

LAVOSAR II WS1:WP2
ORA Standards Update

nexter

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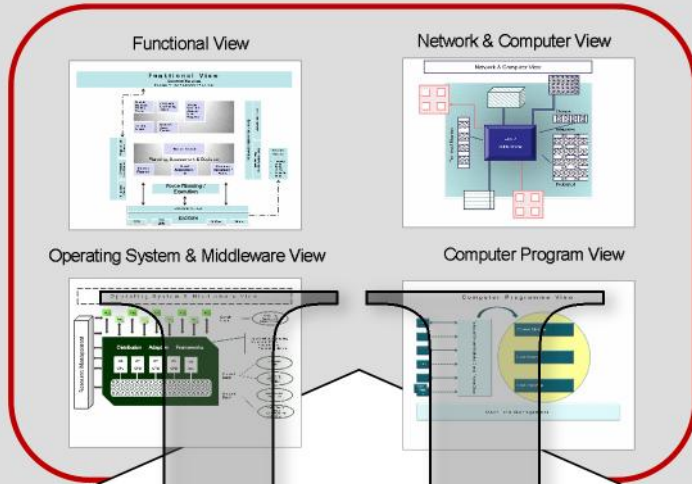


Fraunhofer
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BAE SYSTEMS

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Patria

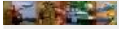


