

Introducing the activity for Dynamic Map in SIP-adus

November 17, 2014

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Organization

Cross-ministerial Innovation Promotion Program (SIP)

Innovation of Automated Driving for Universal Services (SIP-adus)

System Implementation WG

Dynamic Map Structuring Task Force

12 Members from Government, Universities, NILIM*1, DRM*2 and Car OEMs

***1 National Institute for Land and Infrastructure Management**

***2 Japan Digital Road Map Association**

Next Generation Urban Transportation WG

International cooperation WG



Scope of the Investigation

Data Source

Dynamic Data

- ✓ Traffic Jam
- ✓ Traffic Accident
- ✓ Road Condition
- ✓ Signal and Sign
- ✓ Traffic Restrictions
- ✓ ...

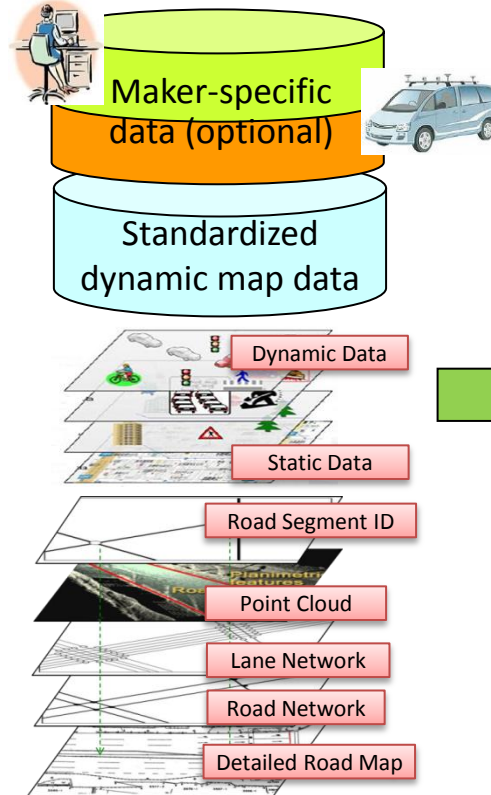
National/local government,
Police, Road Companies

Static Road Structure

- ✓ Highway
- ✓ National Road
- ✓ Local Road

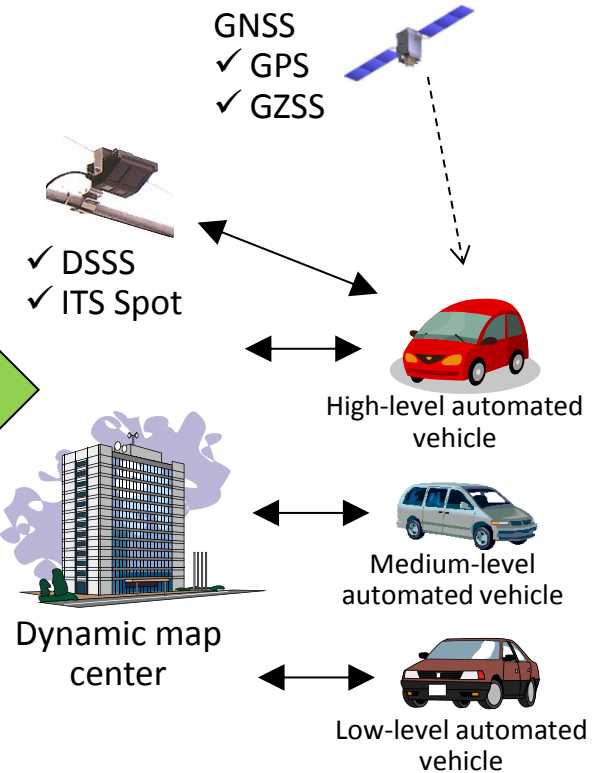
- Availability of data
- Precision, Reliability, Coverage
- Freshness, Real-time property
- Location reference
- Data format

Data Structure



- Easy to store
- Easy to maintain
- Easy to access
- Standardization area

Data Delivery



- Required data
- Use case
- Required precision, reliability, and freshness
- Separation of standardization and competition areas



Current Discussion Items @Task Force

■ Information Gathering

- Formulation and Standardization of Static Map Data Format and Local Dynamic Map
- International and Domestic Activities: ITS-WC, ISO TC204, DRM activity, etc.

