
# STF 448 - ”LOCAL DYNAMIC MAP (LDM) STANDARDISATION FOR VEHICLE ITS STATION”

**Final**

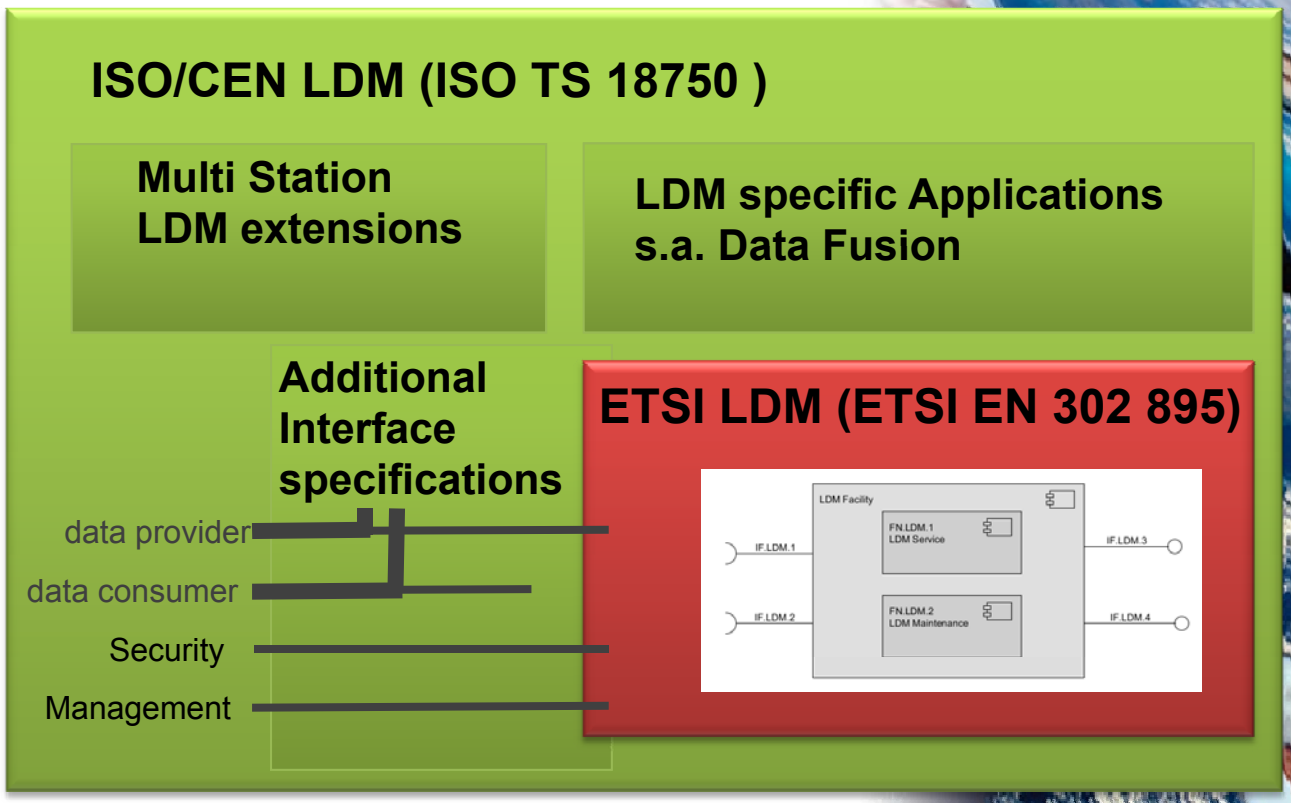
By Paul Spaanderman, Bart Netten

# Purpose of the LDM standardization

- An Local Dynamic Map (LDM) is a key feature to ease the access to relevant commonly used Cooperative ITS information available in the ITS-Station.
- Complexity of the Roadside ITS-S and Vehicle ITS-S are different 2 Work Items were defined:
  - *ETSI ITS TC: STF448 to create the Vehicle focused LDM. The EN 302 895.*
  - *CEN278WG16/ISO204WG18: PT1604 to create the extended LDM specification with focus on RSU ITS-S. The TS 18750.*

# Purpose of the LDM standardization

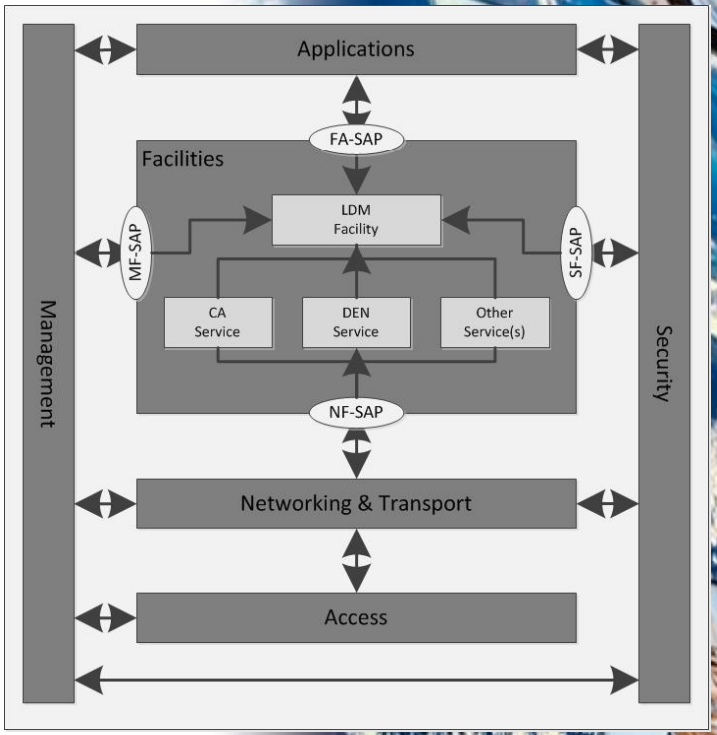
- Cooperation between
  - **ETSI TC ITS**
  - **CEN/ISO**



# LDM specification EN 302 895

The Local Dynamic Map (LDM) is a key facility within the ITS station facilities layer.

