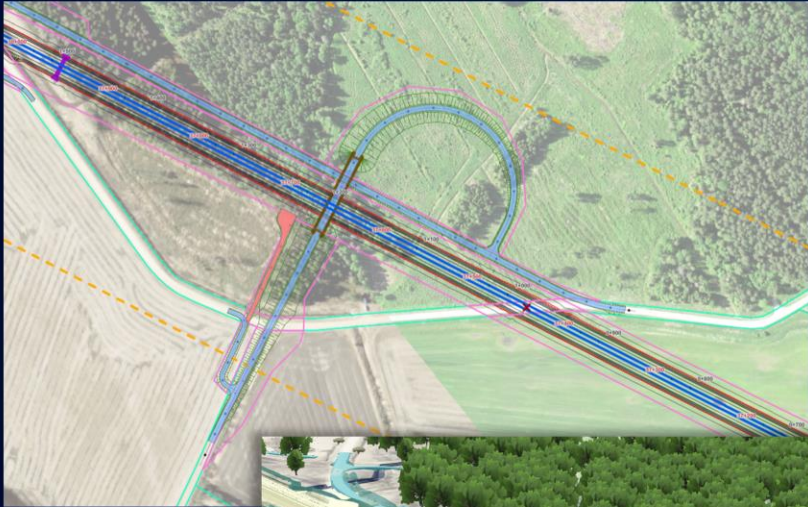
Construction in progress

Gradual start of operations

From Design....

