



WInnComm-Europe 2017

*2017 Wireless Innovation Forum European Conference on
Communications Technologies and Software Defined Radios*



SOFTWARE DEFINED RADIO APPLIED TO MISSION ORIENTED SENSORS ARRAY

*A PROPOSAL TO ADVANCED EMBEDDED SYSTEMS
ARCHITECTURE*

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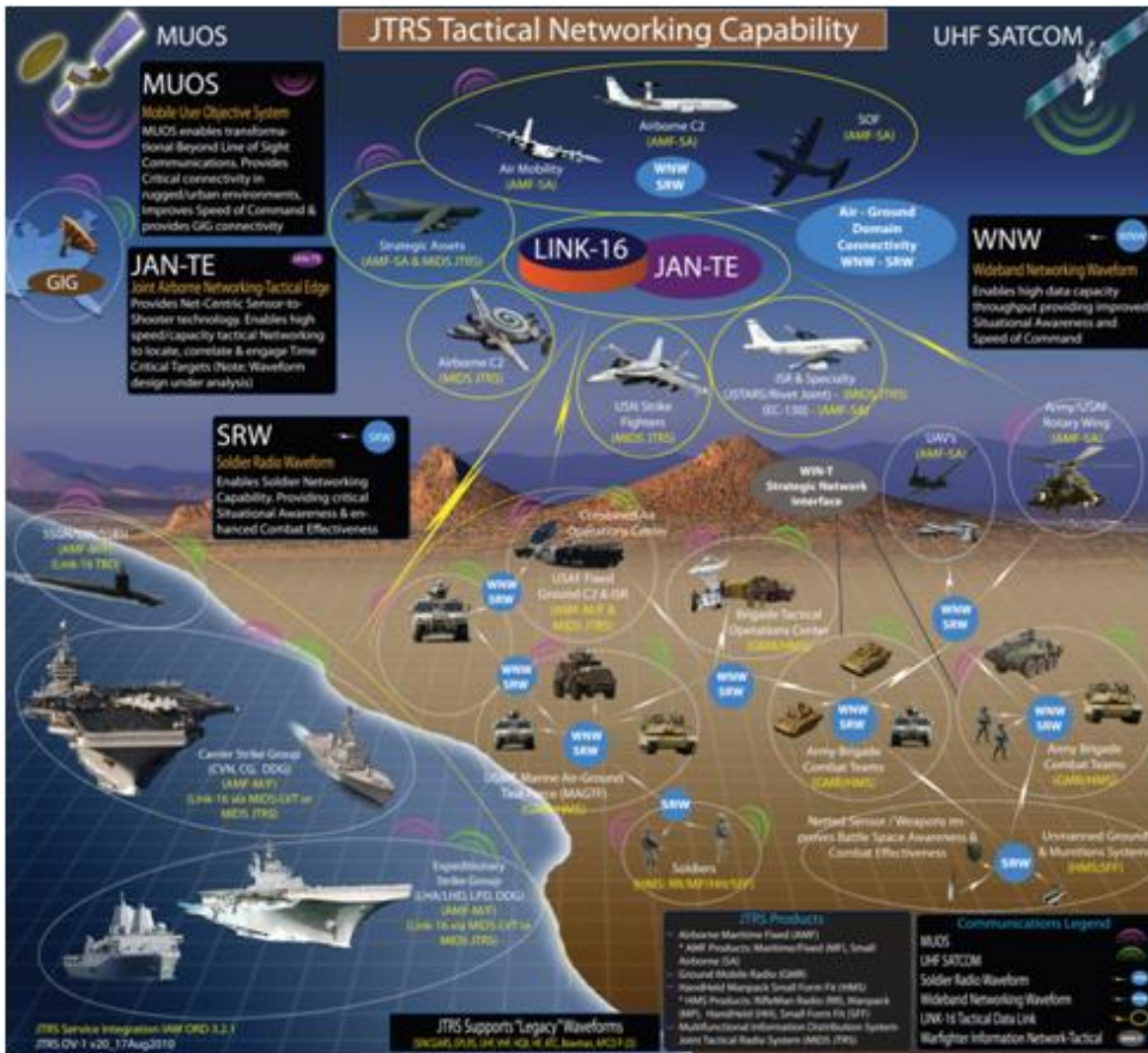
Outlines



