



ESRIUM

SAFE AND EFFICIENT ROADS

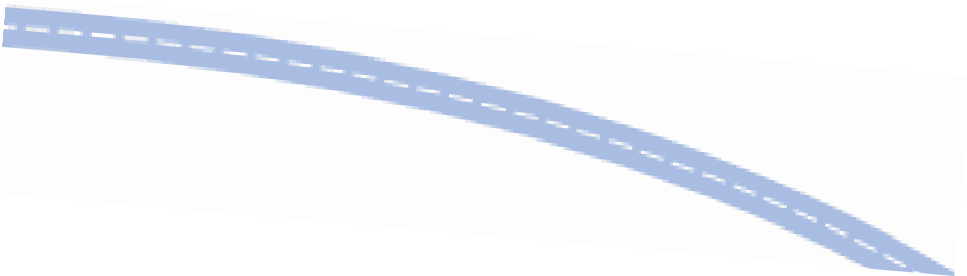


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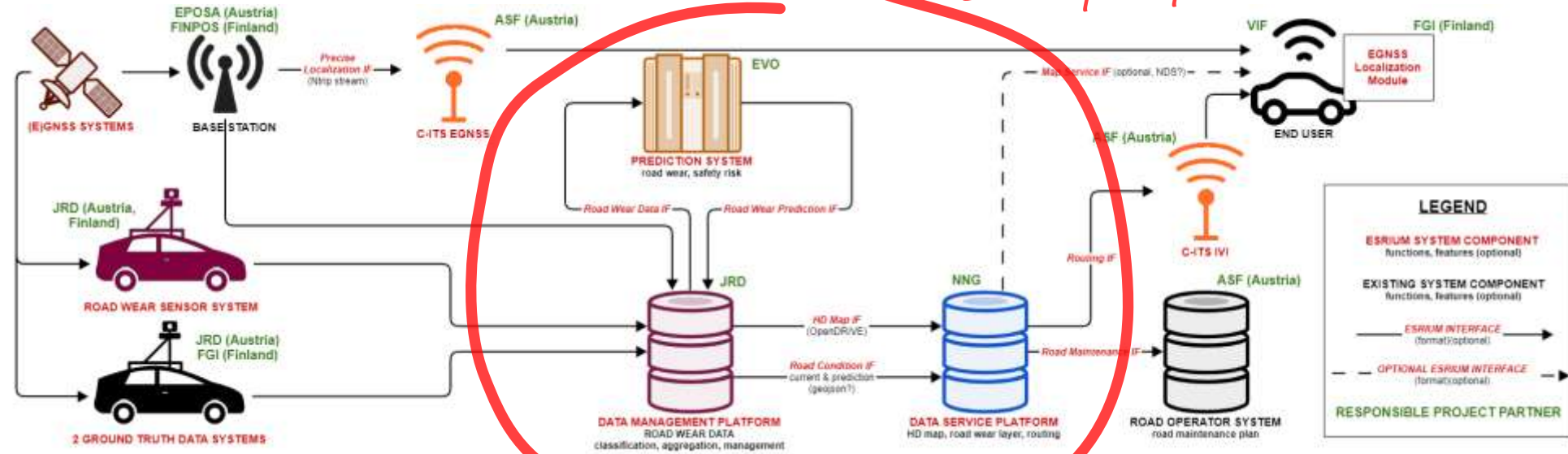


Data platform



System components

Data platform





Data Management Platform (DMP)

- Layer to store road wear map features and road wear predictions with meta data
- Aggregates different types of road wear hotspots as spatial features
- Implemented as spatial database with time series support
- Provides management, validation and visualization modules
- Provides interface for uploading and querying data



Data Management Platform (DMP)

id	type	geom	ts
1	crack	POLYGON(...)	2021-08-15 11:47:01.050
2	surface damage	POLYGON(...)	2021-08-15 11:47:01.299
3	rut	POLYGON(..)	2021-08-15 11:59:01.050
...

r_id	m_key	m_value
1	severity	medium
1	water_depth	1.74
2	severity	high



031 18117187
Track_A-0301-338_2018.07.15.03.17.50(286)

Heading: 92.0
Tilt: 8.6
Field of view: 43.7

031 18117147
Track_A-0301-338_2018.07.15.03.17.50(286)

