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SAFE AND EFFICIENT ROADS

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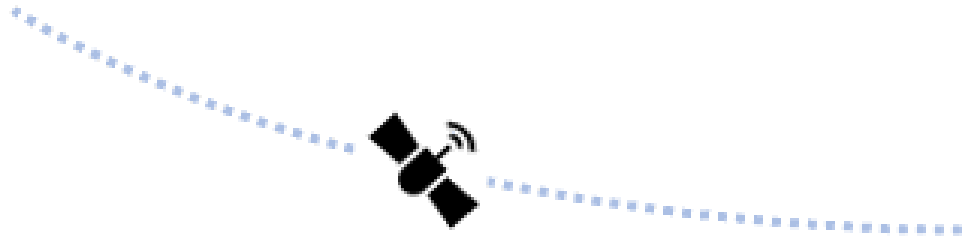
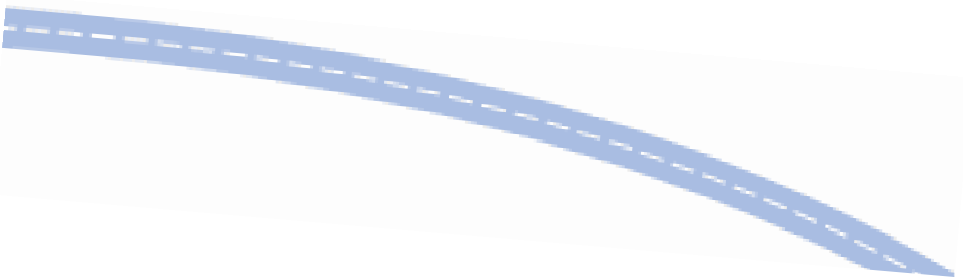


TISA Workshop 15.03.2023:

➢ Road damage classification

Andras Csepinszky, Director of Advanced Automotive Technology at the NNG



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Actual classification available in ESRIUM

- Terminology based on road operators POV
- Definitions reflecting maintenance priority
- SRTI & RTTI needs different approach
- No international consensus exists for both maintenance terminology and for traffic relevant classification
- No international consensus exist on nature of damage data e.g. it can be dynamic, static or even both for service perspective

1 Pavement damage classification (English / Magyar / Deutch)

Pavement	Damage			Description
Asphalt Aszfalt Asphalt	Pavement_damage Útburkolat_hiba	Cracking Repedés	Fatigue_(Alligator)_cracking Mozaikos_repedés	Alligator or fatigue cracking is a series of interconnecting cracks caused by fatigue failure of the asphalt concrete surface under repeated traffic loading. (https://pavementinteractive.org/glossary/alligator-cracking/)
			Longitudinal_cracking Hosszirányú_repedés	Cracks parallel to the pavement's centerline or laydown direction. Can be a type of fatigue cracking or top-down cracking. https://pavementinteractive.org/reference-desk/pavement-management/pavement-distresses/longitudinal-cracking/
			Transverse_cracking Keresztirányú_repedés	Cracks perpendicular to the pavement's centerline or laydown direction. Usually a type of thermal cracking. https://pavementinteractive.org/reference-desk/pavement-management/pavement-distresses/transverse-cracking/
			Block_cracking	Interconnected cracks that divide the pavement up into rectangular pieces. Blocks range in size from approximately 0.1 m2 (1 ft2) to 9 m2 (100 ft2). Larger blocks are generally classified as longitudinal and transverse cracking. Block cracking normally occurs over a large portion of pavement area but sometimes will occur only in non-traffic areas. https://pavementinteractive.org/reference-desk/pavement-management/pavement-distresses/block-cracking/
			Slippage_cracking	Crescent or half-moon shaped cracks generally having two ends pointed into the direction of traffic. https://pavementinteractive.org/reference-desk/pavement-management/pavement-distresses/slippage-cracking/

https://confluence.nng.com/display/ESRIUM/Road+surface+obstacle+types+classification