- Introduction
- Software Defined Radio Program - SDR
- Mission Oriented Sensor Array Architecture - MOSA
- Integrating RDS-SCA Compliance and MOSA
- Concluding Remarks
- Future Works



Introduction



State of the Art of Thought Military:

- Joint Operations;
- Network-Centric Warfare..

Interoperability:

- A major Technological and Operational challenge.

Technological challenges:

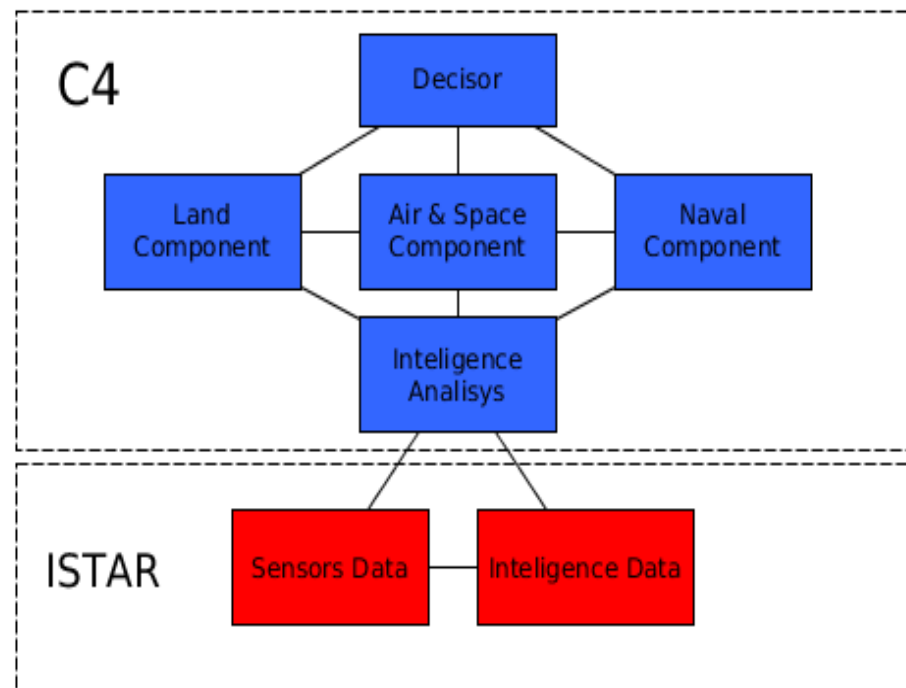
- Vertiginous advancement in Communications;
- Diversity of communication;
- Proprietary solutions;
- Examples: Safety and CODECs.