Heading: -12.1
Tilt: -23.4
Field of view: 43.6



Prediction System

- Provides road wear and quality predictions from the time series of classified road wear data
- Provides a description and depiction of road performance indicators with suitable deterioration models
- Reliability calculation approaches and forecast models with a clear connection between time-dependent and mechanical parameters as well as other influencing variables.
- Data source: Data Management Platform
- Target end user: Road operator (Afinag)
- Output format: GeoJSON

```
{
  "id": "AB2_303",
  "prediction_date": "2021-05-28",
  "wear_predictions": [
    {
      "pred_severity": 3,
      "pred_type": "binder_emission",
      "pred_timeframe": "220 days"
    },
    {
      "pred_severity": 4,
      "pred_type": "chipping",
      "pred_timeframe": "330 days"
    },
    {
      "pred_severity": 5,
      "pred_type": "pothole",
      "pred_timeframe": "440 days"
    }
  ]
}
```



Data Service Platform (DSP)

- Provides services from classified road wear data, prediction data and map data
- Data from different sources are matched and georeferenced
- Road wear and prediction data are aggregated for road maintenance purposes
- Trajectories are calculated for passenger cars and heavy duty vehicles
- Converts map and road wear data for different guidance services, such as NDS Live, TPEG2 or C-ITS IVI



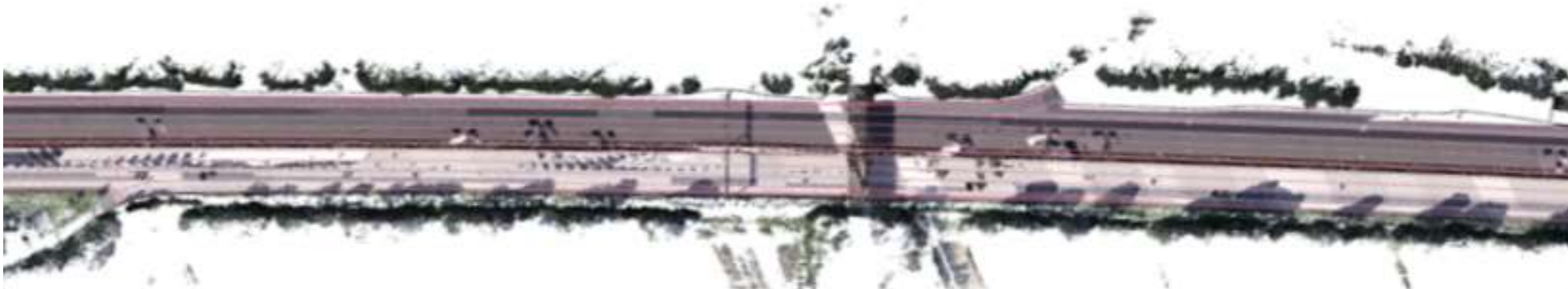
Data Service Platform (DSP)

Data sources:

- Data Management Platform
- Prediction System
- Road Operator (Asfinag)