EDA INDUSTRY WORKSHOP ON EUROPEAN REQUIREMENTS FOR MISSION SYSTEMS OF LAND VEHICLES (WS2)

WP2 Open Reference Architecture Standards Update (Selex ES)

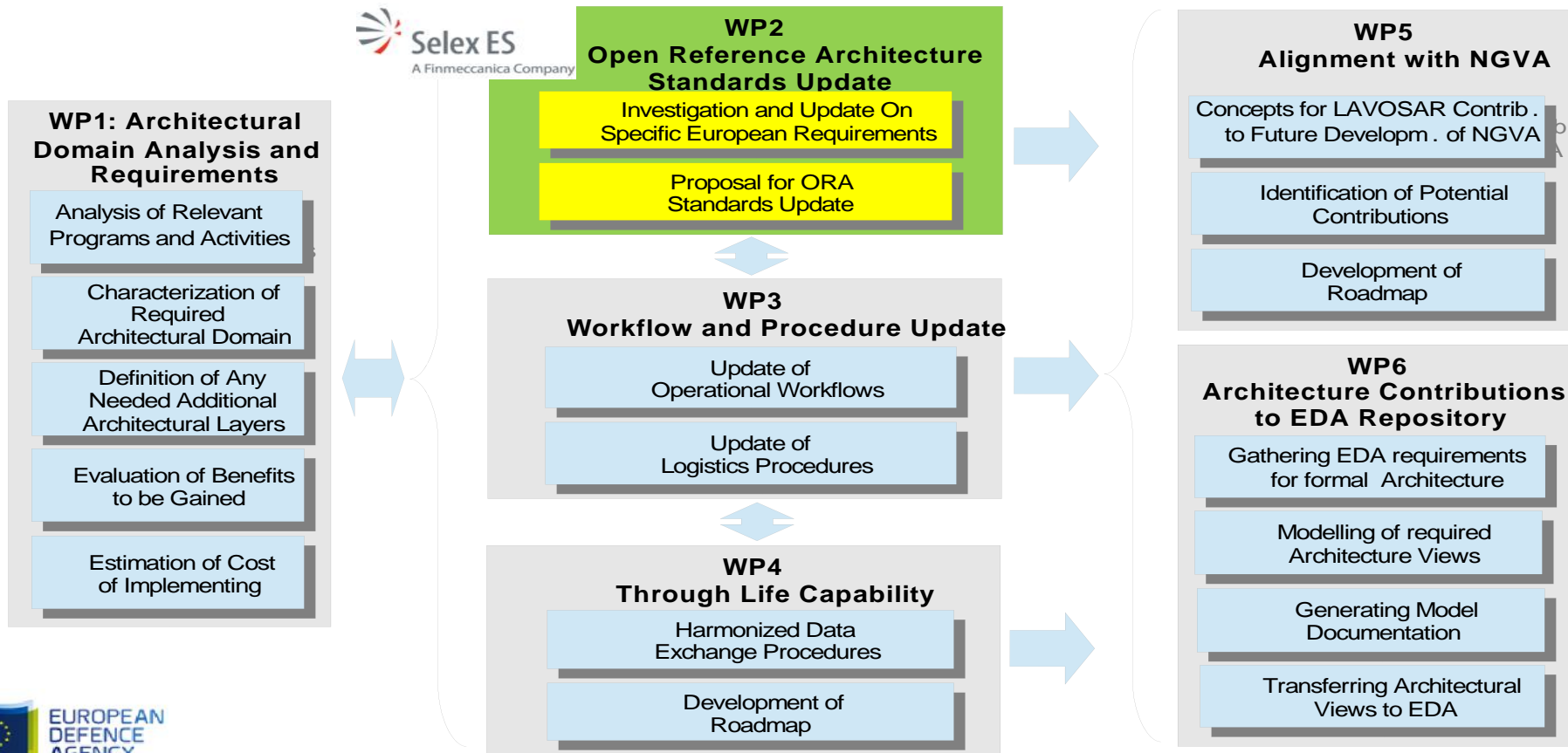
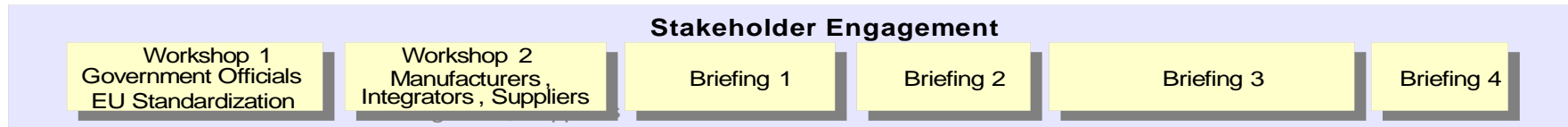
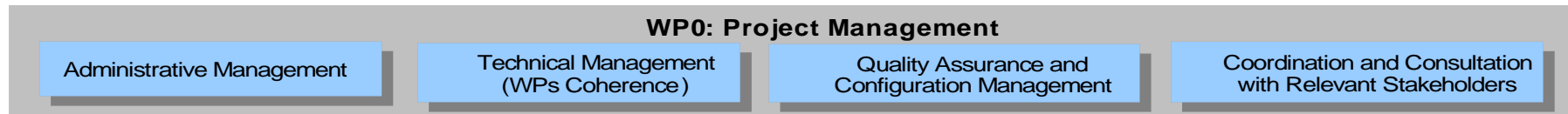
Edouard Mouchel

