Industry Workshop | MINUTES

Meeting date - time: **25 June 2013 - 10:30** | Meeting location: ***EDA, Brussels***

Chair: **Dr. Norbert Härle, RDE**
Rapporteur: **Dr. Oliver Prenzel, RDE**
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Date of Minutes: **01-07-2013**

Attendees:

Marek Kalbarczyk, EDA (Host)

Workshop Participants:
c.f. Appendix List of Attendees

AGENDA TOPICS

Introduction by the EDA

Presenter: ***Marek Kalbarczyk*** | Time allotted: ***15min***

EDA presented an introduction to the LAVOSAR Study and its Industry Workshop.

- The LAVOSAR study relates to a recommendation of Future Land System (FLS) Group
- The 1st LAVOSAR workshop took place at the 23 April 2013 with government representatives
- Aim of this 2nd workshop is to collect feedback from industrial stakeholders

LAVOSAR Study Presentation

Presenter: ***Norbert Härle*** | Time allotted: ***45min***

The study was presented by the contractor, c.f. attached document "2013-06-25 LAVOSAR, Workshop #2, 1. Study Presentation.pdf".

Discussion:

- **Innovation**
  - LAVOSAR sees different innovation speeds in the categories Mechanics, Hardware (Electronics) and Software. Hardware has interfaces to both, mechanics (form factor, e.g. PC104) and software. Also sensors have a high innovation speed at the moment.
  - Continuous innovation may conflict with safety/security.
    - Currently, VRC is carrying out research on Modular Safety Cases. The idea is to just certify added or modified components instead of the whole system.
    - For security, each nation has its own approach. LAVOSAR will make a security proposal for an EU approach which may conflict with some individual nations.
- **Data Model**
  - The UK Land Data Model (GVA Data Model) is currently being abstracted from a Platform Specific Model (PSM) depending on the Data Distribution Service (DDS) to a Platform Independent Model (PIM). This PIM will be a mixture of a Conceptual Data Model and a Logical Data model and might need to be separated in the future. In the FACE project (US), three levels have been developed
    - PIM
      - Conceptual DM (CDM)
      - Logical DM (LDM)
    - PSM
      - Platform DM (PDM)
- **Open Architecture**
  - There are numerous advantages of an Open Architecture as stated in the presentation. Disadvantages of an Open Architecture would be
    - Effort for creating the standard. Additionally to writing the standard, implementation and validation is needed to ensure that the standard represents a feasible solution
    - Effort maintaining the standard. Updates according to the evolution of technology are necessary.
    - Verification and accreditation for subsystems is needed.
    - For a specific case, solutions are often suboptimal but they are optimal overall.
    - Transition for existing equipment / legacy approaches is necessary
- **Logistics**
  - It is necessary to consider logistic interfaces and aspects in LAVOSAR. Currently, the logistic expertise in LAVOSAR is missing but there are plans to get logistics people involved.
- **User Involvement**
  - The involvement of soldiers is not planned for LAVOSAR. It is assumed that procurement also represents the requirements coming from the user. For other similar projects in which the LAVOSAR companies are involved, workshops with soldiers were carried out and the results are influencing LAVOSAR.
- **Training, Modelling and Simulation**
  - Training, Modelling and Simulation are also considered in LAVOSAR, e.g. business plan, role concept.
- **LAVOSAR Focus**
  - LAVOSAR focuses on the Mission Systems of manned and unmanned military Land Vehicles. However, the results may be also applicable to other domains.

Requirements, Standardization and Business Case
Presenter: ***Guy Davies*** | Time allotted: ***1h15***

The "Requirements, Standardization and Business Case" as result of Workpackage 1 were presented by the contractor, c.f. attached document "2013-06-25 LAVOSAR, Workshop #2, 2. Standardisation+ Business Case.pdf".

Discussion:

Data Model and C4I

- Data models other than the UK GVA DM are also available, e.g. STANAG 5525 (JC3IEDM), STANAG 4677 (JDSSDM), VMF, and FACE DM. Most data models are related to C4I but will be considered when making the LAVOSAR recommendations. However, it is out of scope of LAVOSAR to develop a data model.
- The MIP data model was perceived as "heavy" in Spain and alternative information exchange standards would be appreciated for C4I. However, most C4I standards are made for higher echelons and may not be suited to low bandwidth communications. NATO Standards may be STANAG 4406 (MMHS) and STANAG 4677 (Dismounted Soldier Information Exchange). VMF from the US is currently introduced in several nations but was rejected as a NATO STANAG. Standardisation of C4I information exchange at vehicle level would be an important issue.

Human Machine Interfaces

- Human Machine Interfaces listed in the presentation lack next generation interfaces such as Natural Language Interface (NLI), Fingerprint Scanners, Gestures, and Brain-Computer Interfaces. These need to be considered in LAVOSAR.

