HIGH CAPACITY ROAD TRANSPORT

FOCUSSING INNOVATION ON SMARTER MOBILITY SOLUTIONS FOR SMARTER POLICIES

Efficiency Improvement up to 33% by 2030

The AEROFLEX project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 769658

Guiding notes

- The meeting will start 15 minutes earlier (13.45h)
  so that attendees can get over any technical obstacles before the meeting starts.
  Please use this time and be ready for the meeting at 13.45h (already with your cup of coffee/thee).

- Please stay on mute and keep the camera off when not speaking.
- If you are speaking please switch off mute and switch on the camera.

- This webinar will be recorded for the ones not able to attend.

Agenda

- Welcome and rules of the webinar

- ALICE introduction
- Project overview
- Highlights innovations
  - Aerodynamics and hybrid distributed powertrain
  - Analysis of European crash data and scenario specification, front-end design and vehicle architecture
- Q&A

- Modular architectures for efficient logistics operations
  - Smart Loading Units
  - AEROFLEX smart power dolly: Towards efficient and mission-oriented long-haul vehicles
- Q&A

- Impact and requirements
  - How to make road freight transport efficient in my supply chain
    - Demonstration and assessment
    - Transport assessment tool, a cost benefit analysis tool
  - How to drive efficiency and new technology adoption
    - European logistics market
    - State of the art of the regulatory framework and analysis of the technologies
    - Smart and intelligent access regulations to transport infrastructure.
- Q&A

- Next steps, outlook

Develop medium-long term vision for logistics

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ALICE membership per type of organization		
Type of Organization	**Members**	**EU/International Associations**
Shippers & Retail	P&G, L'ORÉAL, proximus, Atlas Copco, HOFER, COLRUYTGROUP	ESC, cefic, ELUPEG, GS1
Logistics Service Providers, Courier and Postal operators & Freight Forwarders	Gebrüder Weiss, GEODIS, BORUSAN LOJİSTİK, FM LOGISTIC, Posteitaliane, Sesé, LINEAS, MULTILOG, OGD, CHEP, TRI VIZOR, CODOGNOTTO	CLECAT, IRU, EALTH, ECG
Ports, Hubs, Intermodal terminals & Transport Infrastructure	Port of Rotterdam, Rijkswaterstaat, TRAFIKVERKET, INTERPORTO BOLOGNA, JLL, HUTCHISONPORTS ECT ROTTERDAM, ECO SLC, Port de Barcelona, Puerto de Algeciras, valenciaport, duisport	FEPORT, European IWT Platform, INE, INLAND NAVIGATION EUROPE
Vehicle Manufacturers & Logistics operations, handling (modular units)	VOLVO, SCANIA, TEVVA, PONERA, LOGIFRUIT	eucar
Information and Communication Technologies & Consultancy	VINTURAS, MARLO, SILENT SENSORS, algoWATT, PNO, UIRNet S.p.A., Green Router, pesclas, PRODUCTBLOKS, everis, log-sea, BIMAR, interlogistics, TRAXENS, ITB Norway, RIA, NIXMOVE, DAC, GEA, VISMA, argus, mosaicfactor, LOGIT ONE, LastMile, inlecom, HaCon, PTV GROUP, TRANSPORECON	ERTICO, LEAN & GREEN EUROPE
Regional & National Logistics Clusters & Associations	vnl, CLOSER, NOV@LOG, AirCargoBelgium, VIL, CESMAD BOHEMIA, Euralogistic, LIMOWA, CARA, EffizienzCluster LogistikRuhr, TKI DINALOG, logistop, POM	Smart Freight Centre
Research and technology Centers	Fraunhofer IML, Fraunhofer IFF, KLU, ICOOR, ZLC, BIBA, Newcastle University, CHALMERS, POLITECNICO DI TORINO, MINES ParisTech, rijksuniversiteit groningen, RISE, TU/e, XAMK, howest, Georgia Tech, Physical Internet Center, ITENE, CATAPULT, ITL, TUDelft, TNO innovation for life, Amsterdam University of Applied Sciences, toi, POLITECNICA, CERTH/HIT, UCA, Malmö University	ectri, ELA, EUROPEAN LOGISTICS ASSOCIATION
European Technology Platforms /PPPs	WATERBORNE, ERRAC, ERTRAC, EFFRA a MANUFUTURE initiative, MANUFUTURE-EU	
Member States and innovation Funding*	Department for Transport, TÜBİTAK, TKI DINALOG, CDTI, Vlaanderen, bmvit, VINNOVA	

** Involved in ALICE Mirror Group*

Activities performed partially in the frame of WINN, SETRIS & SENSE Projects. WINN, SETRIS & SENSE projects have received funding from the European Union´s FP7 and Horizon 2020 research and innovation Programme under grant agreements No. 314743, No. 653739 and No. 769967

Towards zero emissions logistics 2050

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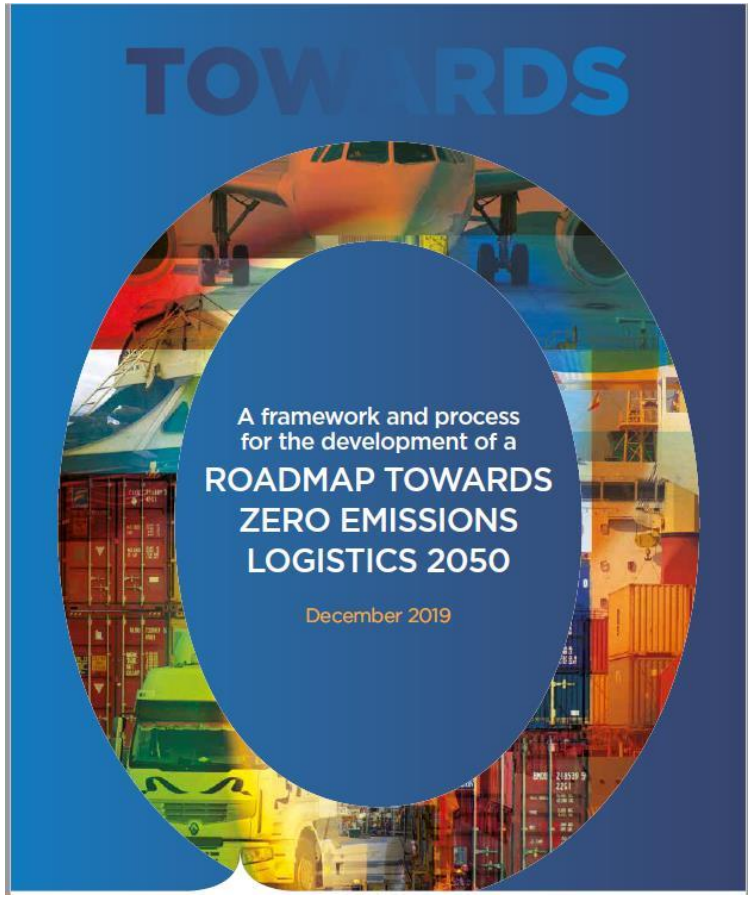

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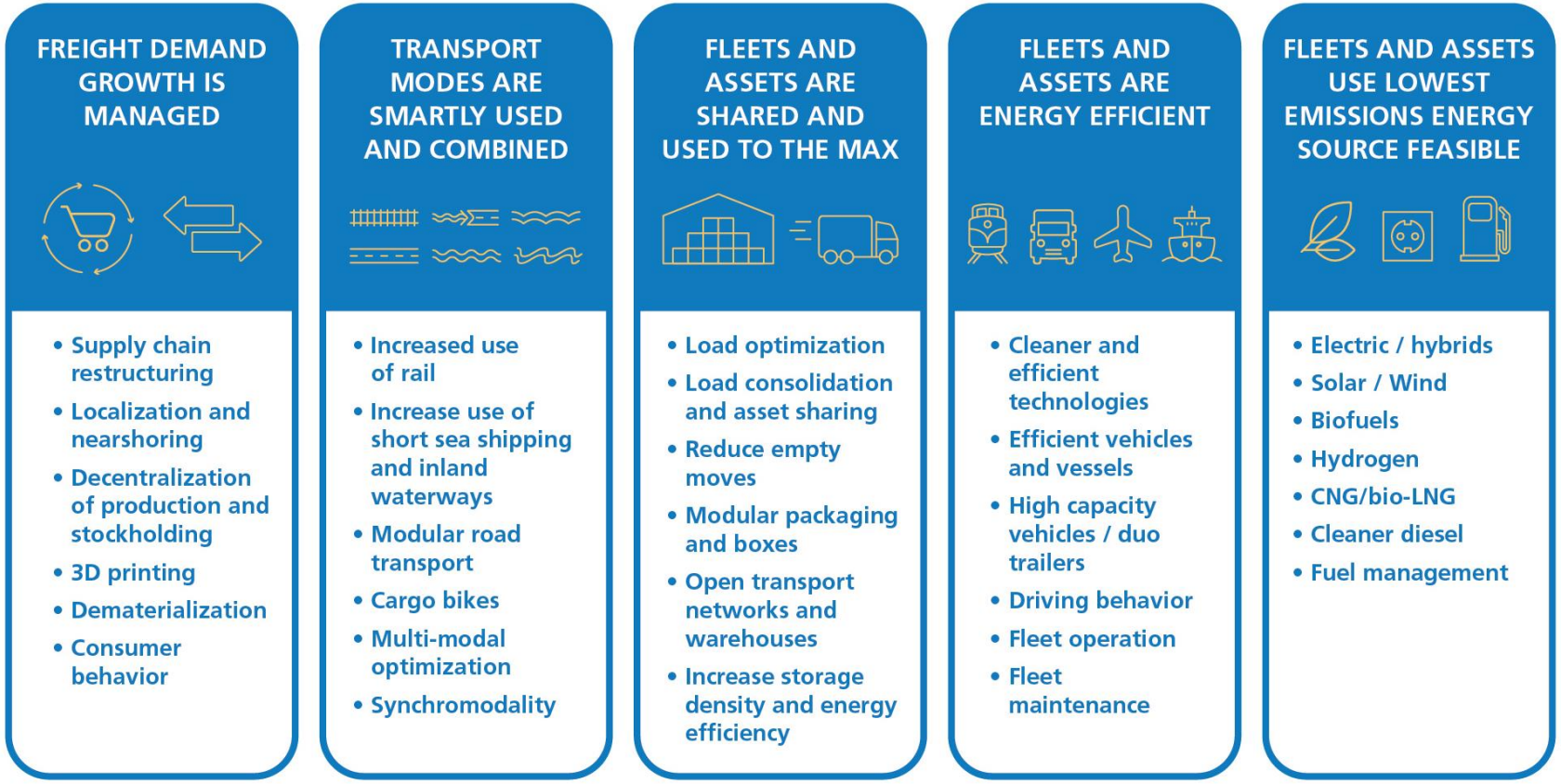

 Roadmap Towards Zero Emissions Logistics 2050. ALICE (2019) www.etp-alice.eu

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Towards a Truly Integrated Transport System for sustainable and efficient freight transport & logistics → 2030

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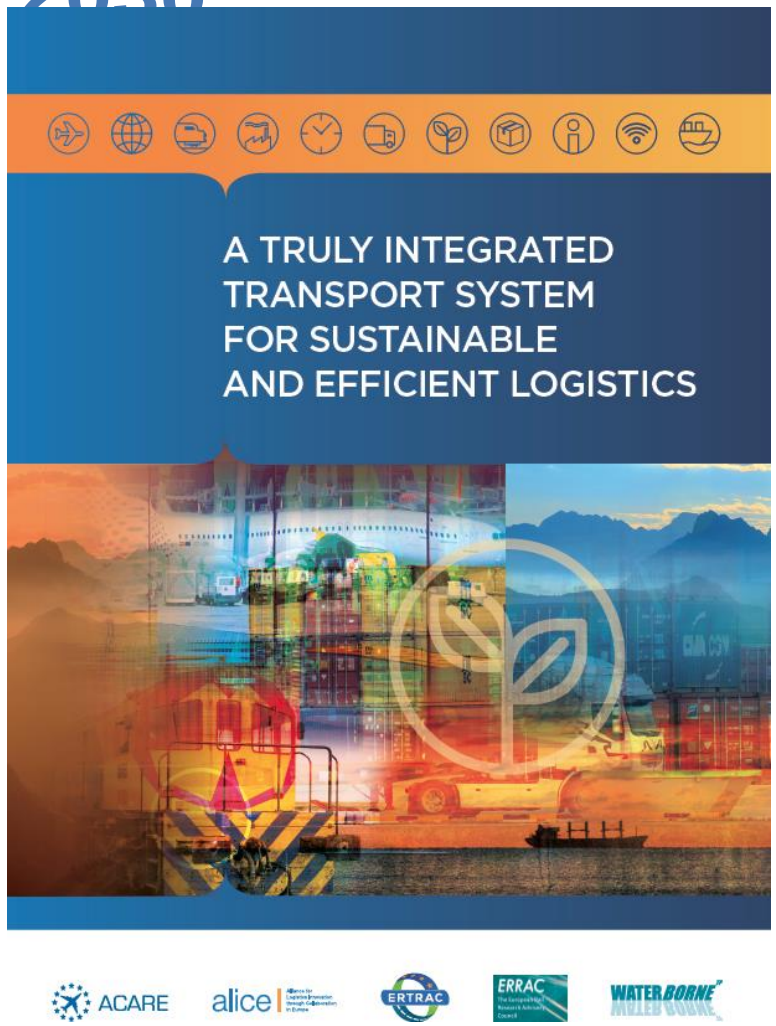

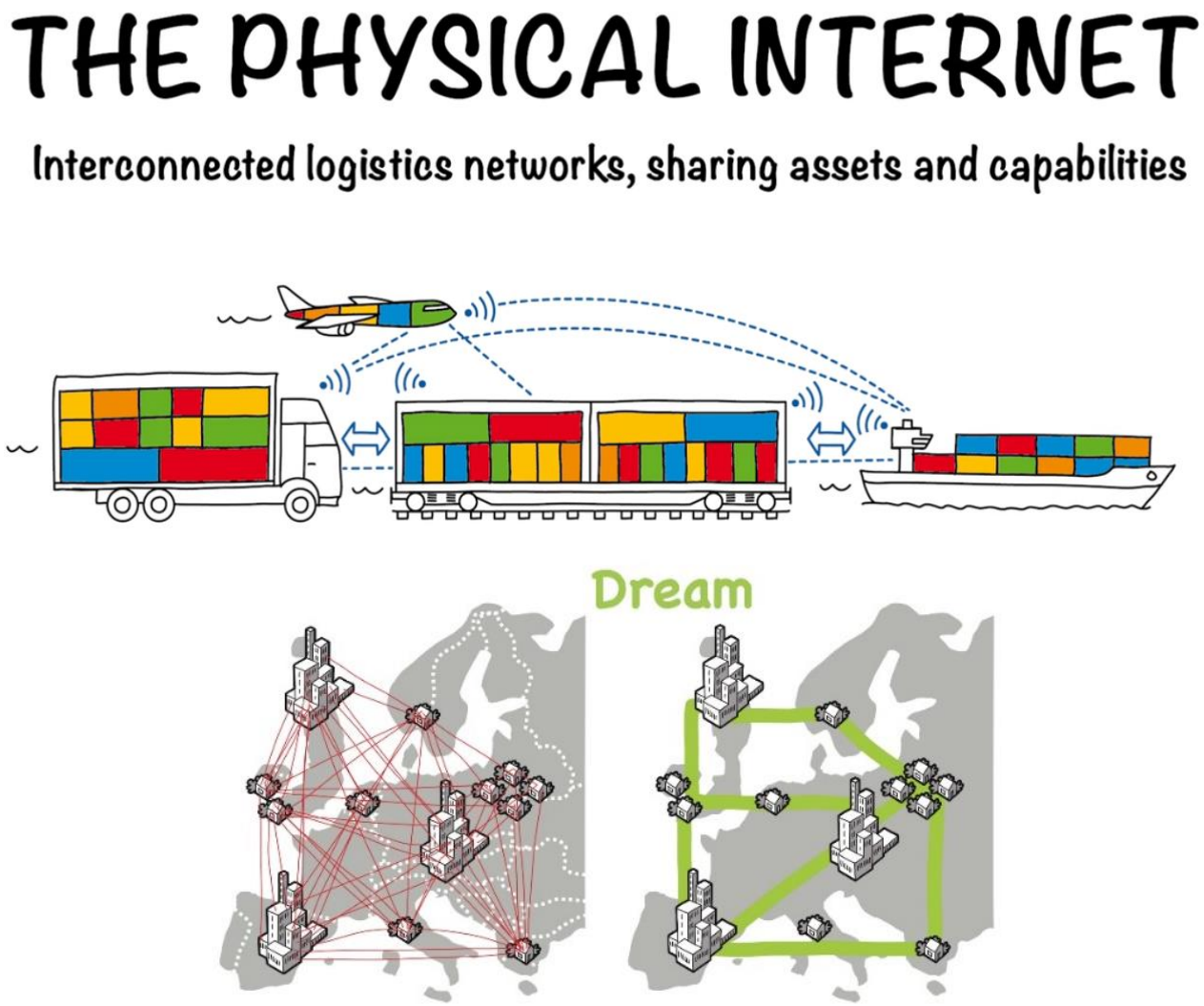

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ALICE liaison with projects & industry initiatives (Link)