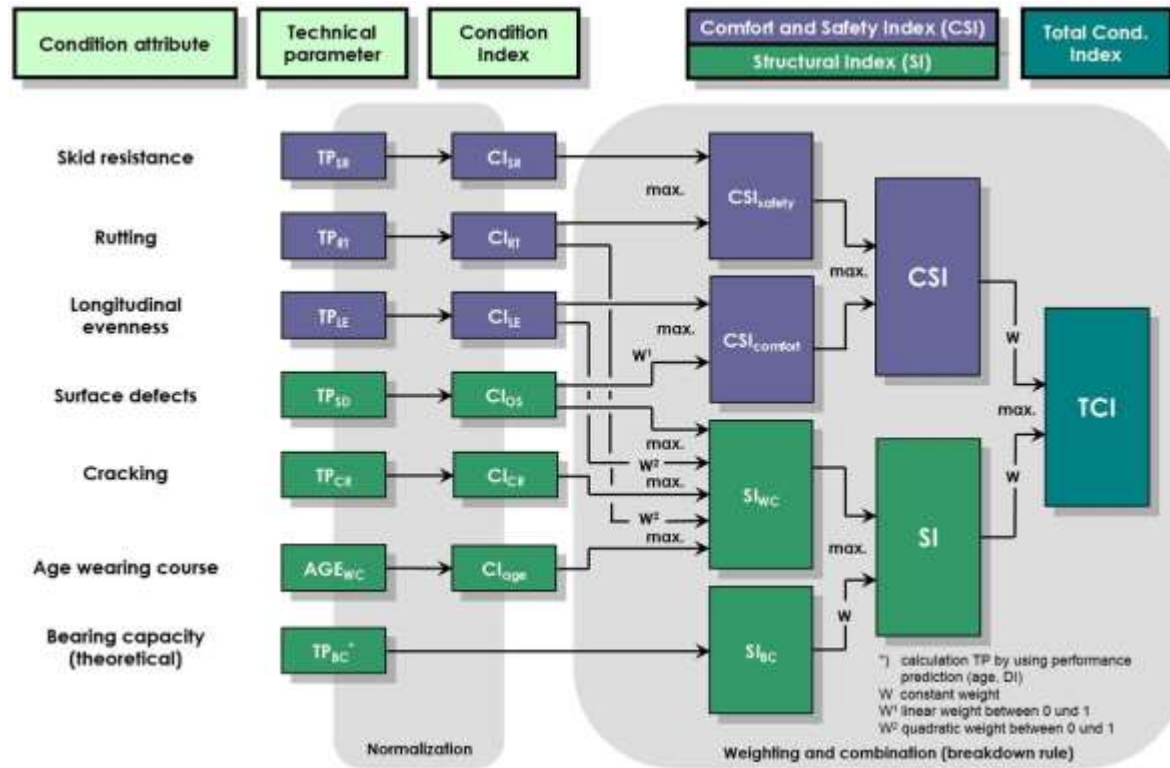
Formats:

- HD basemap (OpenDrive 1.4)
- Classified road wear data & prediction data (GeoJSON)



DSP – Road Maintenance Interface

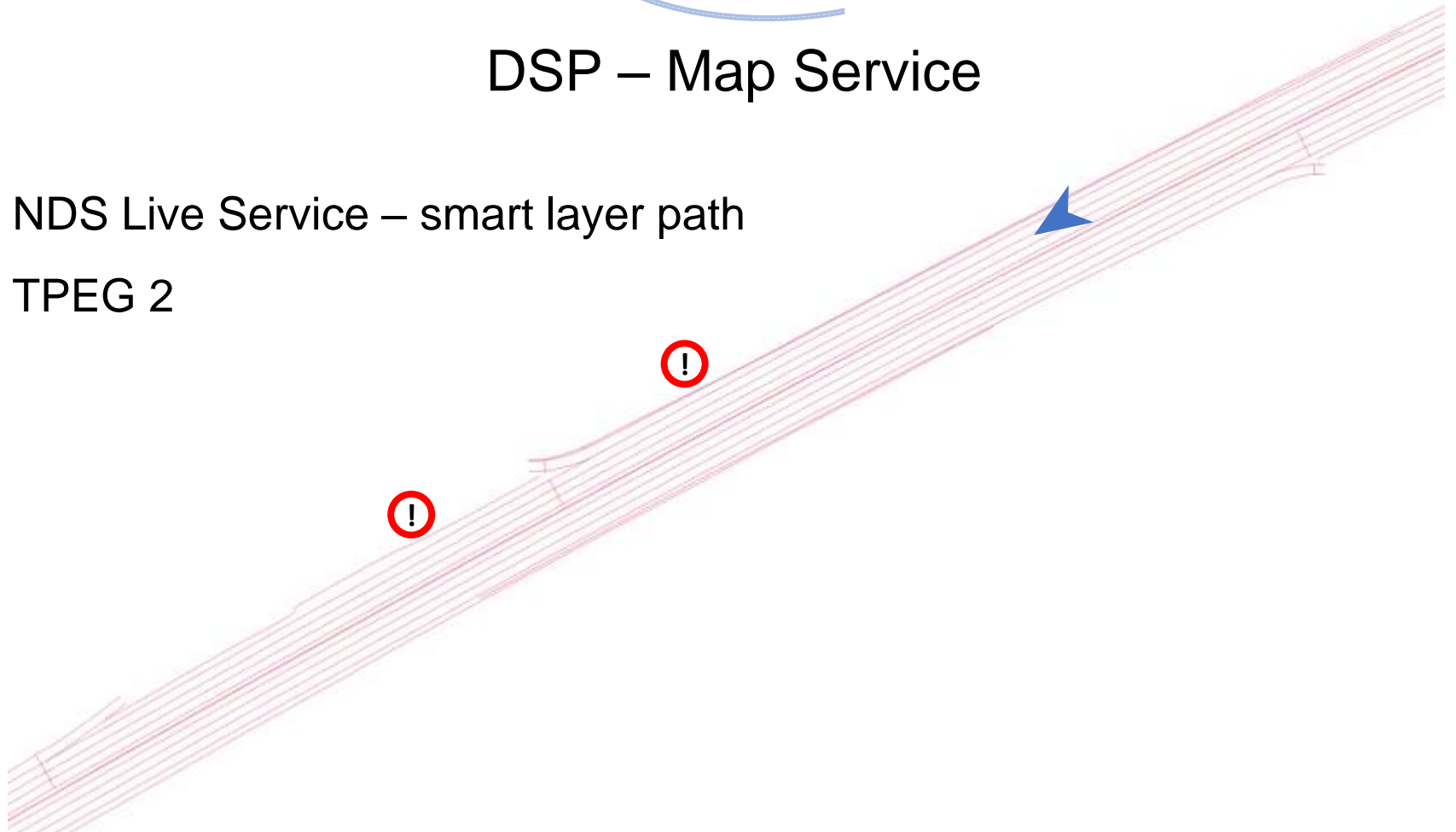
- Aggregation of the classified road wear data to provide road surface quality data for the road operator (Asfinag)





