SCAlable & Reconfigurable
Electronics plaTforms and Tools
Towards the next generation of Integrated Modular Avionics

An introduction to SCARLETT

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Contents of the presentation

- Project Background & Objectives
- IMA2G Enablers
- Demonstration Objectives
Legacy: federated architecture

Cost of spare parts

Management of obsolescence

Complexity of functional upgrades

Maintenance Cost

Regarding costs, the federated architecture leads to serious drawbacks
Requires specific hardware and Operating System for each LRU
Increase operational reliability

Industry-wide step changes were required

Reduce cost of avionics parts

Save weight, volume, power consumption

Reduce Set of Part Numbers

Need to overcome the federated architecture drawbacks

Provide an answer to new market drivers

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Today: Context 1/2

- Aircrafts Orders at EIS

![Orders at EIS graph]

*up to March 2008

Very demanding ramp-up phase at Entry Into Service requires huge improvements in system maturity

Increasing the set of function on board of the IMA:
A way to reduce risks on core electronics maturity thanks to commumalisation of Hardawre / Operating System solutions
Today: Context 2/2

Next generation of IMA platform will need more computing power & more interface capability.
Today: additional market drivers

Increase operational reliability

Reduce cost of avionics parts

Reduce Set of Part Numbers

Save weight, volume, power consumption

Costs became the main driver from Airline point of view
Today: additional market drivers

- Increase operational reliability
- Avoid unscheduled maintenance
- Reduce development cycle
- Scalability to various aircraft types
- Reduce cost of avionics parts
- Reduce Set of Part Numbers
- Save weight, volume, power consumption

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From IMA1G to IMA2G: SCARLETT Objectives

- Increase operational reliability
- Avoid unscheduled maintenance
- Reduce development cycle
- Scalability to various aircraft types
- Reduce cost of avionics parts
- Save weight, volume, power consumption

The Distributed Modular Electronics

SCARLETT IMPLEMENTATION OF IMA2G

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SCARLETT

Aerodays 2011
30th March - 1st April 2011, Madrid (Spain)
http://www.aerodays2011.org/
Innovation beyond IMA 1G

Main Innovations
For DME to meet the market needs

IMA 1G is the baseline

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Separate I/O from computing modules

- Minimizes the set of Remote Module types
- Is adaptable to A/C needs in term of I/O
- Enables increased independence of functions from H/W, hence flexibility of function allocation
- Reduces point to point cable connection

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Support increased computing module performance

- Enables introduction of a full range of applications (time critical, high performance data distribution, etc)

- Increases the number of supported function per module

- Provides enhanced network capability to cope with future needs
Implement platform level services
- Isolates A/C functions from the supporting platform configuration

- Provide enhanced application portability
Implement reconfiguration mechanisms

Platform level services

RDC  RPC  REU

switch switch switch switch

Field Bus

OS OS OS OS

CPM CPM CPM CPM

Toolset Toolset Toolset Toolset

F1 F2 F3 F4

F5 F6 F7 F8

F9 F10 F11 F12

Spare

F13 F14 F15

ADCN
Implement reconfiguration mechanisms

- Is an additional fault tolerance mechanism to handle CPM failure
- Increases operational reliability
- Reconfiguration is provided in addition to existing redundancy
- Ensures management of spare resources that are common to many functions
- Embeds extensive model-based approach

- Enables early validation and maturity

- Provides a platform wide system oriented spreading of configuration data over DME modules

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SCARLETT DEMONSTRATOR

- High Performance data distribution
- I/O Intensive
- Time Critical
- Maintenance & Reconfiguration

Cockpit functions
DME building block intrinsic performance

One DEMONSTRATOR / 4 INSTANCES
SCARLETT DEMONSTRATOR

High Performance data distribution
I/O Intensive
Time Critical
Maintenance & Reconfiguration

Cabin functions such as Ventilation Control System Fire Smoke Detection System

One DEMONSTRATOR / 4 INSTANCES
One DEMONSTRATOR / 4 INSTANCES

<table>
<thead>
<tr>
<th>High Performance data distribution</th>
<th>I/O Intensive</th>
<th>Time Critical</th>
<th>Maintenance &amp; Reconfiguration</th>
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</thead>
</table>

Landing Gear function
Anti-skid Braking
Steering

Flight Control (for Business Jets)
One DEMONSTRATOR / 4 INSTANCES

- High Performance data distribution
- I/O Intensive
- Time Critical
- Maintenance & Reconfiguration

Health Monitoring function
Maintenance Concentrator
Reconfiguration supervisor
Questions?

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  [http://www.scarlettproject.eu/](http://www.scarlettproject.eu/)

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Visit us at Stand 12

![SCARLETT logo](logo.png)

Towards the next generation of Integrated Modular Avionics

**SCARLETT PROJECT**

European Commission Project

7th Framework Programme 2007-2013

Scalable & Reconfigurable Electronics Platforms and Tools

Aerodays 2011

30th March - 1st April 2011, Madrid (Spain)