...To Construction

GIS



## Design Stage

Mainly focuses on 2D data, 3D complements 2D

Design data is updated on time

Share the data with Designers, IB's, Public

Most of the data comes in: CAD drawings, Tables, BIM

The main action takes place in the office

## Construction Stage

Mainly focuses on 3D data, 2D complements 3D

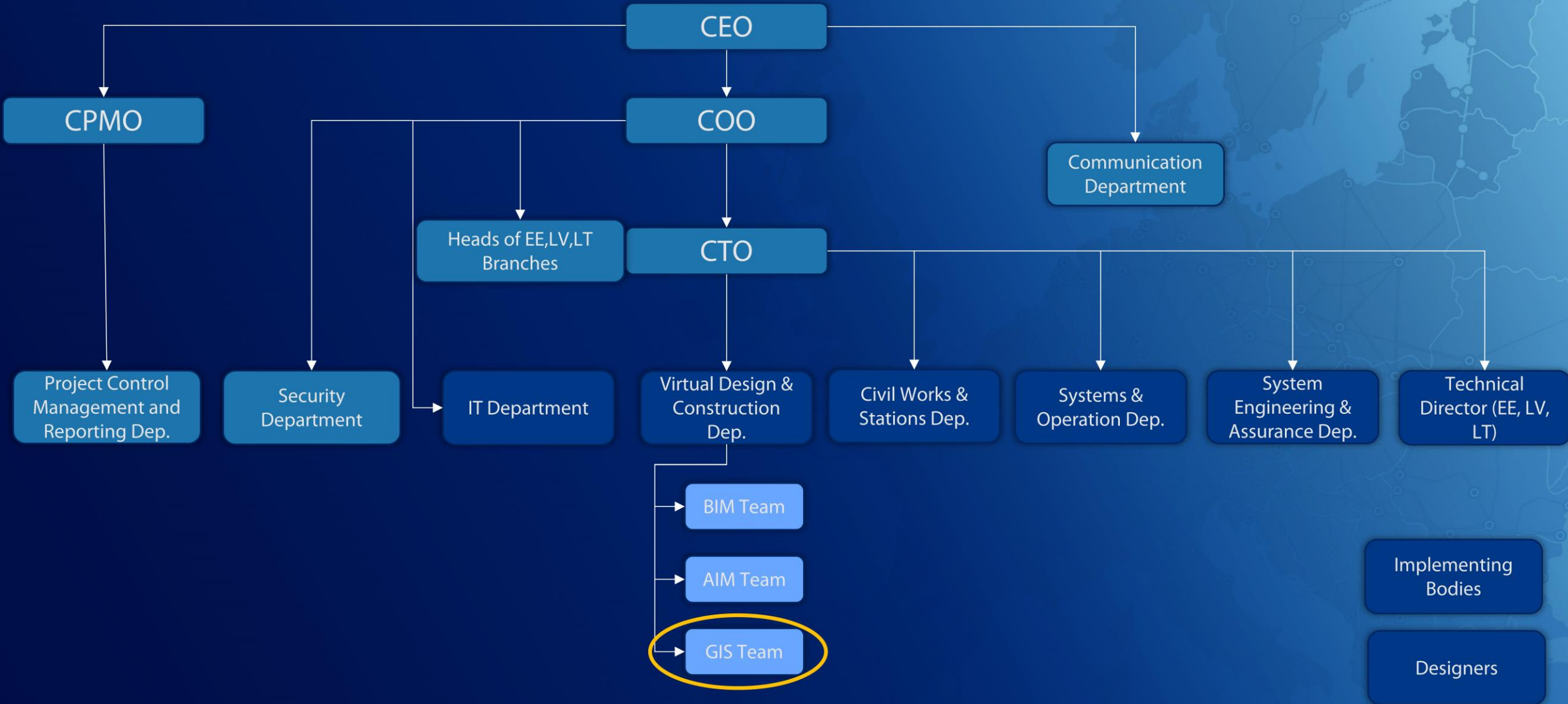
Construction data is updated on time

Share the data with Construction companies, IB's, Public

Most of the data comes in: Visual Media, Lidar, orthophoto, Tables, BIM

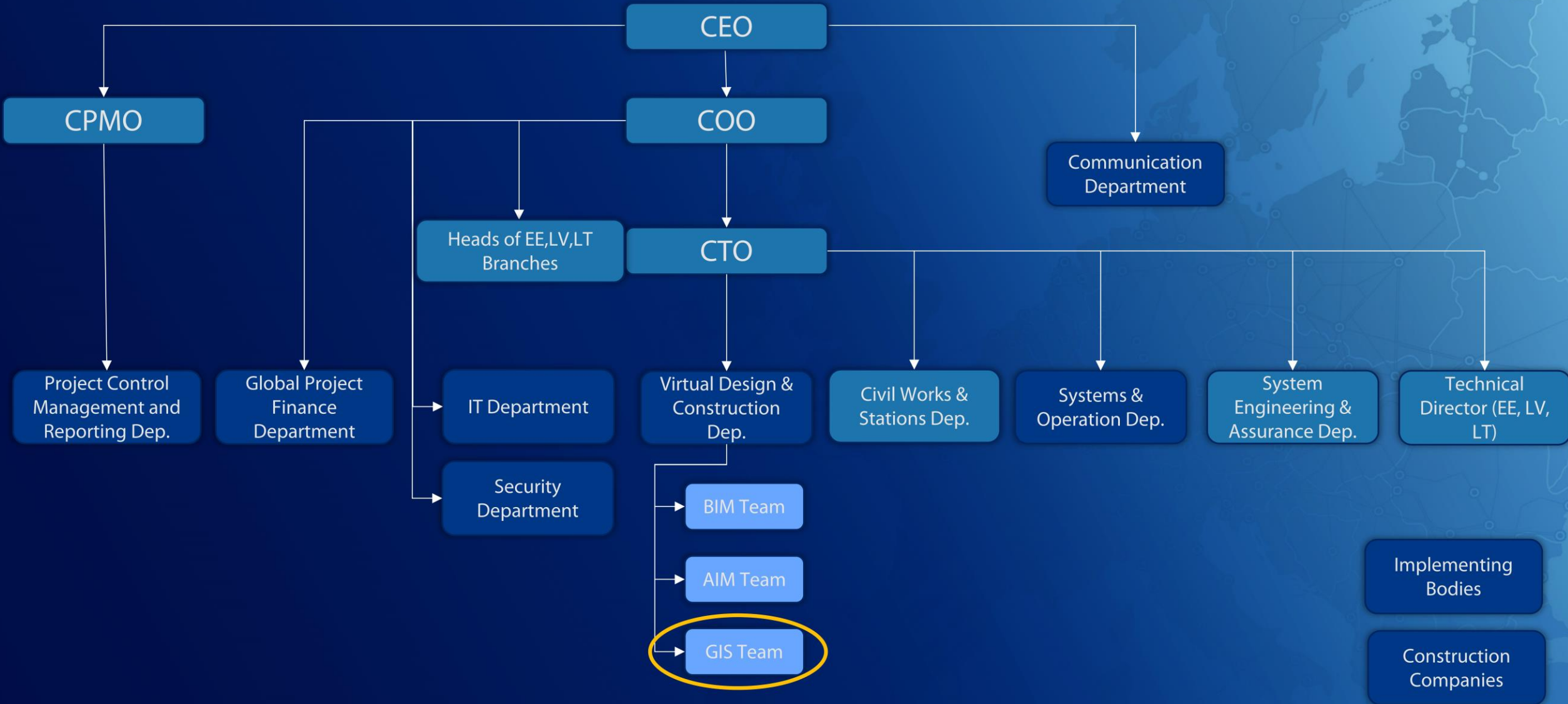
The main action takes place on a construction site