July 2015



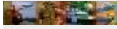
LAVOSAR II Work Package 2 Open Reference Architecture Standards Update

- **WP2 Overview and Context**
- **Specific European Requirements**
 - **EU Rationale**
 - **LAVOSAR I Missing Stakeholder Inputs**
 - **LAVOSAR Classes / Actors / Use Cases / Information Exchange**
 - **LAVOSAR Features Survey Revisited**
 - **LAVOSAR II Revised Survey**
- **Further Questions for Discussion**



Information Flow between Work Packages





LAVOSAR II Work Package 2 : Specific European Requirements

To identify and update specific European level requirements

How to establish these [to be complementary to (N)GVA] ?

- **Rationale EU CSDP Rapid Reaction Force Requirements**
- **Gap analysis from earlier study work**
- **Various Stakeholder Engagements**
 - **WS1 Government Workshop**
 - **Government Survey Questionnaire Revised**
 - **WS2 Industry Workshop (July 2015)**
- **Work Package 1 Output (WIP)**
- **LAVOSAR II Revised Survey**



EU Military Rapid Response Concept : Timelines

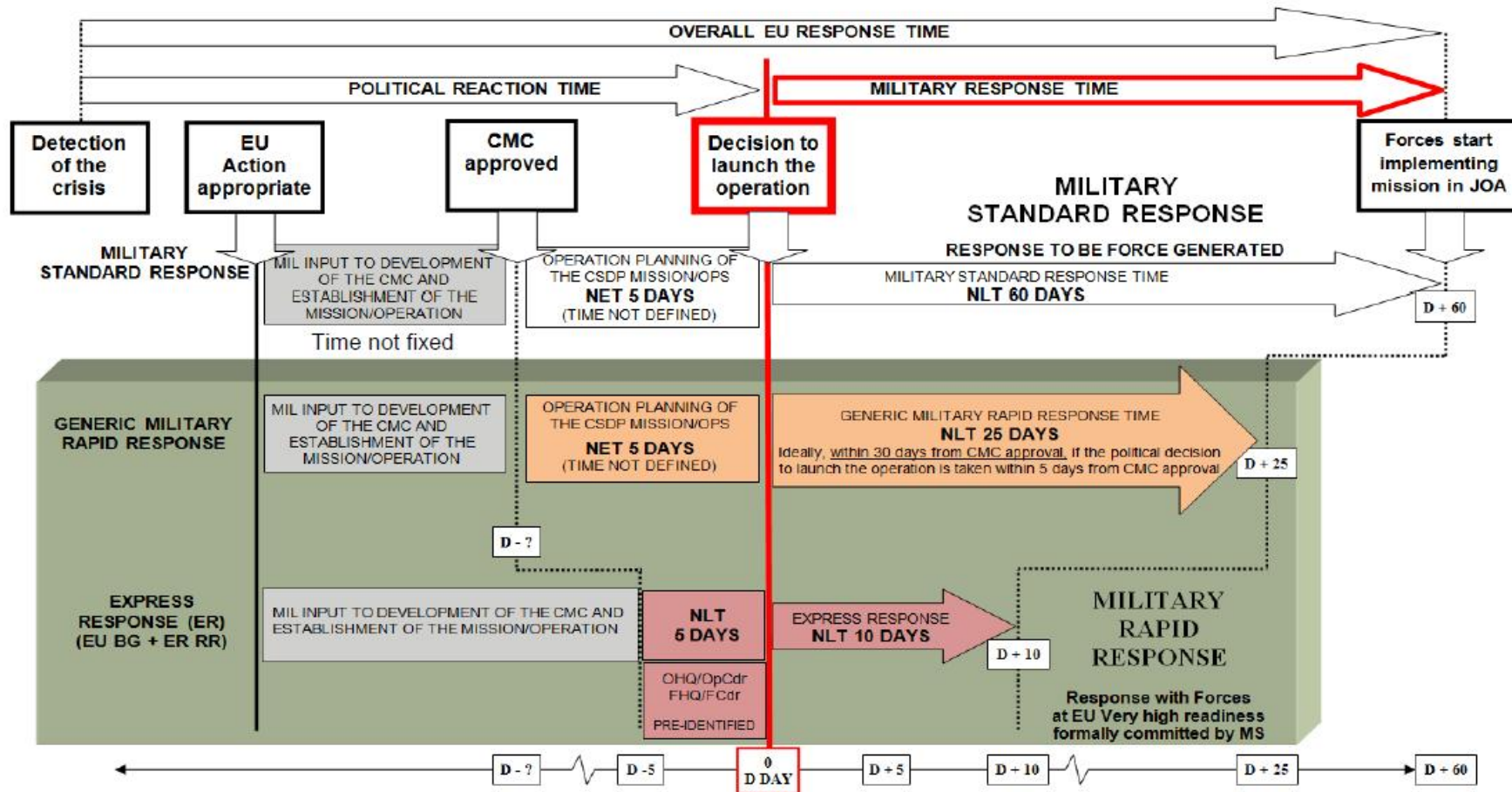
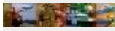
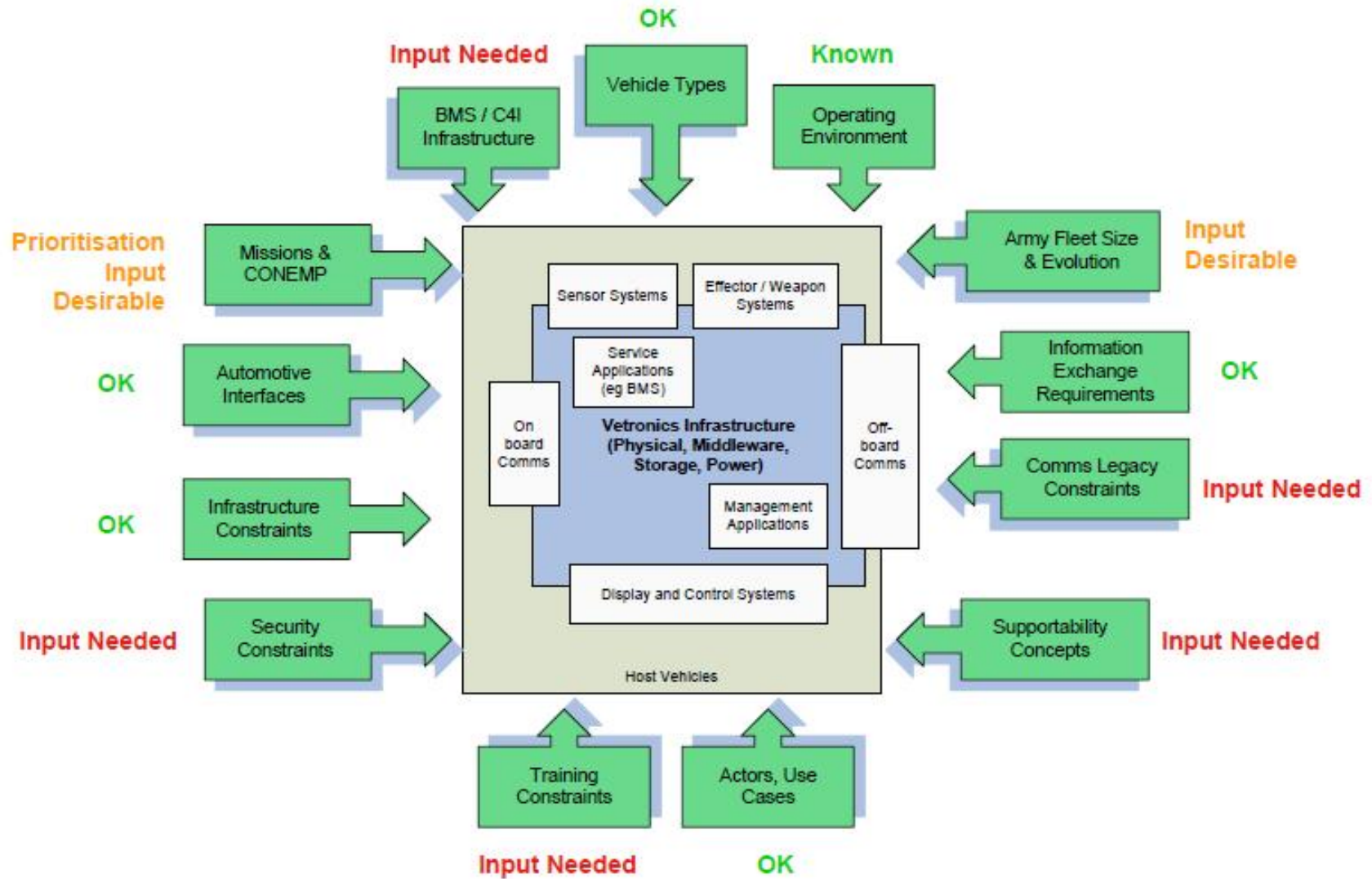


