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MEDIA INFORMATION

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Leonardo: technologies for Earth observation

Leonardo has been active in the Earth observation sector for over 30 years. Satellites help monitor the planet and its health, night and day, to ensure accurate weather forecasts, monitor natural phenomena, defend the environment, and assure security. Leonardo deploys its technology to construct satellites and sensors, set up control centres, develop services and applications. Through the Airborne&Space Systems division and the joint ventures with Thales, Telespazio and Thales Alenia Space, Leonardo takes centre stage in the most important international space missions, working every day to develop cutting edge solutions that help improve the lives of all of us.

COPERNICUS

Leonardo performs a primary role in the European Copernicus programme, serving as an essential partner in the development of systems as well as in the various satellite applications of the programme. Copernicus is, to date, the most ambitious project ever carried out in the field of Earth observation and monitoring, supplying accurate, timely and easily accessible information to improve environment management, understand and mitigate the effects of climate change and to assure civilian safety, also through emergency management. Copernicus is led by the European Commission in partnership with the European Space Agency (ESA) and the European Environment Agency (AEA). ESA is developing 6 new families of optical and radar satellites, called Sentinels, specifically for the operational needs of the programme. Copernicus also makes use of data from over 30 international missions, including Italian COSMO-SkyMed.

Thales Alenia Space is responsible, as prime contractor, for the design, development, integration and final testing of the constellations for the Sentinel-1 and Sentinel-3 missions. The attitude sensors and power units made by Leonardo are installed on Sentinel-1 satellites, while Sentinel-3 is equipped with the SLSTR radiometers – able to measure the temperature of land and oceans from an altitude of 800 km with high accuracy – and with photovoltaic assemblies, which are also on-board Sentinel-5P. Telespazio is one of the main industrial partners of the Copernicus programme: the company contributes to the development of the ground segment and operations. Through its subsidiary e-GEOS (a company of Telespazio and Italian Space Agency) it makes available the data of the COSMO-SkyMed satellites and provides geospatial services and applications for Earth monitoring, emergency operations and maritime security. Data acquired by Sentinel-1 and Sentinel-2 satellites are received for Italy by the e-GEOS Matera Space Centre – one of the three stations of Copernicus' Core Ground Segment. e-GEOS supplies European Commission with geospatial information and satellite maps of the areas struck by emergencies, making the data required for managing catastrophic events available to the civil protection services and competent authorities of the Union's countries, as well as to international humanitarian Organisations.

COSMO-SkyMed

COSMO-SkyMed, financed by the Italian space agency, Ministry of Defense and Ministry of Education, University and Research, is the first dual-use Earth observation system. Its four satellites monitor the entire Earth from space, day and night, under any weather conditions, using high-resolution X-band radars.

Leonardo plays a primary role in the COSMO-SkyMed programme, by constructing the satellites (through Thales Alenia Space) and the on-board sensors as well as in control activities (operated from

Telespazio's Fucino Space Centre). Telespazio built the entire ground segment and managed and the putting into orbit of the satellites. The acquisition, processing and distribution of satellite data for civilian use are managed by e-GEOS, which also markets COSMO-SkyMed data worldwide. COSMO-SkyMed Second Generation system will guarantee starting from 2018 a quantum leap in terms of technology, performance and service life. Thales Alenia Space Italy is responsible for the overall COSMO-SkyMed Second Generation program, including construction of the two satellites, while Telespazio is responsible for designing and developing the ground segment and providing the integrated logistics and operations services. Leonardo also contributes to the program by supplying attitude sensors and state of the art equipment that will process and distribute electric power throughout the satellites.

Meteosat Third Generation

Meteosat Third Generation (MTG) stems from a partnership between ESA and EUMETSAT with ASI's contribution and is the third generation European meteorological satellite system which will ensure a significant improvement in the performance of the current Meteosat constellations, both in the field of weather forecasts and in environmental monitoring applications. The constellation will be equipped with advanced technologies to collect high quality images and will carry instrumentation able to process a map of lightning strikes and to issue early warnings in the event of major showers and thunderstorms.

Leonardo supplies the satellites – for which Thales Alenia Space is the prime contractor - with the photovoltaic assemblies and attitude sensors, as well as being responsible for the design, development and construction of the Lightning Imager. The four Lightning Imagers used in the programme will simultaneously observe Europe, Africa and parts of South America from up high, day and night, to detect electrostatic discharges that take place in the clouds or between the clouds and the ground, contributing to a number of meteorological applications, as well as to atmosphere studies. A fundamental role is also played by Telespazio, which is to support EUMETSAT in launching and placing into orbit the satellites and is set to develop receiving stations, telemetry and control stations. Telespazio's Centro Spaziale del Fucino will be responsible for the preparation and execution of the satellites' flight operations, for the development of the LEOP control centre, for the flight dynamics software and for the preparation, validation and operative coordination of six S-band ground stations.

FLEX

Part of the ESA's 'Earth Explorer' Programme, From 2022 the FLEX mission will study the health of Earth's vegetation from a satellite, gathering data that will have implications for Earth's ecosystems and the maintenance of life on our planet.

Leonardo is responsible for designing, manufacturing and qualifying the FLEX spectrometer which will, from a height of 800km, collect the light emitted by plants and break it down into its constituent colours. The sensor can then identify the faint reddish glow emitted during photosynthesis, normally invisible to the naked eye, and precisely identify the "fluorescence" of vegetation, allowing researchers to measure the health of Earth's ecosystem.