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New in 2020:

PortForward

DataPorts
Data Platform for the Connection of Cognitive Ports

LEAD

SHOW AUTOMATED URBAN MOBILITY

Sprout

ULaaDS
Urban Logistics as an on-Demand Service

Running:

AEROFLEX

BE OPEN

COREALIS THE PORT OF THE FUTURE

DOCKSTHEFUTURE
defining the concept of "Port of the Future"

FENIX NETWORK

GECKO
GOVERNANCE FOR NEW MOBILITY SOLUTIONS

ICONET

levitate

LOGISTAR

Finished:

AEOLIX

ATROPINE
Fast Track to the Physical Internet

CAPITAL

Clusters 2.0

CO-GISTICS

CORE

Dynohubs

LEARN

LogiCon

logiMATIC

MOBILITY 4 EU

nextnet

novelog

safer

SELIS

SMART RAIL

synchro-NET

TURN
NEW MODEL FOR URBAN FOOD TRANSPORTATION

VITAL NODES

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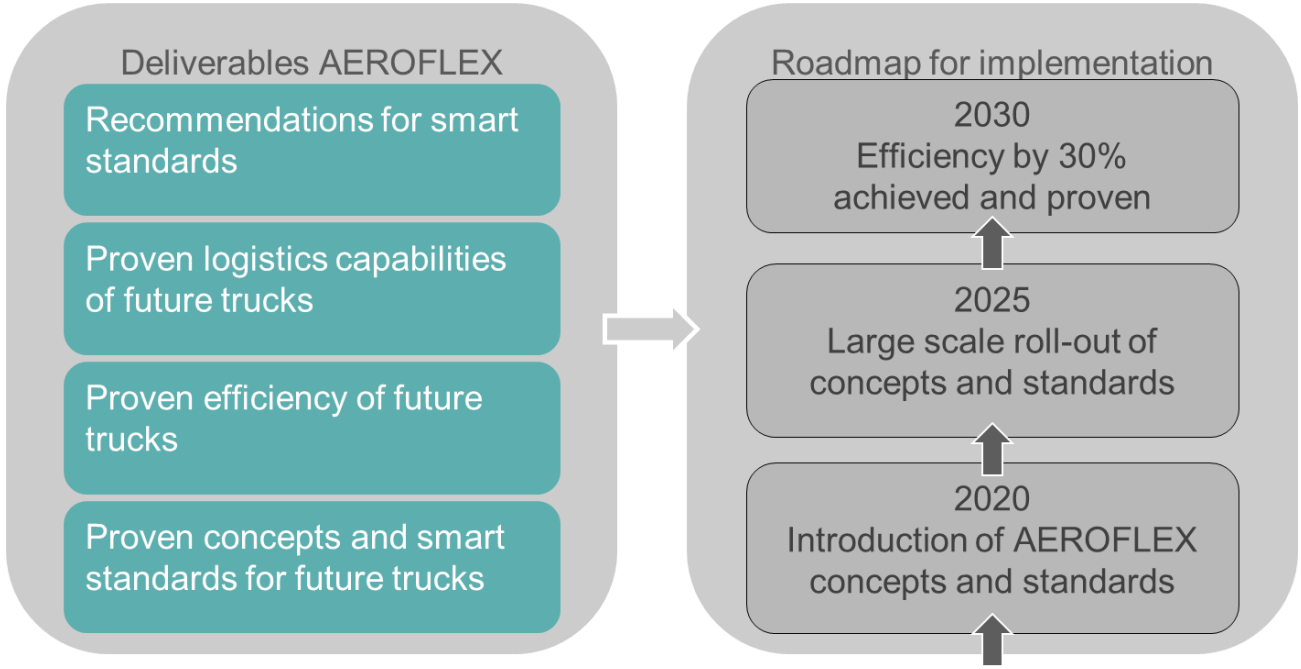
Project Overview

FOCUSSING INNOVATION ON SMARTER MOBILITY SOLUTIONS FOR SMARTER POLICIES

- AEROFLEX SUPPORTS VEHICLE MANUFACTURERS TO MEET THE COMING CHALLENGES AND INCREASE EFFICIENCY FOR ROAD FREIGHT TRANSPORT.
  - Contribution in achieving implementation of "The Physical Internet".*
  - Optimization of multimodal transport chains by drawing on the advantages of the different modes.

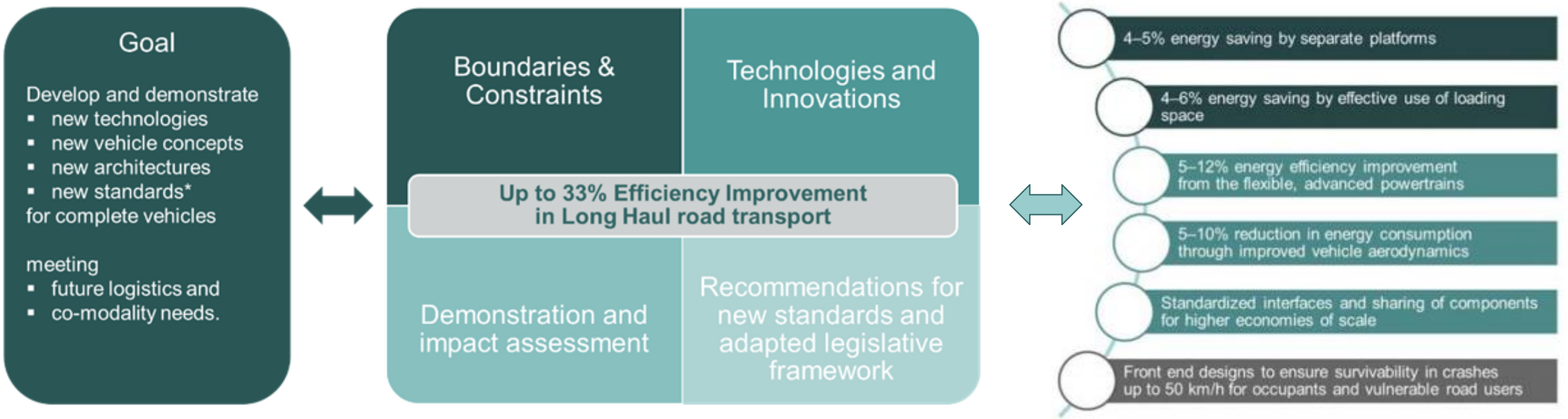
- In this context, it is essential to develop **flexible and adaptable vehicles and loading units**
  - Distributed powertrains,
  - Optimized aerodynamics,
  - Smart load carriers,
  - Interconnectedness

  for low emission and highly efficient long-distance and inter-urban transport and distribution in urban areas.



*http://www.etp-logistics.eu/

EFFICIENCY IMPROVEMENT UP TO 33%

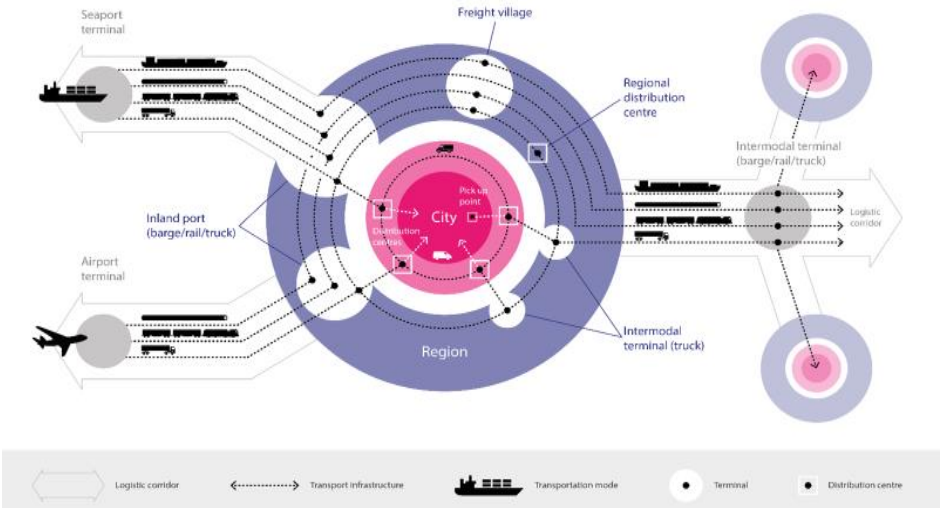


*new standards for hybrid-distributed powertrain, aerodynamic devices for complete vehicle, utilisation of loading units, performance based standards (PBS), access to infrastructure in a multi-mode context

- The optimal matching of novel vehicle concepts and infrastructures require the definition of smart (performance-based) standards for future trucks, load carriers and road infrastructures (Intelligent Access Policies).

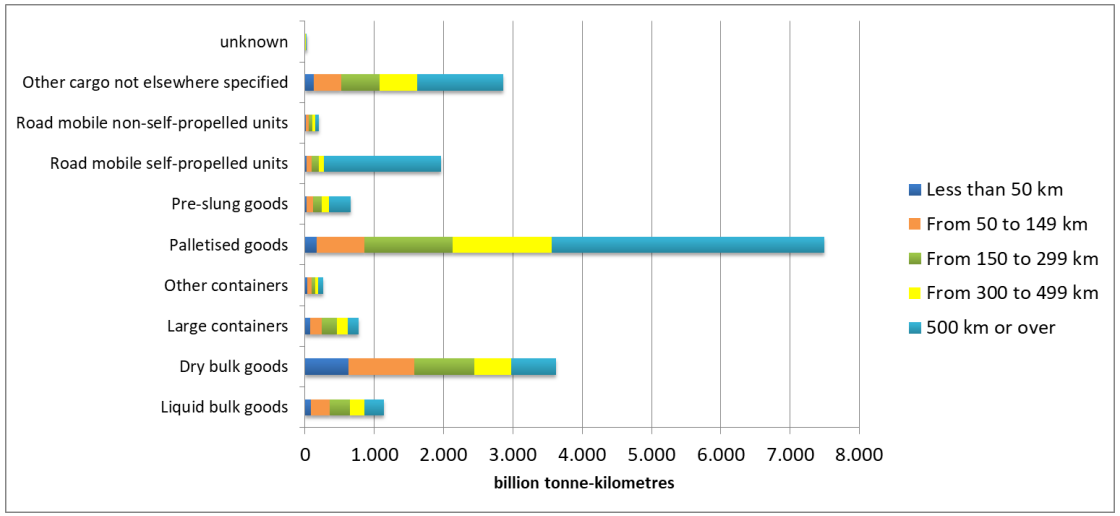
HIGH CAPACITY TRANSPORT, focus on the right cargo

- Infrastructure



- Address logistics concepts for cargo consolidation in logistics hubs and intermodal transport chains

- Relevant cargo units

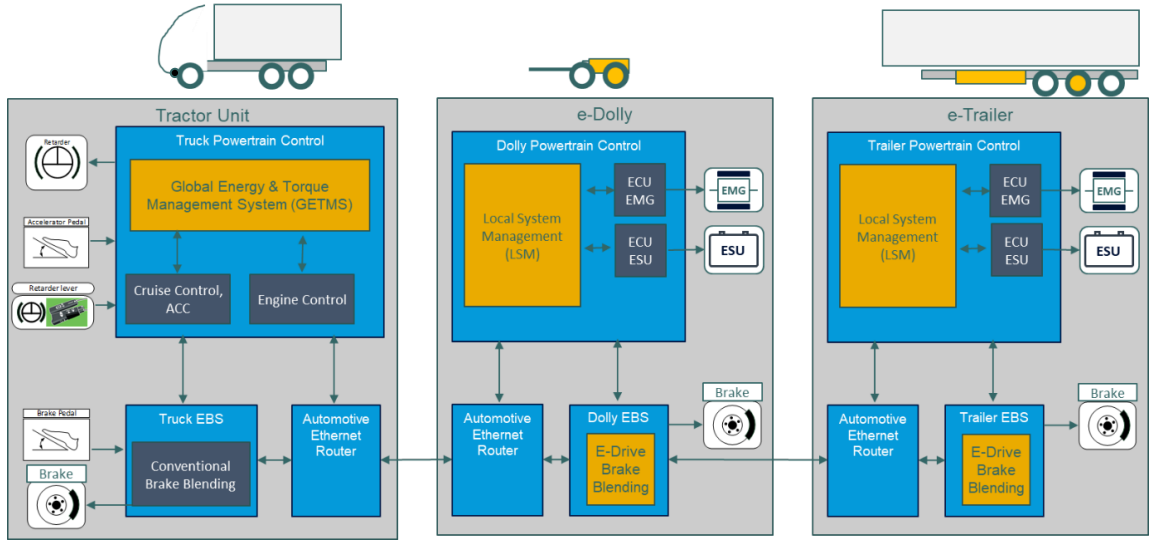


- Address most relevant cargo units – palletized and other cargo collis / customized boxes on long distance transports

High lights of innovations
AEMPT / Aerodynamics / Front End Design

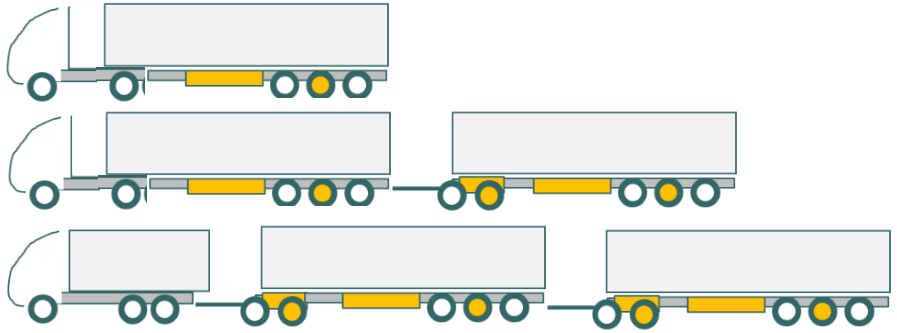
AEMPT, Advanced Energy Management Powertrain

- **Concept**
  - Global Energy Management coordinates powertrain components in truck and trailers.
  - Local System Management in trailers control the specific e-Drives.
  - Communication via new AEROFLEX protocol on Automotive Ethernet.
    Higher data load on conventional plugs.



