Avionic platform technology

Future aircraft systems will have increased level of automation, including autonomous operation and management of air vehicles (manned or unmanned). Degree of automation will directly depend on computing power in the avionics system and the continuously need of increased computing power. Traditionally for avionics this need has partly been fulfilled using commercial available processor (Moore's law) that meets necessary safety requirements for use in aeronautics environment. In near future use of emerging technologies for computing is foreseen, driven by the consumer market. This research focus on certifiable technology and methodology for the next generation avionic platform to complement the rapid technology change we see in society today driven by the civilian consumption market needs. Main three research areas and focus areas of today:

- Architectures and principles for performance scaling, technology and function
  - Introduction of Integrated Modular Avionics (IMA)
  - Run-time reconfigurable architectures
  - Digital smart sensors and actuators
  - Use of multi-core processors
- Resilient, security and reliability related challenges to meet safety
  - Malfunctions referred to as No Failure Found (NFF)
  - Ageing also known as semiconductor wear out
  - Radiation-induced soft errors
  - Architecture mitigation techniques
- Cost effective design methodology
  - Correct-by-construction design flow
  - Automated software generation
  - Power efficient software
  - Formal methods

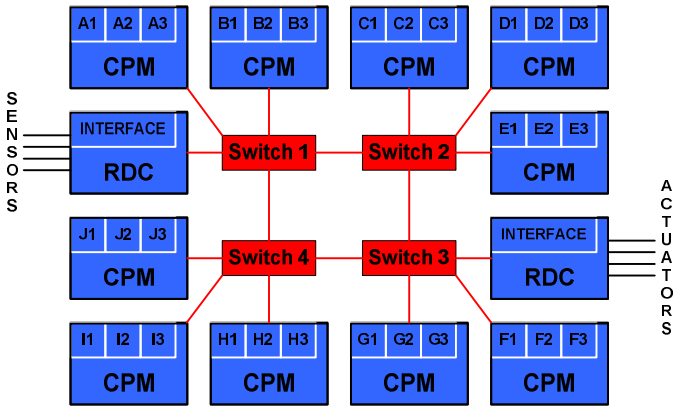

Figure 1. Typical IMA architecture.

The cluster encourages interdisciplinary links between participants from several projects (also other SIO's), where each of the projects are situated in a well-established research area in academia. By focusing on technology's advantage in the avionic platform, all participants achieve a better understanding of how their contributions technologically or otherwise contribute to the whole. The cluster contributes to the early understanding for how the industry at a later stage may utilize different engineering disciplines to apply the expected results and provide added value to the development of the avionic platform.