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Network Object Architectures (NOA) for Avionics

Wednesday 20th June 10.00am – 1.00pm



Aircraft *Network* Problems Today

1. Complexity

- Point to point and point to multi-point links
- Wiring has to survive aircraft use, i.e. jacketing, termination, testing

2. Quantity

- Over 100 separate systems per double-aisle aircraft on average
- All from separate vendors with separate supply chains and use

3. Assembly

- Aircraft built in sections with wiring attached to each section
- Then sections transported around Europe or the USA

4. Cost

- Sole source vendors in many cases with high NRE
- Long term support of products built in up front or charged later

5. Quality always a factor for overhead costs and long term use

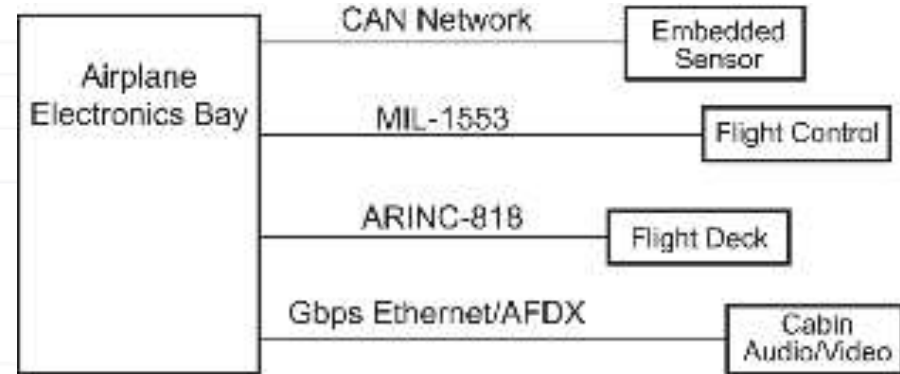


20th to 21st Century Aircraft Wiring

- Initial Electrical Work
 - Radio-tower communication
 - Hydraulics with electronics
 - Electrical sensors
 - Fixed displays
 - Cockpit-cabin communication
 - Point to point/soldered in place
 - Aviation Electronics
 - MIL-STD-1553
 - ARINC 429, 629, 825 (CAN)
 - Ethernet
 - Separate RF lines
 - Complex wiring bundles pre-made and installed as an assembly
-
- Software Architecture Creates Integrated Modular Avionics
 - Integrated Modular Avionics or ARINC 653 also known as IMA
 - Software platform for embedded use with modular hardware in chassis
 - Wiring routes along with electronics bays created and final assembly becomes *“plug, power, and push forward”*

IMA Modules

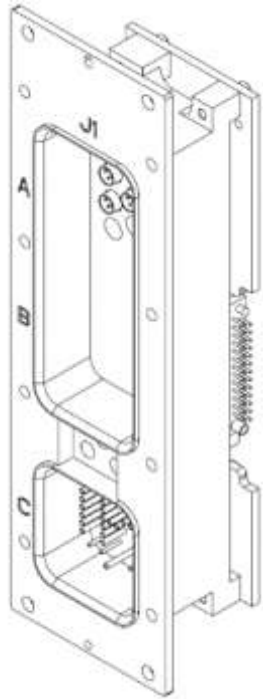
- IMA standardized avionics hardware including mounting, connecting, box size, and often shape
- Led to an E-Bay rush for all vendors to put LRUs in
- One service area with many different service contracts
- Airbus/Boeing own the install



IMA Today

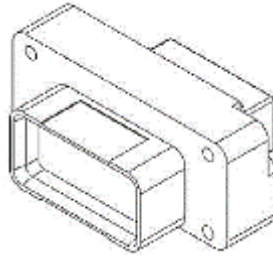
- *Systems added to the E-Bays but the plane stayed the same*
- *Installation was an afterthought*