- **Benefits**
  - Reduced energy consumption, first results 8 - 12%.
  - Improved traction and road safety.
  - Easiness in creating HCV configuration reducing number of pulling trucks.
  - Opportunity to split a vehicle in self driving units.

- Architecture allows configuration up to 5 units



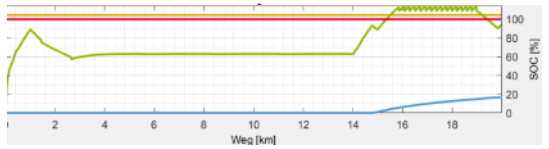
AEMPT, Advanced Energy Management Powertrain

- Automotive Ethernet routers to combine conventional CAN-Communication with new AEROFLEX Protocol

- HMI for giving Driver Feedback on the powertrain state

- Vehicle in the Loop Testing: Real truck tested with virtual dolly and trailer

- Virtual Dynamic Simulations to test the global energy

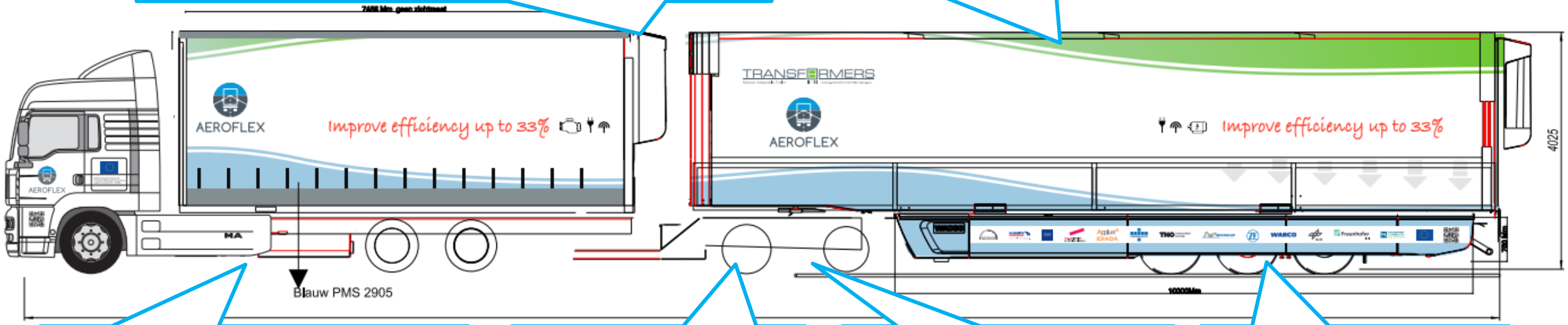


- Multi Body Simulations to assess vehicle stability

AEMPT demonstrator

Communication:
Automotive Ethernet, new Protocol for
Energy/Torque Management; no new connectors

eTrailer:
Schmitz-Cargobull from EU-Project
“Transformers”



MAN 6x2 TGX580:
Energy and Torque Management;
8,2m Swap Body

eDolly:
Hydraulically Steered
Dolly front axle Axle

eDolly:
Axle: ZF AVE130, 250kW;
Battery: AKASOL 75kWh

eTrailer:
Drive axle: Bosch 80kW
Battery:

Aerodynamics for the complete vehicle

- **Concept**
  - Active and passive aerodynamic features for complete vehicle
  - CFD simulations have been used in the development of the aerodynamic features
  - CFD methods have been verified by wind tunnel tests using a 1:3 scale model
  - Final verification with a demonstrator
- **First results**
  - Tractor semitrailer ΔCdxA= >40%
  - EMS1 ΔCdxA= 40%
- **Benefits**
  - Active features for complete vehicle allow optimal drag at all circumstances reducing energy consumption and no restrictions in handling of cargo during loading a/o unloading

Drag reduction vs reference vehicle

ΔCdxA, *realistic*	2.09 m^2 (42%)	2.36 m^2 (40%)
ΔCdxA, *maximum*	2.38 m^2 (48%)	2.62 m^2 (44%)

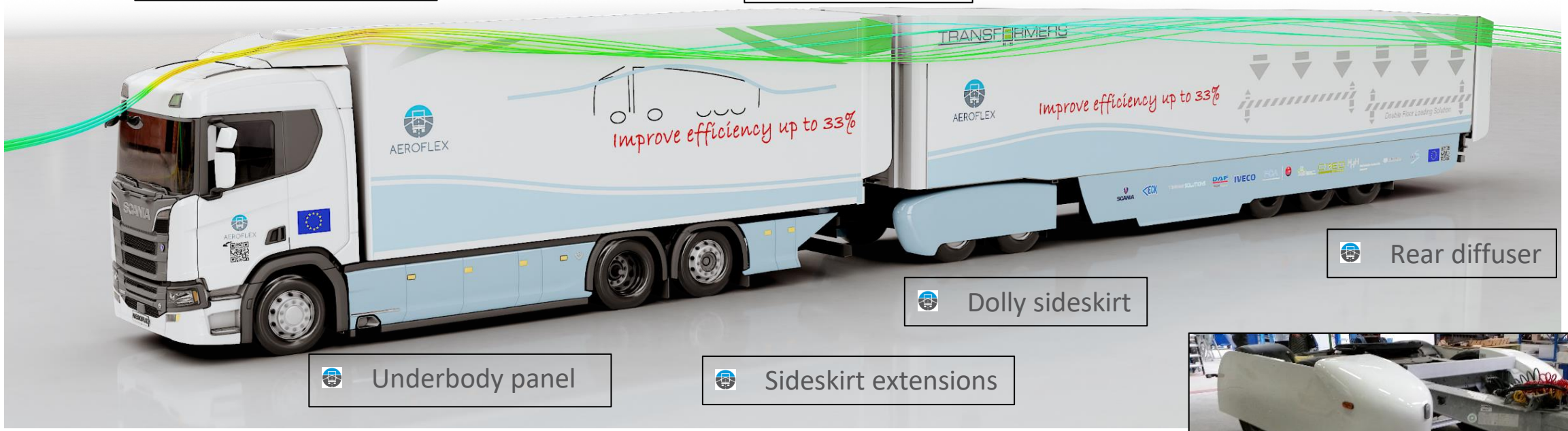
Aerodynamics demonstrator

Adaptable box and trailer shape

Active air deflector

Gap reducer

Active boat-tail



Rear diffuser

Dolly sideskirt

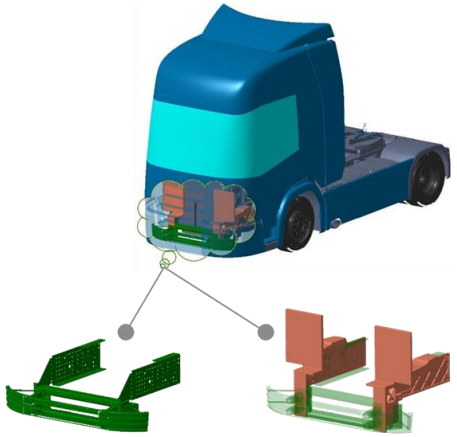
Underbody panel

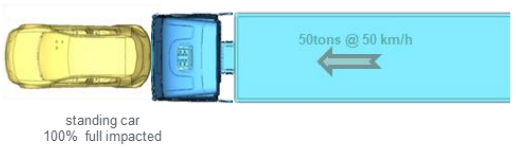
Sideskirt extensions

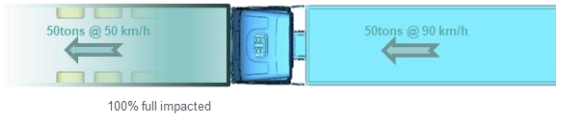
Active ride height

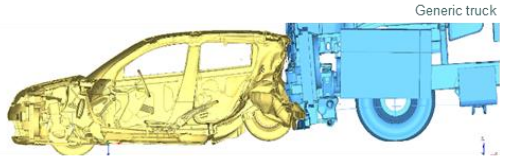
Front End Design and vehicle architecture, protection of car and truck occupants.

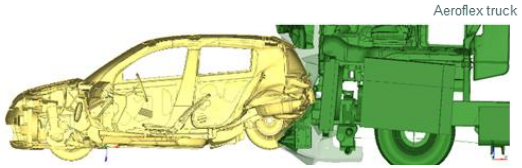
- **Concept**
  - Rear-end crashes are the most relevant scenario. Add protective structures in the elongated front end of the AEROFLEX truck.
  - Investigate the use of ADAS (AEB, SGW, LSS)
- **First results**
  - Passenger car protection: specific crash absorber designed to absorb energy during the collision are added to the front of the truck.
  - Truck occupant's protection: simulations highlight the huge amount of crash energy that cannot be effectively absorbed by any protective structures, despite frontend elongation.
  - Use of active safety systems obligatory to avoid truck – truck collisions and better preserve all the other road users.
- **Benefits**
  - Use of ADAS do reduce collisions with other vehicles and VRU and in combination with earlier mentioned features avoid serious injuries and fatalities

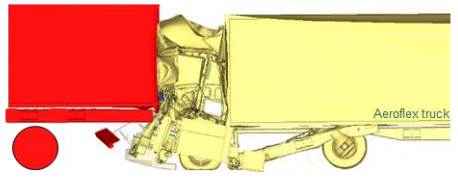






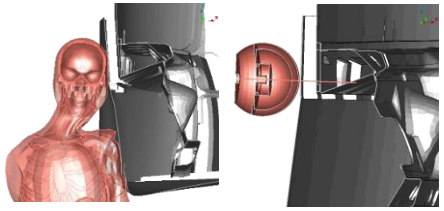


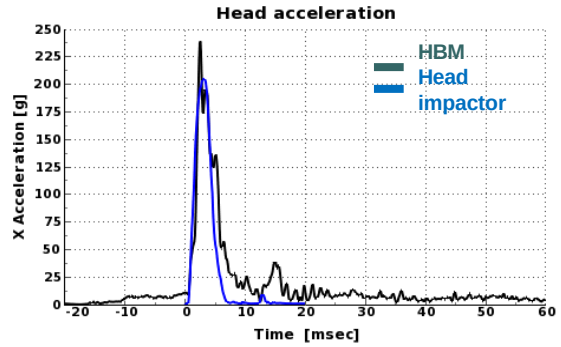




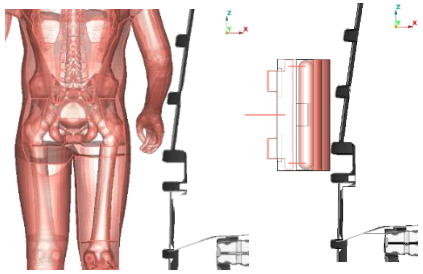
Front End Design and vehicle architecture, protection of humans

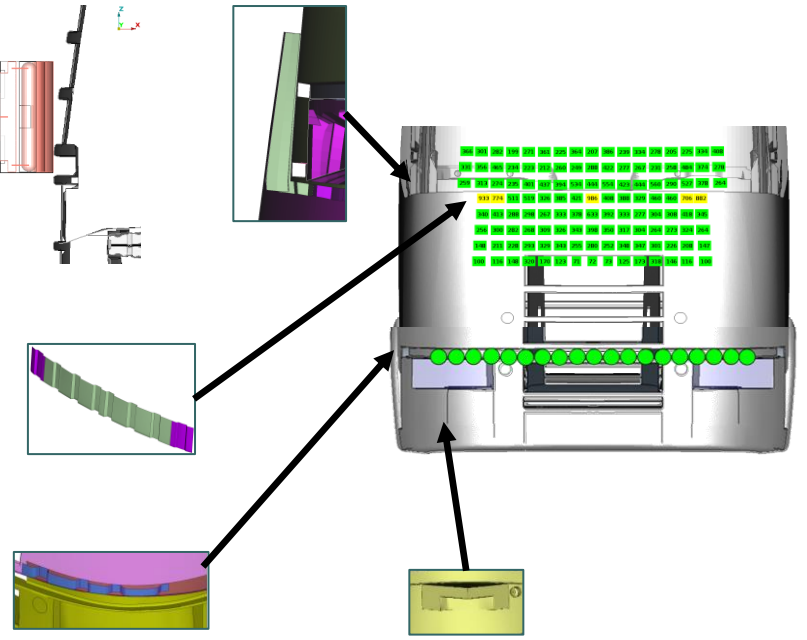
- **Concept**
  - Impact with pedestrians are one of the most relevant scenarios involving VRUs
  - Human Body Modelling (HBM) for impact simulations
  - Adult Head (AH) and Pelvis (upper leg UL) impactors equivalence to HBM





- **First results**
  - Front End modifications for VRUs
  - Add some gap between external skin and windscreen glue area (AH)
  - Add reinforcement in glue area to increase the energy absorption (AH)
  - Reduce the headlamp box to reduce the local stiffness in this area (UL)
  - Add a reinforcement to improve the energy absorption (UL)





- **Benefits**
  - Extended front end can be equipped with above summarized features avoiding serious injuries a/o fatalities for VRUs

Front End Design and vehicle architecture, Active safety systems

- **Concept**
  - Following ADAS were virtually installed, configured and tested on the Aeroflex truck in order to bring more safety:
    - Automated Emergency braking (AEB)
    - Side guard warning (SGW)
    - Line support system (LSS)
- **Benefits**
  - ADAS reduce serious and fatal injuries in combination with the earlier structural features mentioned before

ACCIDENTOLOGY DATA ANALYSIS
- Scenario addressed
- Parameters selection

→ *Please check the TRA paper "An analysis of European crash data and scenario specification for heavy truck safety system development " for more details.*

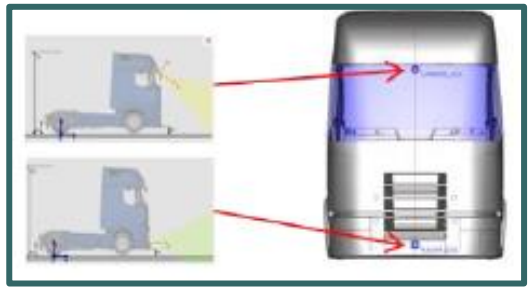
DESIGN VALIDATION PLAN
- Accident test scenario and test cases
- Vehicle conditions (speed, impact angle, …)
- Sensor layouts (LO1, LO2, LO3)

MODELS ADAPTION AND PARAMETERIZATION
- Camera & Radar parameterization
- Truck parameterization
- System improvement and calibration
- Models integration and validation
- Vehicle Modelling for 3D animation

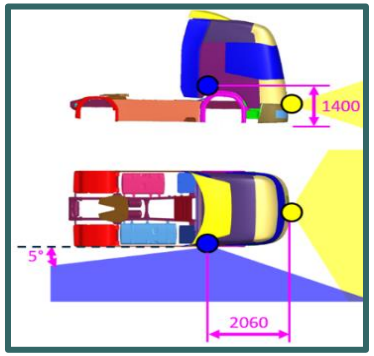
SIMULATION
- Scenarios implementation
- Test automation
- Post-processing
- Test analysis
- Reporting

Front End Design and vehicle architecture, Active safety systems

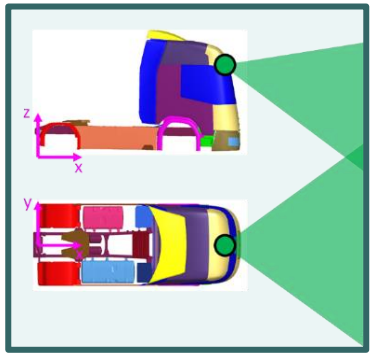
- AEB, camera on the top and radar on the bottom the truck can avoid collision in most of the defined test cases but in some testcases involving VRUs collision cannot be avoided.

