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Dep. Industrial Electronics

A Bluetooth-based Wireless Distributed Data Acquisition and Control System

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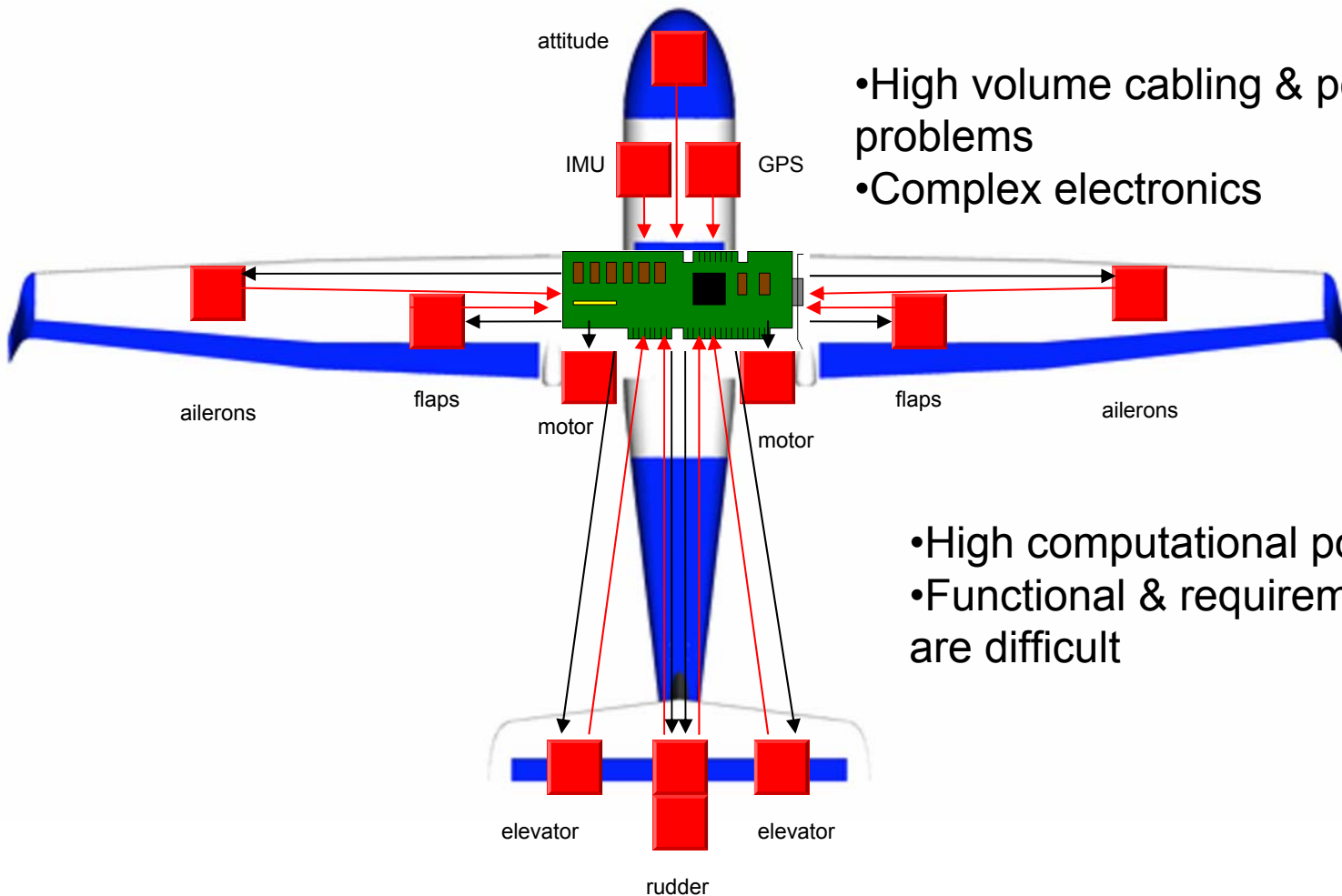
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Conventional Cable Approach



