cooperative Conference 2010 mobility

TOWARD A REAL IN VEHICLE SAFESPOT FUTURE DEPLOYMENT

From Demonstration Prototypes to a Real Product

Perspectives from an Electronic Automotive Supplier

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CVIS COOPERATIVE VEHICLE-INFRASTRUCTURE SYSTEMS

SAFESPOT COOPERATIVE SYSTEMS FOR ROAD SAFETY

European Commission Information Society and Media

Ministerie van Verkeer en Waterstaat

From Demonstration Prototypes to a Real Product

Presentation Higlights

- Deployment Road Map short overview
- Integration in the Vehicles Electronics Architectures
- O.E.M Vs. Aftermarket Systems
- Cost challenges and competitiveness

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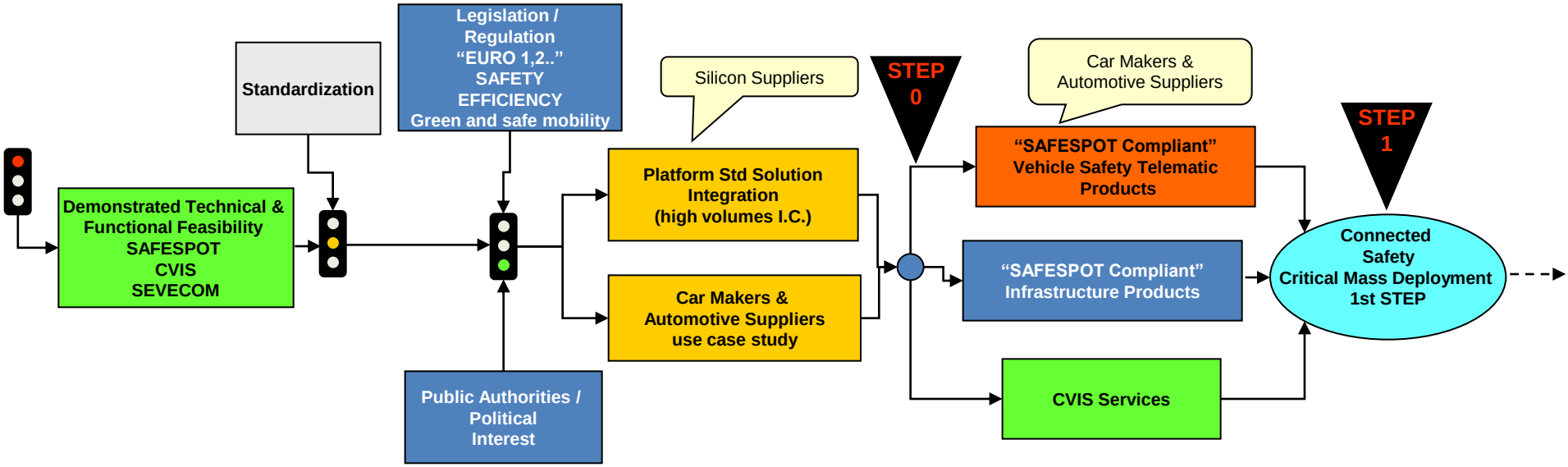
Deployment Road Map short overview (1/2)



STEP 0 is the starting point for the large mass system introduction that will allow the creation of "SAFESPOT Compliant" Vehicle Safety Telematic Products as well as SAFESPOT Compliant" Infrastructure Products and the extension of CVIS services

STEP 1 is the milestone that will show the Connected Safety Critical Mass Deployment. This favourable situation may allow further mass enlargement for the diffusion of Infomobility / Entertainment. / Comfort Services (like pay road, park tolling, access areas management, enhanced services.. etc)

