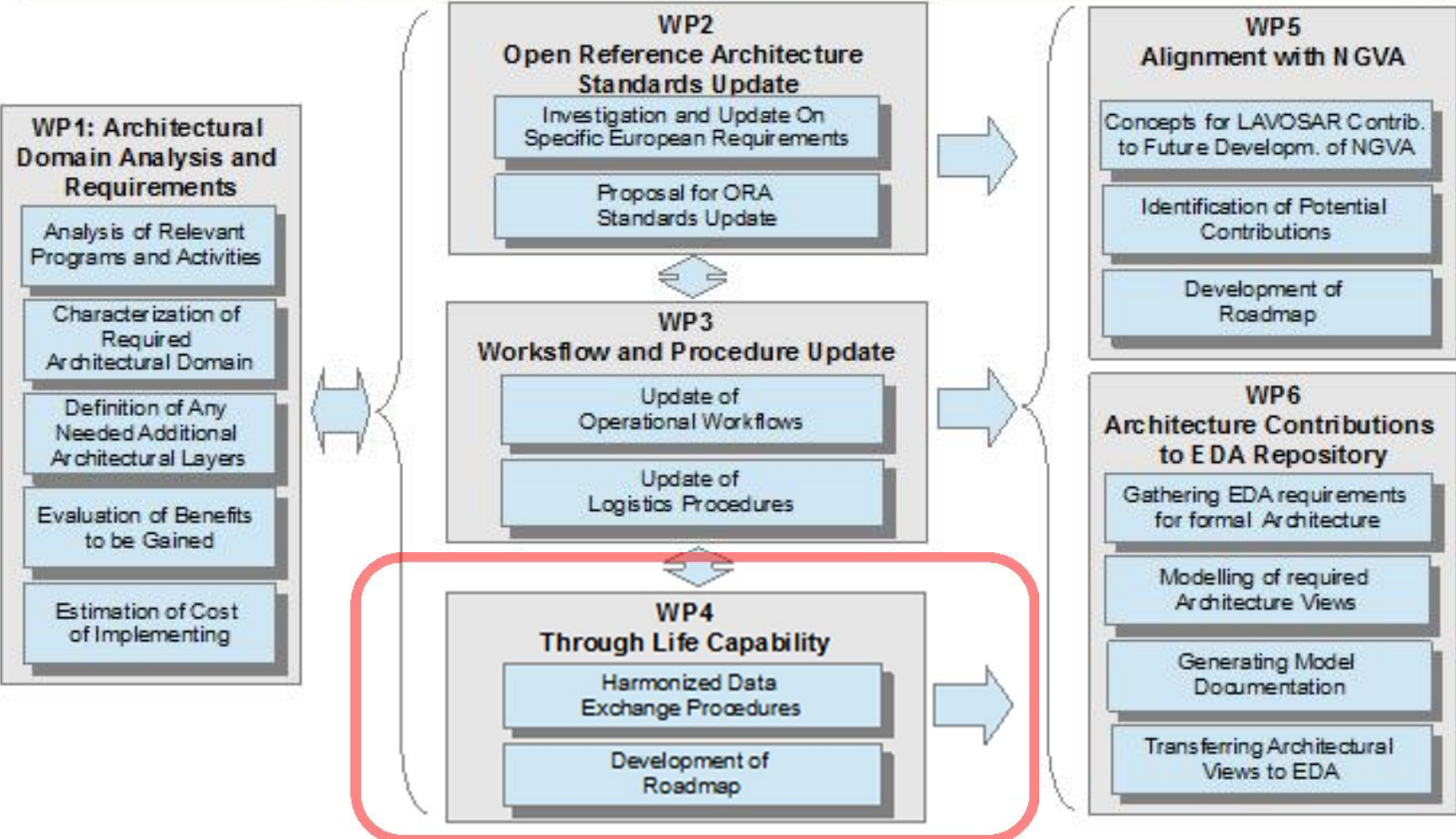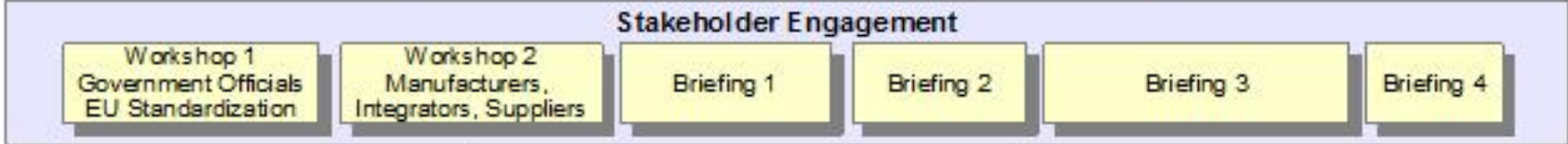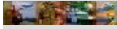# EDA INDUSTRY WORKSHOP ON EUROPEAN REQUIREM
FOR MISSION SYSTEMS OF LAND VEHICLES

