ENSEMBLE

ENabling SafE Multi-Brand Platooning for Europe

Marika Hoedemaeker, 18-09-2018

ITS World Conference Copenhagen, Workshop "Transforming Freight Movement through ITS"

Content

- ENSEMBLE intro and objectives
- Description of the main WP’s
- Impacts of multi-brand platooning
- Platoon coordination
- Where are we now?
- What’s next?

H2020 projects result from ART 2017

ENSEMBLE

	Projects
ICT infrastructure for automated road transport • Design, implement and test ICT infrastructure for higher levels of automation (up to level 4)	ICT4ART
Multi-Brand platooning in real traffic conditions • Testing multi-brand platooning on European roads across national borders	ENSEMBLE
Urban road transport automation	AVENUE
	FABULOS

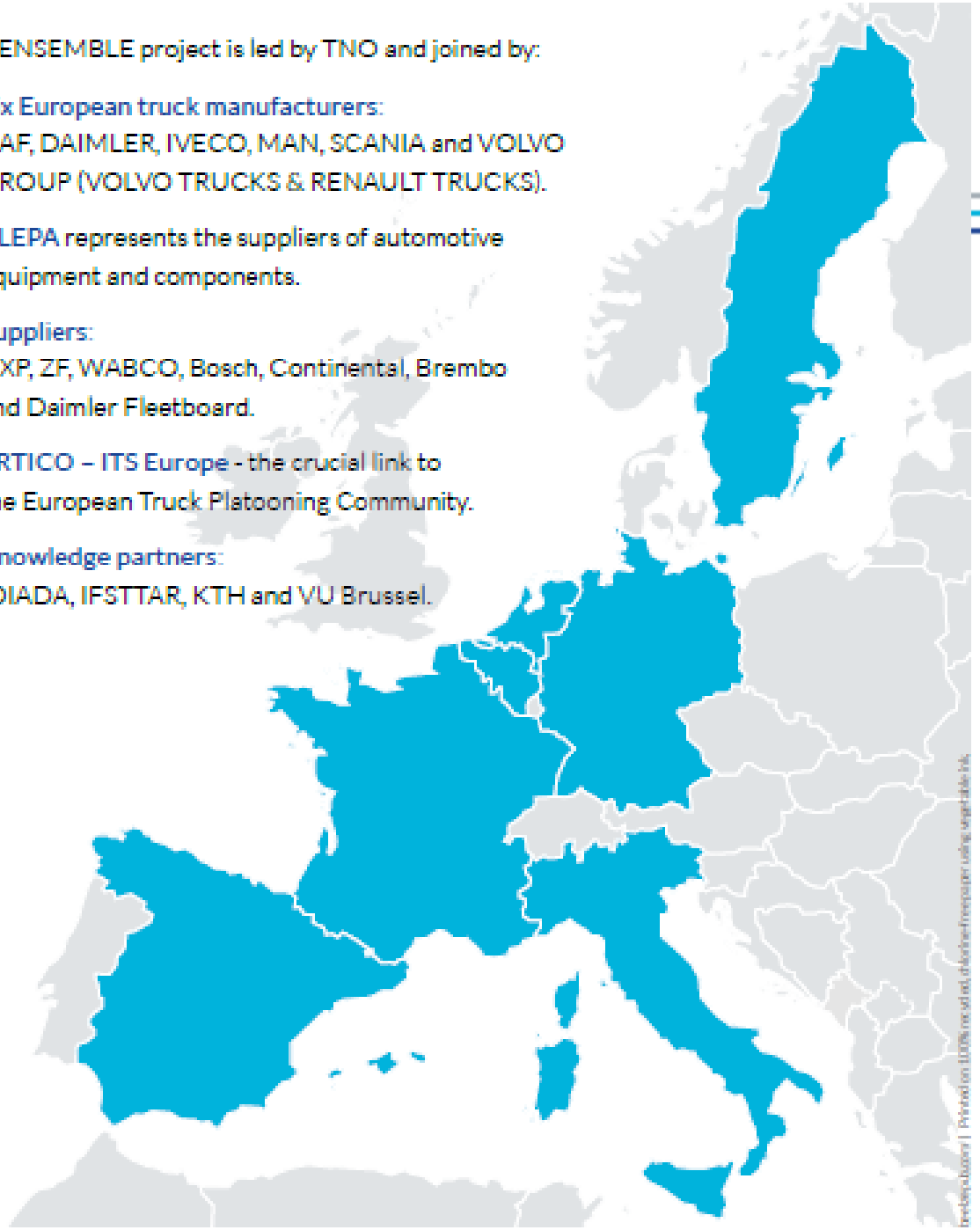
ENSEMBLE facts

- Innovation Action number 769115
- 3 year EU project, started June 1st 2018
- 20 million euro funding EC
- 20 partners, including 6 truck manufacturers and CLEPA representing automotive suppliers