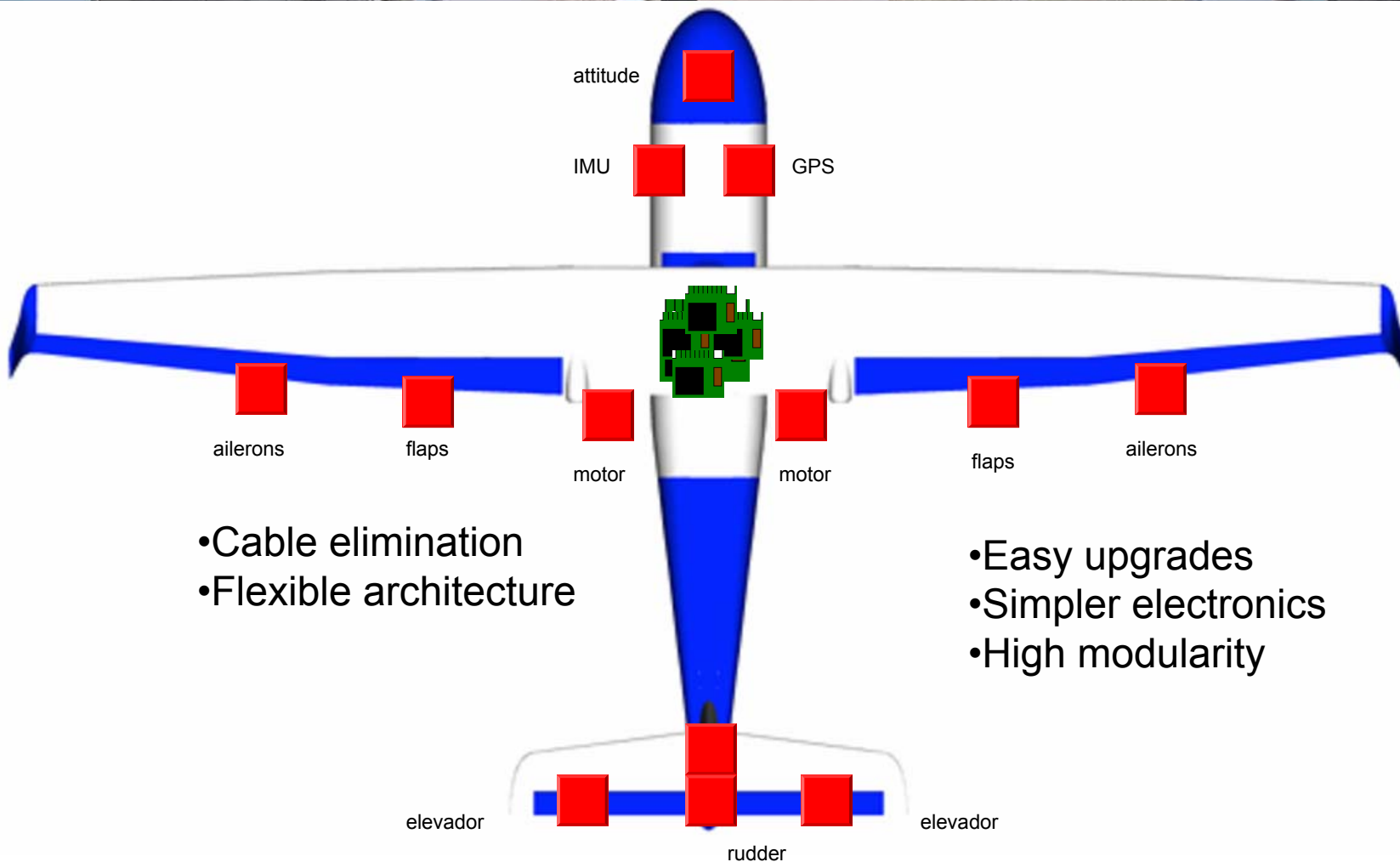
- High volume cabling & potential cabling problems
- Complex electronics

