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ITALIAN CHALLENGES AND OPPORTUNITIES FOR SMALL SATELLITES; A SCIENTIFIC, TECHNOLOGICAL AND INDUSTRIAL PERSPECTIVE

Abstract

Launches of mini-satellites and micro-satellites are increasing all around the world. The interest on small satellites is widening because of lower costs and shorter development times. The large use of Commercials Off The Shelf and the miniaturization of a wide collection of space devices are giving new perspectives to manufacturers and users. Interest on small spacecraft is growing for space agencies, space companies, research centers and universities. The Cheap Access To Space is probably the most attractive point for a set of new actors that can participate to space missions; however the reduced mass is critical for small satellites because the spacecraft sub-systems must cope with less volume and power availability, giving to system design a new importance. Nevertheless this will be also an incentive to develop new skills in the industries, attracting the attention of new generations of scientists and engineers and giving new frontiers of access to space to all nations. The other important point is the reduced time required to study, to develop and to launch a small satellite. The ability to construct and launch small satellites quickly, to serve immediate needs, makes them attractive; this allows to open new interesting application scenarios: for example the surveillance scenario in areas that become of interest within a relatively short time and for a limited period. Disaster relief is another situation that can often be well served by the advantages of small satellites. This paper presents an assessment on the possibilities and the limits of small satellites in an Italian and international perspective, focusing on spacecraft with mass included between 50 and 500 kg. The challenge posed by small satellites represents for a Nation Agency as ASI a great opportunity in order to foster: cheaper and faster testing (IOD/IOV) of new space technologies and techniques; targeted scientific and operational applications (including dual applications); efforts of national industries in delivering a complete space system; disruptive efforts because small missions are small in size but require high tech in order to achieve miniaturization and performances; opportunities for creating links between industries involving subject unknown to the space arena. The market evolution in the past decade and the current projections foresee new opportunities and new challenges for small spacecraft, including constellations of small satellites considering radar, optical and hyperspectral payloads.