Introduction



- Mission Oriented for C4ISTAR
- Embedded Systems:
 - SDR (SCA)
 - Sensor Array





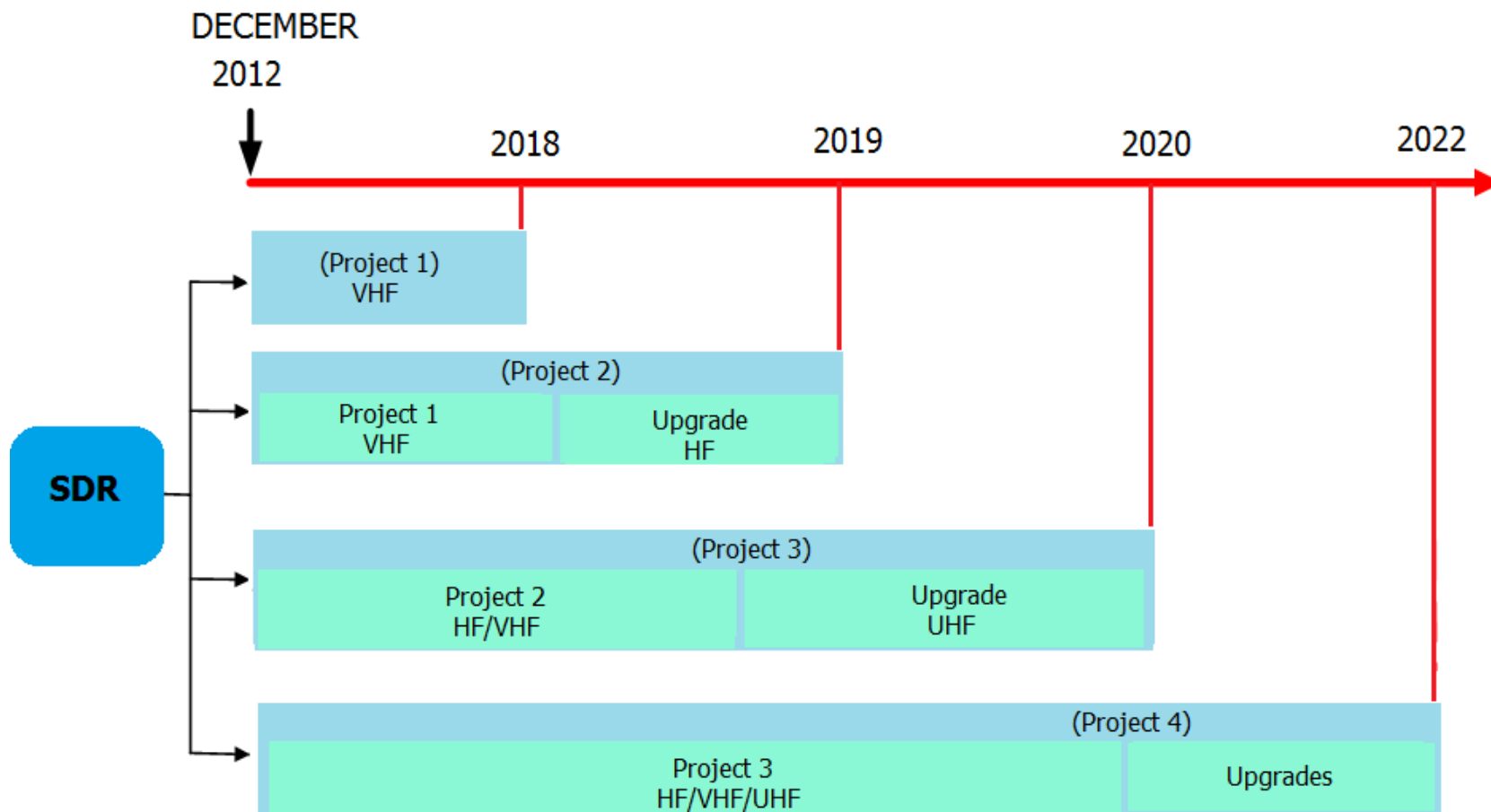
SDR Program Objectives



- Promote interoperability, technological independence, flexibility and security in the tactical communications of the Brazilian Armed Forces;
- Act in the cyber space with freedom of action and to obtain autonomy in strategic area;
- Foment the national industry, particularly the Defense Industrial Base focused on the area of communications and electronics;
- Establish and strengthen institutional links between military and civil science and technology (ICT) institutions;
- Contribute to the training and improvement of highly qualified personnel;
- Create the conditions to start the R & D of cognitive radios.