Physical I/O in IMA Today

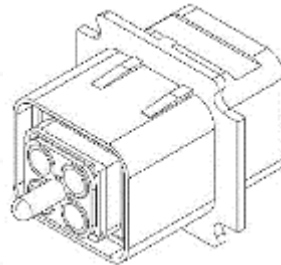


ARINC 600

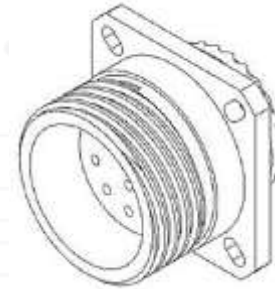
EPX



EN4165



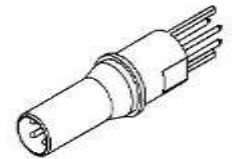
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ARINC 801



QUADRAX



Expandable connectors, inserts and connectors, older style fixed connectors, and now to installable termini where the supply line drives the form factor

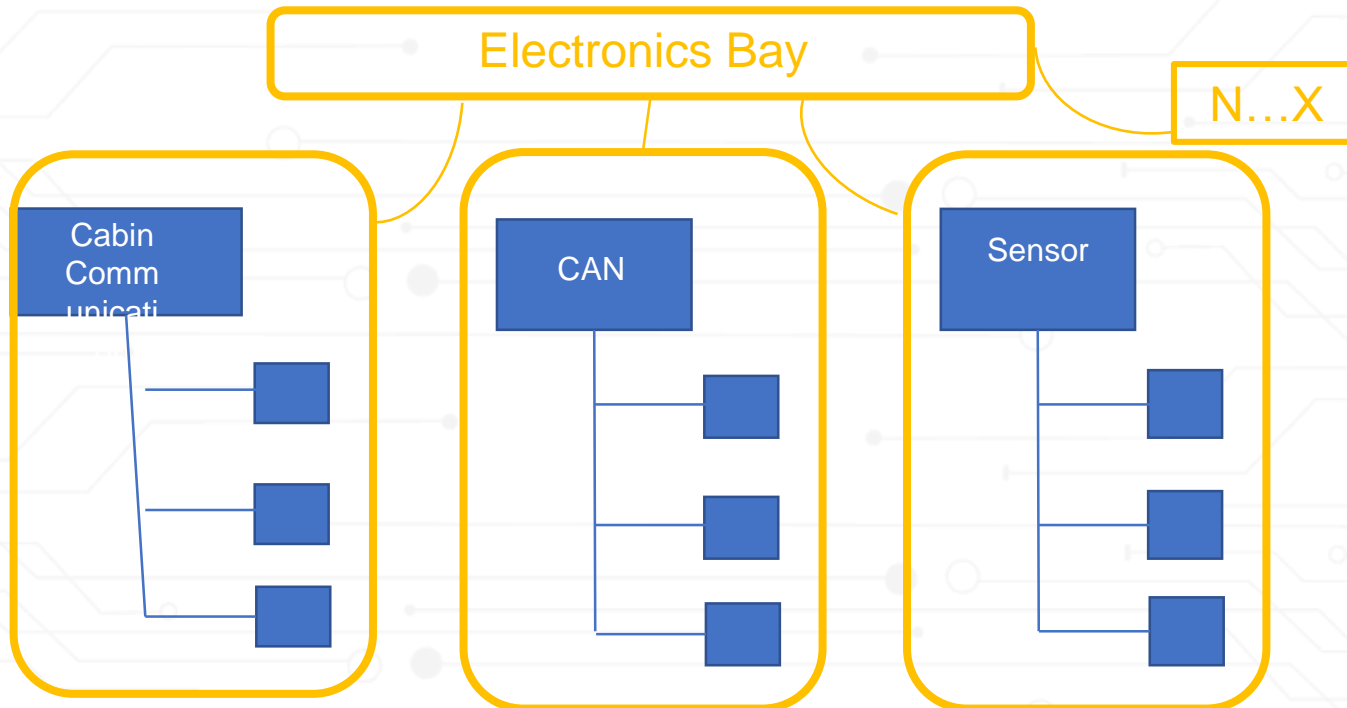
IMA Expands

- The use of Real Time Operating Systems and modular hardware in defined chassis created the basis for networking in an aircraft with the development of ARINC 664 and ARINC 818
 - ARINC 664 enabled the use of Ethernet semiconductors for low cost and standard networking
 - It added valuable tools for controlling the network and data in it
 - ARINC 818 enabled video streams that could be buffered and moved from monitor to monitor enabling increased reliability
 - As a standard, it is bought as a SW stack and supported with open tools



