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SPACE-RELATED SOLUTIONS TO FACE INTERNATIONAL SECURITY RISKS

Abstract

In the field of international security, space capacities combined with other sources and instruments, can significantly contribute to manage potential risks with anticipation before they become a threat. The major identified risks to tackle today to the welfare of humanity are strongly linked to climate change with global warming and environmental consequences, directly impacting food, water and natural resources management. When these vital and basic living conditions are not reached, the local populations leave the affected areas to find acceptable standards of living. Then, the migration flows generate human trafficking and other illegal activities, feeding terrorism and hybrid threats. Henceforth, the major issue is to consider to what extent space capacities can allow to stem this vicious circle and relieve human suffering. For this purpose, ESA and its Member States are fully involved to examine technical solutions, possible applications and services to address such security challenges. Thus, it seems necessary to master and optimise each step of the whole chain from sensor to end-user in order to guarantee the indispensable reactivity, but also the availability, integrity and confidentiality if needed of data and resulting services. The various evolving security situations and associated risks require as well to cover large geographic areas with the appropriate persistence/permanence for near real-time, to follow infrastructures, activities including mobile objects with all-weather capacities, in the desert, in the forest or below the soil and the vegetation canopy, in an urban setting or at sea. In technical terms, that means to use the full electromagnetic spectrum (visible optical, multispectral, hyperspectral, thermal infrared, radar multi-bands, Lidar, video). It also means to combine the respective dual-use qualities of satellites, such as constellations of small or nano-satellites, with aerial systems like HAPS or drones, merging the resulting space an aerial data with open sources for instance in order to provide a consolidated intelligence. However, the main effort shall focus on downstream concrete applications to provide the best possible value added from dramatically increasing amount of heterogeneous raw data, resorting to artificial intelligence models, block chain, change detection software, irregular activities indicators, 3D simulations notably. Protection of sensitive or classified information while handling or disseminating them has to be strongly considered too. Furthermore, in-orbit processing and agile ground stations must be developed to speed up the general process. Finally, the following abstract intends to address the question of an overall approach of space developments to face constantly evolving security risks to bring the most pertinent options to manage them.