

DEVELOPPING ACCESS TO EARTH OBSERVATION THROUGH AIRBUS' NEW SATELLITE PARTNER PROGRAMME

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ABSTRACT: The Intelligence Programme Line of Airbus Defence and Space is a global supplier of commercial satellite imagery and recognised as a world leader in geospatial data provision. Based upon proprietary commercial access to optical and radar satellites, Pléiades, SPOT, TerraSAR-X and TanDEM-X, and privileged access to third-party satellites combined with comprehensive applications experience, Airbus Defence and Space delivers a broad products and services portfolio spanning the entire geo-information value chain.

As a pioneer company in the Earth Observation business, Airbus Defence and Space is constantly listening to the evolving needs of its customers. In this aim, in the early 90's its optical imagery offer has been developed adding the SAR systems from ESA in order to ensure the best use of data complementarity. Then FORMOSAT-2 has been added to Airbus Defence and Space's product portfolio to clearly support the applications served by the SPOT satellites by bringing higher spatial resolution, natural colour and daily revisit. This strategy has been later expanded with KOMPSAT-2 and Deimos.

The company works closely with Space Systems, the satellite manufacturing entity of Airbus Defence and Space to support new satellite operators, in setting up operational data distribution service, benefiting from its long experience in serving customers worldwide.

This article presents the evolution of these various successful collaborations with third party satellite operators, which paved the way to the new Satellite Partnership Programme that is gearing up now at Airbus Defence and Space with the recent integration of KazEOSat-1 and KazEOSat-2, and more to come.

1. IT ALL STARTED IN 1986

On February 1986, a unique success story began: Europe's first Earth observation satellite, SPOT 1, lifted off from Kourou on board of an Ariane 1 launcher. It opened the door to three decades of strong support to the development of applications based on Earth Observation data.

SPOT 1, conceived and designed by the French space agency CNES (Centre national d'études spatiales), was equipped with steerable mirrors, enabling it to look to the right and left of its path, unlike other earth observation satellites at that time. Thanks to this first technological revolution, it was able to observe a given site every 5 days with a 10m spatial resolution and accurately measure the elevation of the terrain. Each following satellite in the SPOT family has seen performance improvements. A further milestone was reached with the arrival of SPOT 5 in 2002, offering images with a resolution of 2.5 m and simultaneous stereo pair acquisitions. It paved the way for the commercial use of satellite images, in particular, its ability to offer precise coverage of large areas in record time for this level of precision.

Over the period since then, Airbus Defence and Space, through its Intelligence Programme Line, has developed a leading global strategy for the sales and marketing of quality satellite image products and services in a timely and professional manner, by continuously adapting its offering to the customers' needs. Its extensive sales organisation in addition to the distribution through a network of partners -more than one hundred and eighty partners worldwide- which includes receiving stations have enabled a global penetration at all levels of institutional bodies -both civilian and military- and commercial sectors.

For all these reasons, Airbus Defence and Space has been entrusted for more than twenty years to distribute remote sensing data from many Earth Observation systems such as Envisat, ERS, Radarsat, Deimos, Formosat-2, Kompsat-2, to name just a few. By proposing these sensors, complementary to its own constellation, Airbus Defence and Space has become a One-Stop-Shop company bringing value to its customers, increased temporal frequencies, serving application with imagery in all resolution range or with supplementary spectral bands for instance. This positioning is key on a customer perspective as it allows the company to provide advises and serve applications with the most relevant type of information available.

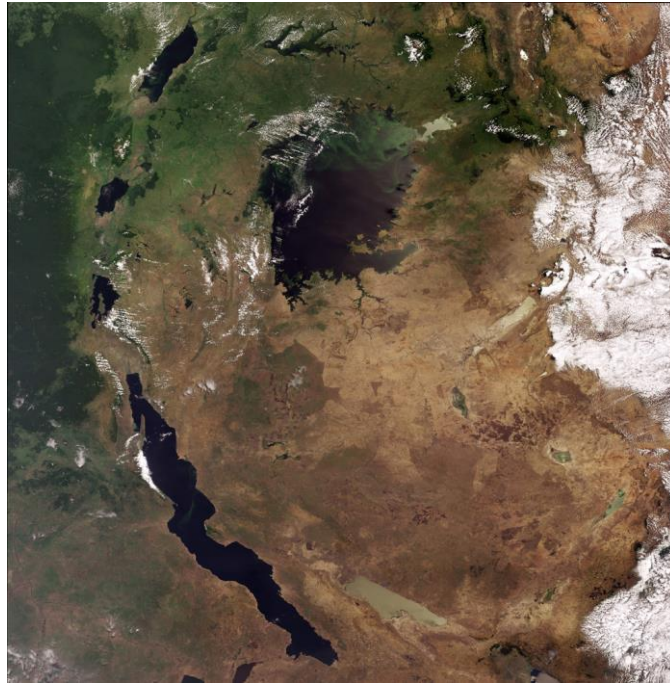


Figure 1: ENVISAT IMAGE, EAST AFRICAN RIFT (©ESA)

2. THE 2000S', SOWING THE SEEDS

The SPOT satellites revolutionized the optical imagery sector, and the company worked on developing new applications, first based on its own sensors, but rapidly saw the gain to combine various types of sources.

This began with the commercial distribution of the ERS-1 SAR data in 1992, which brought a significant experience in the understanding of the geo-information market and how it uses the radar imagery. This knowledge came from the direct contact with customers from a great variety of countries but also from other activities related to the development of the market and applications of SAR imagery. The first years of ERS products commercial distribution were characterised by an important use of ERS data to develop applications using ERS SAR data, and all types of applications were concerned, with a more important use for mapping and interferometric applications. Commercial users then started to use ERS products for operational activities such as oil exploration, and more and more for the mapping in frequently cloudy areas.