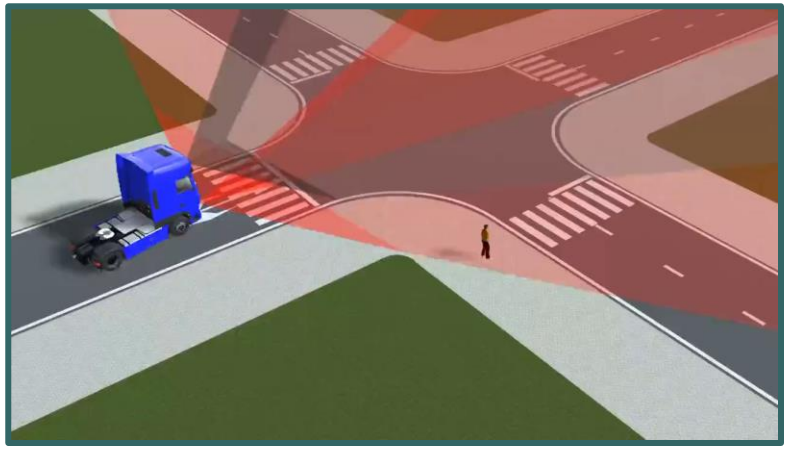


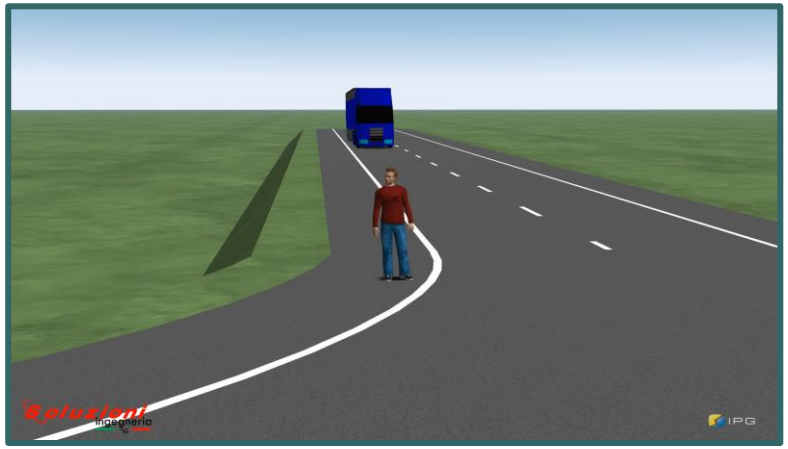
- SGW, radar on the side of the cabin. Data fusion with frontal radar (AEB) with consequent extension of the detection range

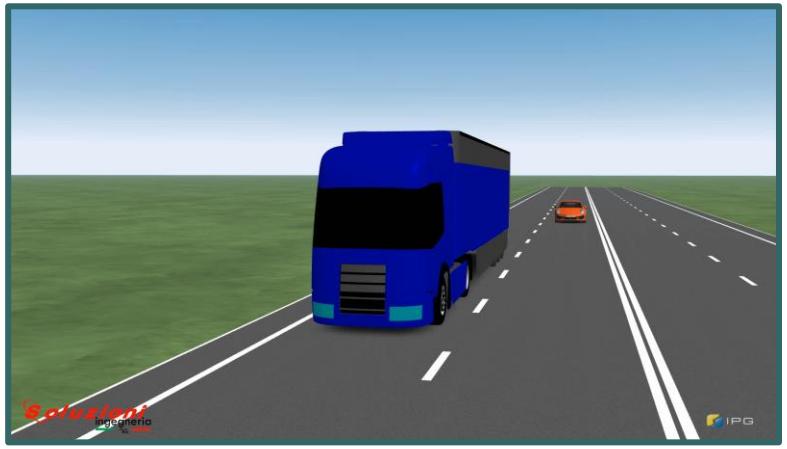


- LSS, camera on top showed bests results (could be the same camera used for AEB) assist by a radar on the side of the truck (same used for SGW).



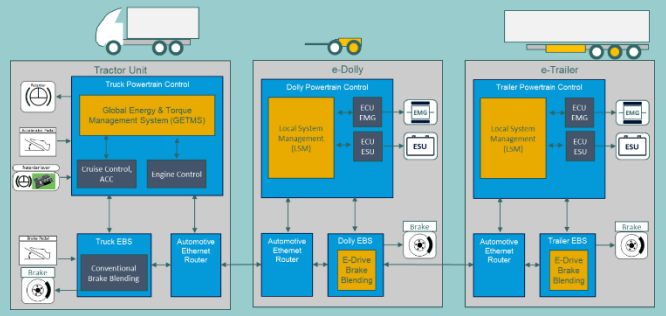






Q&A

AEMPT



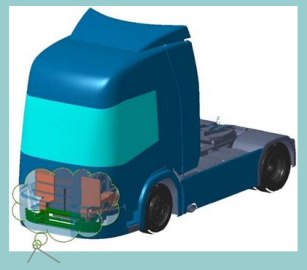
5–12% energy efficiency improvement from the flexible, advanced powertrains

Aerodynamics

5–10% reduction in energy consumption through improved vehicle aerodynamics

Standardized interfaces and sharing of components for higher economies of scale

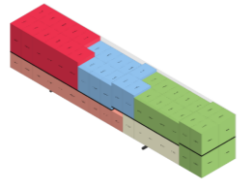
Front End Design



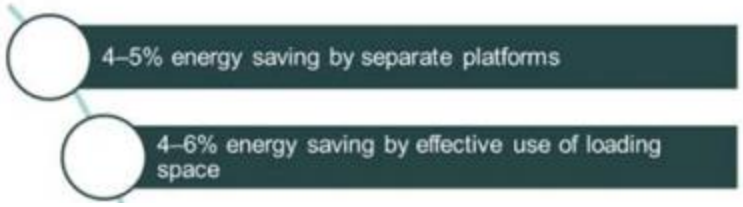
Front end designs to ensure survivability in crashes up to 50 km/h for occupants and vulnerable road users

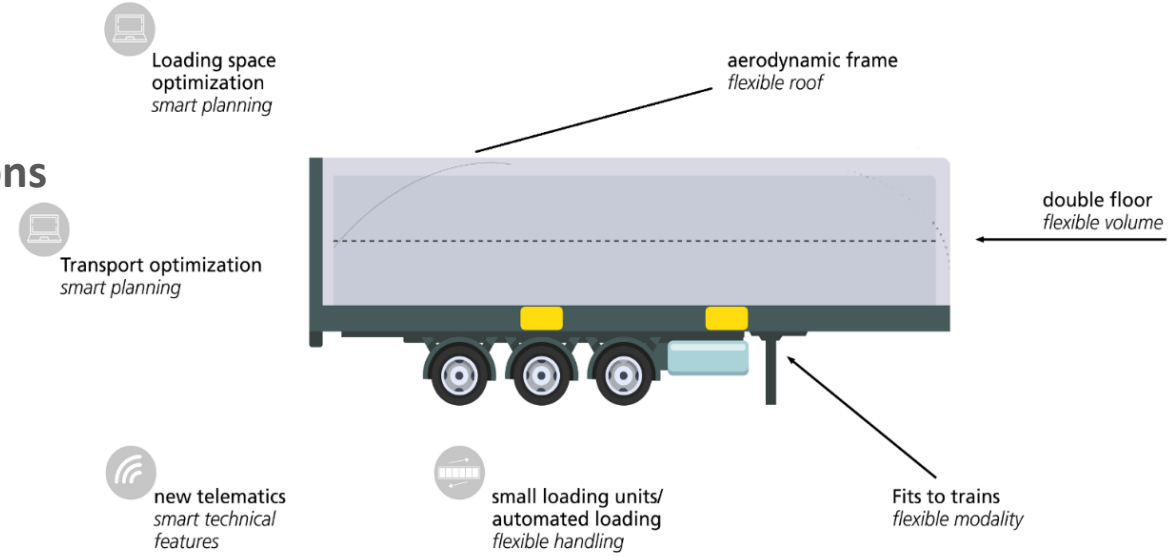
High lights on
Smart Loading Units and Smart Power Dolly

Smart and Flexible Loading Units

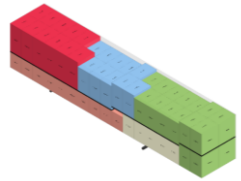


- **Concept**
  - Collaboration with Cluster 2.0, ALICE-ETP, End-Users and AEROFLEX-SB
  - Focus on efficiency in handling of cargo (palletized goods)
- **Development and optimization of**
  - PUZZLE® software
  - CargoCam
  - Double stack and adaptable trailer
- **Three use cases to demonstrate under real-life and conditions**
  - Optimization loading of trailers at P&G
  - Trailer to Train by CFL lorry rail Bettembourg - le Boulou
  - EMS2 configuration
- **First results and benefit**
  - Utilisation of loading unit improved up to 40%
  - Reduction of transport cost (€ t/km) up to 35%
  - Opportunity to bring cargo to rail destressing road on long distance transport

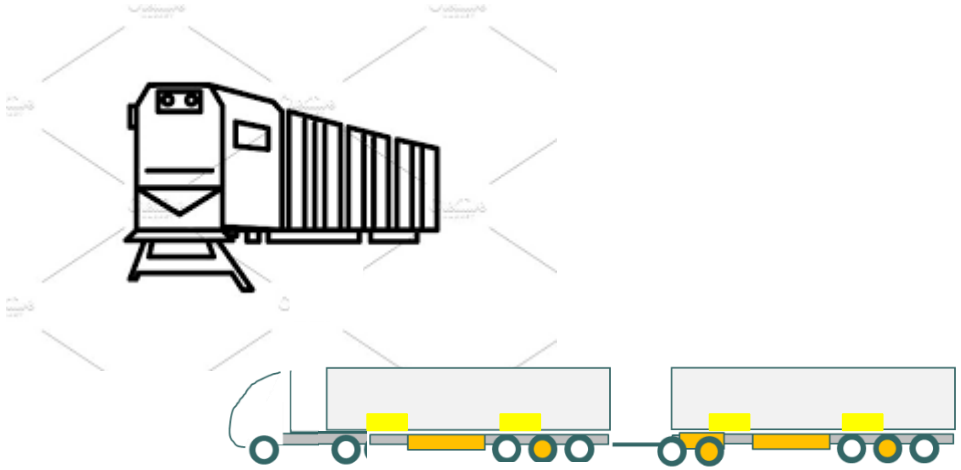




Trailer to Train and EMS2

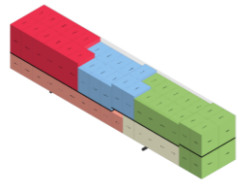


- **Concept 1:** Multimodal - Market segment: long distance transports
- Aerodynamic optimized trailer must fit for 6 most relevant multimodal techniques in EU:
  Crane (>97% rail market share), NiKraSa, Modalohr, CargoBeamer, RoLa & ferry
- Proof aerodynamic devices (boat tail and side skirts) do not cause problems for multi-modality

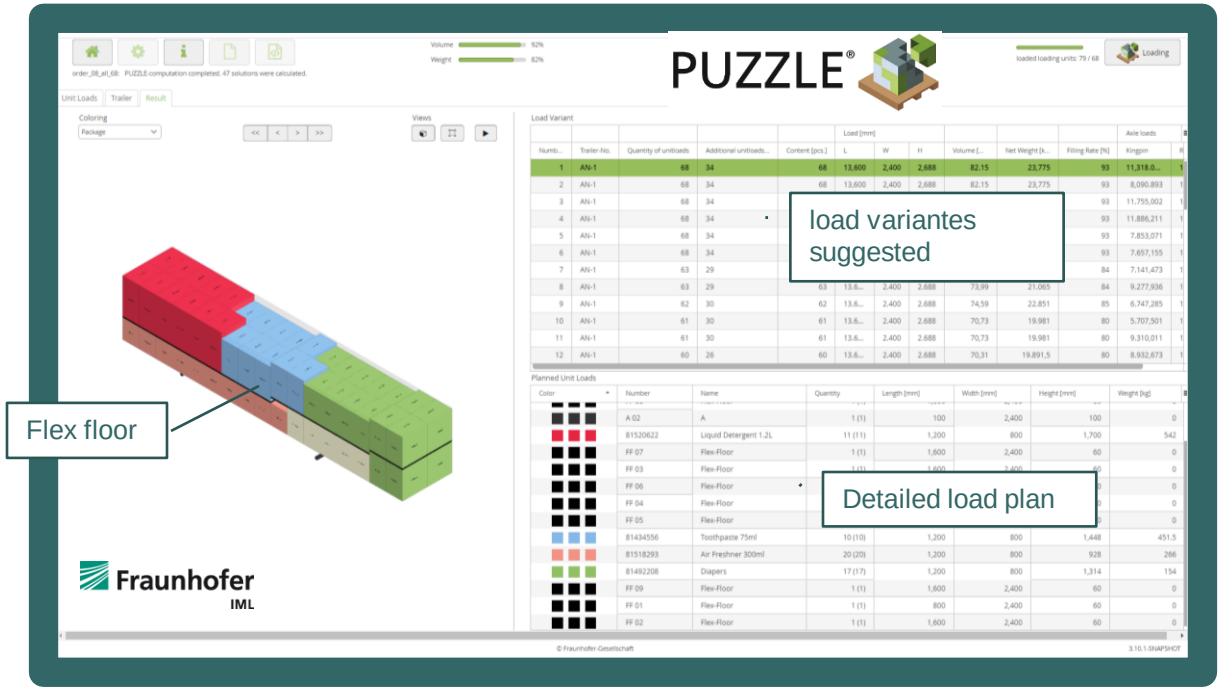


- **Highlights:**
- EMS2, opportunity to bring high amount of cargo to rail and potentially **reduce emissions by >20% and cost by >30%**
- Craneablity of trailer realised by VanEck
- Demonstration in Q1/2021 in real life at CFL, Bettembourg Luxembourg, lifting via crane and NiKraSa and train transport via Modalohr to le Boulou France – Spanish border

Smart and Flexible Loading Units



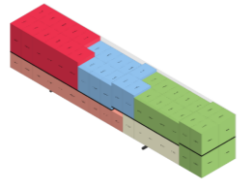
- **Concept 2:** Loading space efficiency – Market segment: Palletized goods
- Flexible floor trailer allows higher load factor
  only feasable with smart elements
- Puzzle® software and camera CargoCam developped to support effective and efficient loading



- **Highlights:**
- PUZZLE® software, by Fraunhofer IML, realized for trailer optimization
  (incl. respecting flex floor option, packing problem and weight balancing (!))
- Test result with low and not stackable pallet loads at P&G test case -> 38% higher filling rate

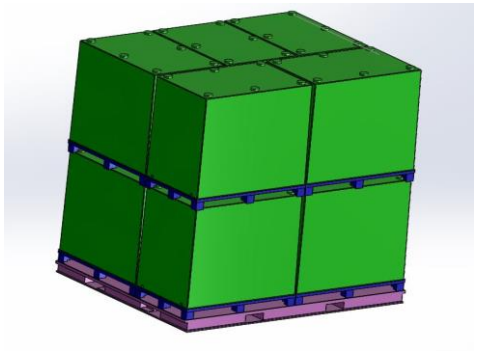
http://demo.mypuzzle.de/aeroflex

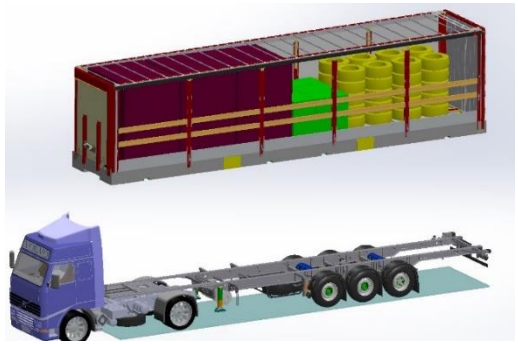
Smart and Flexible Loading Units, modular NMLU