WP4 by Pasi Niemela & Teemu Alakoski

9 July 2015

Military logistics operating environment

Categories of operations

- **Major combat operations**

- **Stabilisation operations**

- **Non-combatant evacuation operations**

- **Operations at home garrison**

Long term storage?

Maintenance levels and their locations

Location	WP3	Simplified organization
Mobile (Operation) (Fielded)	Crew	Crew
	Tactical Maint	Combat Service Support
	Theatre Maint	
Stationary (Garrison) (Homeland)	Depot	Depot
	Design authority	Industry
	Subsystem supplier	
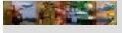
Dataflows between echelons
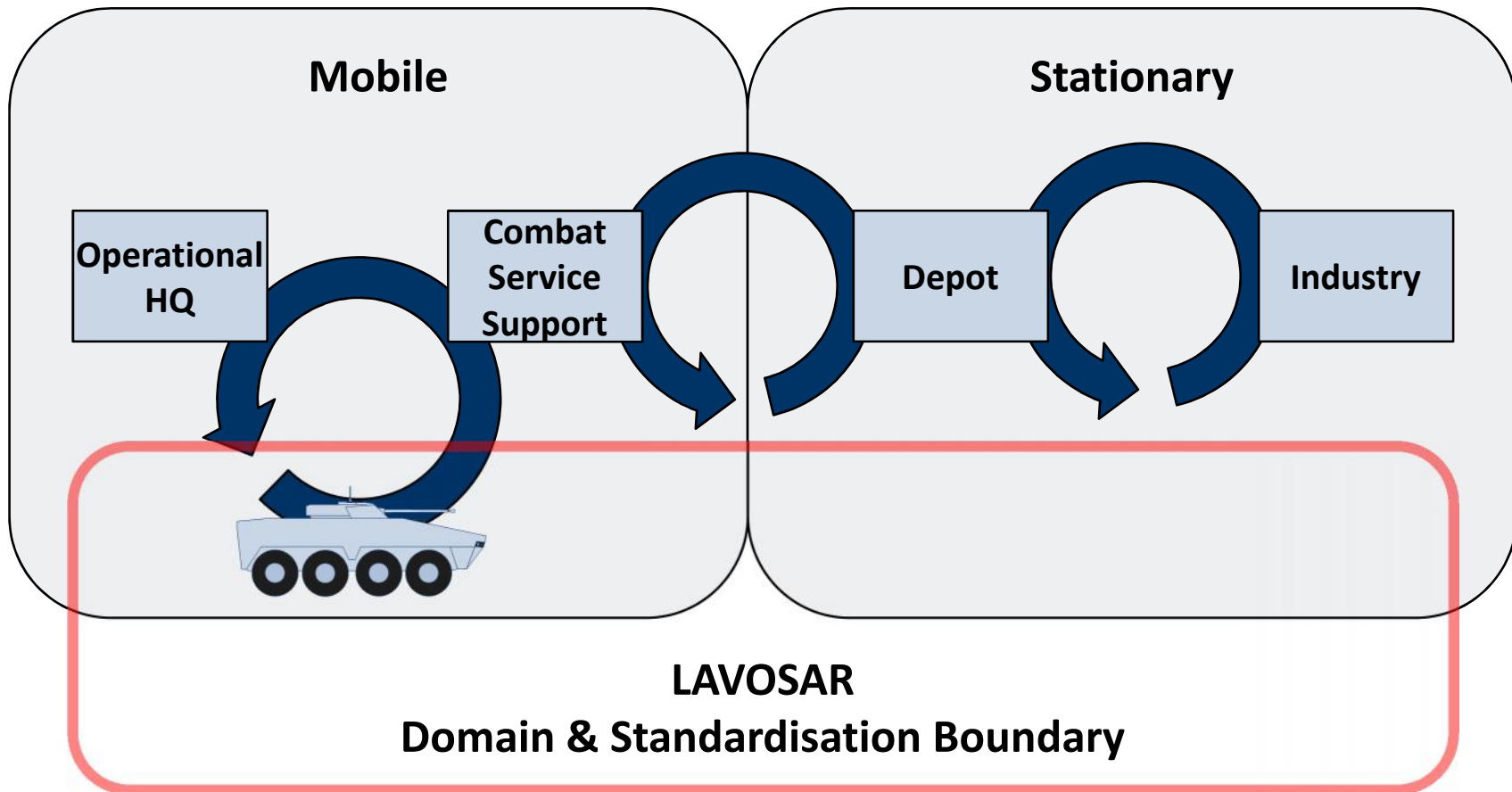
Combat Service Support
Logistics as part of operational workflows

