Software Integrity Analysis Applied to IRIO EPICS Device Support Based on FPGA Real-Time DAQ Systems

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PROPOSAL

What do we present?
- SW Integrity analysis of a RT-DAQ system based on PXIe Fast Controller architecture
- We have applied methodologies used in the Aerospace Industry
- We use RAM, FMECA, FTA, MISRA-C, Specific Standards

System under analysis
- Industrial computer
- PXIe Chassis
- FlexRIO device
- IEEE 1588 Timing board
- IRIO tools for FlexRIO config. and EPICS IOC app implementation

Example: IXV SW characteristics
- Critical SW (DAL-B)
- Hard Real Time
- Fault tolerance
ANALYSIS METHODOLOGY

- **Functional diagram**
  - Functional diagram

- **Fault Tree Analysis**
  - Fault Tree Analysis

- **Failure Mode Effect Criticality Analysis**
  - We base the study on the aviation certification standard DO-178C
    - Partitioning is not required (hypervisor)
    - Isolation through different processes has been considered

- **Software standards, and good coding practices**
  - IEC 12207, IEC 60880, MISRA-C, etc.

- **Software Verification (Results)**
  - Software Verification (Results)