- High computational power
- Functional & requirement upgrades are difficult



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Snapshot



- Cable elimination
- Flexible architecture

- Easy upgrades
- Simpler electronics
- High modularity



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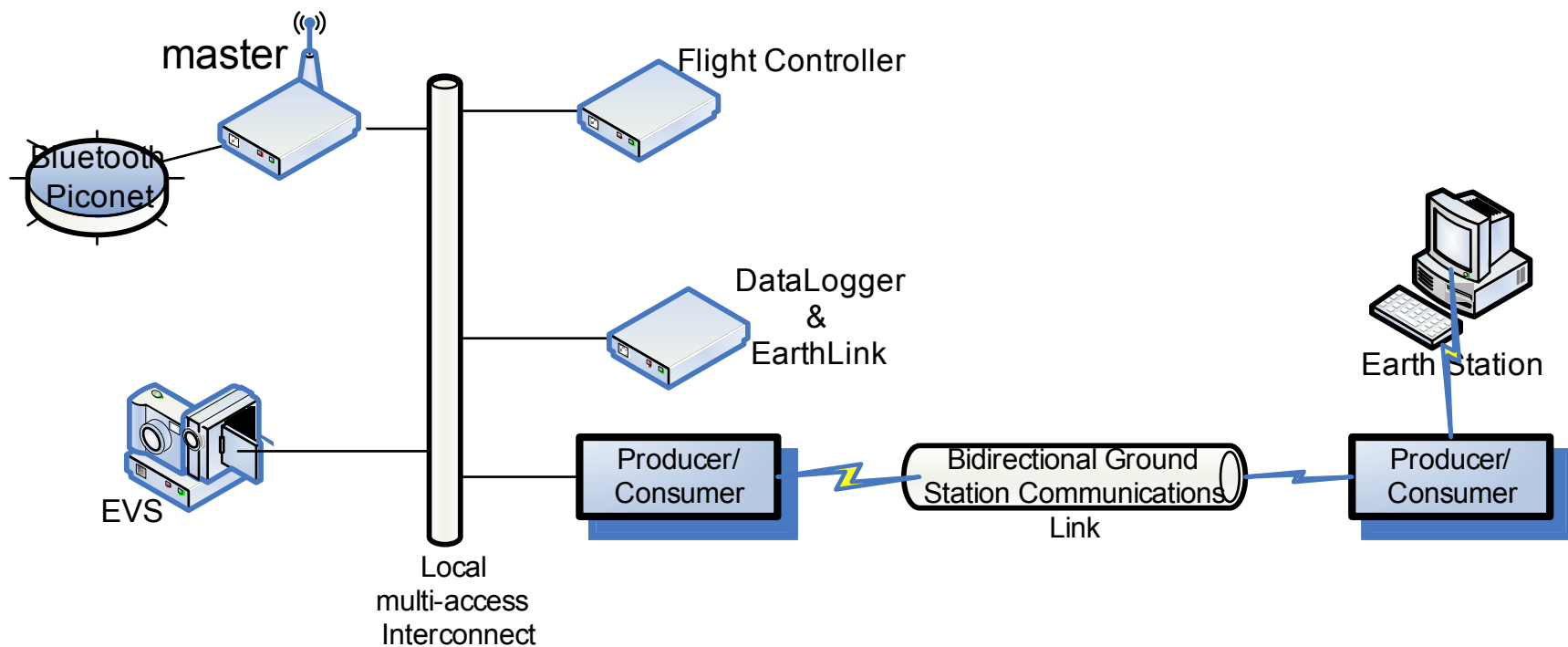
Global aircraft architecture on board instrumentation

- ◆ **GPS**
- ◆ **Inertial Measurement Unit**
- ◆ **6 point aero-dynamical probe**
 - Wind speed, α β angles, altitude, barometric pressure
- ◆ **Radio Altimeter** (automatic landing system)
- ◆ **Temperature** (Onboard electronic modules)
- ◆ **Servo Actuators**
 - 2 Flaps
 - 2 Ailerons
 - 2 Elevators
 - 2 Rudders
- ◆ **2 Electric Motors for aircraft propulsion**



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Global system architecture on board architecture