■ Use Cases of Dynamic Map for Automated Driving / Human Driver

■ List of Dynamic Map Data

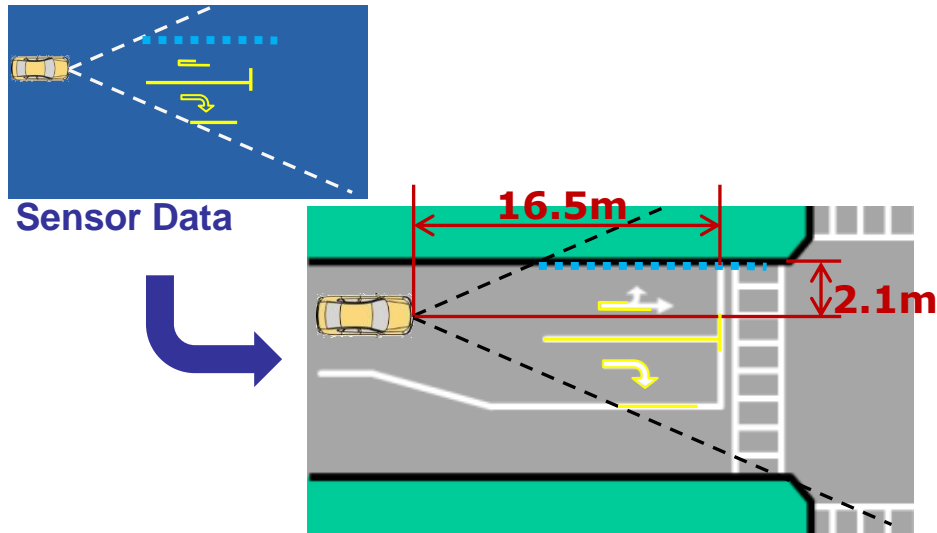
■ Map Data Format Structure and Standardization