In July 2005, FORMOSAT-2, manufactured by Airbus Defence and Space for the Taiwanese Space Organisation (NSPO), has been added to the Intelligence's portfolio right after the satellite has been declared ready for service. Since then, it cleverly supported the applications served by the SPOT satellites bringing higher spatial resolution (2m versus 2.5m for SPOT 5) and natural colours. In addition, thanks to its special orbit, FORMOSAT-2 was the first high resolution system to guarantee a daily access for an intensive monitoring. On an operational point of view, FORMOSAT-2 pioneered the programming of EO satellites in constellation mode; as a matter of fact, the resource of both SPOT 5 and FORMOSAT-2 has been combined in order to cover wide areas in a shorter timeframe, which allowed the production of country wide mosaics with a uniform sampling. In the agricultural domain, where the end-users are keen to receive relevant information whatever the sensor is as raw data are converted into thematic maps, the complementary sensors have then been used to serve customers in the most efficient manner, timely delivering information for decision making.

Another exclusive commercial distribution agreement has been signed with the Korean Aerospace Research institute (KARI) for the KOMPSAT-2 data, again manufactured by Airbus Defence and Space, adding 1m resolution imagery to the products portfolio of the company.

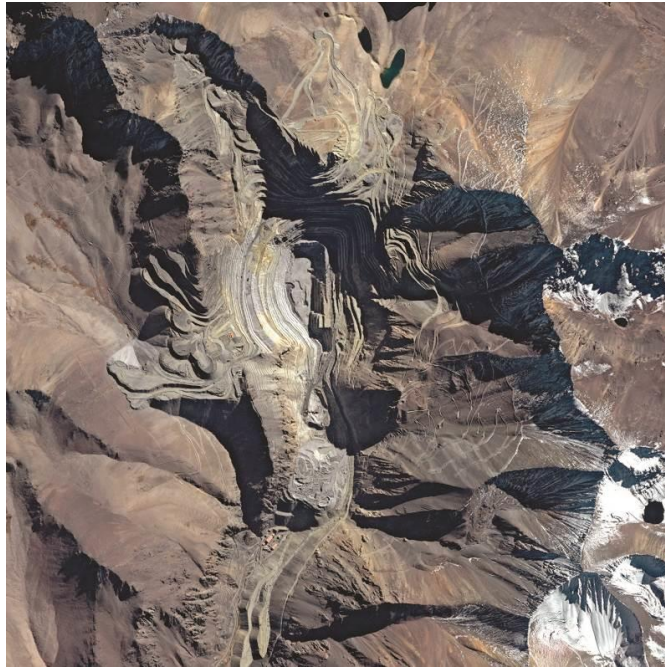


Figure 2: FORMOSAT-2 IMAGE ON LOS PELAMBRES MINE, CHILE (©NSPO 2006)

3. TODAY, THE EXPENSION STAGE

Now fully part of the Airbus Group, the company works closely with Space Systems, the satellite manufacturing element of Airbus Defence and Space to support new satellite operators, in setting up operational data distribution service, benefiting from its long experience in serving customers worldwide.

In 2014, Airbus Defence and Space launched its last bird, SPOT 7, completing the SPOT 6/7 constellation, phased on the same orbit as the two Pléiades. At the same time, a strategic cooperation agreement has been signed with Azercosmos, which consisted in the implementation of Earth Observation service infrastructures in Azerbaijan, including the transfer of ownership of the SPOT 7 (a.k.a. Azersky) satellite to Azercosmos. It also contained the provision of a complete ground system, together with training and capacity-building programs in order to support Azercosmos in the operation and development of Earth Observation data based services as well as value added production. . This partnership is an opportunity for Azercosmos to build up its own experience in operating an Earth Observation system and taking benefit of a strong and experienced partner to develop its commercial footprint in an efficient manner.



Figure 3: LA REUNION ISLAND, FRANCE (SPOT 7/AZERSKY © AIRBUS DS 2014)

The most recent partnership Airbus Defence and Space entered in is with Kazakhstan Gharysh Sapary (KGS) and concerns the distribution of KazEOSat satellites. This collaboration enriches the Airbus DS' portfolio with data from two KazEOSat-2 is a 6.5m resolution optical system with 5 multi-spectral channels, including a red-edge band. This spectral range, between the classical red and near infra-red ones, is characterized by a rapid growth of the vegetation reflectance. It is then particularly suitable for applications related to the monitoring of the growth and status of vegetation. KazEOSat-1 is a very high-resolution images at 1m GSD, which is designed for high quality mono and stereoscopic monitoring over challenging areas. It is an ideal tool for topographic mapping, up to 1:15,000, offering rapid collection and delivery of tricky targets, may it be for defence or oil and gas purposes.



Figure 4: KAZEOSAT-1 ON VENICE, ITALY (©2014 KGS, DISTRIBUTION AIRBUS DS)

4. NEW PERSPECTIVES

Increasingly solutions will be offered based upon an increasingly sophisticated and fast-moving ecosystem of sensors. In the decade to come, many new Earth Observation satellites are going to be launched, more than twice compared to the previous decade, following the important growth of end-users needs.

In this context the Airbus Defence and Space Satellite Partner Programme takes on its full meaning toward the benefit of the users. As the most experienced company in the commercial operation of the Earth Observation systems, Airbus Defence and Space is playing a key role leveraging strong partnerships with new satellite operators, sharing experience and know-how, building capacity in order to fulfil expectations of the users.