

19th SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)  
Hitchhiking to the Moon (8)

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STATE OF THE ART OF TEAM ITALIA AMALIA MISSION FOR THE GOOGLE LUNAR X PRIZE  
RACE**Abstract**

The proposed XPrize Foundation international challenge, supported by Google, to send a privately founded vehicle on the Moon is on its path. Italy is keep developing its national mission to answer this call: AMALIA (Ascensio Machinae Ad Lunam Italica Arte) is a composite made of a transportation vehicle and a small rover the latter to be delivered on our satellite surface to get rid of the broadcasting mission requirements. Team Italia includes the major Italian Aerospace Engineering Universities and Space related industries: Politecnico di Milano, Politecnico di Torino, Università di Roma "La Sapienza", Università di Napoli "Federico II", for the academic participation and Thales Alenia Space-Italia SpA, Compagnia Generale per lo Spazio SpA and TechnoSystem Development SpA for the industrial side. These entities have already an impressive track record in contributing to and developing space exploration and planetary missions for the Italian and the European Space Agencies. As mentioned, AMALIA is a composite, a transfer/landing vehicle plus a wheeled rover. Both of them represent a technological breadboard to spin up specific research areas our country as already the skills on with the strong constraints of costs and developing time containment. At the time being the project is going through its phase B to be largely concluded at the Congress occurrence. The vehicles design is driven by the mass minimization to limit launch costs: therefore miniaturized hardware components are exploited; redundancy is applied only where strictly needed to contain the mission critics. Launcher is almost selected, having in mind the technical constraints satisfaction together with the costs limitation goals. Chemical propulsion currently represents the design solution to control both the transfer trajectory and the landing phase with a specific thrusting profile to cope with fuel mass minimization and thruster throttling limitations. The selected

landing site is equatorial. A four wheels rover with specifically designed suspensions will be released on the surface; navigation will be accomplished by merging classic and visual odometry supported by three cameras mounted on a mast; those cameras will also supply data required to answer challenge official requirements. On board autonomy is limited, leaving the authority to the Ground. A prototype of the vehicle is currently under development. Deeper details on the Team Italia technical work so far, sponsorship recruitment and AMALIA mission peculiarities are offered in the paper.