- **Concept 3:** Modularization and Horizontal collaboration - market segment: milk run

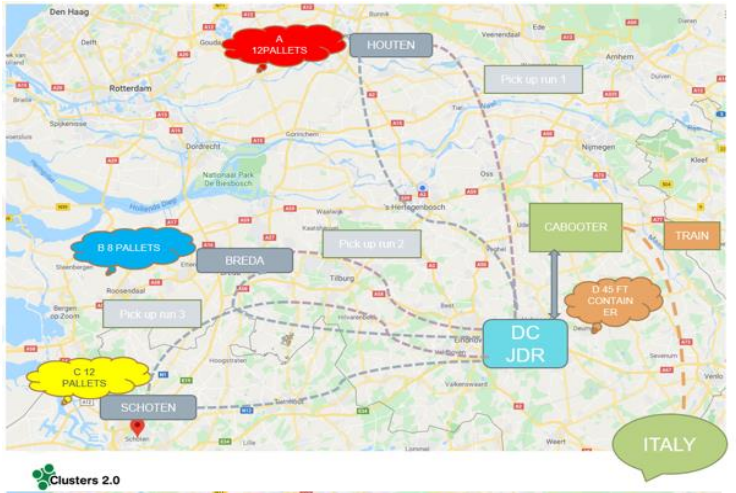
✓ Intermodal transport Holland -Italy
✓ Horizontal collaboration
✓ 43 % reduction in labour cost
✓ Fast
✓ Safe
✓ Secured
✓ Covid friendly

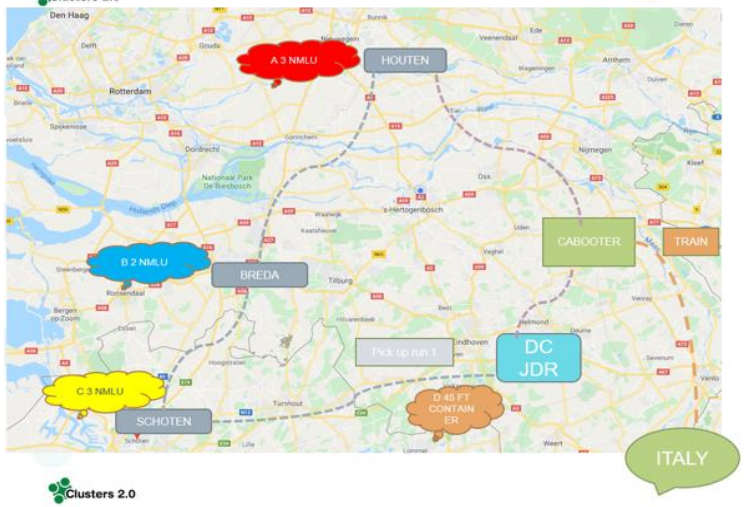




times are recorded during testing and are not based on normal operations

	BASELINE	pallets	nmlu	saving		NMLU USE CASE	time
	PROCES	hours	hours	%		PROCES	hours
A	trailer arrives/reports at Houten	3	3	0%	A	trailer arrives/reports at Houten	3
	driver waits untill trailer loaded	0,5	0,5	0%		driver waits untill trailer loaded	0,5
	dc loads 12 pallets	0,7	0,23	67%		dc loads 3 NMLU	0,23
	trailer goes to dc	3	3	0%			
	trailer unloaded at DC	0,7	0,23	67%			
	pallets stored	0,5	0,5	0%			
B	trailer arrives/reports at Breda	3	3	0%	B	trailer arrives/reports at Breda	3
	driver waits untill trailer loaded	0,5	0,5	0%		driver waits untill trailer loaded	0,5
	dc loads 8 pallets	0,5	0,25	50%		dc loads 2 nmlu	0,25
	trailer goes to dc	3	3	0%			
	trailer unloaded at DC	0,5	0,25	50%			
	pallets stored	0,5	0,5	0%			
C	trailer arrives/reports at Schoten	3	3	0%	C	trailer arrives/reports at Schoten	3
	driver waits untill trailer loaded	0,5	0,5	0%		driver waits untill trailer loaded	0,5
	dc loads 12 pallets	0,7	0,23	67%		dc loads 3 nmlu	0,23
	trailer goes to dc	3	3	0%		trailer goes to Cabooter	3
	trailer unloaded at DC	0,7	0,23	67%			
	pallets stored	0,5	0,5	0%			
D	trailer arrives/reports at DC	1	1	0%			
	driver waits untill trailer loaded	0,5	0,5	0%			
	dc loads 32 pallets in container	1,9	0,475	75%			
	trailer goes to Cabooter	0,5	0,5	0%			
	Total time during testing	28,7	24,9	13%		optimised route total time during tests	14,2
						time savings	43%





- Flexible modules successfully tested within cooperation project Clusters 2.0

Smart Power Dolly, advantages and opportunities

Advantages

- Reduction of fuel consumption and emissions
- Improved traction and driving stability
- Still a weight reduction of ca. 4ton ref EMS1 and EMS2 configurations

Driven axle ZF AVE130 (250kW)

Akasol Li-Ion battery (75kWh)

Automotive Ethernet Router Repeater

Smart Power Dolly

Smart Power Dolly, advantages and opportunities

Opportunities

- Hybrid **distributed** powertrains → split the vehicle in self driving units
- Autonomous yard operation with electric powertrain

- **Focus on yards – instead of public roads**
  - Controlled environment
  - Lower requirements regarding functional safety
  - Quick cost / benefit regarding handling, safety and planning

- AEROFLEX Smart Power Dolly equipped with remote control to demonstrate manual operation

Smart Power Dolly, advantages and opportunities

Fraunhofer Solutions for Yard Automation:

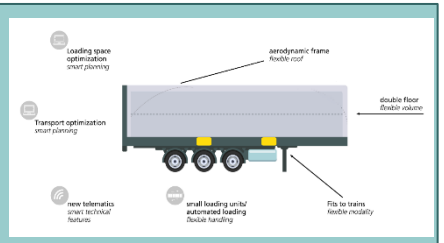
helyOS Control Tower Software

- Controls and monitors autonomous vehicles
- Provides a GUI for creating, executing and supervising missions assigned to autonomous vehicles
- Shows where the autonomous vehicles are and what they are doing → live view
- Coordinates up to 30 vehicles to optimize efficiency
- Uses internet-technologies to access vehicles all over the world

AEROFLEX smart power dolly: Towards efficient and mission-oriented long-haul vehicles

Q&A

Smart Loading Units



- 4–5% energy saving by separate platforms
- 4–6% energy saving by effective use of loading space

Smart power dolly

- Standardized interfaces and sharing of components for higher economies of scale

AEROFLEX

Demonstration & Assessment
How can I make road freight transport efficient in my supply chain?

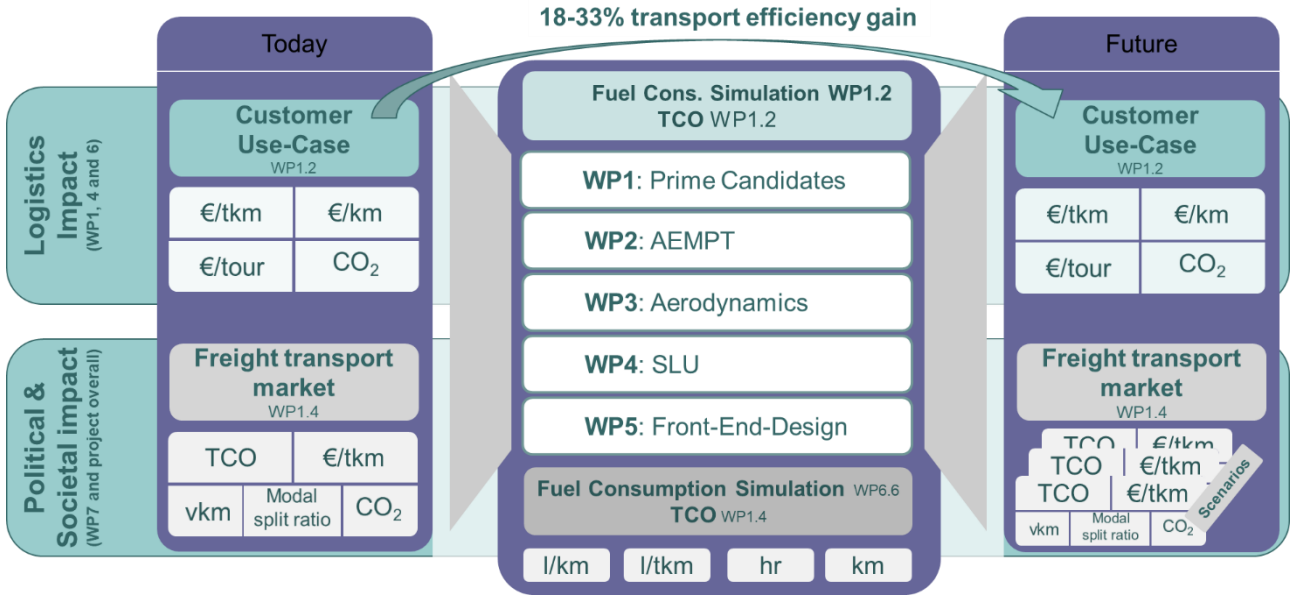
Demonstration & Assessment

Concept

- Representative use cases in common supply chains
- Test and assessment framework
- Evaluation and assessment of test results

Results

- Test matrix, test protocols and test cases
- Reference and advanced reference tests
- Assessment framework as in picture



Benefit

- Confirmation of test program validity by SAE
- Assessment build up on test results AND representative end user cases

Highlights of assessment framework

- Inclusion of end user specific cost / benefit module
- Efficiency benefits for end user in multimodal context

Demonstration vehicles

- Baseline:
  - MAN 4x2 + Curtain semitrailer (Zero-case)

  - SCA 4x2 + Box semitrailer (Aero baseline)

- Advanced reference (TRANSFORMERS project):
  - MAN 4x2 + TF - SCB

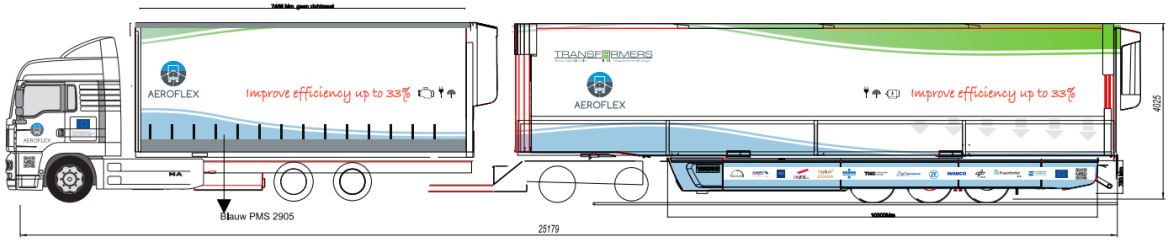
  - SCA 4x2 + TF – VET

- EMS 1 (25m) reference
  - MAN 6x2 – Curtain semitrailer

  - SCA 6x2 – Box semitrailer

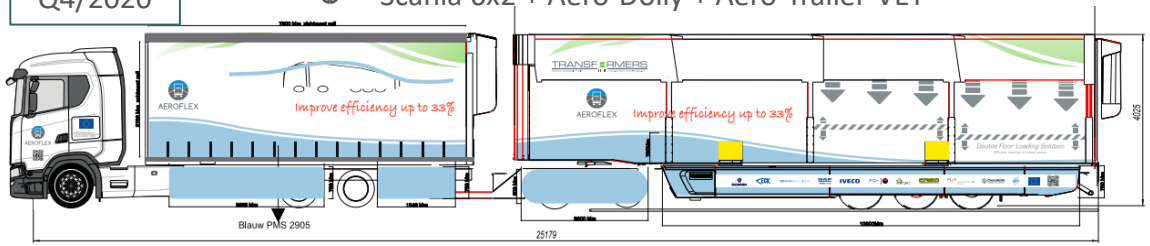
Q4/2020

- Beyond State of the Art:
  - MAN 6x2 + e-Dolly + e-Trailer SCB



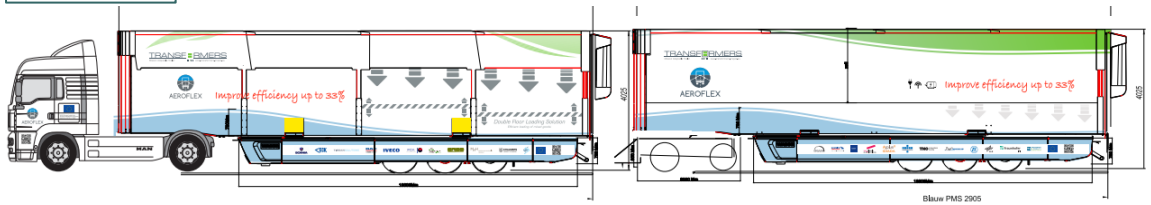
Q4/2020

- Scania 6x2 + Aero-Dolly + Aero-Trailer VET

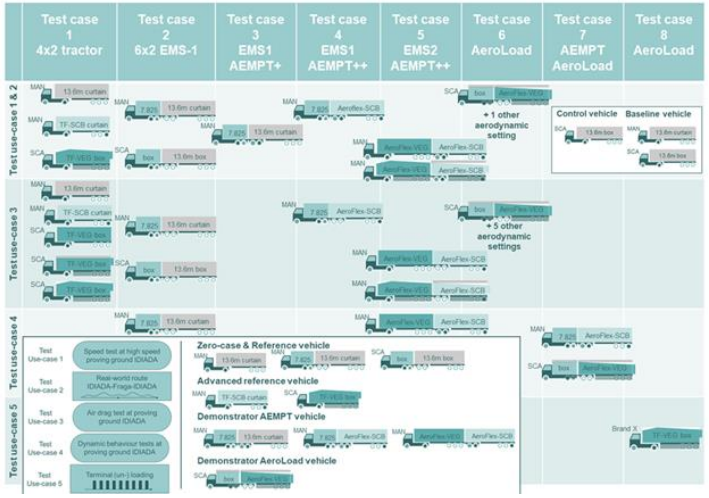


Q1/2021

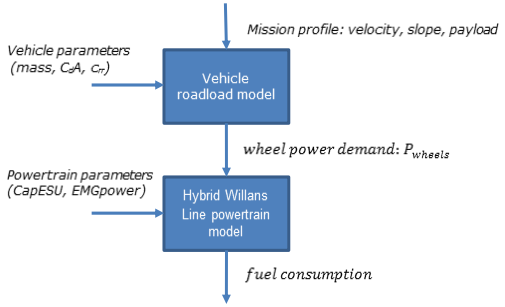
- MAN 4x2 + Aero-Trailer VET + e-Trailer SCB