# GIS Team place in Project and most common partnerships. Design Stage



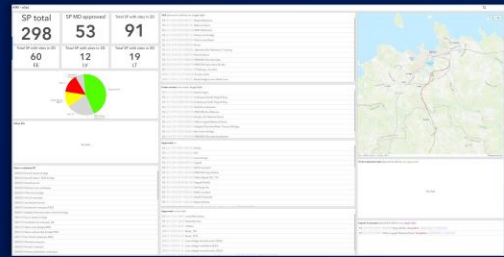
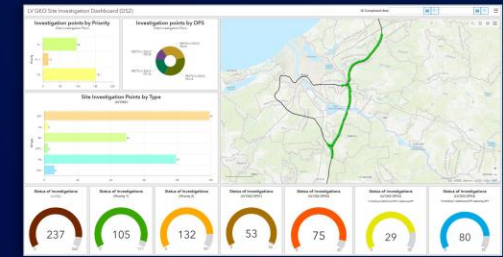
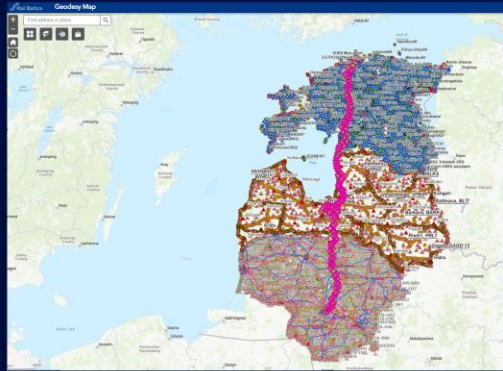


# GIS Team place in Project and most common partnerships. Construction Stage



# What Design Stage brings to Construction Stage

2D data: Thematic Maps, Dashboards etc.