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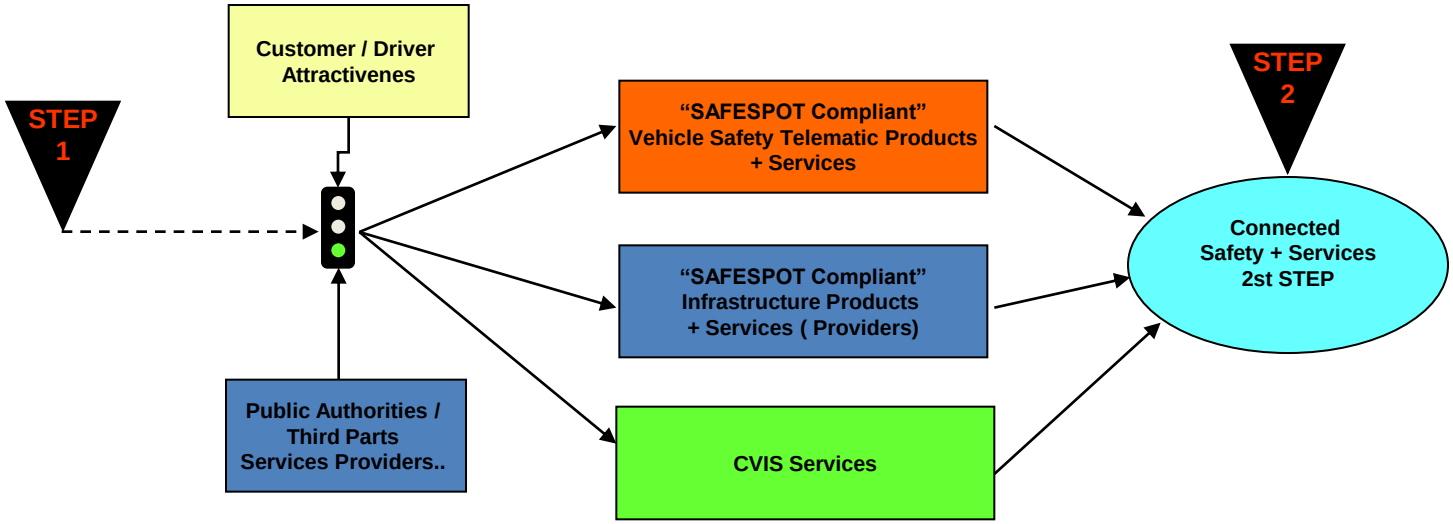
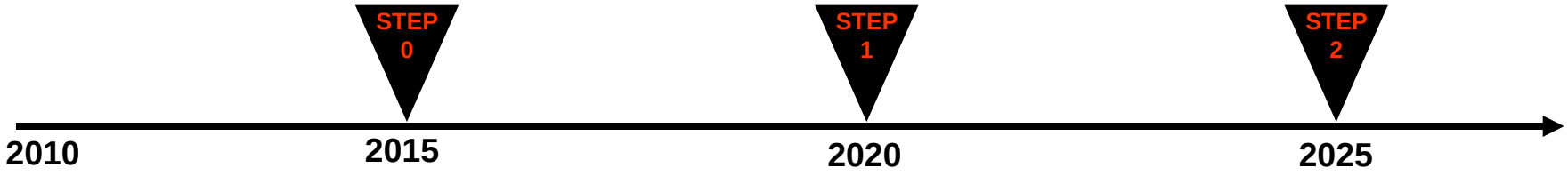
Deployment Road Map short overview (2/2)



STEP 2 The consequent Customer & Driver Attractiveness and the Public Authorities and Third Parts Services Providers should characterize a great situation where, on the base of a well assessed V2V and V2I scenario, a lot of further services will easily and rapidly increase the business opportunities



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Integration in the Vehicles Electronics Architectures (1/8)

❑ The SAFESPOT System deployment into vehicles as Original Equipment deals with the complex matter of optimal integration into the E/E architectures and components (ECUs)

❑ Each O.E.M. has his own proprietary E/E solutions normally designed with their tire 1 Suppliers capable to fit the specific Brand requirements both in term of functionalities, distinctive aspects and target cost

