

HUMAN SPACEFLIGHT SYMPOSIUM (B3)  
Utilization & Exploitation of Human Spaceflight Systems (3)

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ITALIAN SPACE AGENCY SCIENCE ON THE INTERNATIONAL SPACE STATION: THE FUTURA  
MISSION

**Abstract**

Pursuing the ASI/NASA MoU for the MPLM/PMM modules, the Italian Space Agency has access to the ISS utilization resources. In this frame, ASI has carried out over the years a thorough ISS Utilization programme including on board scientific experiments, in the field of the Life and Physical Sciences. Per the same memorandum, ASI accrued three Shuttle flight crew member opportunity and the rights to one ASI-provided ISS crew member for one on orbit increment every five years, with an assured minimum of three. Within this frame, ASI has assigned Italian astronauts of the European Astronaut Corps to three short-duration flight opportunities to ISS, namely Shuttle flights STS-100 (Guidoni), STS-120 (Nespoli, Esperia) and STS-134 (Vittori, DAMA), and to two ISS long-duration flight opportunities, with Luca Parmitano assigned to ISS Expedition 36/37 (Volare) and Samantha Cristoforetti, seventh Italian astronaut and first Italian woman in space, assigned to ISS Expedition 42/43 (Futura). Under the coordination of the Italian Space Agency and with the industrial support services provided by Kayser Italia, a pool of scientists, academic researchers and industries leader in innovative technological fields worked into the design and implementation of payloads, experiments and scientific protocols in the fields of human physiology, cell biology, countermeasures, physical sciences and technological demonstrations in order to complement the Futura Mission with a comprehensive research program. Following a call for research opportunities, as well as promoting public-private partnership, ASI selected for the Futura Mission a total of 10 investigations, involving more than 15 different institutions and about 30 investigators. The experiments required use of ASI flight hardware developed for previous experiments, available either on ground or on-board; access to on-board facilities provided by NASA and ESA, under ad-hoc agreements; development of brand new payloads. In this case, specific hardware was designed, developed and fully qualified against ISS and transport vehicles requirements, by the academic institutions or the industries, with the research integration and operation control services provided by ASI through Kayser Italia, ASI prime contractor for the ASI ISS utilization industrial support services. The paper presents the investigations relevant to the

FUTURA mission, describes the flight hardware and the major tasks relevant to the mission integration, the ground processing and the on orbit operations. As well, a description of the ASI education and communication initiatives for the Futura Mission, jointly implemented with ESA, will be provided.