Combat Service Support is a subset of military logistics, as it primarily addresses those factors directly influencing combat operations.

- **Give an answer to: is System still combat ready?**

- **Provide a asset status and location picture**

- **Supply consumables**

- **Provide proactive platform and system maintenance**

- **Do all this with utilising least possible network capability and bandwidth**

Monitor also combat readiness of the Crew?

Operational HQ

Combat Service Support
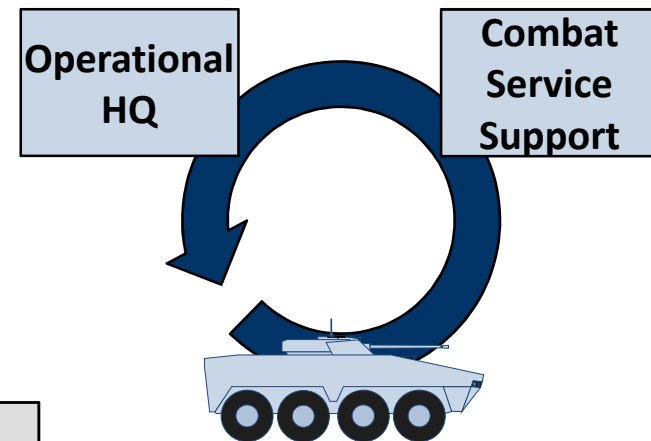
Pre-mission training?
a) Separate facilities and simulators
b) Embedded into LAVOSAR
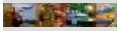
Use case: External data exchange **before operational use**

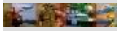| Data category	Data	Data source	Data destination	Comment
Military Land Vehicle status and configuration data	Configuration	Vehicle DB	CSS DB	Also utilized by SRT
	Vehicle			
	Weapon system			
	Tools			
	Additional equipment			
	Usage data	Vehicle DB	CSS DB	Operating hours, on-off cycles, operating profile, V0 speeds. Also utilized by SRT.
	Vehicle Platform			
	Mission subsystems			
	Consumables status	Vehicle DB	CSS DB	Also utilized by SRT
	Ammunition in vehicle			
	Petrol, Oil, Lubricants			
	Batteries			
	Technical status	Vehicle DB	CSS DB	Also utilized by SRT
	Vehicle Platform			
	Mission subsystems			
	Software updates			
C2 tactical data	ORBAT	FOB tactical DB	Vehicle DB, Soldier equipment	Unit ORBAT for comms and BMS configuration
	Radio Frequency			
	Crypto Key			
	Map Material			
	Tactical Data			E.g. location of own and known enemy forces
	COP updates			E.g. own location, observations, orders, threats
Personnel and crew data	Crew Role: Driver	FOB tactical DB	n/a	Training Certificate / Permission
	Crew Role: Commander			Training Certificate / Permission
	Crew Role: Gunner			Training Certificate / Permission
	Personal Equipment			Utilizes Mission planning DB