Other Related Projects

- Other projects from EDA are related and their results may be used by LAVOSAR, such as a project about UGTV or SDR. However, the results of all those projects are not available to LAVOSAR due to property rights. Also projects such as VICTORY from US or SCORPION from FR would be useful inputs. Information from these projects is classified and not available to LAVOSAR.

Business Model and Roadmap

- The savings of 10% was based on the procurement of a mission system for only one fleet (APC). When including training, logistics and maintenance for a whole lifecycle the number easily increases to 25%. One upgrade of mission subsystems was considered when calculating the costs. Substantially more saving could be achieved when sharing components between several mission systems, several fleets and several nations. Currently LAVOSAR has insufficient data on procurement plans for EU nations. Foreseeable programs estimated as 5000 vehicles are rather huge and will be spanning a long time frame of more than 20 years.
- A question was raised about how to prevent National specialisations of systems emerging and becoming incompatible once an initial set of standards had been agreed. The contractor suggested that this was where a central authority could play a key role; by being responsible for the uptake and maintenance of a LAVOSAR approach across multiple member states.
- An EU standard based on the recommendations of LAVOSAR has many more advantages than just cost savings, such as increase of mission system performance, flexibility, enabler for

innovation, but also early de-risking of subsystem implementation and integration. It is worth looking at the whole package of benefits.
- The roadmap stating that the standard will be written in a time frame of 2 years (2014+2015) but is optimistic and will only be achieved if everything runs smoothly.
- Tailoring solutions for specific capabilities or missions is exactly the fundamental idea of a Reference Architecture and is an important enabler.
- Leader countries shall be countries with the largest fleet sizes. There are countries which even spend in this stagnating market. UK with GVA and FR with SCORPION will be happening anyway.
- Vehicles are a rather static market. However, the innovation rate with mission systems is rather high and flexibility is therefore mainly needed there.

Multi-Security Domains

- During the LAVOSAR Government Workshop, the request for multi security domains was formulated.

EU Wide Requirements

- Common capabilities could help in saving cost. This would require harmonization of requirements. However, these are often nationally classified.

Lunch Break
Time allotted: 45***min***

Computing and Communication Environment
Presenter: ***Olivier Schmidt*** | Time allotted: ***2h***

The "Computing and Communication Environment" as intermediate result of Workpackage 2 was presented by the contractor, c.f. attached document "2013-06-25 LAVOSAR, Workshop #2, 3. Technologies.pdf".

General

- The technology presentation was intended to give an overview about what technology/products exist and what could be possible. It was not intended to recommend standardisation on products. Abstracting products to their functionality, features and selection guidelines will be part of the recommendations for standardisation.

CPUs

- When selecting CPUs, environmental requirements, such as temperature ranges, are crucial and need to be considered beside the pure functionality and performance. However, there are also possibilities for cooling and heating which could make a processor possible which was not fulfilling the requirements in the first place.

Virtualization and Safety/Security

- Virtualization which means running several Virtual Machines with individual operating systems on a single computer is a key technology to solve safety and security issues. Different security domains may run on different Virtual Machines strictly separated from each other. Hypervisors of Type 1 (native) are using a common kernel of about 10,000 lines of code versus Millions line of Code for any Operating System (e.g. MS-Windows). Such kernels are even able to separate Ethernet Adapters and can be certified with respect to security and safety. Built-in-Tests will run on the individual Virtual Machines and are part of the Hypervisor itself. It should test at different startup levels when booting a system, rather than just displaying a message saying it is not working.
- Usually Red/Black separation is handled differently in each individual nation. LAVOSAR will propose an EU solution which may influence the national approaches
- Security Profiles/Targets for Vehicle Domain have to be defined.

Data Exchange Mechanisms

- DDS covers the broadest range from non-realtime to extreme realtime and is therefore a potential candidate for the recommended middleware. However, DDS is only as good as the underlying network layer. Solutions might need to have, for deterministic communication, Time-Triggered Ethernet as network layer or to use a hybrid approach with a separate communication line for safety critical parts which is approved (e.g. FlexRay, TTCAN, etc.).

Video Transmission

- A proposal was made to use a technology, such as LVDS, for video transmission rather than Ethernet. This would result in a hybrid approach with Ethernet for low data throughput demands and LVDS for the videos. This approach will be taken in to consideration for the LAVOSAR Architecture.

Mobile Communications

- UMTS/LTE solutions shall be only used carefully as there is an infrastructure needed and communications can easily be monitored.

Operating Systems

- The presentation shall also list modern Operating Systems, such as
    - Windows 7/8, Windows 7/8 Embedded, etc.
    - However, operating systems get Evaluation Assurance Levels (EAL) only after some years which make modern Operating Systems not suitable.