ENSEMBLE team

The ENSEMBLE project is led by TNO and joined by:

- Six European truck manufacturers:
  DAF, DAIMLER, IVECO, MAN, SCANIA and VOLVO GROUP (VOLVO TRUCKS & RENAULT TRUCKS).
- CLEPA represents the suppliers of automotive equipment and components.
- Suppliers:
  NXP, ZF, WABCO, Bosch, Continental, Brembo and Daimler Fleetboard.
- ERTICO – ITS Europe - the crucial link to the European Truck Platooning Community.
- Knowledge partners:
  IDIADA, IFSTTAR, KTH and VU Brussel.



18 September 2018

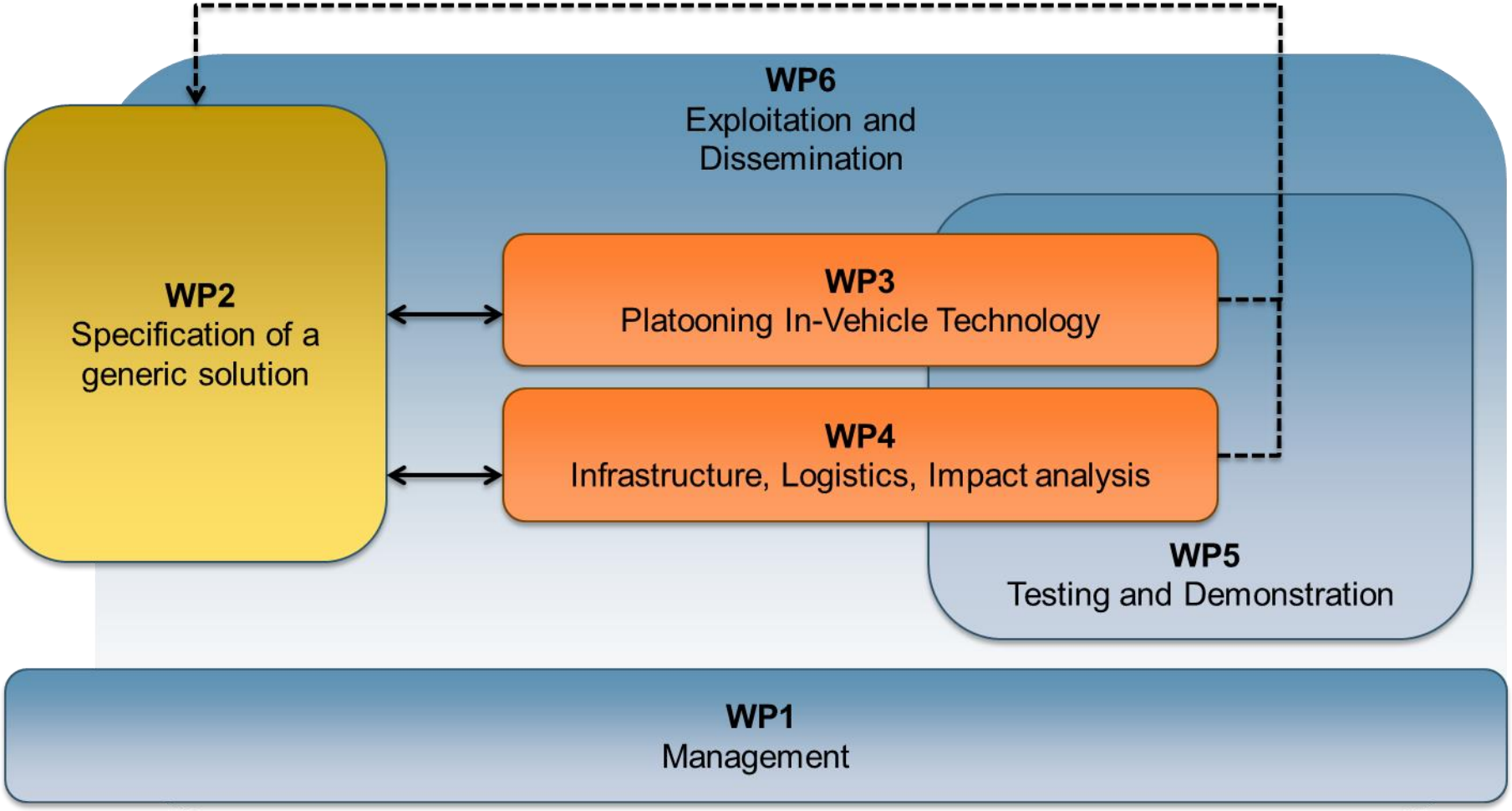
Objectives of the 3 year project

- To pave the way for the adoption of multi-brand truck platooning in Europe
- To align and work on standardization
- To demonstrate differently branded trucks in one platoon
  - Under real world traffic conditions
  - Across national borders.

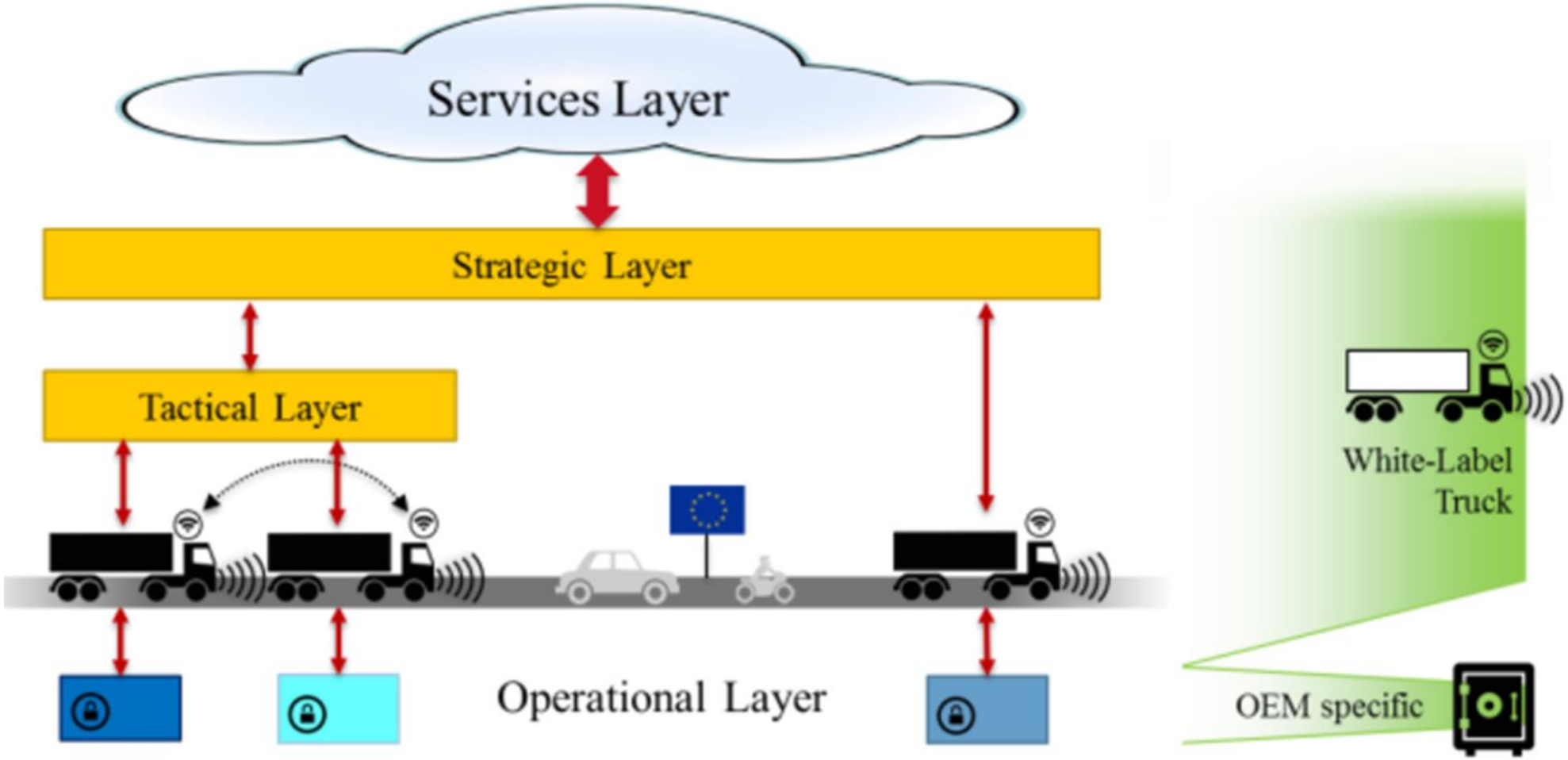
- To assess impacts on traffic safety, throughput and fuel economy.

