

## Alcatel Alenia Space hosts the MORE Scientific Team meeting.



The 1<sup>st</sup> Meeting of the MORE Scientific Team has been conveyed by the Principal Investigator, Prof. Luciano Iess of the University of Rome "La Sapienza", and hosted by Alcatel Alenia Space in its Rome premises on February 26<sup>th</sup> and 27<sup>th</sup>.

MORE (Mercury Orbiter Radio Science Experiment), is a scientific investigation selected by ESA for the Bepi Colombo mission and contributed by the Italian Space Agency.

The main scientific goals of MORE are the determination of Mercury's gravity field and internal structure, and an extensive set of tests of the Einstein's General Relativity (including the Shapiro time delay on radio signals, caused by the space-time curvature, and the precession of Mercury's perihelion). MORE's advanced radio system will also be used for a navigation experiment that will combine precision tracking data with a novel orbit determination code developed by the University of Pisa.

Team members belong to scientific institutions in Europe and United States, with major roles played by the universities of Rome "La Sapienza", Pisa, and Bologna, University of Namur and Royal Observatory of Belgium, Jet Propulsion Laboratory and University of Colorado.

MORE exploits the experience gained, at both scientific and industrial levels, with the Radio Science experiment of Cassini mission, the first at Ka band, which included a 32-34 GHz frequency translator, developed by Alcatel Alenia Space, having the unprecedented frequency stability of  $10^{-16}$  over 1000 sec. A performance which has enabled the Italian scientific community (Prof. Luciano Iess, Prof. Paolo Tortora of the University of Bologna and Prof. Bruno Bertotti of the University of Pavia) to test the relativistic deflection of the radio signal with an accuracy of 20ppm, a result 50 times better than any previous one (*Nature*, Sept. 25<sup>th</sup>, 2003). One of the goals of MORE is to improve the above accuracy thanks to the addition of a ranging channel to an enhanced Ka Band Translator.

The goal of the first MORE meeting has been the planning of the scientific team activities as well as the preliminary definition of the requirements at both system and experiment levels. The meeting was also attended by the science teams of other Bepi Colombo onboard instruments addressing Mercury's geodesy and geophysics (the ISA accelerometer, the SIMBIO-SYS camera and the BELA laser altimeter), in view of future close collaboration for joint scientific investigations.

Important contributions to the discussion came from the many players involved in this complex experiment, namely ESA, ASI, the industrial prime contractor Astrium and, in particular the Alcatel Alenia Space Italia instrument team, largely based on the previous Cassini team.

MORE enriches the role Alcatel Alenia Space is playing in the Bepi Colombo mission, where it is Industrial Co-Prime, with specific responsibilities for the Power and Radio Frequency subsystems, the Orbiter thermal control, as well as Assembly, Integration and Verification activities.

The Radio Frequency subsystem includes the Alcatel Alenia Space's Deep Space Transponder (X/Ka bands), which represents the new generation of the S/X Deep Space Transponders successfully operating on Mars Express, Venus Express and Rosetta spacecrafts.