■ Location Reference : Geographical / Topological

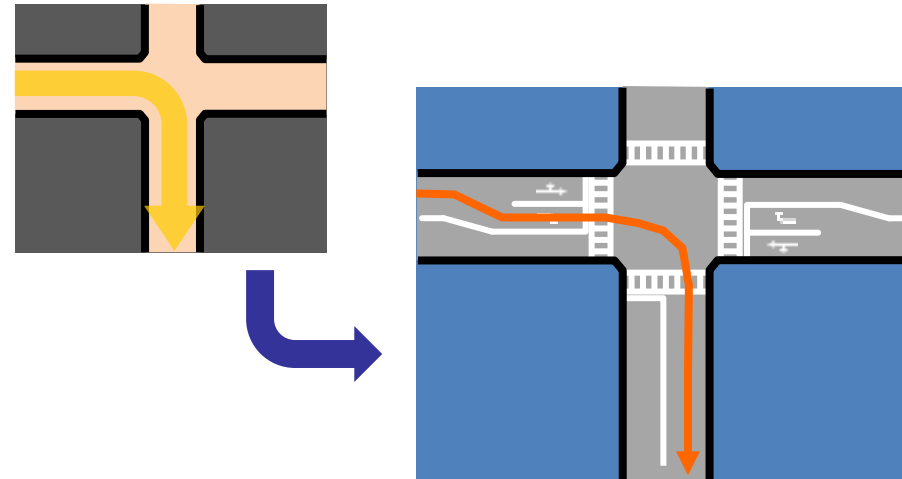


Use Cases of Dynamic Map for Automated Driving

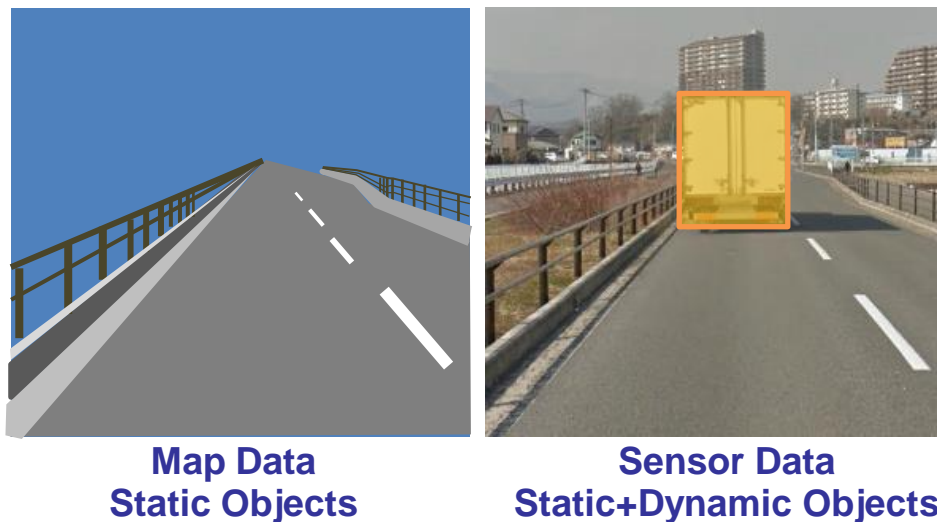
Location Identification



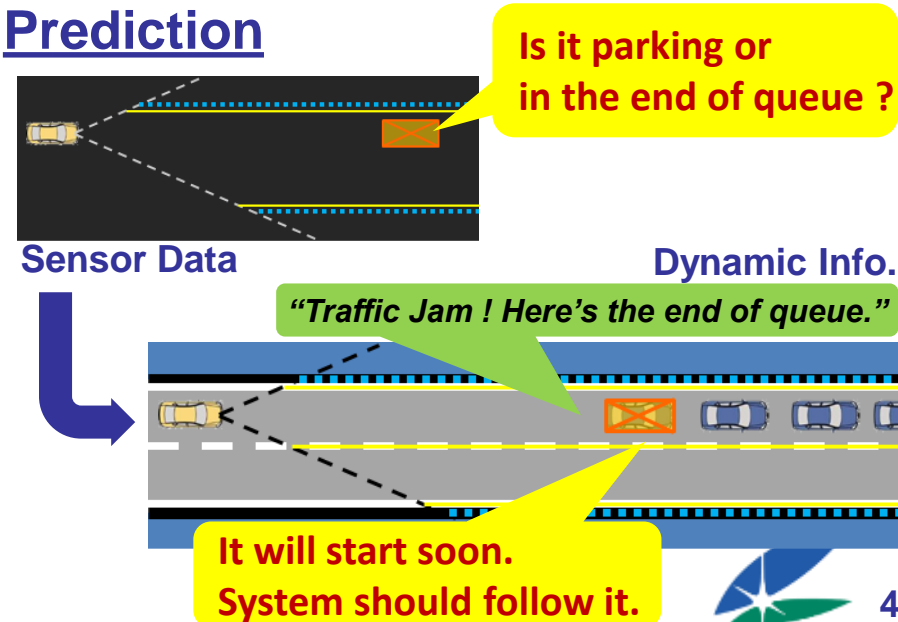
Lane level Route Planning



Extracting Dynamic Objects



Prediction



Use Cases of Dynamic Map for Human Driver

■ Advanced Navigation

- More Precise & Less Time Lag
- Guiding Continuous Traffic Flow
- Recommending Drive Lane
- Personalized Route Guide
- Energy Saving Route Guide