❑ We can imagine that the SAFESPOT paradigms implementation may be presented to the driver (in particular for the HMI) in different ways; it will depend on the Car segment and type, as well as the different vehicles manufacturers and automotive suppliers, situation similar, for example, to the actual Instrument Clusters

❑ The probable trend, as happens in today vehicle will be to share as much as possible the technical solution among different suppliers; typically all the contents that are not visible and do not contribute to the differentiation of the functionality should be the same. That's what today refers for instance to the CAN bus or AUTOSAR solutions. This deals with the adoption of common standards thus allowing the possibility to reach large volumes

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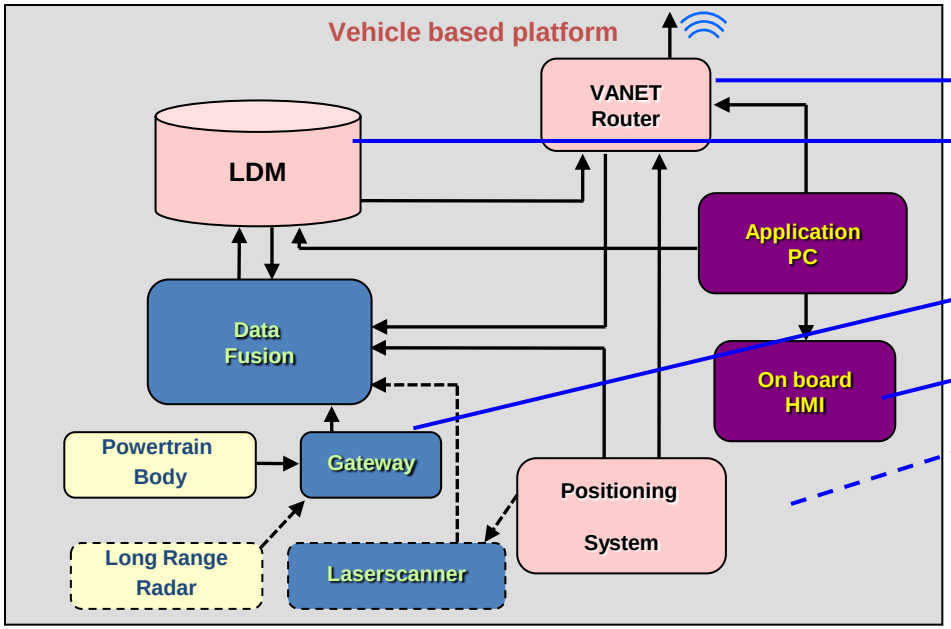
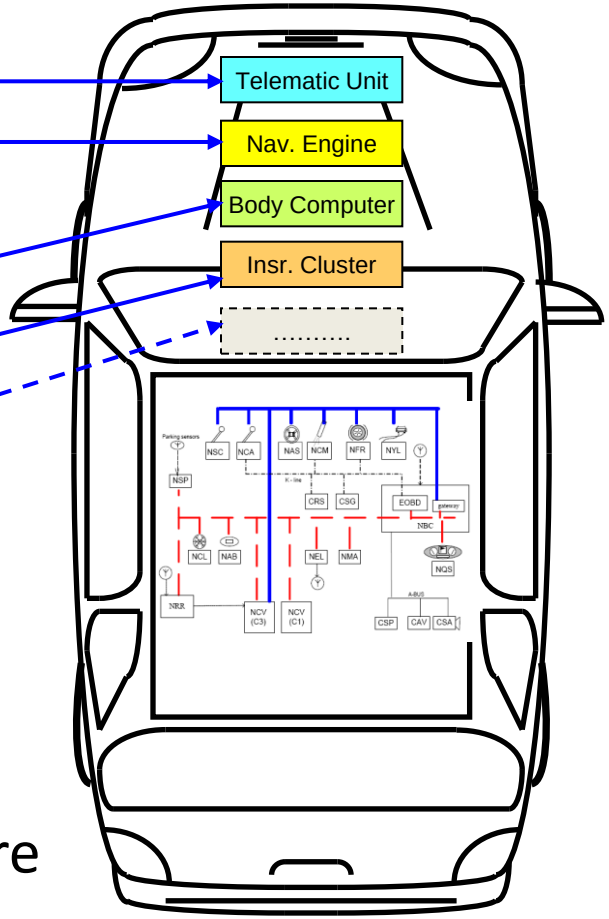
Integration in the Vehicles Electronics Architectures (2/8)