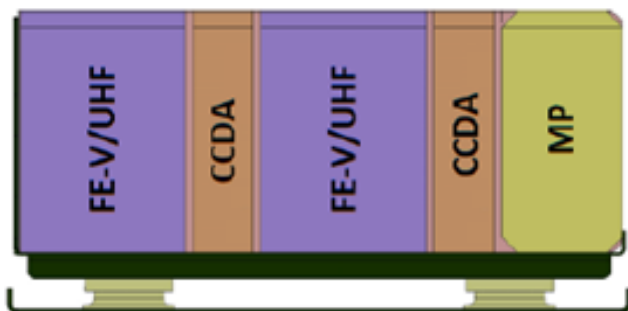
SDR Program





SDR Project

Modules & Integration Test





MOSA Definition



- Mission-Oriented Sensor Array (MOSA) is an intelligent sub-system of a UVS, embedded in a UVS to provide **processed and ready-to-use information** in real time, done on-board in **data processing engines**. It is composed by sensors array, controllers, processes and a specific communication protocol (SSP/SSI) to connect MOSA with the Vehicle.

- MOSA can also provide:
 - ❖ Payload interchangeability among different aircrafts;
 - ❖ A standard, model based, hardware/software development platform.



MOSA Concepts

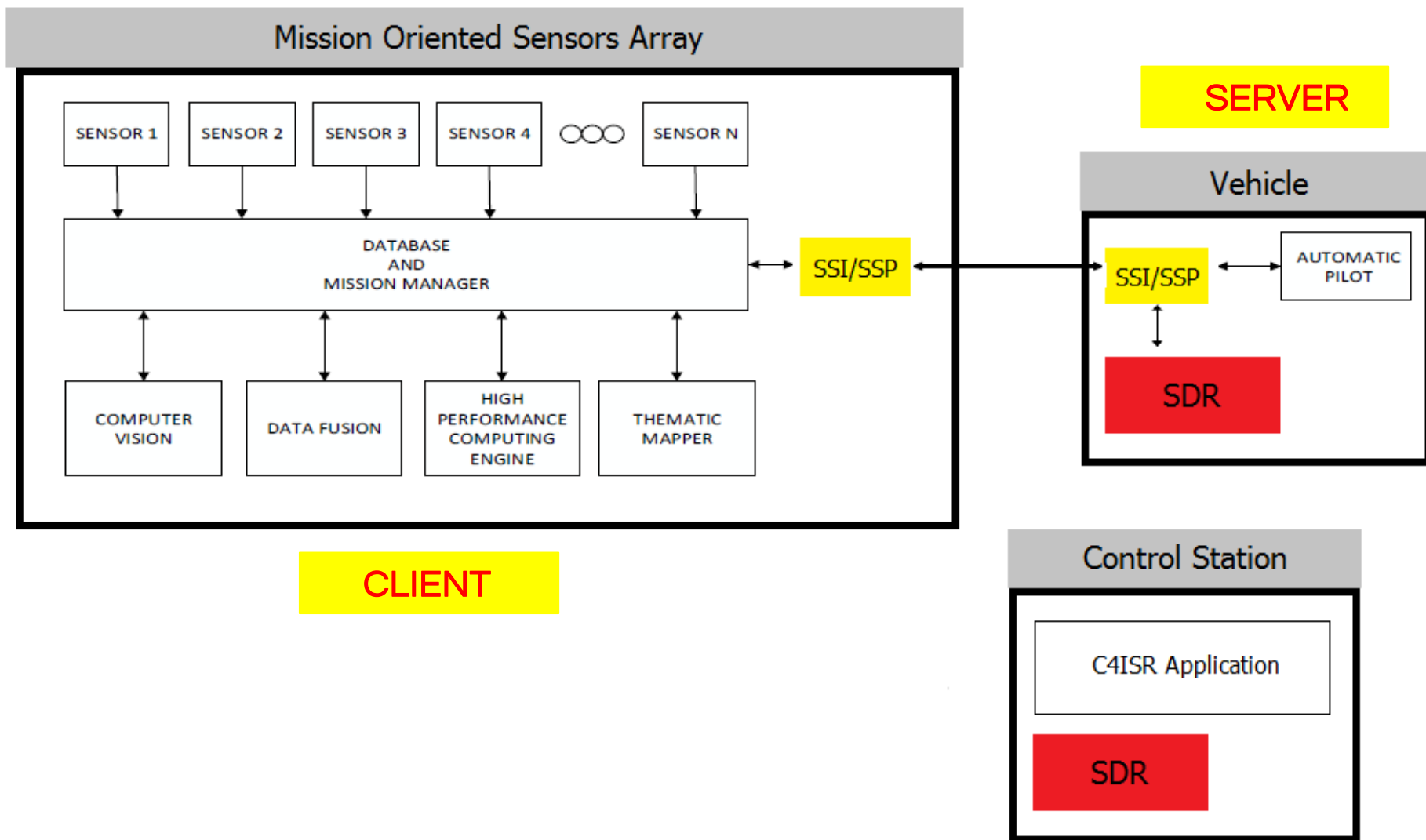


- For most practical civilian applications, an aircraft with a MOSA payload can be viewed as an **automatic measurement device**;
- A **standard interface** with the vehicle (navigation and control services) can provide plug and play facilities allowing easy **interchange of payload and vehicle (platform)**;
- Real time data processing (or pre-processing) on-board **to avoid the transmission of high amounts of raw data**;
- Different missions **can run in parallel** using the same data sources.