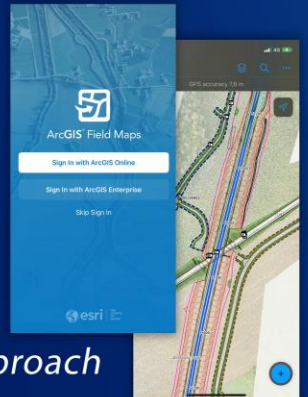


Internal Data Sharing Policy

3D data: BIM, Lidar, Mesh



Mobile Approach

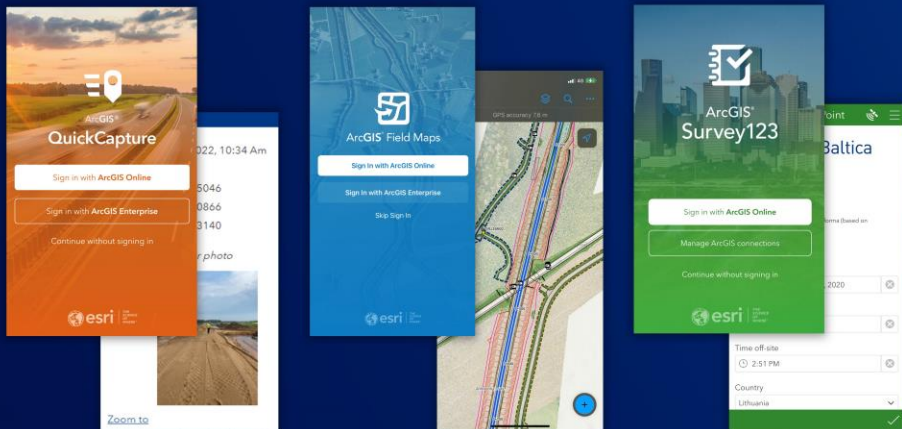


## Construction Stage: Goals

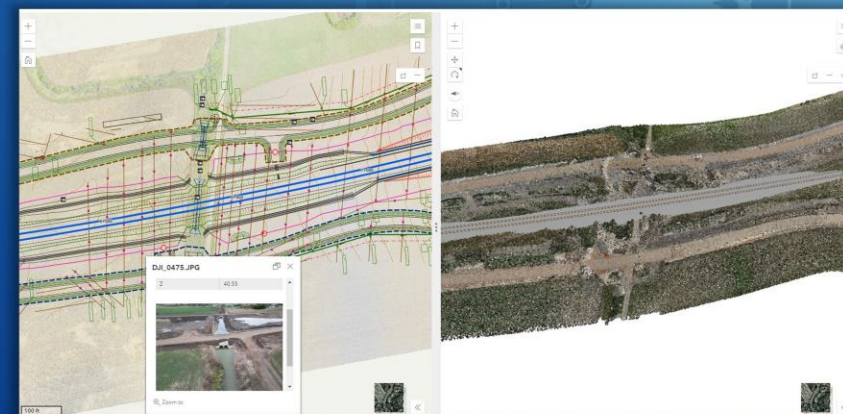
- Follow the construction progress
- Supervise the quality of construction works
- Combine finances, planning and actual construction progress
- Provide technical information to non-technical staff and the general public

# Follow the construction progress / Supervise the quality of construction works

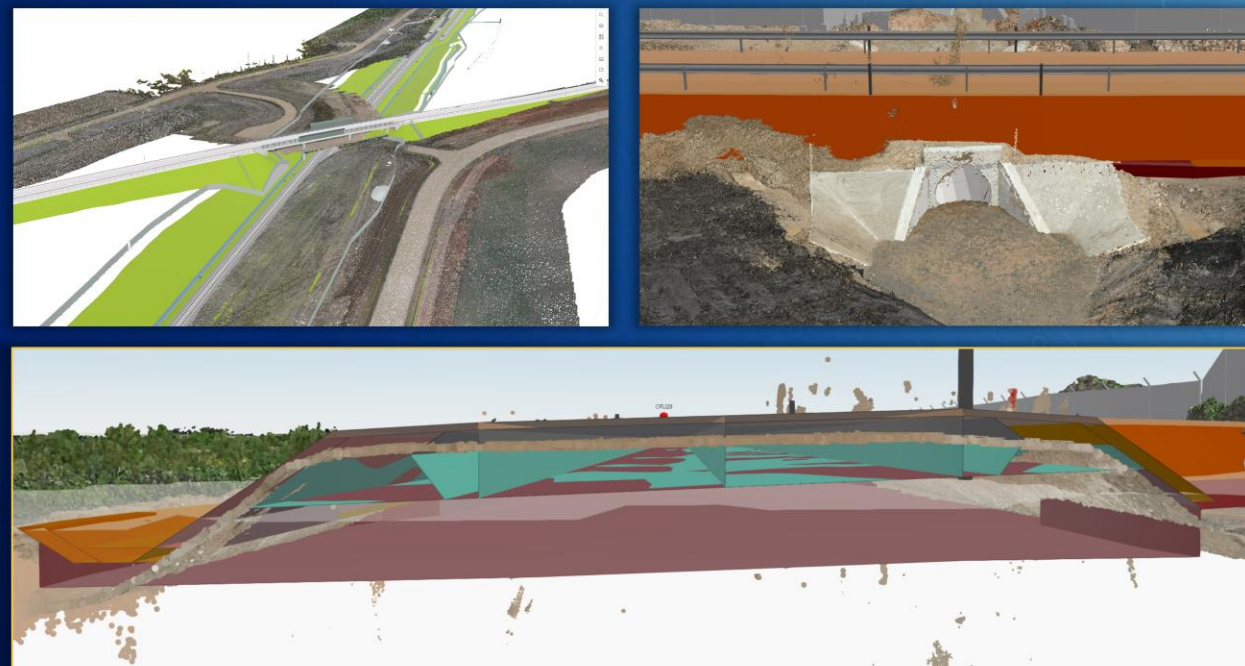
## Field Applications. On-site Data Collection



*BIM and Lidar integration allows a quick evaluation of Construction Quality And Progress*