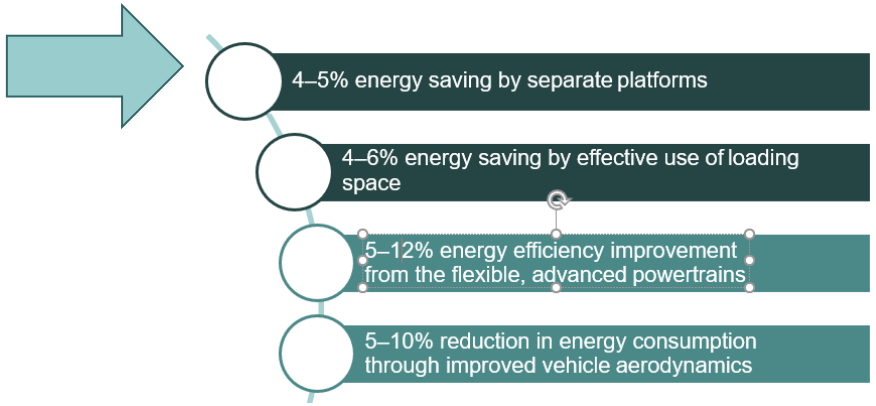


Evaluation and impact assessment

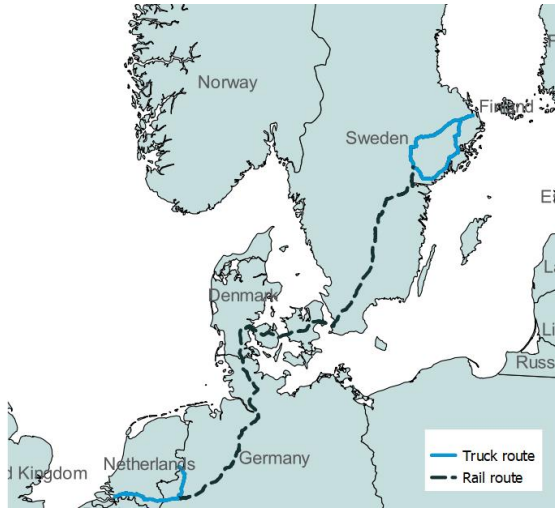


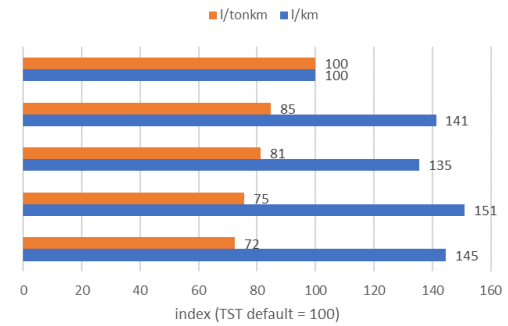
Testing





Evaluation

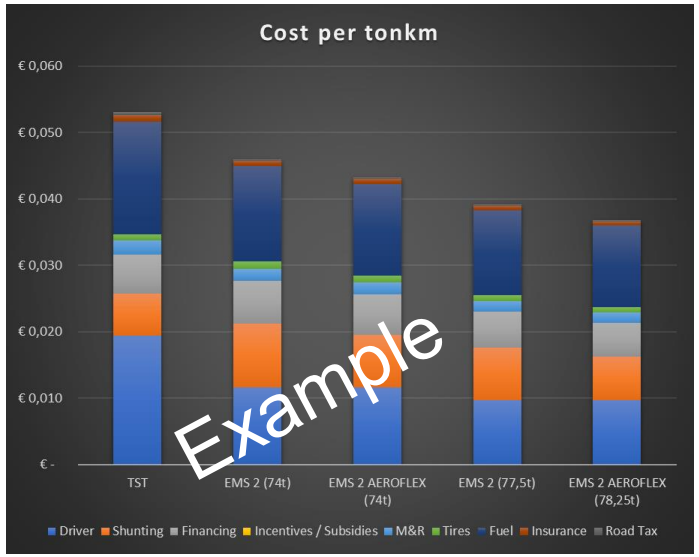


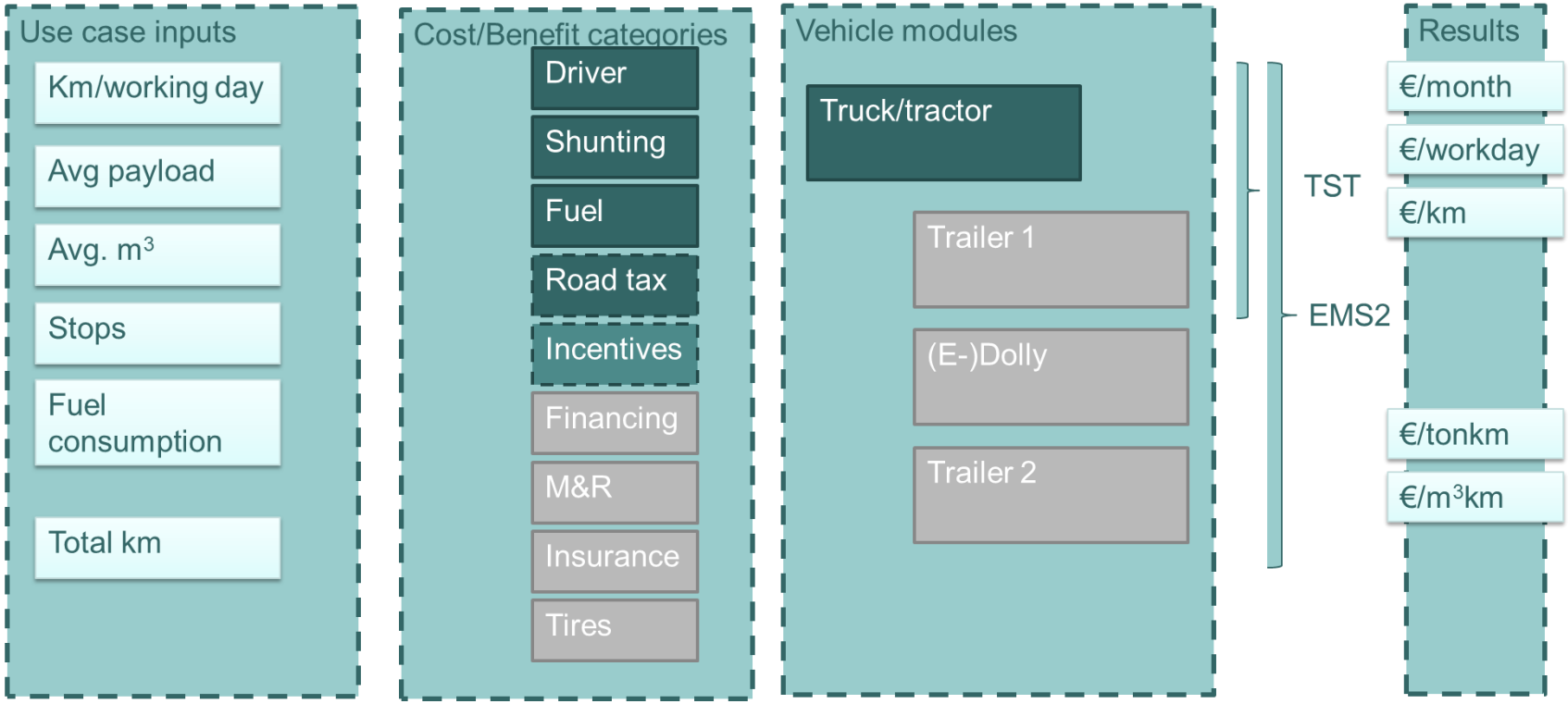


Real world impact assessment

Structure of cost-benefit model

- Added to the transport efficiency assessment framework
- Cost-benefit analysis for actual end user cases
- Structure of model and typical outcomes checked and agreed by LSP's





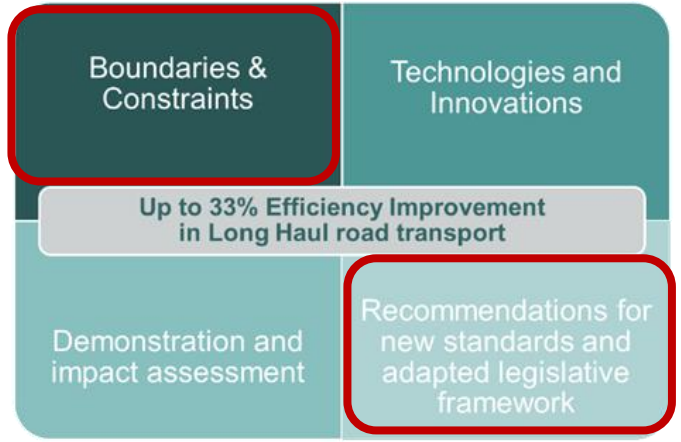
Open question: is there a need for a webtool application as activity beyond AEROFLEX?

Impact & requirements
How to drive efficiency and new technology adoption?

Impact & requirements
How to drive efficiency and new technology adoption?

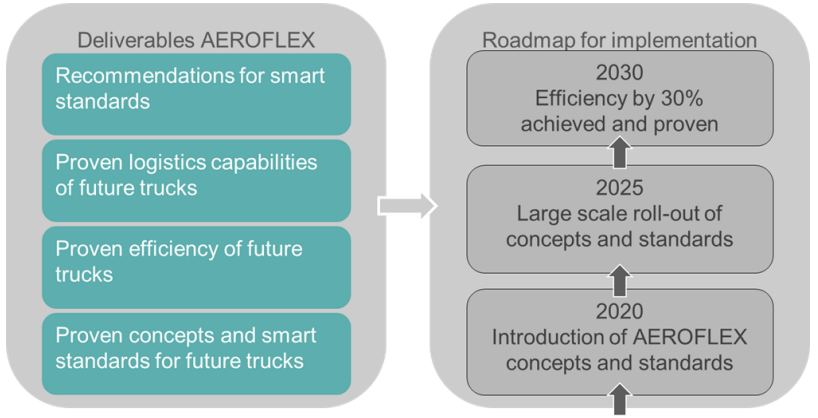
Concept

- Survey on the **needs** of the European transport logistics market and **requirements** of EU road freight transport
- Analyses of the European transport market, **trends and market drivers** in logistics
- Derive first recommendations regarding **use cases** coming from the market analysis
- Define the **state-of-the-art regulatory framework** regarding the freight transport market:
  - Current state of the EU legislation
  - Definition of the boundary conditions



Results

- **New technologies and vehicle concepts** are needed to further reduce emissions and to use the infrastructure safe and efficient
- The optimal matching of novel vehicle concepts and logistics require the definition of smart standards for trucks, load carriers and infrastructures, **Intelligent Access Policies.**

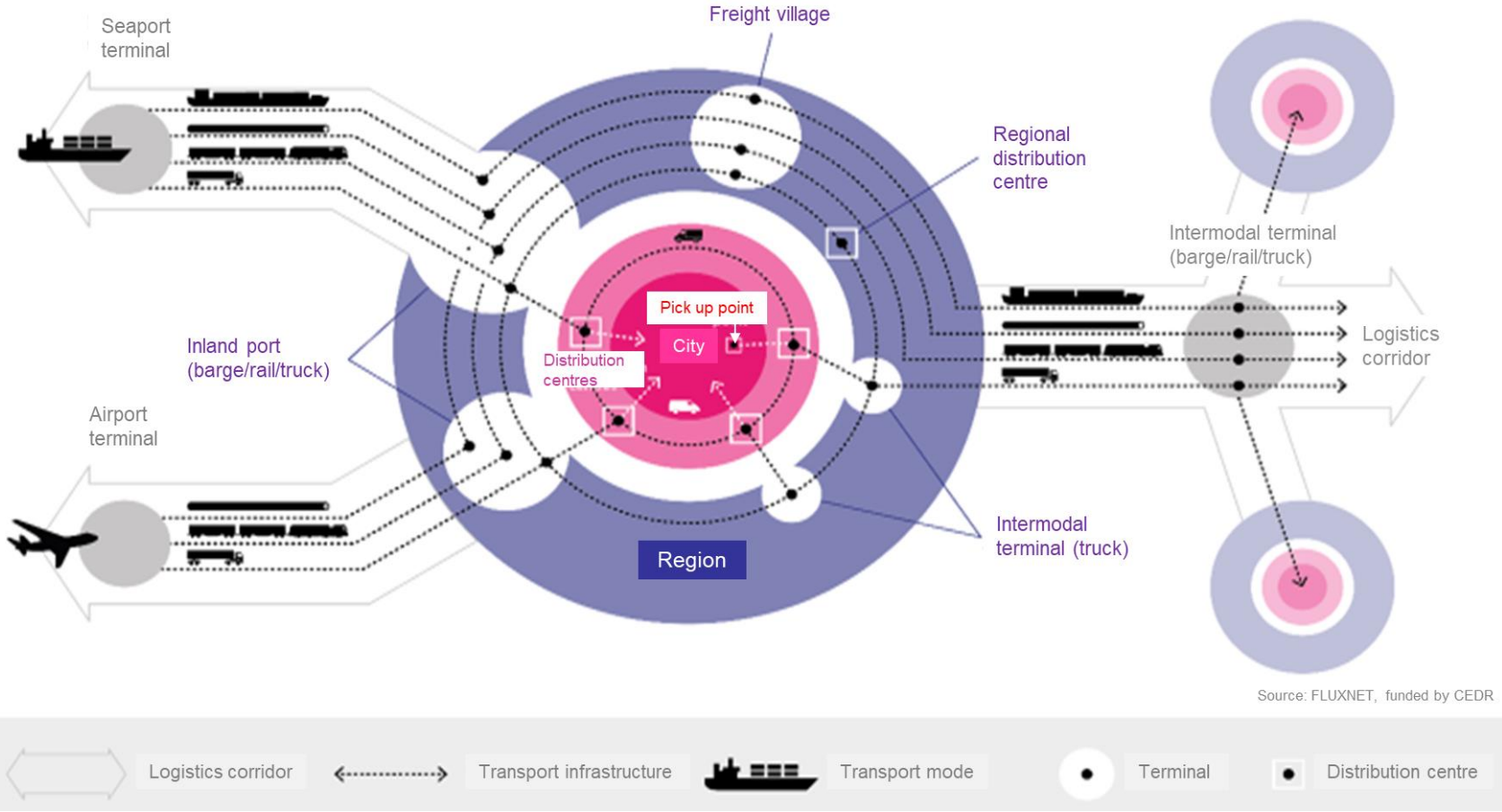


Benefits

- The use of new vehicle concepts and smart loading units **maximise the freight transport efficiency, reduction on the environmental impact and stimulate multi-modal transport**.
- Our contribution to re-thinking the **transport logistics as a short-term contribution** for the European Green Deal goals