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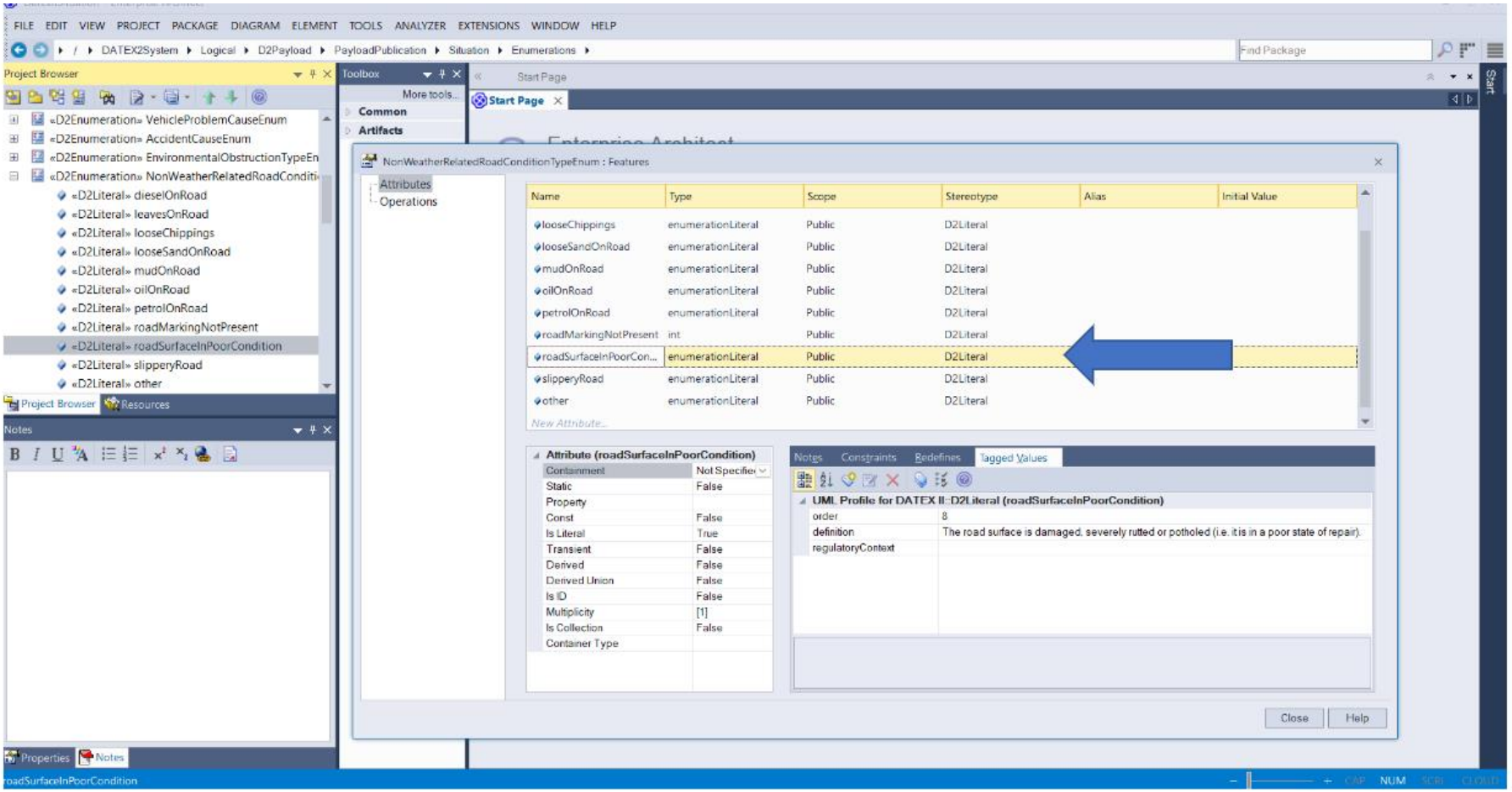
What is going on?



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What is going on?

ISO/AWI 22726-2 Intelligent transport systems –Dynamic data and map database specification for connected and automated driving system applications –Part 2: Logical data model of dynamic data

- Is referencing the road damage service use case as traffic relevant
- Keeps open the possibility to integrate DATEXII, TPEG, IVI, VICS etc. data for road damage
- All these standards needs to be extended to carry relevant information for SRTI use cases (for both human and machine drivers)
- Extension needs to be synchronized and SRTI relevant road damage classification and metadata needs to be specified

Discussion points

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✓ Road damages needs to be classified for both

- Road maintenance
- In-Vehicle usage
- **Impact:** in-vehicle system requirements need to be considered (driver needs, vehicle needs, traffic needs, etc.)
- **Fact:** not all road damage type are dangerous for the vehicle and for the traffic
- **Impact:** business model may suggest vehicles avoiding non-dangerous road damages can benefit of incentivization (in case maintenance and in-vehicle usage are linked together) –is this business model realistic?