■ Predictive Vehicle Control Assistance

- Automatic Gear Shifting According to Road Shape Ahead
- Vehicle Dynamics Control According to Road Grade



◆ *Out of Scope*

- *Negotiation & Control with Other Traffic ... marginal*
- *Traffic Flow Optimization*



List of Dynamic Map Data

■ Road Information

- HD Map : Road, Intersection, Ramp etc.
- Traffic Rules
- Landmarks
- POI
- Accident Black Spots

■ Traffic Status

- Traffic Jam
- Traffic Light Status
- Road Works, Accident, Obstacle
- Weather
- Parking Lot Vacancy
- Road Condition (Icy, Wet, Dry)

■ Car/Bike/Pedestrian



Task Force does not aim comprehensive listing.

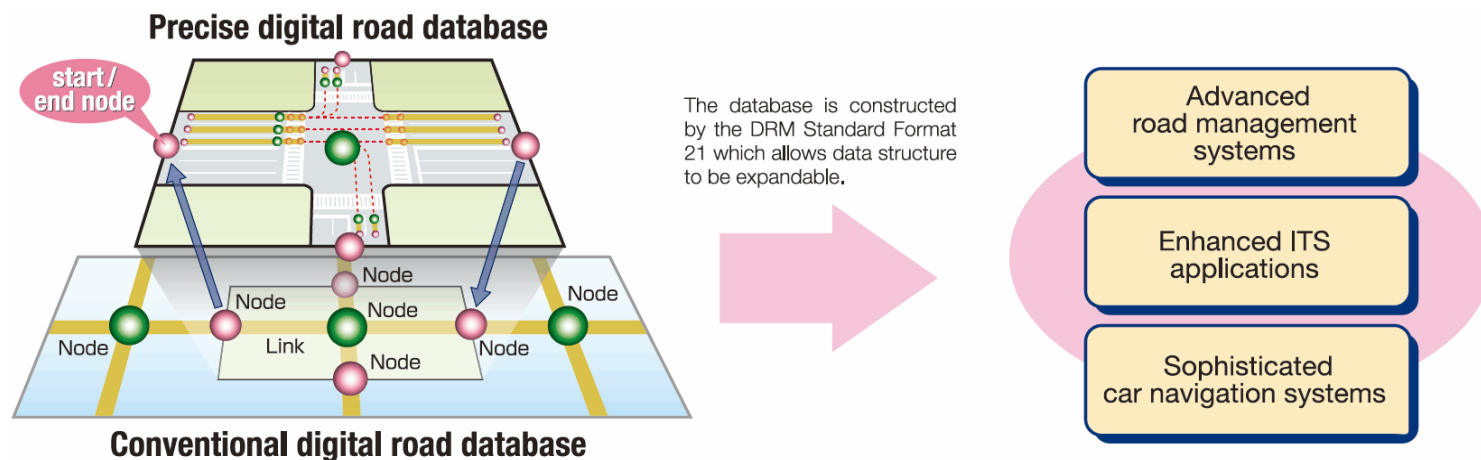


Map Data Format Standardization

New Map Data Format which is applicable to Automated Driving should be established.

■ Existing Standardization Activities

- ISO TC204 WG3 : New PWI “Expansion of ISO14825” is started
ISO14825 : Geographic Data Files (GDF)
- ISO TC204 WG18 : TS18750 “Definition of a global concept for LDM”
- DRM : Precise digital road map database



Source : DRM Website (<http://www.drm.jp/english/drm/database/standard.html>)