Each SAFESPOT component
should find the appropriate place into the
O.E.M. proprietary E/E in vehicle architecture

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Integration in the Vehicles Electronics Architectures (3/8)

In SAFESPOT project the components have been distributed in several PCs.
It was not in the aims of the project to reach optimization and performances, nevertheless the achieved testing results provide important indications to be taken into account for the future industrial deployment.

❑ **LDM (Local Dynamic Map)**

- .Performances in the time domain are crucial
- Short latency time should be assured also in critical conditions
- LDM can gain the benefit of an optimal embedded design with a dedicated and optimized engine
- A tailored co-processor integrated in a controller I.C. is one of the possible solution
- This needs high volumes with the necessity to extend the standardizations

❑ **COMMUNICATION**

- The 802.11p device is expected to reach soon benefits from large volumes
- Router functionality (as for LDM) has to assure a compliant behaviour in the time domain
- The Router should find an optimized implementation in an embedded dedicated engine
- Extension of the standardization also in the upper layers of the communication is desirable

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Integration in the Vehicles Electronics Architectures (4/8)

❑ HMI

- HMI was not in the main core activities of SAFESPOT project, but is another important component of the system that needs to be managed in a proper manner
- A Safety system should be supported by an adequate HMI capable to provide the right information at the right time and in the appropriate way (visual, acoustic, haptic…) depending on the level of importance and the driving context
- Ideally the HMI should find place inside the vehicle basic information systems, for example the Instrument Cluster, but can also be improved using more enhanced interfaces
- TFT re-configurable screens, Infotainment and Navigation Systems or HUDs can provide nice way to deploy the information to the driver
- Low cost / low segment vehicles should be equipped in a minimal way, capable in any case to delivery the SMA (Safety Margin Assistant) information in an essential manner

❑ APPLICATIONS

- The deployment of applications is more a matter of computation and memory availability
- It should expected that in the next years this will not represent the main problem
- SAFESPOT Applications probably will can find right place inside the evolution of Navigation Systems

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Integration in the Vehicles Electronics Architectures (5/8)

❑ GATEWAY

- This is one of the components that is more dependent from the specific and proprietary E/E architecture
- Nevertheless we can assume that, the most important SAFESPOT in vehicle related parameters (i.e. speed, light and brake status….) should be standardized in such a way
- We can see as an example what happened for instance in the OBD Scan Tool in U.S.
- Safety parameters can be exported in a common way to the SAFESPOT system

❑ POSITIONING

- Precise Positioning calculation is a fundamental topic for SAFESPOT applications
- In SP3 (Innovative Technologies) different possible methods have been considered to find innovative approaches for the positioning task in order to implement highly precise and reliable positioning module
- The achieved results will certainly drive the deployment for future products
- Furthermore new systems (i.e. Galileo) will give substantial improvements on the localization task

❑ ESPOSYTOR

- The SAF**ESPO**T **Sy**stem Moni**tor** plays an important role inside the project
- In the real deployment it should be assimilated as a useful monitoring and testing tool for developers