Use case: External data exchange **during operational use**

Data category	Data	Data source	Data destination	Comment	Priority
Military Land Vehicle status and configuration data	Configuration			Also utilized by SRT	n/a
	Vehicle				
	Weapon system				
	Tools				
	Additional equipment				
	Usage data	Vehicle DB	CSS DB	Operating hours, on-off cycles, operating profile, V0 speeds. Also utilized by SRT.	4
	Vehicle Platform				
	Mission subsystems				
	Consumables status	Vehicle DB	CSS DB	Also utilized by SRT	3
	Ammunition in vehicle				
	Petrol, Oil, Lubricants				
	Batteries				
	Technical status	Vehicle DB	CSS DB	Also utilized by SRT	2
	Vehicle Platform				
	Mission subsystems				
	Software updates				n/a
C2 tactical data	ORBAT			Unit ORBAT for comms and BMS configuration	n/a
	Radio Frequency				
	Crypto Key				
	Map Material				
	Tactical Data			E.g. location of own and known enemy forces	
	COP updates	Vehicle DB	Soldier equipment	E.g. own location, observations, orders, threats	1
	COP updates	Soldier equipment	Vehicle DB		
	COP updates	Vehicle DB	FOB tactical DB		
	COP updates	FOB tactical DB	Vehicle DB		
Personnel and crew data	Crew Role: Driver			Training Certificate / Permission	n/a
	Crew Role: Commander			Training Certificate / Permission	
	Crew Role: Gunner			Training Certificate / Permission	
	Personal Equipment			Utilizes Mission planning DB	

o **Amount of usage data created (for the purposes of CBM)?**

Use case: External data exchange **after operational use**

Data category	Data	Data source	Data destination	Comment
Military Land Vehicle status and configuration data	Configuration			
	Vehicle	Vehicle DB	CSS DB	Also utilized by Army fleet management DB and Industry
	Weapon system			
	Tools			
	Additional equipment			
	Usage data			Operating hours, on-off cycles, operating profile, V0 speeds. Also utilized by Army fleet management DB and Industry.
	Vehicle Platform	Vehicle DB	CSS DB	
	Mission subsystems			
	Consumables status			
	Ammunition in vehicle	Vehicle DB	CSS DB	
	Petrol, Oil, Lubricants			
	Batteries			
	Technical status			Also utilized by Army fleet management DB and Industry
	Vehicle Platform	Vehicle DB	CSS DB	
	Mission subsystems			
	Software updates			
C2 tactical data	ORBAT			Unit ORBAT for comms and BMS configuration
	Radio Frequency			
	Crypto Key			
	Map Material			
	Tactical Data			E.g. location of own and known enemy forces
	COP updates			
	COP updates			E.g. own location, observations, orders, threats
	COP updates			
	COP updates			
Personnel and crew data	Crew Role: Driver			Training Certificate / Permission
	Crew Role: Commander			Training Certificate / Permission
	Crew Role: Gunner			Training Certificate / Permission
	Personal Equipment			Utilizes Mission planning DB

Use case: External data exchange **during depot-level maintenance**

Data category	Data	Data source	Data destination	Comment
Military Land Vehicle status and configuration data	Configuration	Vehicle DB	Army fleet management DB	Also utilized by Industry
	Vehicle			
	Weapon system			
	Tools			
	Additional equipment			
	Usage data	Vehicle DB	Army fleet management DB	Operating hours, on-off cycles, operating profile, V0 speeds. Also utilized by Industry.
	Vehicle Platform			
	Mission subsystems			
	Consumables status			
	Ammunition in vehicle			
	Petrol, Oil, Lubricants			
	Batteries			
	Technical status	Vehicle DB	Army fleet management DB	Also utilized by Industry
	Vehicle Platform			
	Mission subsystems			
	Software updates	Army fleet management DB	Vehicle DB	Beforehand tested updates from DA or OEMs
C2 tactical data	ORBAT			Unit ORBAT for comms and BMS configuration
	Radio Frequency			
	Crypto Key			
	Map Material			
	Tactical Data			E.g. location of own and known enemy forces
	COP updates			
	COP updates			E.g. own location, observations, orders, threats
	COP updates			
	COP updates			
Personnel and crew data	Crew Role: Driver			Training Certificate / Permission
	Crew Role: Commander			Training Certificate / Permission
	Crew Role: Gunner			Training Certificate / Permission
	Personal Equipment			Utilizes Mission planning DB

Characte...
- **Depot...**
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  - •
  - •
- **Ample...**
- **Data e...**
  Securi...
  and st...
  bound...
- **Data e...**
  confid...
  - •
  - •