Overview of infrastructure

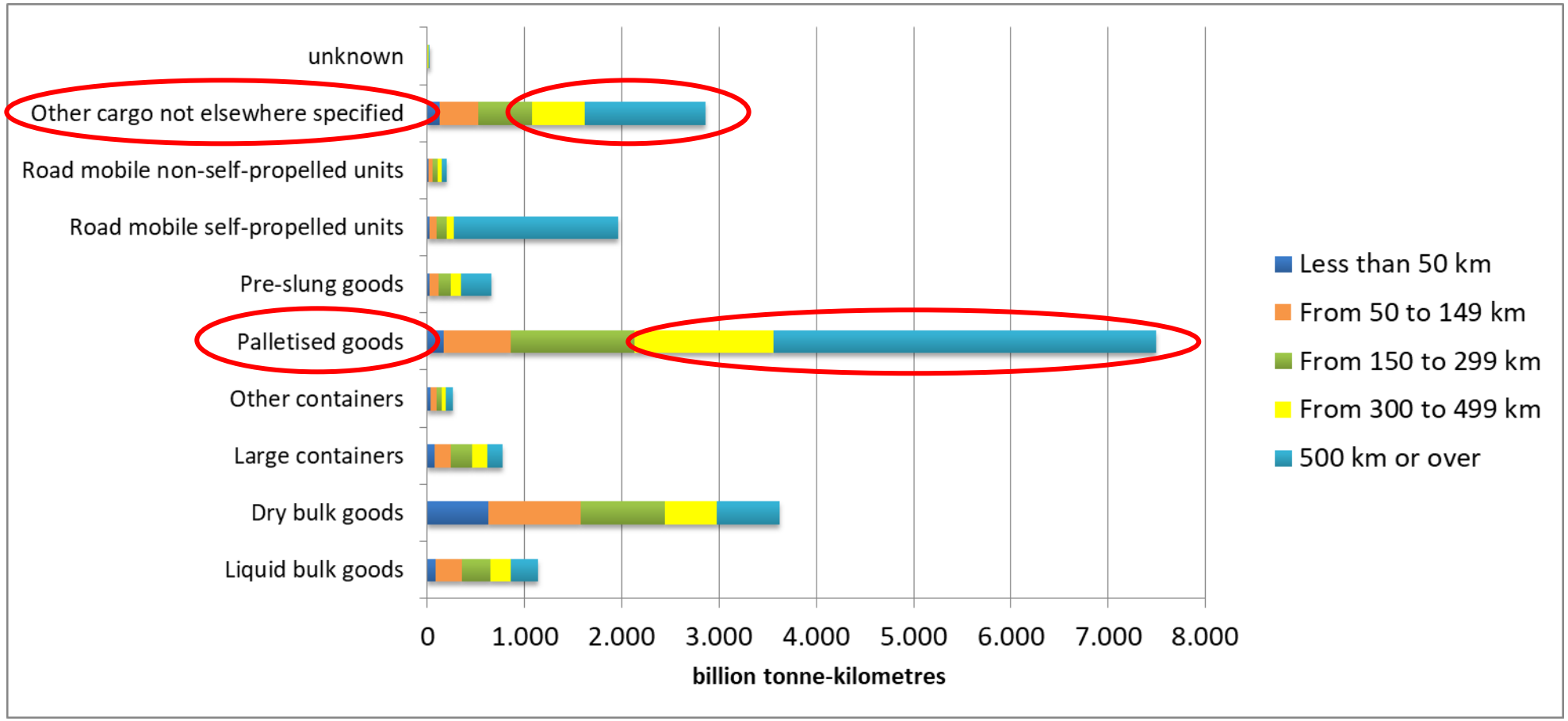
- Transport of freight and goods needs use of all modes
- Take the advantage of each mode
- Corridors, ports, hubs and terminals, the right mode, the right vehicle and loading unit ensure the optimal delivery at destination



Overview of freight

- Characterisation of transported cargo in EU-28 in 2016 (source EUROSTAT 2018)

- palletised goods which recorded 42.9 % of the EU-28 road freight
- palletised through flexible loading units
- Modes need to focus on right cargo segments



AEROFLEX innovations most relevant Physical Internet (PI) advancement

- Steerable e-dolly supports :
  - (Autonomous) maneuvering of loading units in logistics yards (PI nodes)
  - Drivers focus is driving, relieves driver shortage and improves specialization
- Modular, adaptable loading unit
  - Perfectly in line with PI concept
  - Optimization with puzzle software
  - Robust on all transport modes
- Less energy demand per tkm

Scenarios (year 2040) – impact EMS1/2 on EU market

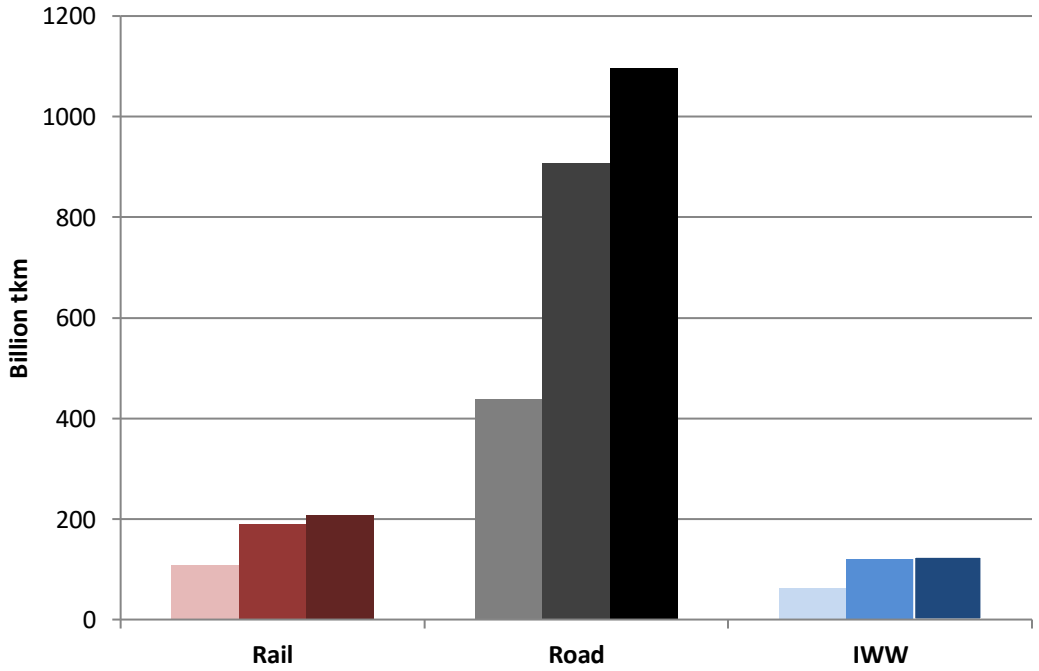
Macroscopic modelling –
modal and mean split differences (EU28 – incl. UK)

- Baseline (without EMS)
- EMS1 operating without any restrictions
- EMS1 and EMS2 operating without any restrictions
- Consideration of external costs of transport
  (e.g. study of infras)
- Limit the average load factor (payloads)
  to avoid that heavy cargo (commodity groups: e.g. coal, ores, fertilizer, soils) will be shifted from rail to road in the simulation

Result

- Estimate expected benefits of new vehicle concepts in EU freight transport market

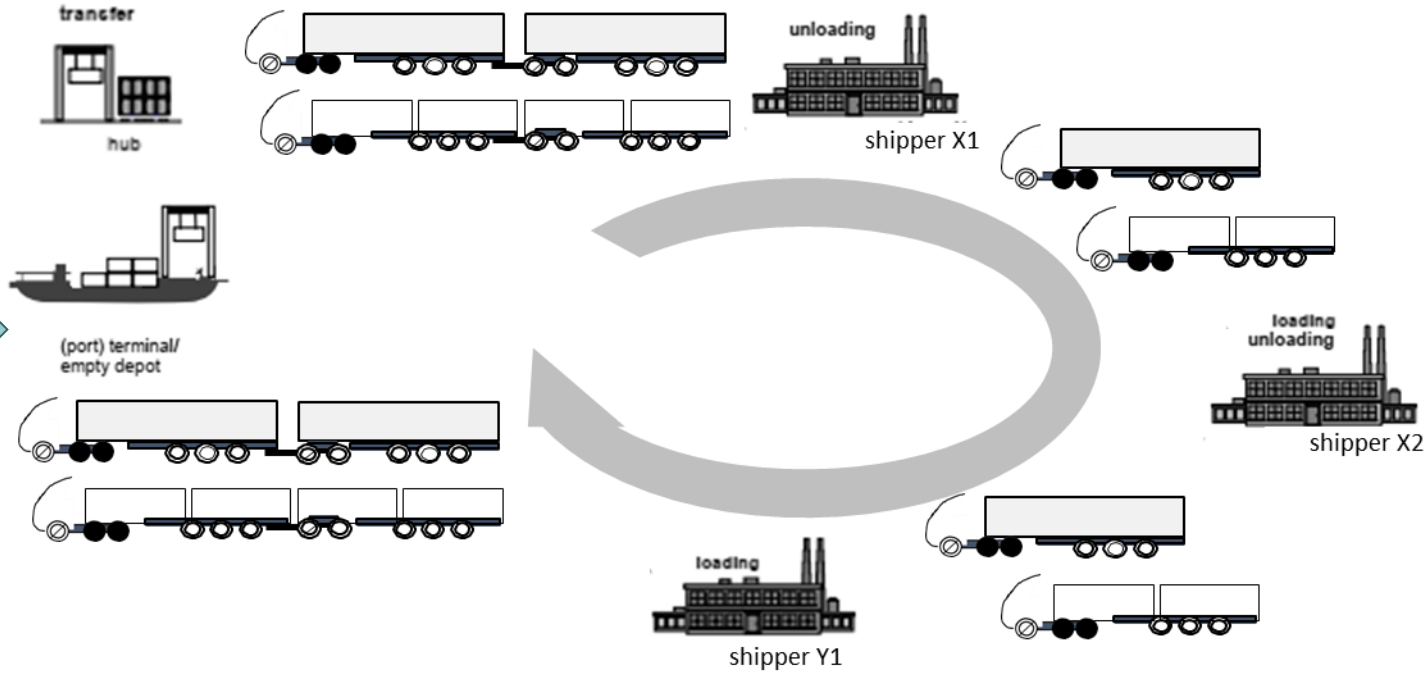
Projection of Modal split in 2010, 2030 (bright colours) and 2040 (dark colours) predictable - sample Germany



Sensible situation related to rail/intermodal transport

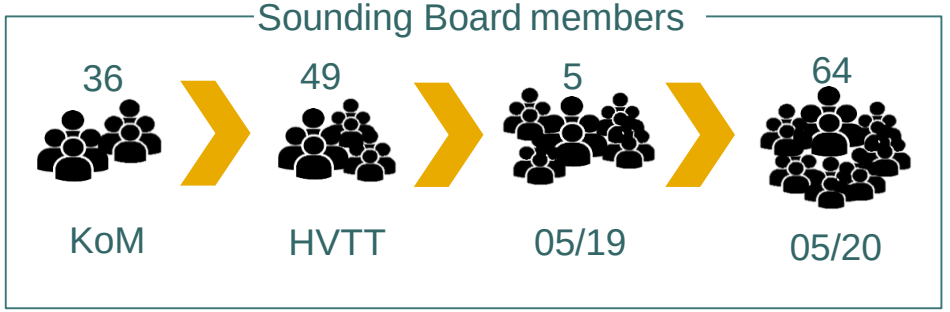
- Cost reduction for pre- an post haulage on road in intermodal transport will support mode shift road/rail, road/IWW and road/short sea shipping

Figure:
Intermodal transport chain – use of EMS2 and the opportunity to extend the trip planning and reduce of daily circle runs (example)

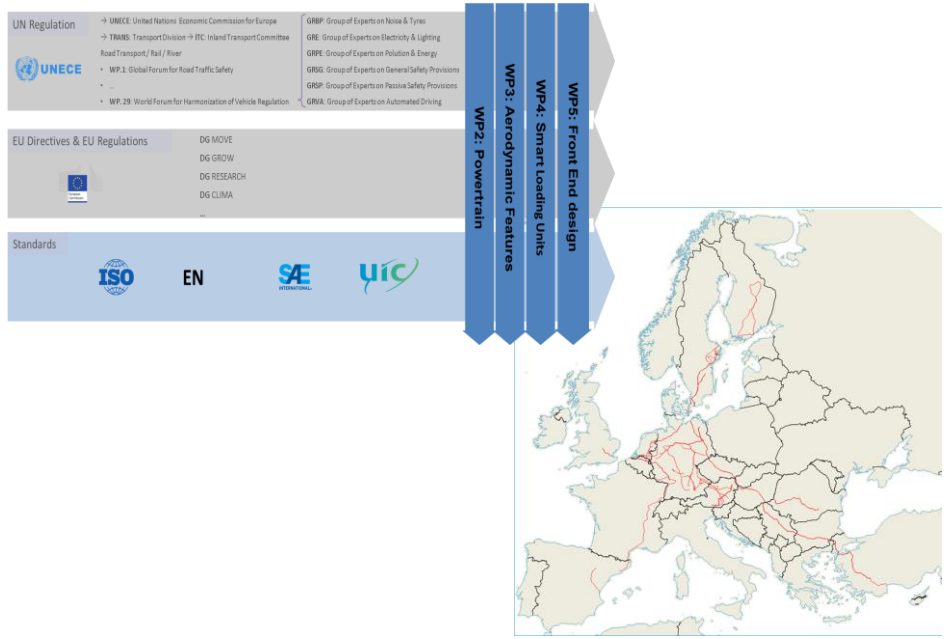


Impact and requirements, state of the art of the regulatory framework and analysis of the technologies

- Establishment of a **Sounding Board** to advise and help guide the process of defining the recommendations for implementation of the solutions and measures developed within the AEROFLEX project

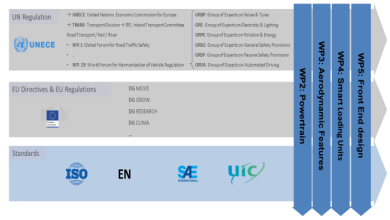


- Drafting of coherent **recommendations for revising standards and legislative frameworks** in order to allow the new aerodynamic and flexible vehicle concepts on the road



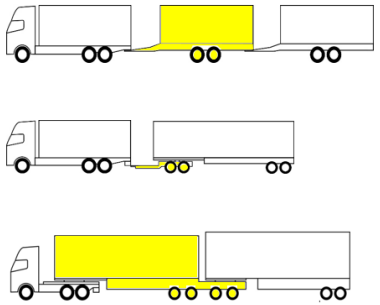
- **Recommendations** to policy-makers, authorities and industry on **standardization issues and a legislative framework** for multi-modal use of the vehicle concepts developed

Intelligent Performance Based Standards for safe and efficient use of vehicles



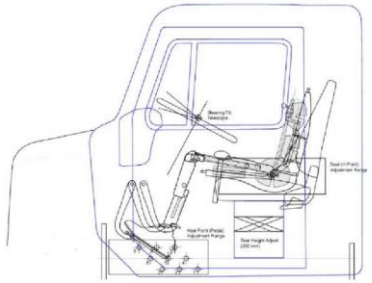
UN level

- Modular Vehicle Combination Group
- Requirements for Road Train Combinations (mainly in R13, for Braking Systems).
- Interconnections (EBS systems).
- 2nd step would include introduction of steered dollies (Regulation 79).



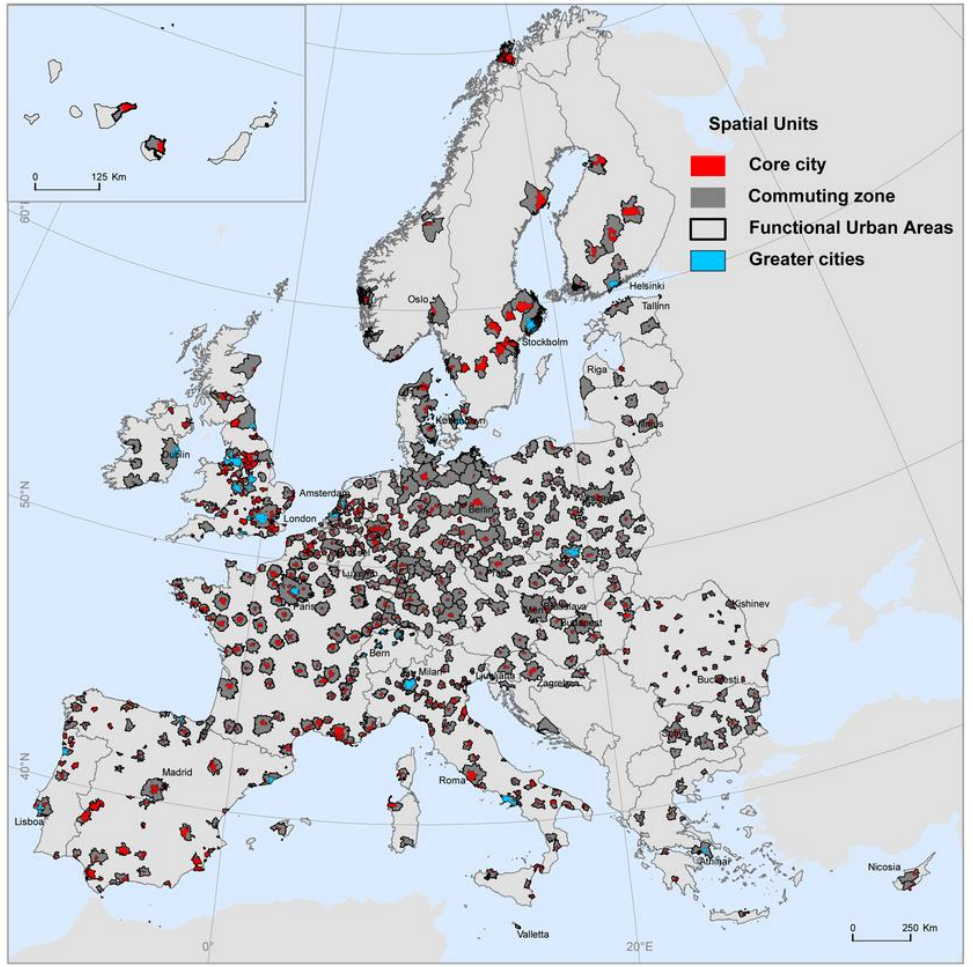
EU level

- Masses and dimensions
- New requirements for Aerodynamic devices (tests and dimensions).
- New requirements for Elongated Cabs (maximum dimensions, direct vision improvement and safety for VRU.



