

IAF SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)  
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TELDASAT – INDUSTRY 4.0 FOR GLOBAL AND SAFETY CRITICAL MACHINES AND  
INFRASTRUCTURES**Abstract**

In the very near future, hundreds of millions of intelligent, mostly energy autonomous operating sensors will be distributed world-wide, requiring data interconnection on a global scale and at lowest possible cost. This requires a dedicated Machine-to-Machine (M2M) communication network to be characterized by •Global availability even in areas without GSM coverage •Extreme low energy consumption footprint and Beamforming Antenna •Secure and high availability data services for professional users •Dedicated network with cognitive machine intelligence capabilities

The TELDASAT project, incubated by the ESA BIC Oberpfaffenhofen, with the Sat4M2M GmbH, in a first phase has chosen the International Space Station as testbed for a demonstration and validation phase in 2018/19, followed by a pre-operational phase with launching customers. Later-on, the aim is a fully functional system on a dedicated small-sat satellite constellation of not less than 12 satellites, or as hosted payload on an existing low-Earth orbit satellite network. Terrestrial systems cannot cope with the given set of requirements. Especially 24/7 global M2M services for the “Internet of Things (IoT)” for surveillance of safety critical infrastructures for millions of sensors, needs to guarantee data-collision free access. Advanced technologies, CDMA-coding, protocols, antennas and chipsets are required. These components are currently under RD, and simulation. However, before launching dedicated satellites, system verification is key to reduce development time, risks and costs. The objective of this Strategic Partnership(SP) with ESA, in the frame of ESA’s Commercial Partnerships for Space Exploration initiative, is to perform the TELDASAT technology demonstration and system verification onboard the ISS. It shall include mid/long-duration experiments, possibly until ISS End of Life scheduled for 2024. It is based on the GTS experience gained on the Russian Zvezda module since 2013. If successful, services will be established from the ISS and offered to dedicated user groups in a pre-operational mode for up to 10.000 subscribers. Potential customers of this future service such Deutsche Bahn and RZD Russian Railways have already signaled their strong interest. The ability to service, replace, update, and control components installed on the ISS and supported by astronauts, is very essential for allowing an early and time-efficient system verification. Thus, the paradigm change in space-industry and its applications towards commercially oriented space technology demonstrations shall be supported, using existing ISS capabilities, innovative IoT-tailored technologies and blockchain application to secure intellectual property rights(IPR). The presentation will encompass the market requirements, detailed technical solutions, give system overview including user and space segment.