Use case: External data exchange **during long-term storage**

Data category	Data	Data source	Data destination	Comment
Military Land Vehicle status and configuration data	Configuration	Vehicle DB	Army fleet management DB	Also utilized by Industry
	Vehicle			
	Weapon system			
	Tools			
	Additional equipment			
	Usage data	Vehicle DB	Army fleet management DB	Operating hours, on-off cycles, operating profile, V0 speeds. Also utilized by Industry.
	Vehicle Platform			
	Mission subsystems			
	Consumables status	Vehicle DB	Army fleet management DB	Also utilized by Industry.
	Ammunition in vehicle			
	Petrol, Oil, Lubricants			
	Batteries			
	Technical status	Vehicle DB	Army fleet management DB	Also utilized by Industry
	Vehicle Platform			
	Mission subsystems			
	Software updates			
C2 tactical data	ORBAT			Unit ORBAT for comms and BMS configuration
	Radio Frequency			
	Crypto Key			
	Map Material			
	Tactical Data			E.g. location of own and known enemy forces
	COP updates			E.g. own location, observations, orders, threats
	COP updates			
	COP updates			
	COP updates			
Personnel and crew data	Crew Role: Driver			Training Certificate / Permission
	Crew Role: Commander			Training Certificate / Permission
	Crew Role: Gunner			Training Certificate / Permission
	Personal Equipment			Utilizes Mission planning DB

Characteri...
- **Periodi...**
- **May be...**
- **Releva...**
  defects...
  sanity/...
  respect...
- **Time cr...**
- **Ample...**
- **Data ex...**
  inhibite...
  becaus...
  admini...
- **Data ex...**
  data co...
  - •