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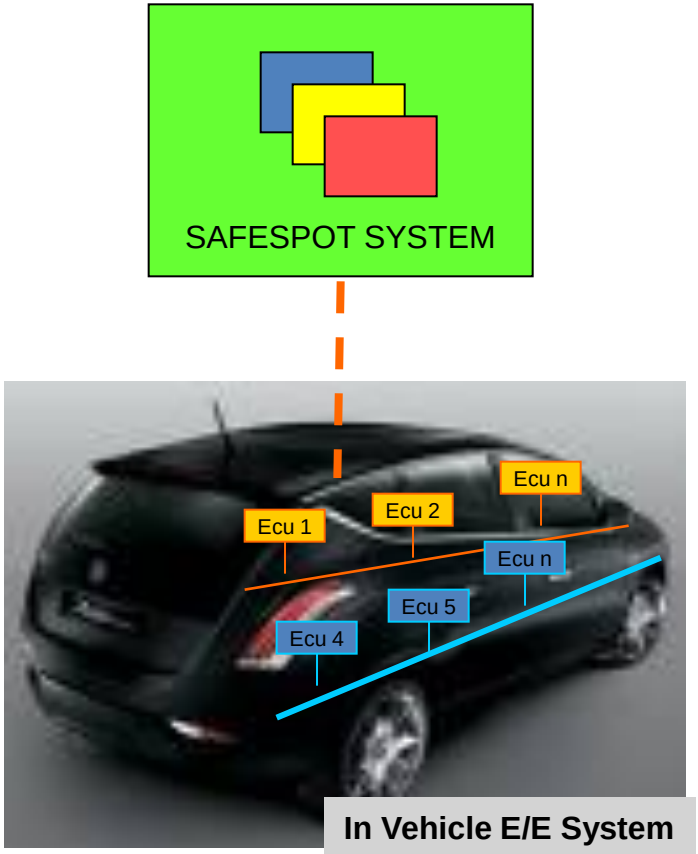
Integration in the Vehicles Electronics Architectures (6/8)

Stand Alone SAFESPOT plug-in



- This first solution considers the SAFESPOT system as a complete add on components set including also his own HMI
- The connection to the in Vehicle data is desirable but not mandatory
- In such a case the Safety applications will be limited to those that do not require punctual internal vehicle status and information: ex. functions based on road condition monitoring or using vehicle sensors in this case are excluded
- All these factors are limiting the number of functionalities
- Nevertheless this should probably be the ideal architecture for retrofit solution for olds and already in circulation vehicles

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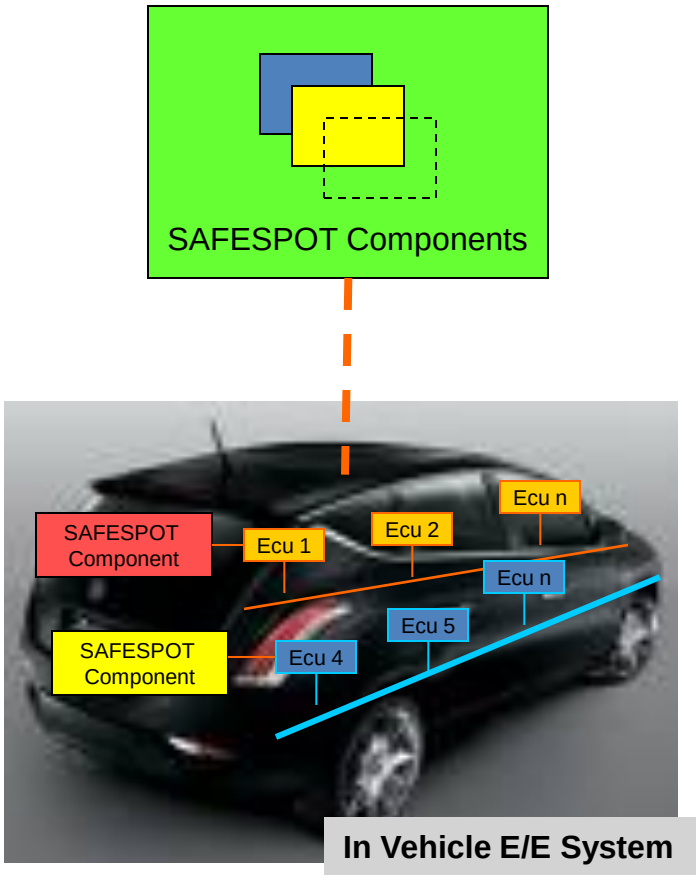
Integration in the Vehicles Electronics Architectures (7/8)