✓ Are road damage information dynamic or static by their nature?

- **Impact:** data service needs to be low latency or high latency? (C-ITS, SRTI, Map as a Service)
- **Impact:** Expected update frequency and data production processes need to be adjusted accordingly
- **Impact:** optimize data delivery strategy for in-vehicle usage

✓ Road damage data needs to have relevant content description

- Geolocalisationof road damage objects (need to avoid too many LR points as it can overload in-vehicle systems –if map matching happens in the car which is the case for C-ITS and SRTI services)
- 3D characteristics (voxel model?) to make SRTI relevance assessment possible (e.g. deep pothole with sharp edges risking tire failure)
- Metadata (validity time –it will disappear due to planned maintenance, severity for different vehicle types, etc)
- Fact: data relevance, confidence, reliability and trustworthiness is key for CCAM
- Fact: In vehicle systems have limited CPU and RAM for map-matching

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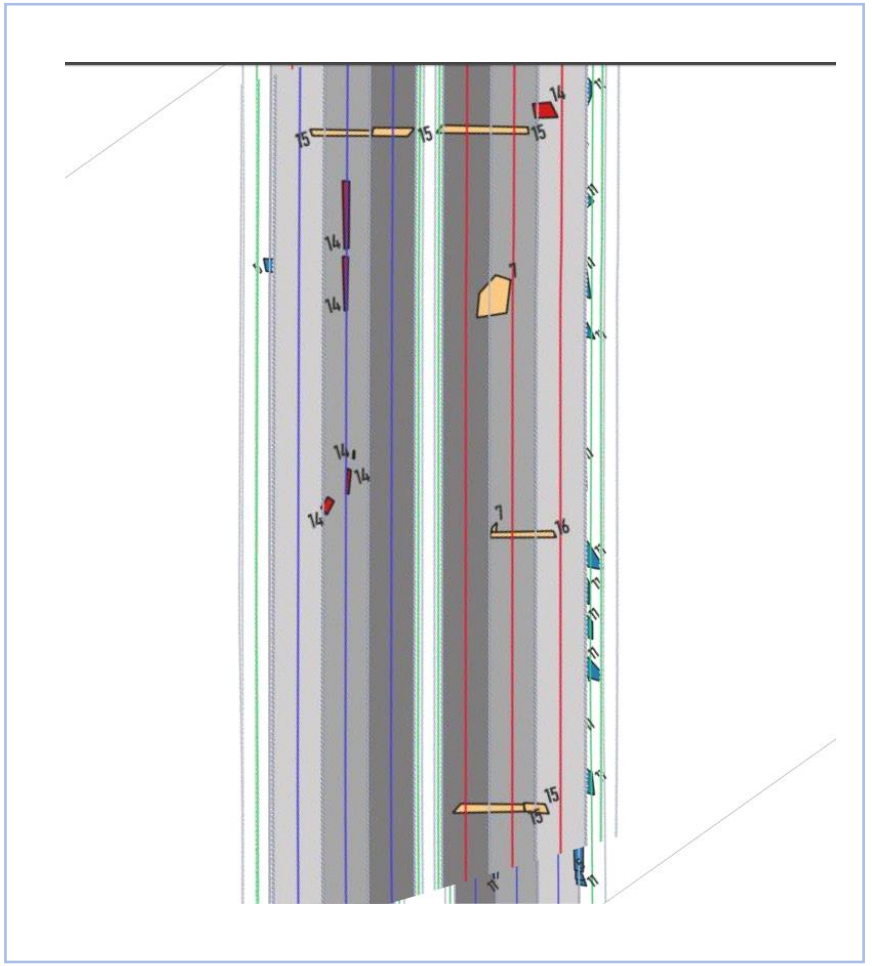
Example damage sets

- Group of RWFs
- RWFs on the lane boundary...
- All lanes are corrupt, how to prioritize?



15/03/2023

Thank you!

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