

## ADVANCED STUDY 45-1-6: STUDY ON REAL-TIME PUBLISH-SUBSCRIBE - DATA DISTRIBUTION SERVICE (RTPS-DDS) AVIONIC DATA DISTRIBUTION PROTOCOL

DDS/RTPS selection requirements to be used with the restrictions of an avionic system (custom middleware)

**Data distribution based on topic:** each node of the network can instantiate a writer based on a type of data, without knowing which other nodes are interested in this information;

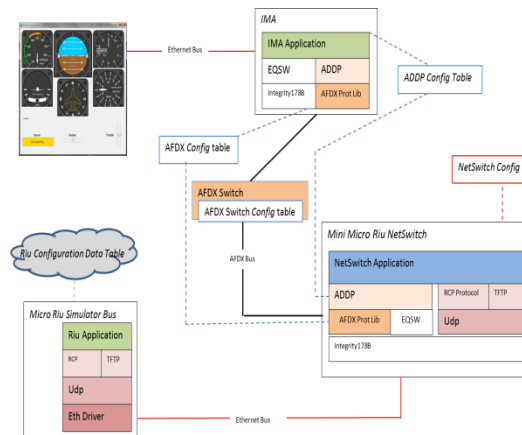
**Topics can be added thought Configuration file:** the protocol supports the insertion of a new topic in a system

**High level of configuration per host and per topic:** there are a number of QoS parameters that can be used to configure both the type of data, (i.e. best-effort vs reliable), and the reader and writer that handle that type, (i.e. number of stored items per topic).

**Portability :** it is possible to compile the library in the widest range of environments. This is achieved by using a minimal subset of C++ language compatible with embedded systems. An interface for ADA/C applications is also provided.

**Low dependency from the HW/RTOS:** all dependences from operating system and low level services are segregated to a limited number of classes that must be sub-classed for the target environment.

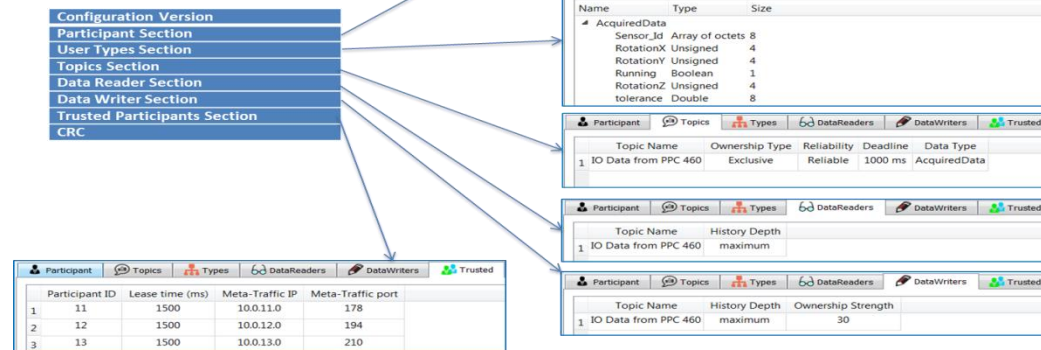
### Avionic Platform Demonstrator – SW Architecture –



### Avionic Data Distribution Protocol

- tailoring of the RTPS protocol that is based on the Real-Time Publish-Subscribe (RTPS) paradigm
- Interface is a tailoring of DDS/DCPS API.
- designed to be platform & RTOS independent
- designed to run over UDP/IP and AFDX
- developed following Do178B objectives.

### ADDP Configuration Files



The screenshot shows the ADDP Configuration Files structure and its GUI representation. The configuration files are organized into sections:

- Configuration Version
- Participant Section
- User Types Section
- Topics Section
- Data Reader Section
- Data Writer Section
- Trusted Participants Section
- CRC

The GUI shows the configuration for a Participant (ID: 13) with a Lease time of 2000 ms. It displays a table of AcquiredData with columns Name, Type, and Size. The table shows data for Sensor\_Id, RotationX, RotationY, RotationZ, Running, and tolerance. Below this, there are tables for Topics, Data Readers, and Data Writers, showing details for IO Data from PPC 460, including Ownership Type, Reliability, Deadline, Data Type, History Depth, and Ownership Strength.

Participant ID	Lease time (ms)	Meta-Traffic IP	Meta-Traffic port
1	11	1500	10.0.11.0
2	12	1500	10.0.12.0
3	13	1500	10.0.13.0