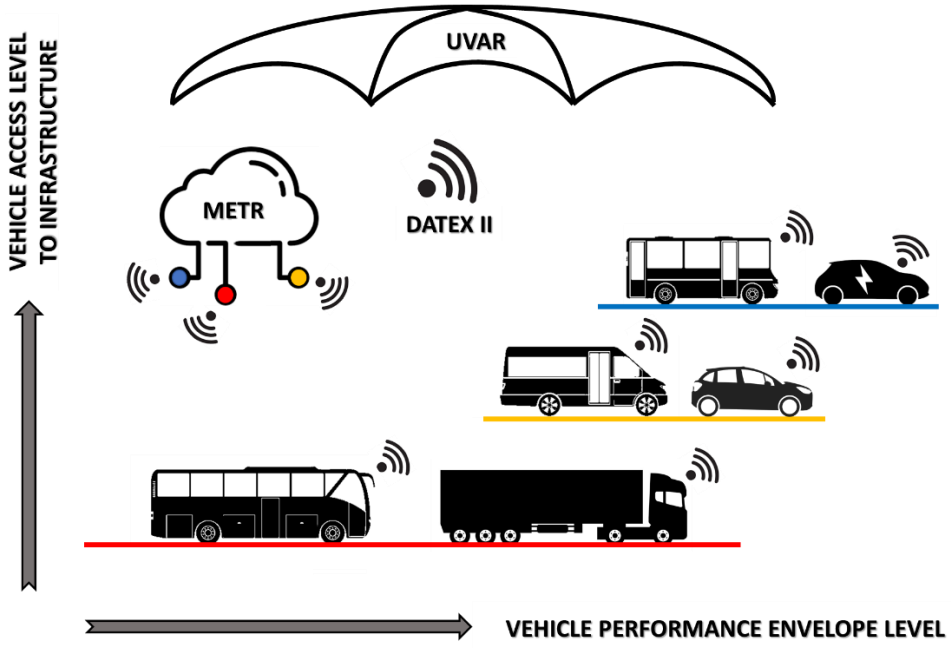
Intelligent Access Standards for safe and efficient use of infrastructure

- More and more local regulations are introduced restricting access creating barriers for logistics
- Transport of freight and goods are confronted with diversity in regulations
- Access policies are an opportunity to take away the burdens through
  - management of access and
  - regaining the control on the logistics and transport operation.
- Need to develop “the Pathway to Intelligent Access Policies through Europe to safeguard freight transport in a healthy, safe and environmentally friendly context”.

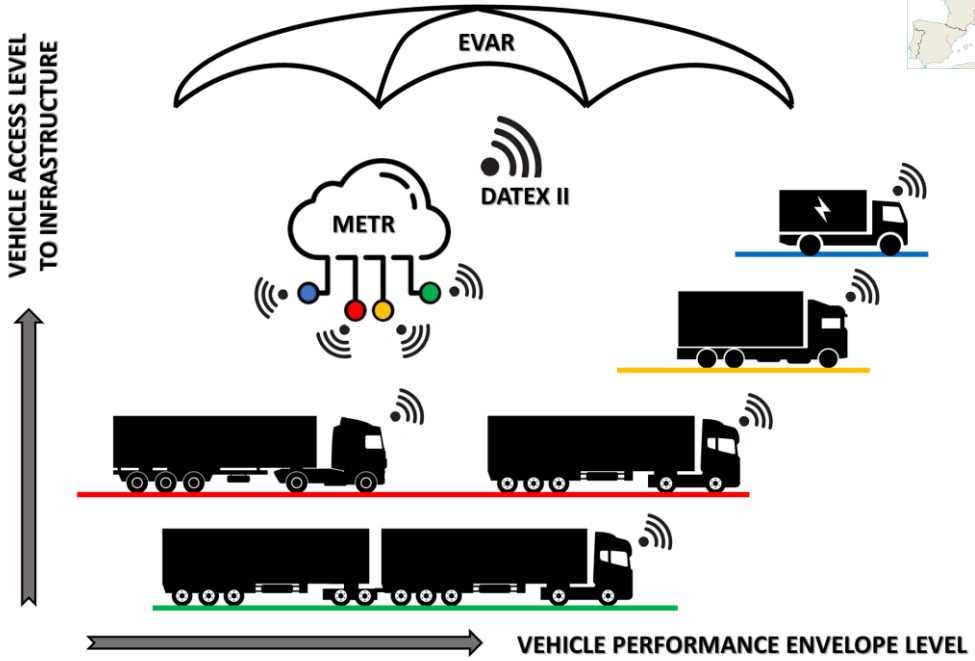


Intelligent Access Policies for Safe and Efficient Use of Infrastructure (example)

- "Pathway to Intelligent Access Policies through Europe to safeguard freight transport in a healthy, safe and environmentally friendly context".



- Urban Vehicle Access Regulations (UVAR) & Management for Electronic Traffic Regulations (METR)
  e.g. NORDICWAY project, DG MOVE UVAR pilot

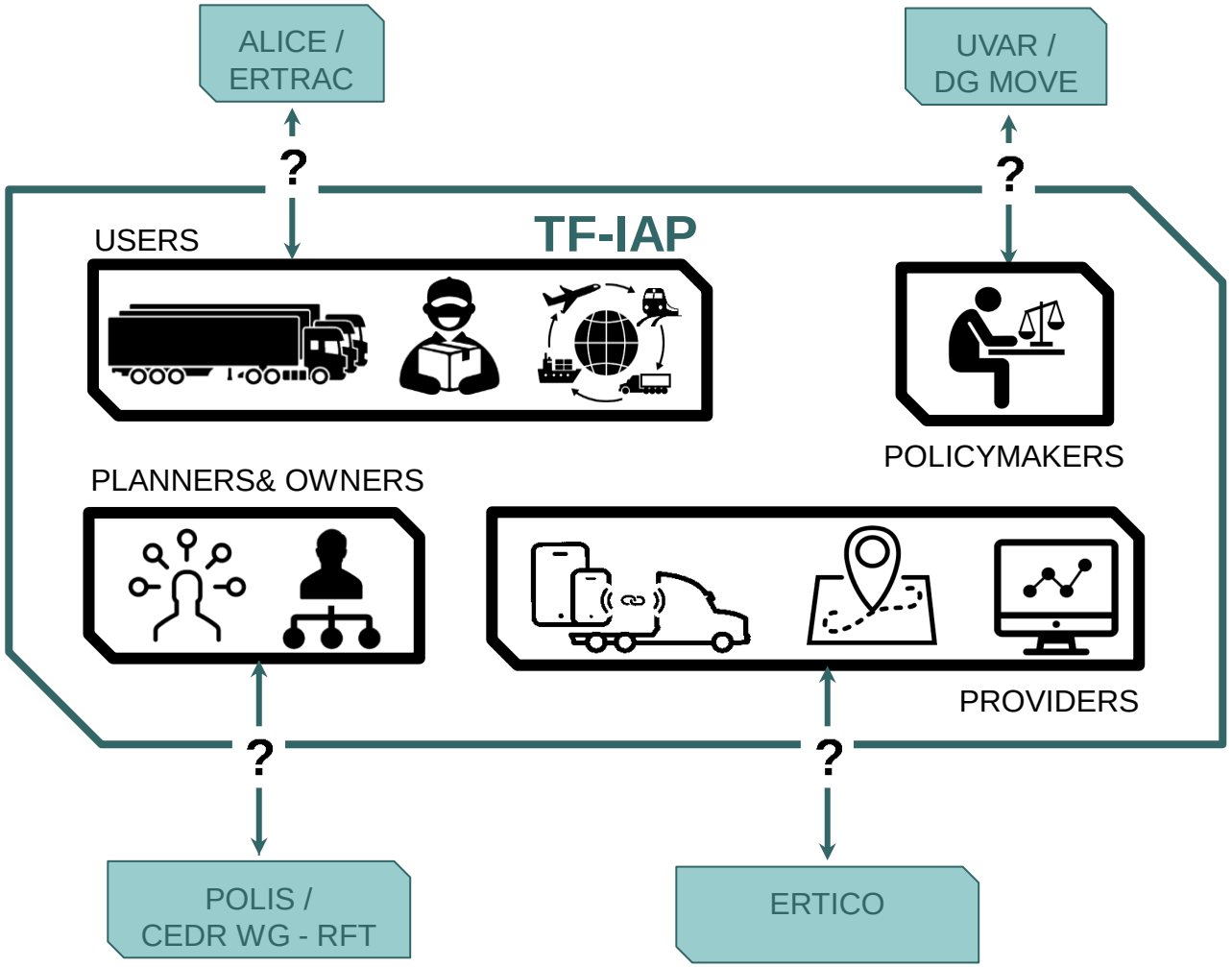


- Task force to promote European Vehicle Access Regulations (EVAR) & Management for Electronic Traffic Regulations (METR) for transport of freight in Europe

Intelligent Access Policy
Identified Stakeholder Clusters

- USERS – represented by the transport companies, fleet owners, logistic service providers, shippers, other road users, and users of other modes
- PROVIDERS – represented by the companies/institutes, offering systems and tools to execute EVAR and METR
- POLICYMAKERS – policymakers and (safety) certification authorities on European, national, and regional level
- PLANNERS & OWNERS – responsible for building and maintenance of infrastructure (road/rail/water/air/tube)

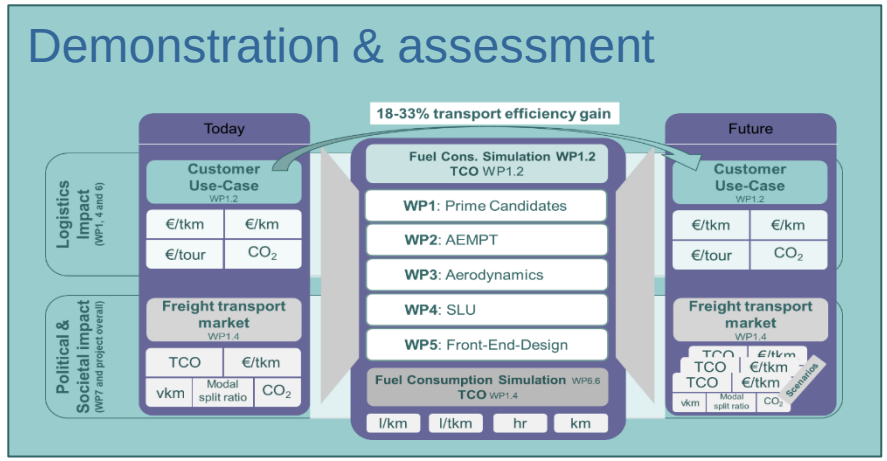
Task force to involve the stakeholders and achieve commitment to IAP-agenda

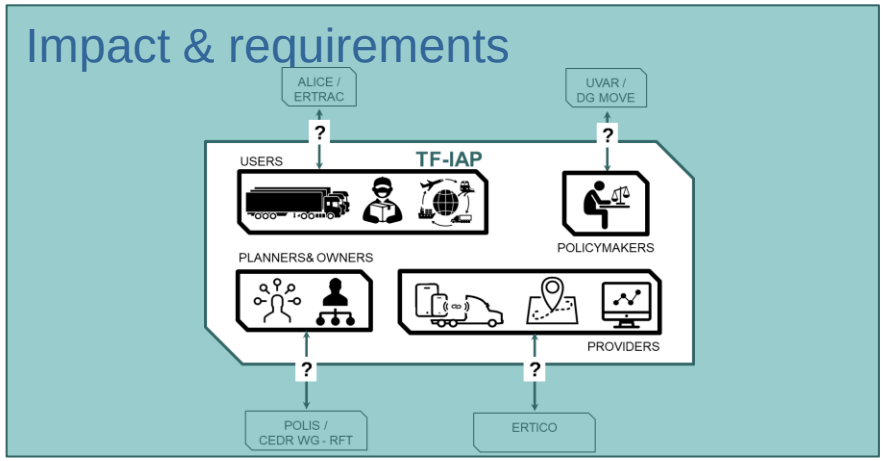


- The project AEROFLEX has decided to initiate a start of **IAP Task Force,** find budget to continue the activities driving the IAP-agenda beyond AEROFLEX.

- **Join our intiative! ->**
  marta.tobar@idiada.com
  www.aeroflex-project.eu

Q&A


Demonstration & assessment
18-33% transport efficiency gain
Today
Future
Logistics Impact (WP1, 4 and 6)
Political & Societal impact (WP7 and project overall)
Customer Use-Case WP1.2
€/tkm
€/km
€/tour
CO2
Freight transport market WP1.4
TCO
€/tkm
vkm
Modal split ratio
CO2
Fuel Cons. Simulation WP1.2
TCO WP1.2
WP1: Prime Candidates
WP2: AEMPT
WP3: Aerodynamics
WP4: SLU
WP5: Front-End-Design
Fuel Consumption Simulation WP6.6
TCO WP1.4
l/km
l/tkm
hr
km
Scenarios


Impact & requirements
ALICE / ERTRAC
UVAR / DG MOVE
USERS
TF-IAP
POLICYMAKERS
PLANNERS& OWNERS
PROVIDERS
POLIS / CEDR WG - RFT
ERTICO


Standardized interfaces and sharing of components for higher economies of scale

Summary of activities to be addressed in future R&I projects

- Scaling (logistics) projects to further demonstration and implementation new technologies / systems to realize the needed impact and efficiencies. (autonomous handling and transportation of freight and cargo).

- Link EMS to zero tail pipe vehicles, connections to urban logistics including last mile operations. Potential solution to speed up decarbonization at cost able to bear by the society and contributing to the Green Deal targets (50 - 55% CO2 reduction by 2030).

- Project OEM / trailer-manufactures / transshipment / intermodal operators to demonstrate the holistic system.

- Access policies on a European base, linked to Balkan and Turkey, managing growth of transportation by a constant reduction of emissions.

  Ensure formation and continuation of TF-IAP beyond June 2021.
  Involvement of and supervision by ALICE, ERTRAC, POLIS and DG MOVE.

Next steps and outlook

- IDIADA, Santa Oliva

- Next meetings
  - GA web-meeting – 3 / 4 November 2020
  - SB web-meeting – 4 / 5 November 2020
  - ALICE web-meeting – March 2021
  - Final meeting preliminary 22-24 June 2021

https://aeroflex-project.eu/tra2020-aeroflex-papers/

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Keep healthy

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