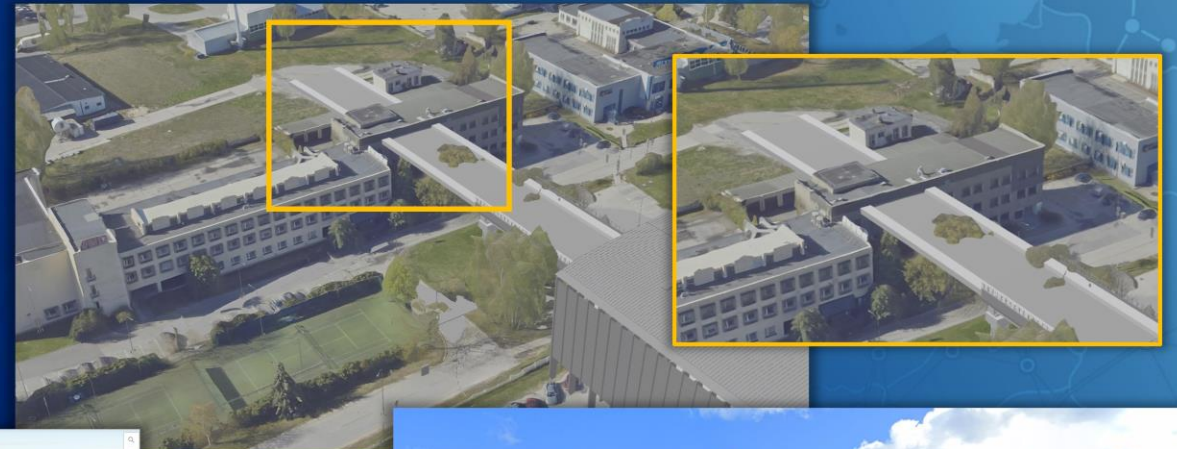


## Remote Sensing (UAV)

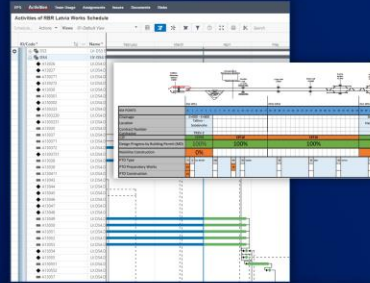


# Provide technical information to non-technical staff and the general public

BIM & Mesh data combine in GIS not only allows to show how future infrastructure will fit into the existing environment, but also allows to identify potential issues and shows everything in a very simple and understandable way for everyone.



# Combine finances, planning and actual construction progress / Provide technical information to non-technical staff and general public



Project Control Management and Reporting Dep.



Global Project Finance Department



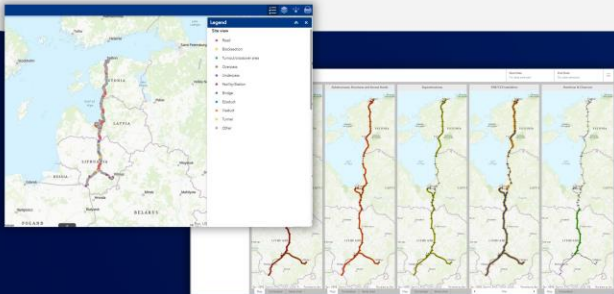
Communication Department

GIS Team

Security Department

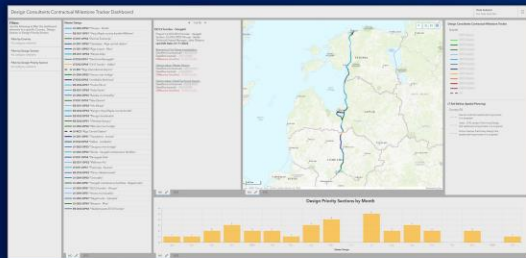
## Construction monitoring for Technical Teams

Technical data of construction progress. High level of detail of information depending on the topic



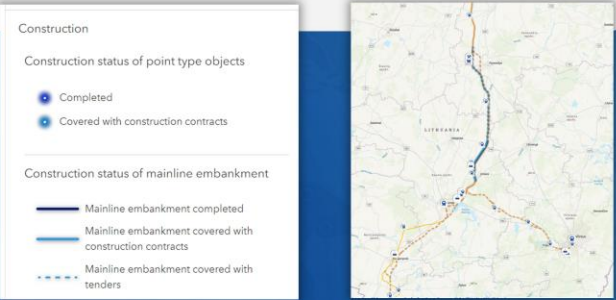
## Construction monitoring for Decision Makers

Financial, planning and construction progress data linked together in order to understand if everything is happening according plan



## Construction monitoring for Public

Clear and simplified information about ongoing processes. The scope of information is limited to the mainline and PTO



## Construction Stage: Challenges

- Large amounts of remote data: point clouds, orthophotos, satellite images, videos, photos, etc.
- High demand on time and human resources
- Combine the office and construction site workforce
- Multiple construction sites in different locations at the same time
- Implement GIS solutions in the field of construction activities

## What's Next?

- Finalize a strategy that defines the methodology and level of detail for sharing construction status information with technical teams and the public.
- Find the best approach to link financial, planning and construction progress data
- Drones vs. Satellites
- Clearly define Lidar use cases
- Clearly defined use cases for video material and the possibility of integration with GIS





# Thank You!



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