Figure 4: Military Rapid Response timelines

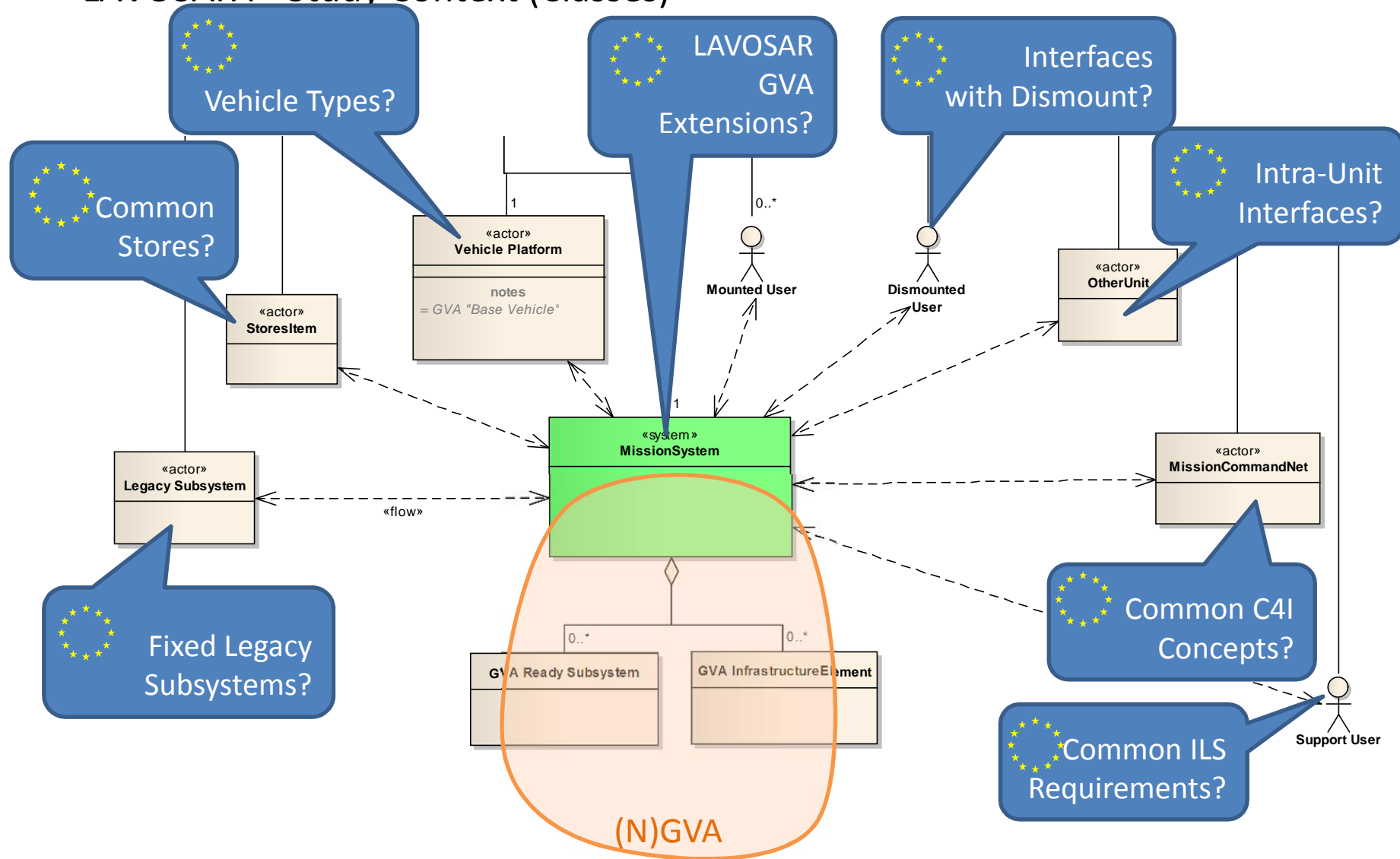


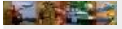
LAVOSAR I - Missing Stakeholder Inputs



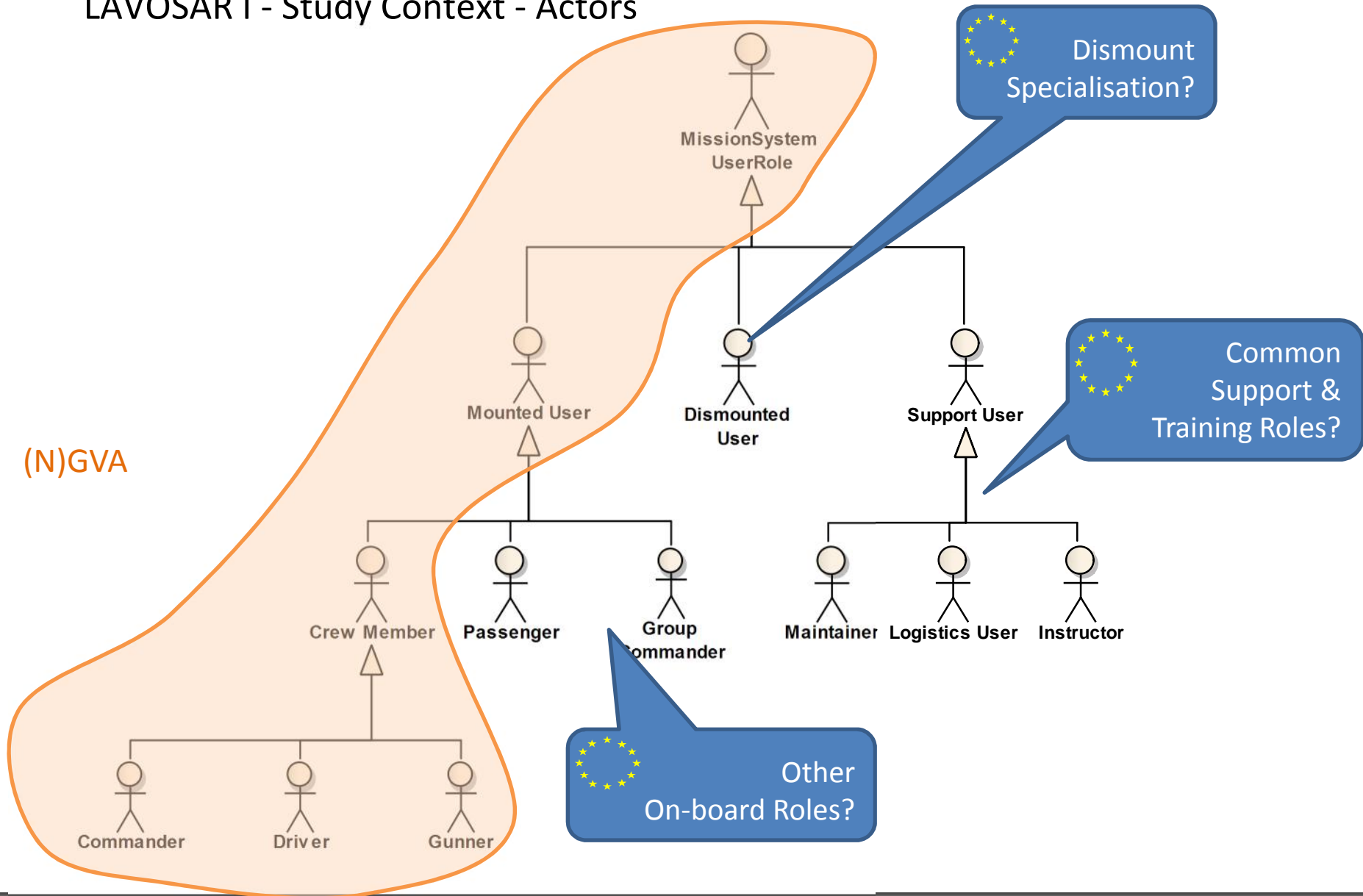


LAVOSAR I - Study Context (Classes)





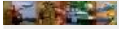
LAVOSAR I - Study Context - Actors





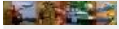
LAVOSAR 1 Study Results - 3. Normative Framework - Use Case Identification 'Use Cases & Actors'

Use Case	Actor						
	CMDR	DRV	GNR	Passenger	Instructor	Maintainer	Logistics User
COMMANDS, ORDERS							
Develop Briefing & Orders	█						
Receive Briefing		█	█	█	█		
SITUATION PICTURE							
Develop Local Situation Picture	█	█	█	█	█		
Develop Battlespace Picture	█						
View Local Situation				█	█		
Record & Report Situation	█						
Plan & Manage Mission	█						
ACTIONS							
Acquire Target	█		█				
Engage Target	█		█				
Assist Driving		█					
MAINTAIN OPERATIVE STATE							
Access & Initialise Mission System	█	█	█	█	█	█	█
Manage Power	█	█	█				
Manage Vehicle Health & Maintenance	█					█	█
Manage Defensive Aids	█		█				
Manage Stores	█		█				█
TBC Training Use					█		
TBC Specialist Use				█			