And in this way ensure acceptance and deployment of platooning

Project structure



Platooning layers



WP2 Specification of a generic solution

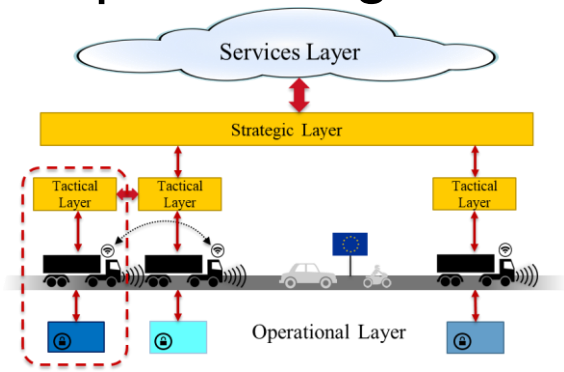
Objective:

- Definition of the *specifications* of the layers and their interfaces to be implemented within the testing and demonstration trucks of the 6 OEMs
- *Iteration process* to validate and modify the specification during the whole project life-cycle is an essential part of the work
- Important input for *standardization*

WP3 Platooning Technology

- Design and implementation of a platooning system according to the specifications of WP2

- Develop the common functionality that is required for multi-brand platooning:
  - platoon coordinator functionality
  - mechanism to check consistency of the messages
  - functionality to guarantee safe behaviour of the platoon



- At least Platooning Level A is implemented, meaning a.o. that only longitudinal automation will be implemented.

- The implementations will be verified in WP5 against the specifications and requirements given in WP2

WP4 Impacts of multibrand platooning

Assessment of the impact of multi-brand platooning on:

- Road infrastructure (pavement, bridges, tunnels)
- Economic and environmental benefits,
  i.e. fuel savings and emissions for different time gaps and positions in the platoon
- Truck drivers & other road users
  i.e.how is their behavioral response and how can we support their interactions with truck platoons
- Traffic conditions and traffic flow

- Assessment of the variability of these impacts:
  Variability in loads and dimensions
  Formation of platoons on the fly

WP4 Service and strategic layers

- Individual trucks need to find each other to form platoons
- During platoon driving, dissolve at some point and continue independently

ENSEMBLE provides:

- Assessment of multi-brand specific issues to form platoons on Strategic and Service Layers
- Description of the interaction and information exchange between the Tactical and Strategic Layer and Service Layer
- (cyber)security prerequisites for data exchange and management for the Strategic and Service Layer, and the interaction with Tactical layer
- Proof concept of platoon coordination in multi-brand pilot case

WP5 Testing and Demonstration

Definition of methodology and test plan for:

- Verification
- Validation: test tracks & public roads
- Evaluation
- Demonstration

Performance of:

- Validation of the generic solution via physical tests in test tracks
- Multi-brand platooning testing in public roads
- Technical evaluation of the generic multi-brand platooning solution
- Demonstration of the multi-brand platoon solution in public roads

WP6 Communication and exploitation

- Interaction with stakeholders
  - ETPC
  - Supporting partners
- Actively contribute to standardization activities
- Communicate and raise awareness about the ENSEMBLE project
- Involve relevant public stakeholders for allowing truck platooning testing on public roads over cross-borders;
- Encourage the exploitation of ENSEMBLE results in Europe and beyond;

Where are we now?

- Focus on WP2 and WP3
- State of the art finished by end of September
- Cooperate to come to jointly agreed specifications (end of 2018)

- Related to the platooning levels A, B, C
  - Level A = minimum requirements
    - E.g. no lateral control, following distance minimum of 0,8 s, disengage platoon or not with with intruder
  - Level B and C will be jointly agreed on, but not demonstrated in the final demo.

