PRESS RELEASE

European Launch Vehicle Ariane 6: Fraunhofer IWU and ESA Deploy Innovative Sensor Technologies Across All Production Sites

On November 4, an Ariane 6 rocket successfully carried the Earth observation satellite Sentinel-1D into orbit. Looking ahead, the new launch vehicle is expected to lift off at short intervals, allowing Europe to remain a key player in space research. A perfectly synchronized production network that manufactures components with the highest precision is essential for aerospace applications. Sensors can play a crucial role here—from physical traceability of parts to condition monitoring and quality management. Advanced sensor technology also helps make energy consumption in production more manageable.

Following a successful pilot phase, Fraunhofer IWU and the European Space Agency (ESA) are now rolling out four sensor groups to all Ariane production sites as part of the SmartSENS project. "The goal is to consolidate all data on a single platform (ESA-Steam) and analyze it to enable closed-loop quality control," explains Dipl.-Ing. Albrecht Hänel, Head of the Digital Production Twin Department at Fraunhofer IWU and project manager at the institute. Sensors known as asset trackers monitor the availability, condition, and location of production equipment and resources, as well as key manufacturing processes, in real-time. Monitoring vibrations during processing provides valuable insights into product quality via process stability. GPS trackers enable complete traceability of parts and components on their way into the factories, during further processing, and on their way to (final) assembly. A fourth category of sensors tracks energy consumption during production, helping to keep the manufacturing-related CO_2 footprint as low as possible.

IMPROVE: Getting Better

SmartSENS is part of the ESA program "IMPROVE! – Technologies for Smart Manufacturing, Intelligent Logistics and Sustainability." The program's initiatives aim to create a fully automated and intelligent end-to-end value chain for the Ariane 6 launch vehicle and the P120C rocket engine. The focus lies on groundbreaking innovations in predictive maintenance, connected sensor networks, digital supply-chain management, and sustainable production processes.

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A Living Partnership

Fraunhofer IWU and AS Consulting launched SmartSENS in May 2025. In the first phase, the sensor technologies were tested and validated in a real production environment at MTA Augsburg. The solutions in use include energy and vibration sensors from ABB, Brady systems for real-time asset traceability, and GPS trackers from Trusted A/S for transport monitoring. Production partners now receiving the rollout include, for example, ArianeGroup (Vernon, France), Avio S.p.A. (Colleferro, Italy), GKN Aerospace Sweden AB (Trollhättan), and ATC Space s.r.o. Klatovy (Czech Republic).

Fig. 1 Fraunhofer IWU and ESA are deploying innovative sensor technologies across all Ariane 6 production sites
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Fig. 2 Ariane 6 A62 launch vehicle at Europe's spaceport in Kourou, French Guiana (August 6, 2025)
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