

COMMITTEE ON THE PEACEFUL USES OF OUTER SPACE

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Item 11

Space and climate change

ITALIAN DELEGATION

Mr. Chair, Distinguished Delegates,

it is a pleasure to have the opportunity to present to you some of the main activities the Italian Space Agency is carrying out with the national community concerning the crucial topic of Space and Climate Change.

Following a national initiative titled *Innovation For Downstream Preparation For Market*, I4DP, various are the approved projects oriented to allow us a better understanding of climate change and the related impacts on our Earth.

Among the activities selected by the tender evaluation board, we would highlight the *Monitoring Water Infrastructures through Satellite Data* (MISD). The primary target of the project is to control and monitor the efficiencies and infrastructural stability of the water distribution and drainage networks. The proposal arises from the need to fill the existing gaps in the current operating systems for monitoring the Basin infrastructures, through the synergistic use of different types of satellite data: Multispectral, Hyperspectral and SAR. In particular, the project aims at the analysis of subsidence, landslides, water and sewage networks. Operators of the integrated water cycle generally have a big problem to face, represented by the losses along the water networks. According to recent reports related to the national geography of technical quality of water networks, in Italy these losses can achieve values higher than 52%, with linear water losses until to about 49 mc/km/dd (depending on geographic areas of interest). Only about 10% of these losses, attributable to the non-integrity and/or lack of tightness of the elements that make up the water network (pipes, joints, user leads, hydraulic organs and network pressure), occurs on the ground and therefore is immediately identifiable. Generally, the search for leaks takes place with the so-called "traditional" acoustic method, through the use of "ground" instrumentation. Satellite technologies offer interesting possibilities for the detection of water network leaks: detection of leaks using radar satellite images to identify the presence of moist soil (and consequently of leaks); possibility of investigating large portions of territory without needing of local operators in the field for the pre-localization of the leak; use of SAR interferometry for the detection of movements/subsidence of the Earth's surface to identify sections of the network in areas that have critical movements and defines different levels of inspection priorities.

In addition, following our national developments on hyperspectral satellite sensors, we activated the program *PRISMA Science*, to enhance the capability of interpreting the data from our homonymous satellite and to prepare the community to the next upgraded missions of this kind. With regard to climate change and its impacts, this line of activity is fostering the project **PANDA-water** concerning the development of applications for monitoring inland and coastal waters and the **Prisma FOREST** project focussed on the derivation of leaf nitrogen concentration.

Objectives of the PANDA WATER project are to provide a set of validated products for inland and coastal ecosystems for PRISMA imagery spectrometry. They provide a series of innovative and validated products, derived from PRISMA L1 and L2D hyperspectral and panchromatic data, in order to obtain new variables of interest for inland and coastal waters: more accurate estimates of optically active parameters (chlorophyll-a, suspended solids and colored dissolved organic matter); more advanced products, such as particle size distribution of suspended sediment, transparency measurements, attenuation coefficient and euphotic depth, presence of cyanobacteria and toxic algal blooms, water column depth estimation, natural materials and lures floating on the surface of the water

Still within the Prisma Science programme, it is of importance to cite the project **OVERSEE**, a collaboration project developed together with NASA JPL and Goddard Space Flight Center in the US. Starting with two field campaigns, one in Italy (Gulf of Oristano) and one in Vietnam (Saigon-Dong Nai Delta), the main goal of OVERSEE is the identification of ecological and morphological indicators (or sets of indicators) based on Earth observation multisensor data to evaluate and identify emerged and submerged land cover and coastal changes and, together, to predict which are the most vulnerable areas to floods and erosion processes related to both natural and anthropogenic pressures.

Mr Chairman,

let me add one more programme of the Italian Space Agency oriented to the development of *Earth Observation Tools and Techniques in conditions of Proximity and Persistence*. The **project STOPP**, in fact, is aimed at developing new space technologies for remote sensing of bio-indicators from the stratosphere, capable of providing information relating to the state of health of the environment. Key aspects are *proximity observations* (around 20km altitude) related with space data and persistent observations through systematic revisits of the same area lasting for weeks or months. Specific technologies will also be tested through scaled-up prototypes and/or controlled environments. From a scientific point of view, it develops new knowledge in aerospace and remote sensing sectors joining skills coming from different disciplinary fields such as Environmental Sciences and Plant Biology.

Mr Chairman, Distinguished Delegates,

Climate change represents one of the greatest challenges of humanity, one that requires the efforts of all society to tackle it on a global scale and with all available means, including those provided by the space sector. Italy is committed to contribute to this global effort and will continue to mobilize its forces, its knowledge and competences to work on better solutions coming from its space sector.

Thank you, Mr Chairman