DSP – Map Service

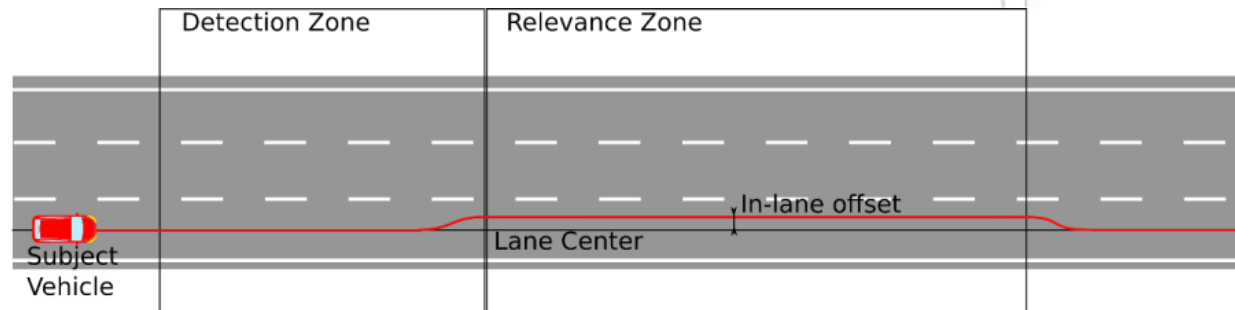
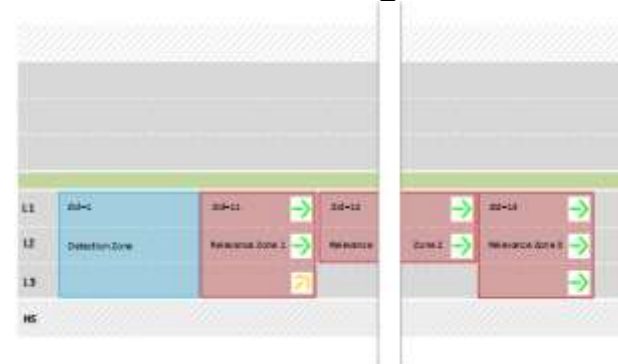
- NDS Live Service – smart layer path
- TPEG 2





DSP – Routing Interface

- Routing info for the road operator's C-ITS IVI service
- Target end users: passenger cars & heavy duty vehicles (trucks, buses)
- Road wear data is filtered by vehicle categories for safety critical road damages
- Possible maneuvers:
 1. Avoid the road damage by an in-lane maneuver
 2. Avoid the road damage by switching lanes
 3. Slow down
- Calculating Detection and Reference Zone positions from
 - Road damage position and severity
 - Vehicle type
 - Speed limit





24/09/2021

Thank you!

András Csepinszky





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