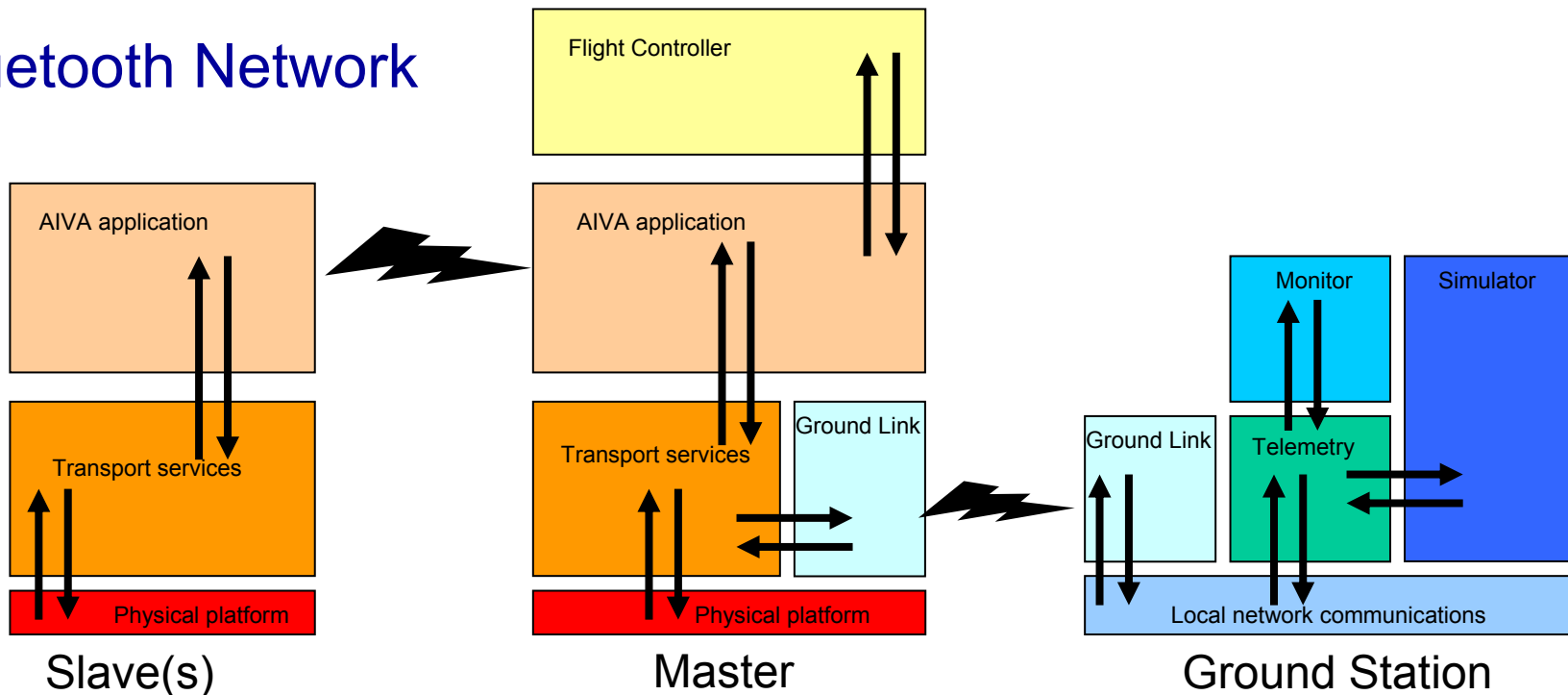




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Global system architecture Communications model