IMA Now Has a Problem

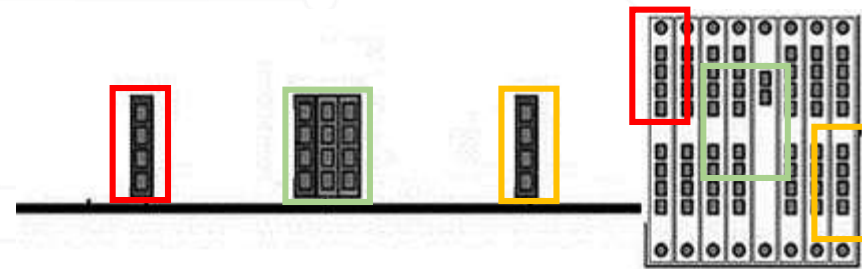
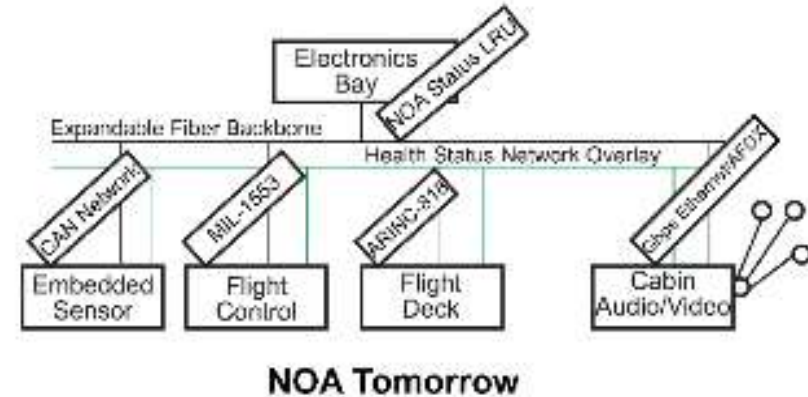
- E-Bays are full
- Systems getting more complex
- *The wiring no longer fits*
- *It takes too long to install*
- *It's too complex to service*



Network Object Architecture: NOA

NOA will have protected memory, modular hardware for vendor specific applications but also have networked modules, linked by fiber optics throughout the plane

*No protocol conversion
Separated by wavelength as well
as Software Partitions*



Applications

- Boeing and Airbus upgrades
- Business jet flexible and installable networks
- Passenger networks, protected, to enable in-vehicle communication between passengers and on-board apps
- Mobile services to support internet/cloud as passengers board and depart the plane, independent of IFE or the carrier's app and accounts
- LRU sensor or maintenance systems

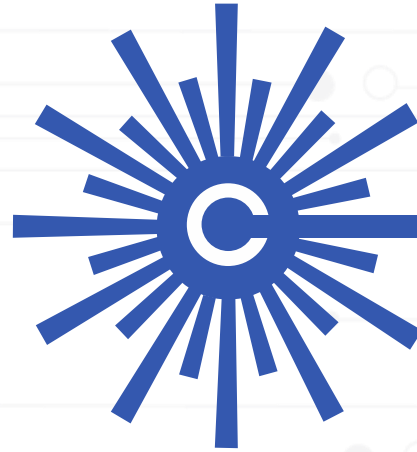


Company Information

Quality System:

ISO 9001:2008 + AS9100D
CERT-18.174.1 + 18.174.2

ATEX Compliant, OP IS
S20.20 ESD program
J Standard electronic parts work



Company Information:

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