Partial in vehicle integration



- This is the case in which some part of the SAFESPOT components is deployed in the already in vehicle series components. As an example the HMI may take place in the Instrument Cluster or in the embedded Navigation System
- The synergy with existing always present in vehicles components deals with cost optimization as well as a better distribution of the functionalities inside the E/E vehicle architecture
- Several Cars E/E architectures are today offering the possibility to be connected with external devices (Cell Phones, Portable Navigators, PDA…). For instance in the FIAT Group vehicles this is done using Bluetooth connection to the in Car Blue&Me device
- Such a type of connectivity should be useful in the future to extend the possibility of connection to external sub-systems like SAFESPOT, thus implementing what in the actual demonstrators is done with the Vehicle Gateway device

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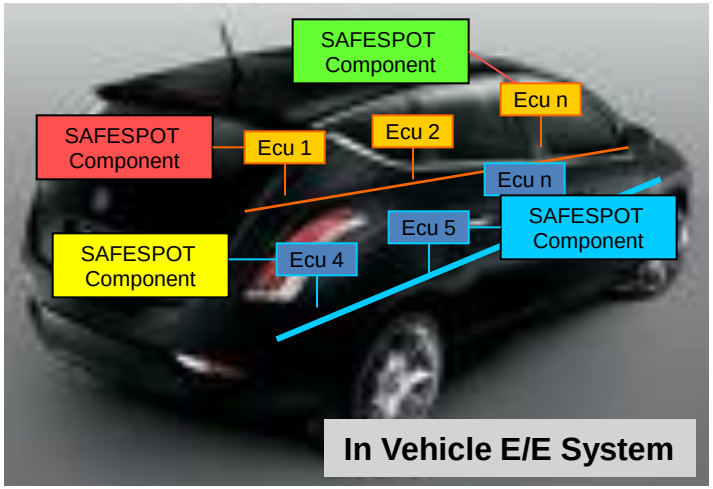
Integration in the Vehicles Electronics Architectures (8/8)

Fully Integrated System



- In this case all SAFESPOT components are conceived to be integrated into the E/E architecture
- This means both the integration into series components as well as in dedicated electronics but specifically designed for the vehicle system
- This is the optimal solution: the O.E.M. optimized design deals with a possibility to reach greater performance respect the two previous solutions
- Reliability of the system and ergonomic aspects will gain the advantage of a tailored specific solution for each vehicle

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O.e.m. Vs. Aftermarket Systems

- O.E.M → for new vehicles and for Brand images differentiation (ex. HMI, look and feel functionality, high end vs low end cars)
- O.E.M. → is better for reliability and ergonomics
- Aftermarket → to equip existing circulating vehicles to reach critical mass volumes
- Aftermarket → to extend to several type of vehicles and small brands

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Cost challenges and competitiveness

- High volumes silicon integration (standardization)
- Platform standardization (cooperation between suppliers and O.E.M.s)
- HW & SW solutions as common factor (AUTOSAR approach)
- Brand and Company differentiations by functions, look & feel, ergonomics….
- Integrated vs. distributed allocation: specific design solution for cost optimization
- As enabling factor for the market penetration it's possible to imagine that a very thinly implementation of the SAFESPOT paradigms, with minimal essential safety applications supported by an easy and cheaper HMI should find a right place into the cost / competitiveness deployment scenario

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Thank you !

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