Bluetooth Network



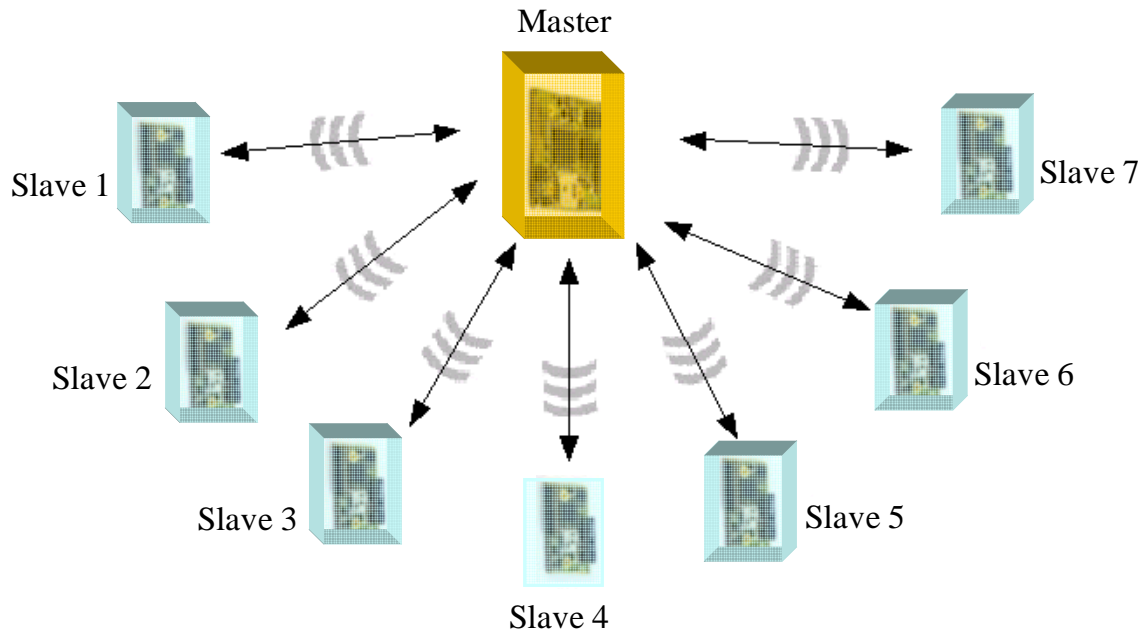
Layered architecture

- Flexible project
- Reduce maintenance and future upgrades



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Global system architecture Virtual machine advantage



point-multipoint approach
(Wireless MultiDrop)

- Performance is affected
- Limited functionality

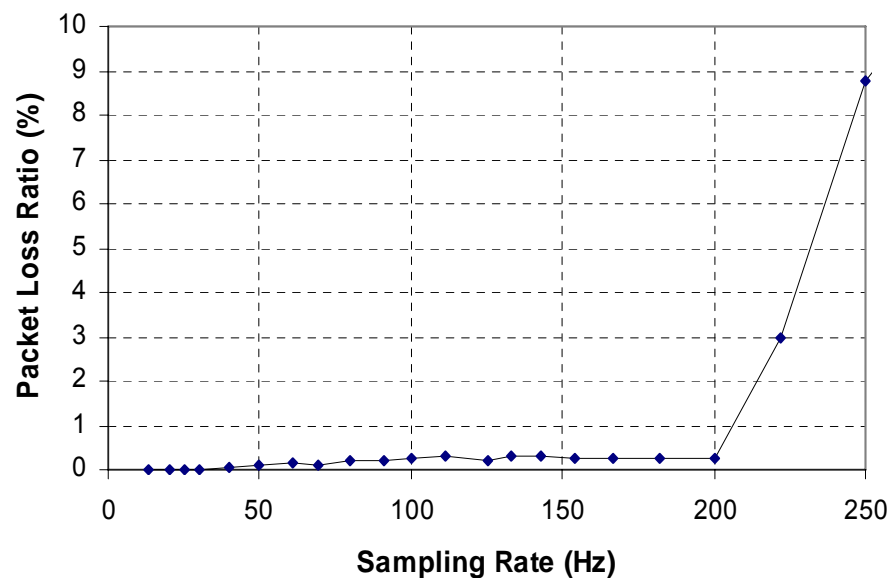
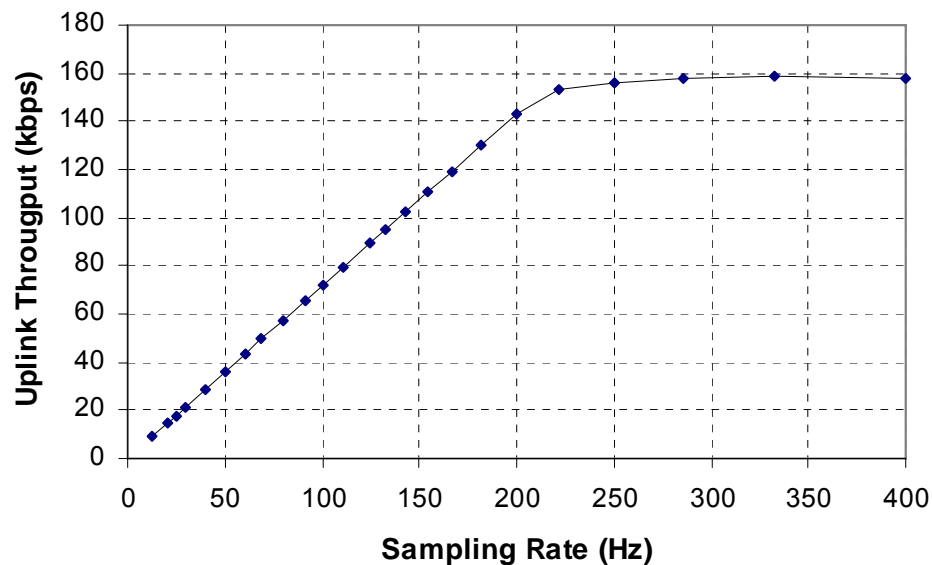
- Bluetooth stack interaction at application level
- Bluetooth complexity details can be ignored
- Better function integration
- Designer focus is on wireless application only



