

Press release

TTTech Aerospace and RUAG Space selected by Northrop Grumman to provide network and computing platform for NASA's Gateway

- TTTech Aerospace and its space products design and manufacturing partner RUAG Space will deliver the TTEthernet network and computing platform for the Gateway's habitation and logistics outpost (HALO) built by Northrop Grumman.
- HALO will serve as temporary living quarters for the astronauts preparing to land on the moon, offering necessities such as life support systems and storage, as well as communication and docking capabilities.

Vienna and Houston, TX/Zurich, June 28, 2021: TTTech Aerospace was selected by Northrop Grumman to provide the TTEthernet-based network and computing platform for the Gateway's habitation and logistics outpost (HALO). HALO will serve as the astronauts' temporary living quarters on their way to the moon. The Gateway is part of NASA's Artemis program that plans to land the first woman and first person of color on the moon and extend space exploration to Mars. The first products produced by TTTech Aerospace and its space products design and manufacturing partner RUAG Space are scheduled for delivery to Northrop Grumman in the coming weeks.

Northrop Grumman and TTTech Aerospace have worked together for several years in a NASA-funded R&D program that prototyped data networks for the Gateway. These data networks were based on TTEthernet, a scalable, standards-based technology that delivers deterministic real-time communication, guaranteeing the submission of critical messages as well as standard communication data on a joint network. TTEthernet has been established as the International Avionics System Interoperability Standards (IASIS) by NASA and its space agency partners and serves as the primary data network for the entire Gateway, as well as connecting to new modules as they are delivered.

TTTech Aerospace and RUAG Space provide modular TTEthernet network and computing platform

"TTTech Aerospace is very excited to work with Northrop Grumman and to support the Gateway and NASA's Artemis program. The space sector has a visionary mission and is an extremely challenging field. Reliability and fault-tolerance are key when it comes to safety-critical missions with humans on board. TTTech Aerospace and its space products design and manufacturing partner RUAG Space have already supplied space products for a variety of international programs. Together, our expert teams work with Northrop Grumman to implement the TTEthernet data network in HALO," says Bob Richards, Vice President Space, TTTech North America.

"Bringing humans to the moon is a highly exciting mission, and space electronics is key to enable that. An astronaut many thousands of kilometers away from earth needs to rely on solutions providing maximum safety and security. Together with TTTech we can provide exactly this – the most reliable data network platform for outer space", says Anders Linder, Senior Vice President Electronics at RUAG Space. For its entire electronics portfolio RUAG Space offers a direct technical interface to U.S. clients in its office in Denver, Colorado.

The space hardware for the HALO program will be designed and produced in Vienna, Austria. The modular product platform provides a fault-tolerant, safety-critical data network backbone and computing platform that supports the three configurable Ethernet traffic classes: best effort traffic, rate-constrained traffic and time-triggered traffic. The network and computing platform consists of

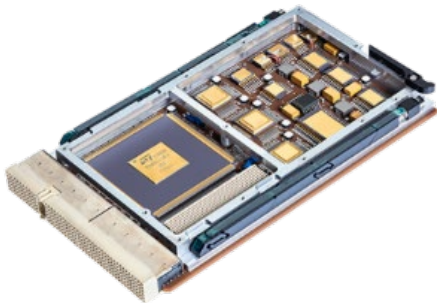
complete box level products integrating TTEthernet network switches, end systems, embedded software, computing modules, network configuration tools, as well as integration support.

Images



Caption: Artist's rendering of HALO (habitation and logistics outpost; on the right) and PPE (power and propulsion element; on the left) orbiting the moon as part of the Gateway (Copyright: Northrop Grumman)

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Caption: TTEthernet End System Space 3U cPCI, one of the components of TTTech Aerospace's TTEthernet network and computing platform (Copyright: TTTech Computertechnik AG)

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Caption: "TTTech Aerospace is very excited to work with Northrop Grumman and to support the Gateway and NASA's Artemis program. Our expert teams work with Northrop Grumman to

implement the TTEthernet data network in HALO,” says Bob Richards, Vice President Space, TTTech North America. (Copyright: TTTech Computertechnik AG)

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Caption: “Together with TTTech we can provide exactly this – the most reliable data network platform for outer space”, says Anders Linder, Senior Vice President Electronics at RUAG Space. (Copyright: RUAG Space)

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About TTTech Aerospace

TTTech Aerospace provides deterministic embedded network and platform solutions for aerospace and space applications. Its products have already completed over 1 billion flight hours in Level A safety-critical applications like fly-by-wire, power systems, avionics, engine controls and environmental control systems. Proven, mature solutions help customers in the aerospace and space industries to develop integrated, modular and scalable deterministic network platforms that increase safety, fault-tolerance and availability. In addition, integrated solutions reduce size, weight, power and cost (SWaP-C), allowing for easier handling of equipment and lowering total lifecycle cost.

TTTech Aerospace is a business unit of TTTech Computertechnik AG, a leading provider of safe networked computing platforms. TTTech is the innovator of Deterministic Ethernet and a driving force behind the IEEE TSN and the SAE Time-Triggered Ethernet standards. TTTech Computertechnik AG operates under the umbrella of the TTTech Group, a globally oriented group of high-tech companies, founded and headquartered in Vienna, Austria.

Web: <https://www.tttech.com>

About RUAG Space

RUAG Space is the leading supplier to the space industry in Europe, and has a growing presence in the United States. In total, RUAG Space has about 1,300 employees across six countries. RUAG Space develops and manufactures products for satellites and launch vehicles—playing a key role both in the institutional and commercial space market.

RUAG Space is part of RUAG International, a Swiss technology group focusing on the aerospace industry. Based in Zurich (Switzerland) and with production sites in 14 countries, the company is divided into four areas: Space, Aerostructures, MRO International and Ammotec. With its strategic focus on aerospace, the company will consist of the two segments Aerostructures and Space in the medium term. RUAG Space is Europe's leading supplier of products used in the aerospace industry. RUAG Aerostructures is a global first-tier supplier in aircraft structure construction. RUAG International employs around 6,000 people.

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