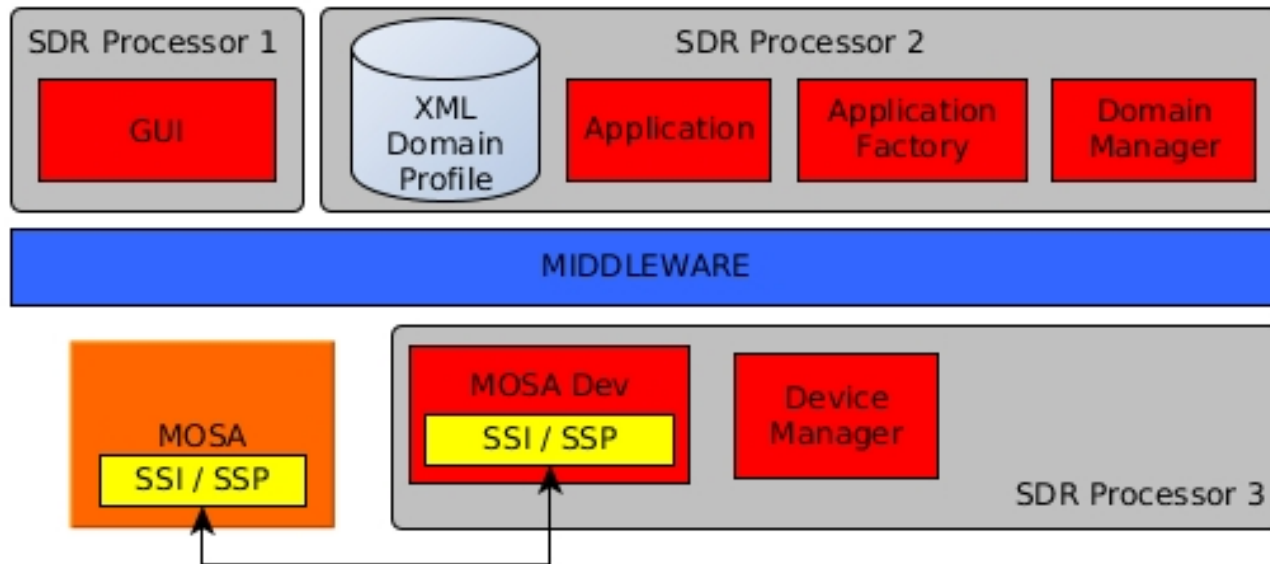
MOSA Architecture

Functional Organization





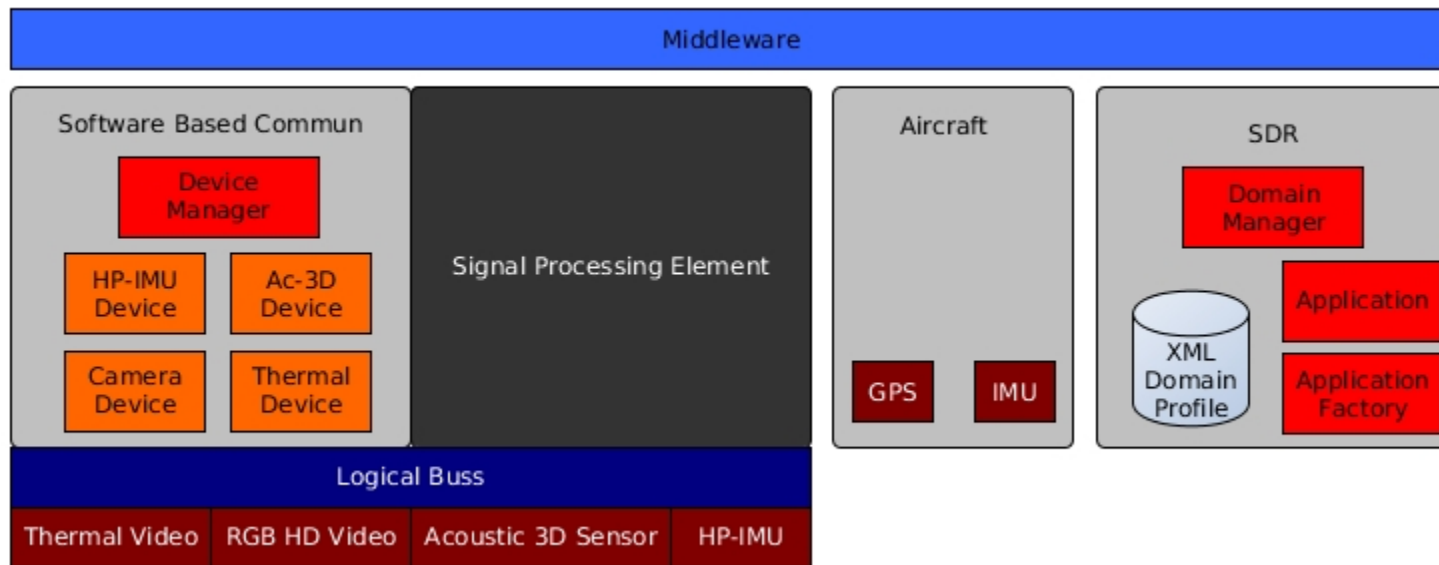
Integrating RDS-SCA & MOSA



- Automatic Waveform Capabilities & Capacities Check
- Selection of The Best Waveform Available
- RS232 for Legacy Systems



Integrating RDS-SCA & MOSA



- Automatic Waveform Capabilities & Capacities Check
- Selection of The Best Waveform Available
- Hardware and Software Interoperability & Reusability
- Better suited for High Cost Radio and UVS Systems



Concluding Remarks



- A proposal for Integration of SDR-SCA with MOSA for embedded processing of data in to enable real time on Unmanned Systems;
- The preliminary analysis presented indicates that MOSA and SDR-SCA architectures are compatible, so that its integration can represent a major step towards improving the usability and enhancement of autonomous systems in civil and military applications.



Future Works



- Test and Simulations with the proposal architecture in a critical scenarium (AMAZONLOG 2017);
- Explore new Wireless Communication Concepts such as Adjustment on-the-fly of waveform Mission-Oriented; (e.g. Spectrum Sensing and Dynamic Spectrum Access).

NEVER GIVE UP!



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