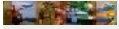
LAVOSAR II 2015 Government Survey

- **Decision taken to update and Re-issue Survey to Government April 2015**
- **Sent to expanded group of countries ~ 30 in total**
- **Survey Findings :**
 - **Re-iterated earlier results**
 - **Additional areas of emphasis**



2015 Survey Countries

- Austria
- Belgium
- **Bulgaria**
- Croatia
- Cyprus
- Czech
- Estonia
- **Finland**
- France
- **Germany**
- Greece
- Hungary
- Ireland
- **Italy**
- Lithuania
- Luxembourg
- Latvia
- Malta
- **Netherlands**
- Norway
- Poland
- Portugal
- Romania
- Serbia
- **Spain**
- **Sweden**
- Switzerland
- Slovenia
- Slovakia
- **UK**

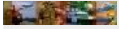


2015 Survey returns have been received from the following countries :

- Bulgaria
- Germany
- Finland
- Italy
- Netherlands 1
- Netherlands 2
- Spain
- Sweden
- *UK*

LAVOSAR I in 2013 responses :

- Austria
- Bulgaria
- Czech Republic
- Germany
- Italy
- Sweden
- UK



For the purposes of the survey, a Mission System is assumed to be a modular scalable suite of subsystems and crew interfaces on-board a vehicle that adds capabilities, beyond the basic automotive platform, creating a specific variant or role.