LAVOSAR external interfaces

Logistics DB

Tactical DB

C2 Tactical data

COP updates

COP updates

Technical Status

Usage data

Consumables

Configuration

| Tactical Radios | WLAN + LAN | 4G | USB |

USB

Tactical Radios

Communication Layer

Software Data Bus

Video & Audio
Status & Control
Safety Critical Data
Secured Links

BMS

Gateway

Sub Systems

Sub Systems

HUMS

Automotive

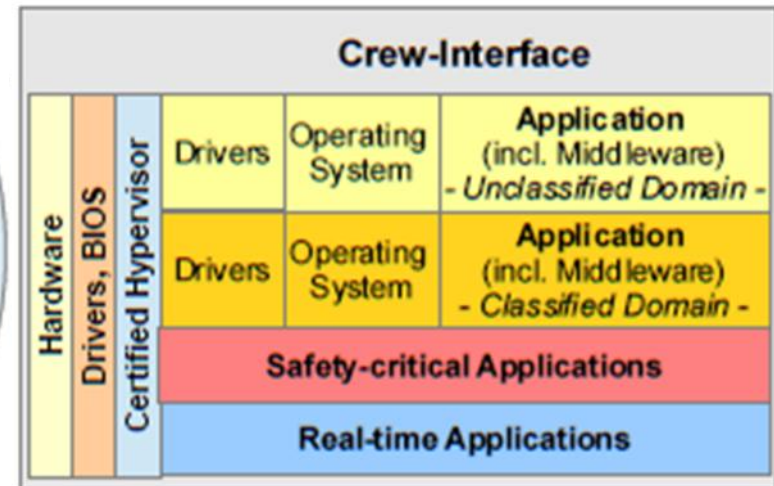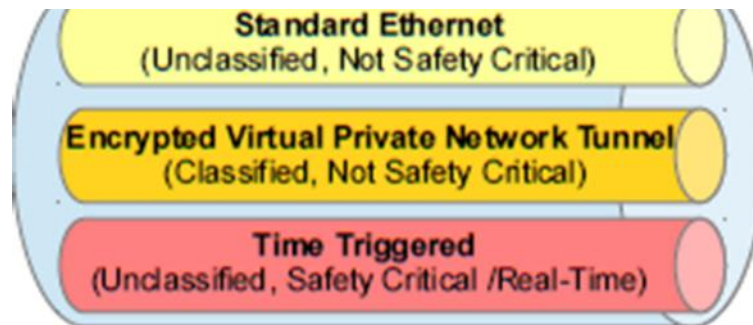**Platform**
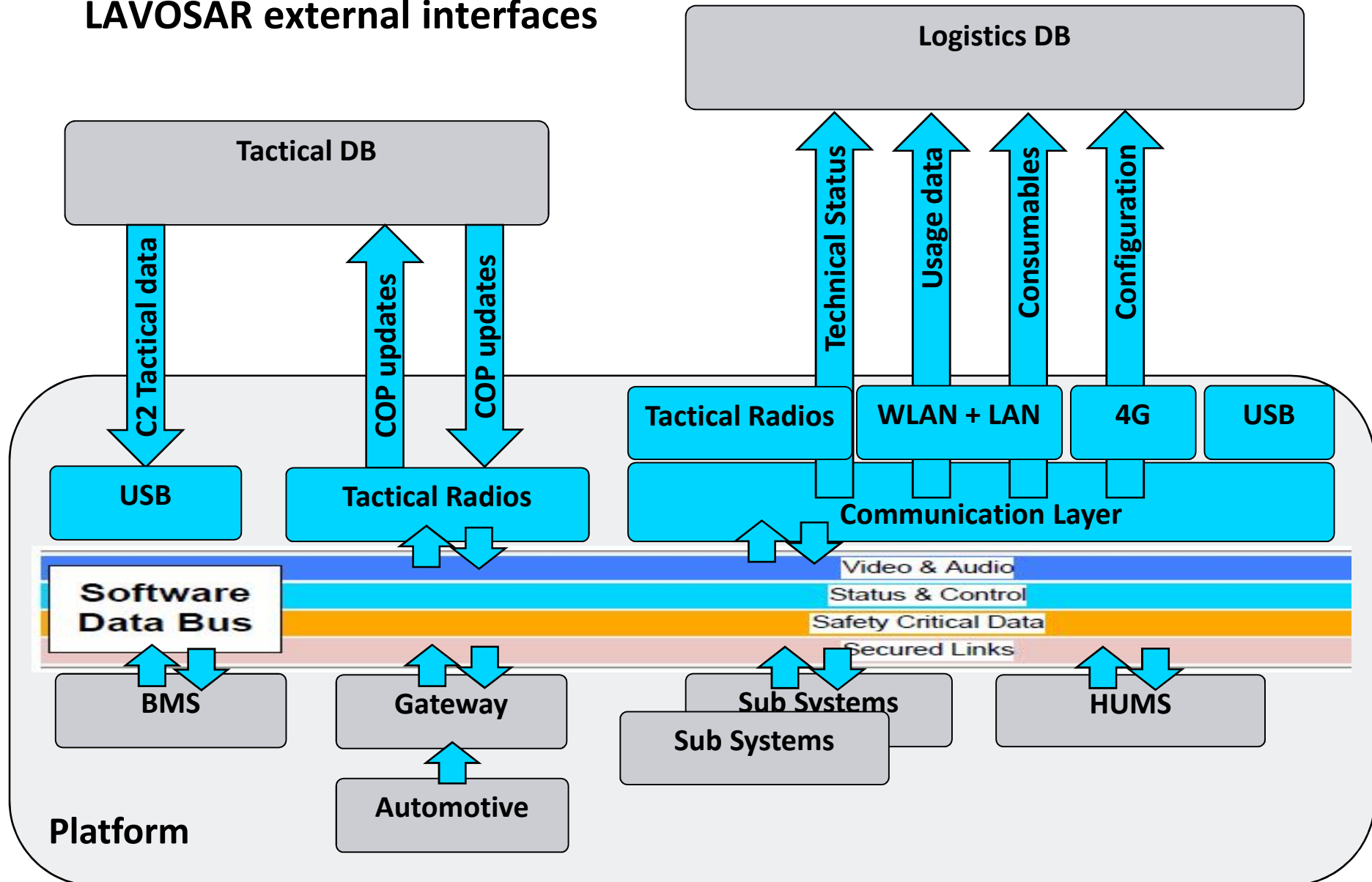
Information System Security at LAVOSAR Mission System

Security inside LAVOSAR Mission System can be handled by virtualization.

Data distribution challenges to be solved when operating under multiple administrative domains, such as coalition forces and industrial co-operation:

- From "**need to know**" into "**need to share**" and "**need to hide**".
- From separate networks to **one common physical infrastructure**.
- ➢ The Solution could be **content-based information security, CBIS**.
- ➢ Data itself has **security attributes**.
  - ➢ Content Data
  - ➢ Security Related Metadata

Content-Based Information Security, CBIS

Untrusted network and database(s)