SAP

- Interfaces to SAP are important for logistic reasons. They need to be considered in LAVOSAR.

Functional and Technical Architecture

Presenter: ***Oliver Prenzel*** | Time allotted: ***1h***

The "Functional and Technical Architecture" as initial result of Workpackage 3 was presented by the contractor, c.f. attached document "2013-06-25 LAVOSAR, Workshop #2, 4. Architecture.pdf".

Discussion:

Service View

- In the service view of the initial architecture,
  - the services are on very different levels and the structure needs to be improved
  - following services are missing
    - C4I service
    - Power Management Service
  - Services should not necessarily be related to equipment but rather to capabilities or functions, e.g. replace Sniper Detection Service by Threat Detection Service

Target Classification

- The usage of the word "Target Classification" caused confusion as it was used as a Signal Processing term inside a sensor but as a military term it belongs to the C4I System.

Data Model

- The data model shall be independent from the underlying exchange mechanism since the exchange mechanism might change with time or the data model might be used for other communications. Also the data model needs to include logistic data.

Extra Vehicle Communications

- It was proposed to leave out extra vehicle communication as this adds another level of complexity. However, the LAVOSAR Government Workshop made it obvious that there is a need for inter vehicle communications in the near field area.

EMC

- EMC needs to be considered, especially in the light of plug and play since EMC compatibility on component level does not guarantee EMC on Vehicle level.

CAN Bus

- The fear that LAVOSAR would not recommend CAN bus was raised. LAVOSAR has not reached a conclusion on this yet. However, legacy systems are also taken into account when formulating the architecture and at least gateways will be suggested.

Long term Vision

- A long term vision for Vehicle Mission Systems is needed in order to plan beyond LAVOSAR.

Automobile Industry

- More Interaction with the automotive community should also be established.

Concluding Remarks and Way Ahead

Presenter: ***Norbert Härle, Marek Kalbarczyk*** | Time allotted: ***30min***

The LAVOSAR study will take all the input from this workshop into account and continue to develop the Reference Architecture as recommendations for an EU standard. The resulting Public Executive Summary which will be available in Nov. 2013 will be distributed among the participants of the workshop.

Immediately after this workshop following information will be distributed:

- Extract of Presentation held during this workshop
- Minutes of the workshop

- Summary Note
- Two questionnaires about relevant standards and technologies to be filled in and returned by 9 July 2013

Annex 1

GEM 3 - LAVOSSAR WORKSHOP 25 June 2013 List of Participants		
First name	**Last name**	**Organisation**
Lorenzo	ABAD MENOR	Navantia Sistemas
Teemu	ALAKOSKI	Patria Land Systems Oy
Kristoffer	BIEL	BAE Systems Bofors
Maximilian	BORNEFELD-ETTMANN	CAUSA GmbH & Co. KG
Mario	CIAVATTA	Iveco
Timothy Guy	DAVIES	Selex ES Ltd
Antony	DAWE	IBM Global Business Services
Jürgen	DEBUSMANN	Causa Consulting
Aditya	DESHPANDE	Vectronics Research Centre
Louisa	DUBOIS	Steria
Ralph	ERDT	Fraunhofer FKIE
Piergiorgio	FOTI	Selex ES
Petter	GARDIN	Saab AB
Petter	GÄRDIN MAGNUS	Saab
Andre	GOOSEN	Cassidian, EADS Deuthchland GmbH
Norbert	HAERLE	Rheinmetall Defence Electronics
Christopher	HUGHES	AnCoast Ltd.
Marek	KALBARCZYK	EDA
Jens	KARLSSON	MilDef AB
David	KEMPTON	Thales
Julia	LOPEZ DE LA TORRE LUCHA	NTGS
Mauro	MARCHISOTTI	Iveco Defence Vehicles
Edouard	MOUCHEL	Selex ES
Uwe	MUENCH	BAAINBw K1.2
Aleksander	NAWRAT	OBRUM Ltd.
Daniel	OTA	Fraunhofer FKIE
Stefano	PIOVAN	Iveco Defence Vehicles
Olivier	PRENZL	Rheinmetall Defence Electronics
Olivier	SCHMIDT	THALES Communications & Security
Reinhard	SCHMIEDL	Diehl Defence Holding GmbH
Martin	SCHOESSLER	CAUSA GmbH & Co. KG
Benoit	SENECHAL	THALES
Elias	STIPIDIS	Vectronics Research Centre
Joachim	STRAY	Thales Norway
George	VALSAMAKIS	Vectronics Research Centre
Olivier	VOISIN	DGA
Florian	WALZ	MBDA Germany
Mariusz	WIŚNIEWSKI	WB ELECTRONICS S.A.
Jozef	WRONA	PL MoD