

From the SPOT family towards the Pléiades concept - the proven and extended EO system

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ABSTRACT

The SPOT program is now 15 year old. SPOT 1 was launched on February 1986 and SPOT 5 will be launched beginning of 2002. During these years SPOT has proven its technical and operational capability to serve the EO users community, in a very wide field of application domains.

Its stereoscopic viewing capacity, worldwide coverage, high image quality and user oriented services have been key elements for its success.

With SPOT 5 a new step will be reached, with a better resolution while keeping the same swath width, and with a new instantaneous stereoscopic capability given by the HRS instrument.

To take advantages of new technological developments which are now available in Europe, in terms of satellites and sensors, and to face increasing competition, especially from US with high resolution satellites, CNES has proposed a new concept: Pléiades to be implemented in the future.

The new technical context is the use of smaller satellites, with better resolution and improved agility. Heavy multi-sensors satellites, such as SPOT 5 or Envisat could now be replaced at lower costs by several lighter satellites, each satellite having only one instrument with eventually several acquisition modes.

The new economical context is from side the competition between commercial image distributors (Spot Image, RSI, Space Imaging, ..) and the development of valuable information services and on the other side the need to satisfy also public requests, either for scientific purposes or for environmental and risk management.

At the strategic level the need to have on one hand military systems (such Helios) and on the other hand civilian systems (such Spot) is not any more so obvious. Dual systems could be envisaged for both types of users, military and civilian.

The mission analysis made by CNES with Spot Image and several user representatives has shown that about ten types of sensors has to be envisaged to fulfill the user's needs. Some of them are not yet mature (P band radar, hyperspectral) and need R&T developments. Others are already or will be available very soon (Wide Field from SPOT 5, C band radar from ERS, Envisat or Radarsat). Among the remaining ones some could be developed in bilateral cooperation, others within the ESA Earth Watch program, and for both cases with a possible public private partnership.

Therefore Pléiades will be developed step by step, with several components. Each component could be developed within a cooperative framework different from the others. The benefit from synergies between of all these components will be taken at the ground segment level to provide more efficient services to the users (request management, programmation, archives, processing and product's delivery)

The first Pléiades components will be the Optical and X band Radar components of the High Resolution Dual System to be developed between France and Italy, as agreed between the two

Countries on the 29th January 2001 summit in Turin. Two optical and four radar satellites will provide metric resolution images with a very high revisit capacity: 24 h for optic, 12h for SAR. This system will provide accurate data to fulfill scientific needs as well as institutional or commercial ones with a special emphasis on security matters in terms of defense and civilian protection.

The definition of other components is also in progress at CNES:

- The Interferometric Cartwheel, which will provide a worldwide metric DEM with 3 passive micro-satellites to be used in cooperation with an active SAR satellite (ALOS, Envisat or others)
- The Wide Field and Superspectral components will provide continuity of the SPOT 5 mission and dedicated products and services for agriculture (precision farming) and environment (GMES).