As before the assumption is made that vehicles will be categorised into 5 main types :

- **Main Battle Tank (MBT)**
- **Infantry Fighting Vehicle (IFV)**
- **Reconnaissance Vehicle (Recce)**
- **Armoured Personnel Carrier (APC)**
- **Trucks**



General Comment on 2015 Survey results

Mission System features required more in higher end vehicles ie. MBT, IFV, Recce, APC with more minimal Mission System equipment requirements in the Trucks vehicle category

Specialist role vehicles of IFV and Recce are the highest scoring generally requiring more Mission System equipments

General consensus across the contributors in the areas that are important

For example Mission System Features such as :

- **On-board Crew Communication Intercom**
- **Voice radio using VHF/HF**
- **Navigation for Own Vehicle**
- **Off-board Radio to Dismounted Soldiers (where appropriate)**
- **Provision of Driving Sensors**
- **Power Management**
- **Obscurant and Smoke launch for all types except the Trucks vehicle type**



2015 Survey Results Specific Mission System Features of Interest

Reviewing in detail the averaged table of results scores and hence requirements of particular interest (apart from the general points mentioned above), the following Mission System features can be highlighted :

1) User Interface

- Need for integrated multi-function HMI per crewstation position important generally and for IFV and Recce vehicles in particular, ideally with a common look and feel across the fleet
- Head-out operation of the Mission System for Recce vehicle
- Crew Aids for collaboration or task sharing between vehicles in own troop. **This implies the requirement for on-off vehicle data gateways (and by implication, associated technology and interoperability standards)**



2) Sensors

- Driver close indirect vision sensors (Day and or Night capable) are important for all vehicle types apart from trucks
- 360 Sensors for close indirect vision for any user are important for IFV and Recce
- Surveillance or Target Acquisition sights for Recce and IFV
- CBRN Hazards detection sensors for Recce and IFV
- Germany highlighted potential for provision of on-board human living condition sensors (eg. CO₂, temperature, etc.)



3) Effectors

- Remote controlled weapon system for Self-Defence of IFV, Recce and APC vehicles
- Optical Effectors (probably LRF) scored highly for IFV and Recce
- Defensive Aids subsystems for MBT, IFV and Recce
- Germany highlighted potential for non-lethal effectors



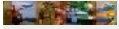
4) Applications Software

- Fire Control for MBT, IFV and Recce
- Precision Target Geo-location for IFV and Recce
- Navigation and associated aids (routing, waypoints, etc.)
- On-board Maintenance manuals across all vehicle types
- **Battlefield Information Management** including Digital Maps for IFV and Recce vehicles
- **Battlefield Scenario Simulation and Training** for IFV and Recce (and to a slightly lesser extent MBT). This training scenario on-**vehicle is another emergent area** for considering potential new system elements, interfaces, standards and use cases