Content protected end-to-end

Strong user authentication

Key is strong key management

Content might be executable code

Key management layer

User authentication & key management

Network layer

Untrusted Network

Fleet Management DB

User operations layer

Crew   CSS   Depot   Industry
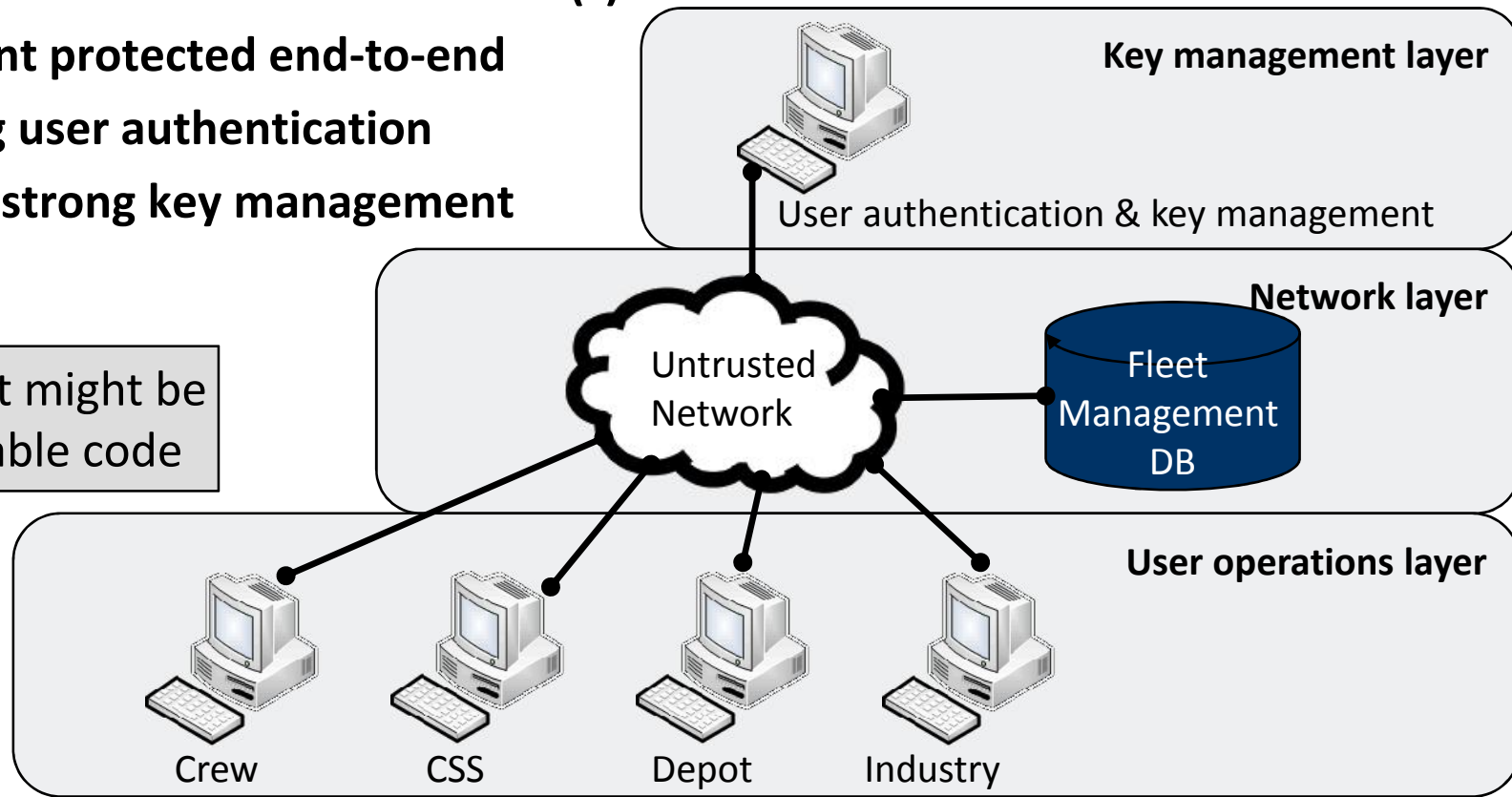
Inspiration form FDF publication:
Content-Based Information Security (CBIS)

Distributed HUMS

Off platform

Usage data

Technical status

CBM data

Principal differencies how to divide CBM functionalities

Sub Systems

- Data acquisition
- State awareness
- Prognosis assessment

HUMS

- Database
- State awareness
- Prognosis assessment

Sub Systems

- Data acquisition
- State awareness

Sub Systems

- Data acquisition

Automotive & legacy gateways

Usage data

Technical status

CBM data

Usage data

Techincal status

Usage data

Usage data

On platform