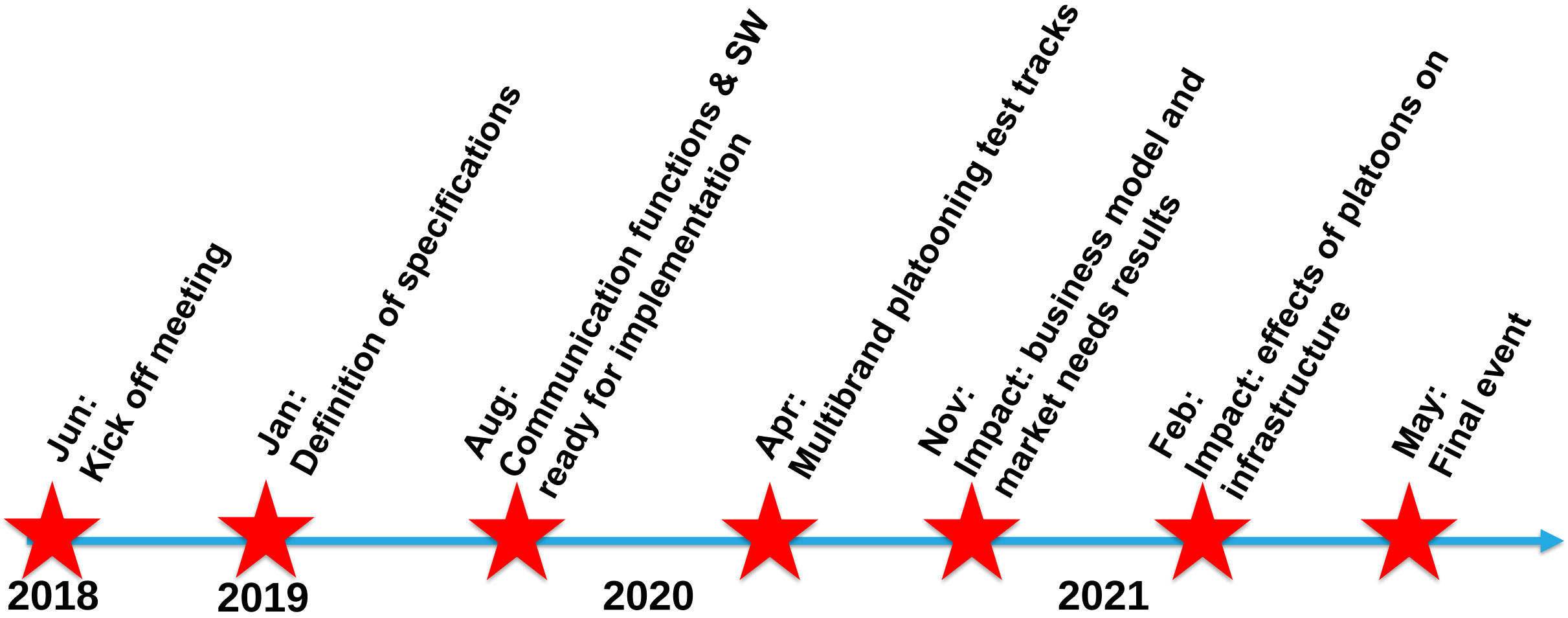
- Results will be in public deliverables since we aim for standardization and broad implementation

What will be the focus next year?

- Design and implementation of a platooning system according to the specifications of WP2
- Develop the common functionality that is required for multi-brand platooning:
  platoon coordinator functionality
- V2X communication aspects
- Set up of test plan
- Licence exemptions
- Market analysis and business models

- Arrange for official cooperation/twinning with US

Main dates


Jun: Kick off meeting
Jan: Definition of specifications
Aug: Communication functions & SW ready for implementation
Apr: Multibrand platooning test tracks
Nov: Impact: business model and market needs results
Feb: Impact: effects of platoons on infrastructure
May: Final event
2018
2019
2020
2021

Multi-brand platooning becomes a reality in Europe

Innovation and Networks Executive Agency

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 769115

Thank you for your attention

ENSEMBLE

www.platooningensemble.eu

Marika.hoedemaeker@tno.nl