WICO4SAT Abstract

The WICO4SAT project is a study of a point to point UWB link between 2 RTU devices installed on a Stratobus™ HAPS. In a first use case the target of the system is to assess the feasibility of deterministic UWB communications inside the Stratobus™ environment. In a second use case a theoretical study was conducted to evaluate the feasibility of using a deterministic wireless network to connect thermal sensors mounted on the wings of solar panels to an RTU mounted inside a spacecraft.

For Use Case 1, the system is composed of two UWB Gateways, each of them connected via USB to a PC Application. The PC Application emulates an RTU that generates test data packets of 800B payload. The test data is sent over the UWB network by using a deterministic protocol based on the ISA100 Wireless specification. The PC Application allows for the configuration of the network and provides communication statistics to the operator.

For Use Case 2, an UWB node is placed on each of the solar array wings of a spacecraft in order to collect the measures from thermistors spread across the solar arrays. The UWB nodes then transmit those values through a wireless link towards an UWB gateway located inside the spacecraft.

The activity has assessed the feasibility of using deterministic RF communications using UWB in both use cases, as follows:

- The data capacity of the UWB link is 1.2 Mb/s, better than the standard MIL1335 wired.
- The UWB link is resilient to intentional jamming in 2.4 GHz of 13 dBm power at 10cm.
- Distances of 130m LoS have been demonstrated.
- For Use Case 2, the UWB network can accommodate up to 20 RF Nodes, each of them connected to 10 temperature sensors and transmitting every 100ms.
- Future activities should aim at reaching TRL6 and at executing an IOD. As an intermediary step, a test on a stratospheric balloon can be organized for a reasonable cost.