Location Reference : Geographical / Topological

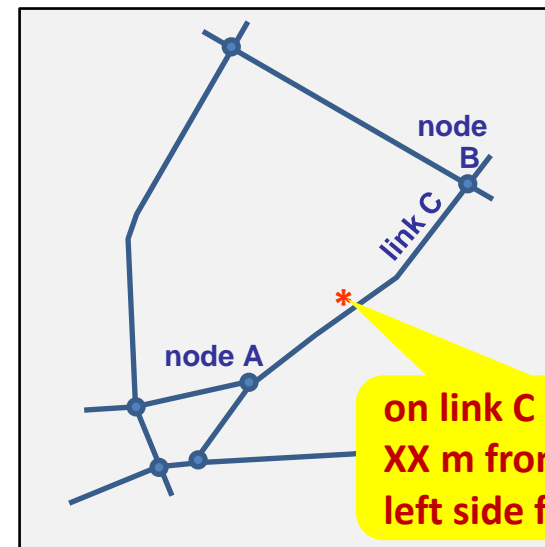
To exchange objects' location, location reference for Dynamic Map should be standardized.

- 3D global coordinate + supplementary information : Geographical
Not suitable for automated driving?
- Node / link / lane segment ID + relative position : Topological
Is the assignment of authorized ID possible?



Source : UNU Website (<http://archive.unu.edu/access/>)

Geometrical format



Topological format



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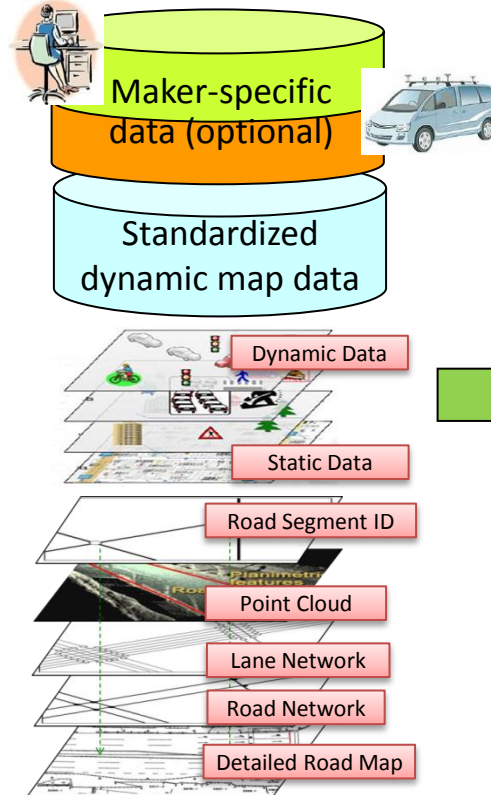
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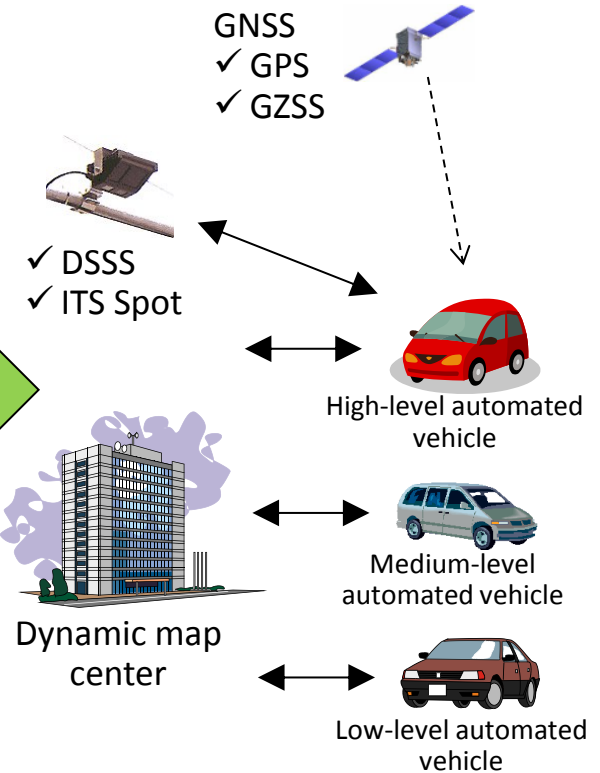
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Thank you