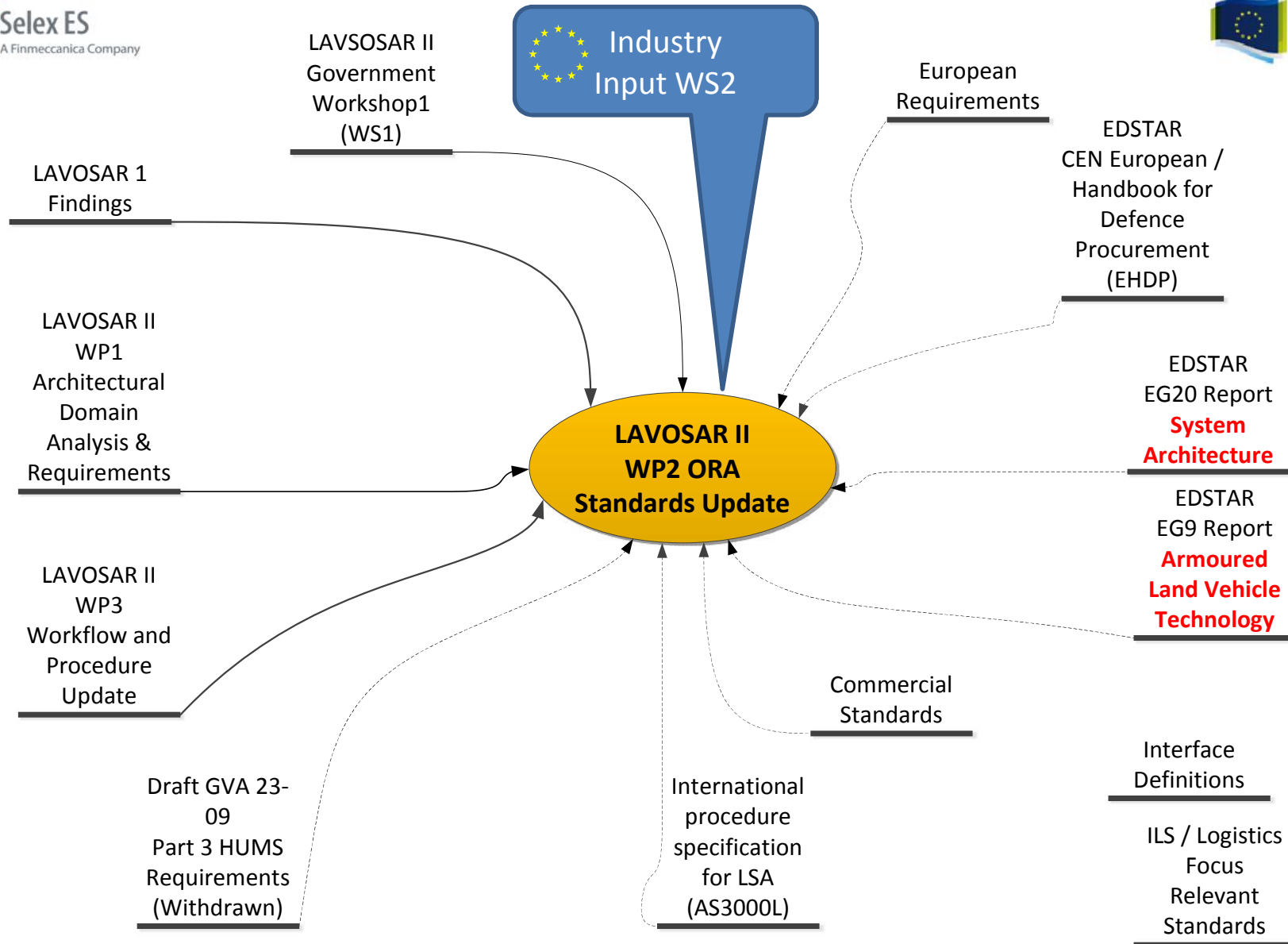
5) Missions System Infrastructure

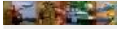
- Data Radio for MBT, IFV and Recce vehicles
- Off-board Data communications to dismounts **for IFV and APC** in particular
- Mass storage of Mission Data for IFV and Recce vehicles
- Germany uniquely cited provision of Common Logistic Transmission system with a specialist connector
- **Note** : GSM/3G/4G Network Interoperability **not** viewed as a high priority



6) Information and Power Exchange Requirements

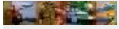
- Own Vehicle to Dismounts **for IFV and Recce vehicles**
- Own Vehicle to Troop **for IFV and Recce vehicles**
- Own Vehicle to Command Network **for IFV and Recce vehicles**
- **High Speed Data Links to UAV/UGV for IFV and Recce vehicles in particular**
- **Note:** Dismounted Equipment, Internet, Maintainer link bandwidth capability **not** seen as particularly important





Specific Questions for WS2 relating to WP2, to re-cap :

- Which Vehicles should apply ?
- Interfaces with Dismounts ?
- Intra-unit interfaces ?
- Common stores approach ?
- Fixed Legacy subsystems ?
- Common C4I concepts ?
- Common C4I concepts ?
- Logistics Personnel
- LAVOSAR (N)GVA Extensions ?
- Common C4I concepts ?
- Logistics personnel ?
- Mission System Features / Subsystems to prioritise ?
- What does industry expect from architecture or standards definition?
- What reference architectural level is expected ie. What level of hierarchy/detail is most useful as an Open Reference Architecture standard ?



Thank you. Further questions / comment ?