The LDM supports the Basic Set of Applications by providing plausible authorized, area related information in a time relevant manner.




## Applications considered:

- Driving assistance - Cooperative awareness;
- Driving assistance - Road Hazard Signalling;
- Speed management;
- Cooperative navigation Location based services;
- Community services;
- ITS station life cycle management.

# LDM functionality EN 302 895

**The Basic Local Dynamic Map (LDM) is a Data store within the ITS-S to:**

- **Store and protect LDM Data Objects to be shared with facilities and applications within a single ITS-S;**
  - Store LDM Data Objects from LDM Data Providers, such as the Basic Services
  - Provide LDM Data Objects to LDM Data Consumers, such as the BSA
    - by means of subscription/notification method; or
    - by means of queries including spatial queries;
- **Ensure data access is authorized through registration as LDM Data Providers and Consumers;**
- **An entity can be registered as a LDM Data Provider and a Consumer, for example:**
  - data fusion capabilities, or an application providing derived data as input to other applications

At registration the Security is asked for authorization. The LDM verifies permissions upon every access.

# LDM functionality EN 302 895

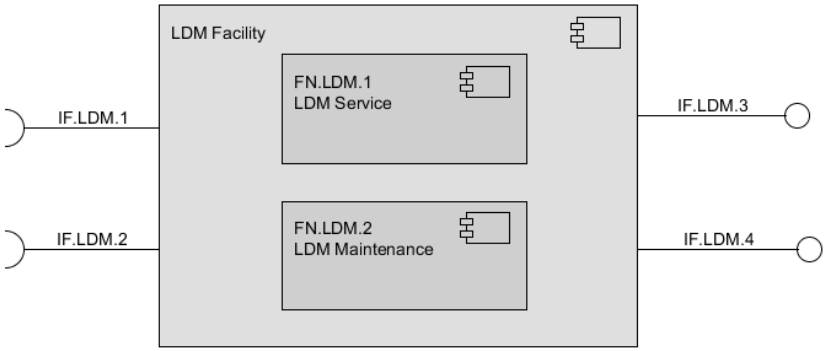
## The Basic Local Dynamic Map (LDM) is a Data store within the ITS-S to:

- **Store, maintain and protect information according to constraints of time and area of maintenance;**
  - The LDM Data Provider defines LDM Data Objects with timestamp (generation time) and location reference (reference position/area)
  - The LDM maintains data within a minimum history window (time validity) and within an area around the ITS-S (LDM configuration)
  - Enable garbage collection mechanisms outside this window
- **Requests for LDM Data Objects can be filtered**
  - for example by LDM Data Object type, attribute values, time stamp, location (e.g. area)
- **Prioritize data requests;**
  - Enable LDM to manage its own performance by ordering requests
  - LDM Data Consumers may indicate their priority upon every request

# LDM functionality EN 302 895

## LDM Functional Architecture

- The LDM Service component is responsible for Providing functionalities to authorized LDM Data Providers for LDM data manipulation.
- The LDM Maintenance Component is responsible for storing and maintaining the data and its integrity as well as for the garbage collection of persistent data held within the LDM




| Interface ID | Interface Type | Component connected | Message Type | Direction |
|---|---|---|---|---|
| IF.LDM.1 | R | Management layer | MF-SAP | IN and OUT |
| IF.LDM.2 | R | Security layer | SF-SAP | IN and OUT |
| IF.LDM.3 | P | LDM Data Providers | CAM, DENM and other | IN |
| IF.LDM.4 | P | LDM Data Consumers | CAM, DENM and other | OUT |

# LDM functionality EN 302 895

## Now and Future use

- **Enable basic functionality**
  - Store and request data from basic messages as LDM Data Objects
- **Enable advanced functionality, e.g.**
  - Store and requests sub objects (e.g. dynamically changing containers)
  - Maintain history of data (e.g. to support data fusion)
- **LDM Data Objects should be *Common* to all facilities and applications in an ITS-S**
  - As defined in a Common Data Dictionary
    - Currently only for (CAMs (EN 302 637-2) and DENMs (EN 302 637-3);
  - To be extended with data dictionaries from other message sets or applications, also from other standardization bodies, such as CEN; ISO; SAE; TISA; IEEE and ITU.

# LDM functionality EN 302 895

## STATUS of the EN 302 895 Standard.

- After 3 remote consensus with 0 comments at the last cycle the Final Draft EN 302 895 V0.0.12 is provided for TB approval 2014-01-16.
- Start of Public Enquiry will start and will lead to the release of this standard as EN 302 895 V1.1.1.

# Any questions?

- Paul Spaanderman, STF 448 Leader
  - paul.spaanderman@tno.nl
- Bart Netten, STF 448 and PT1604 expert
  - bart.netten@tno.nl