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Global system architecture

Experimental results

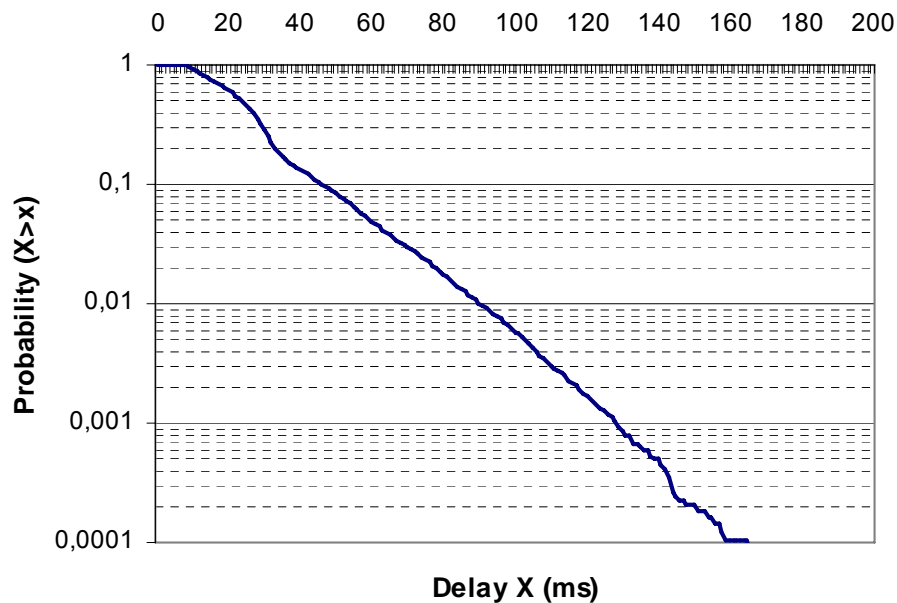
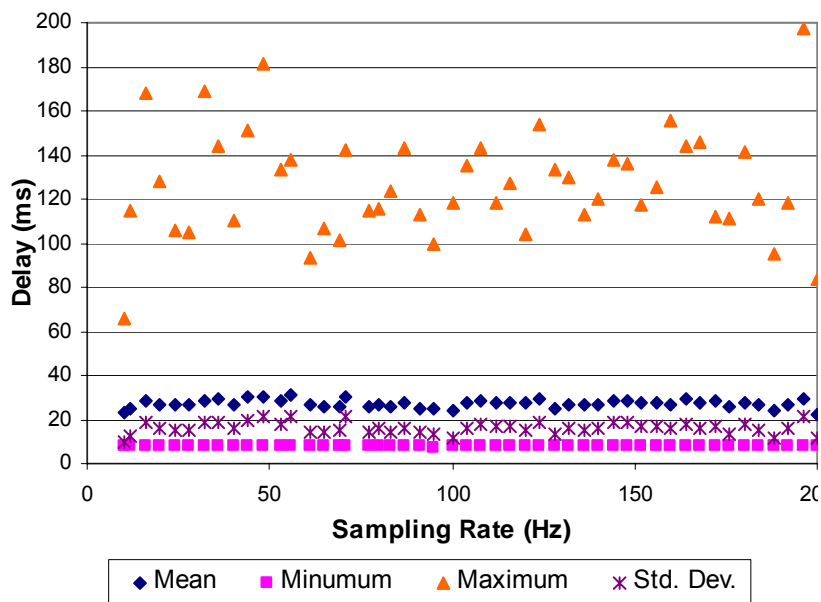


- Experimental setup: 6 slaves, uplink constant bit rate traffic, 15 byte packets, balanced mode.
- The developed system is able to reach a sampling rate of 200 Hz for all slaves simultaneously without performance degradation.



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Global system architecture Experimental results



- The delay is not adversely affected by a rise in the offered load, as long as the network operates below the saturation point.
- The mean delay is around 27 ms.
- The delay is lower than 90 ms for 99% of the samples.