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The European Space Agency's infastructure for observing the terrestrial biosphere

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Our understanding of many biogeochemical processes strongly depends on the availability of long-term, large scale observation systems. In recent years satellite remote sensing has proven invaluable tool for providing a wide range of observations on a global scale. This presentation will present the most recent status of the satellite infrastructure of the European Space Agency (ESA) and its future development. We will review ESA's Sentinel satellite system, a family of operational satellites, and the Earth Explorer system, dedicated research satellites.

ESA currently develops five new Sentinel missions specifically for the operational needs of the Global Monitoring for Environment and Security programme. The Sentinels are based on a constellation of two satellites to fulfill revisit and coverage requirements, providing robust datasets for a wide range of applications. The Sentinels will be launched from 2013 onwards. These missions carry a range of technologies, such as radar and multi-spectral imaging instruments for land, ocean and atmospheric monitoring. Out of the five Sentinel missions Sentinel 1,2 and 3 carry instruments that will provide operational observation streams for terrestrial applications
• Sentinel-1 is a polar-orbiting, all-weather, day-and-night radar imaging mission. Among others it will provide information about land-cover, biomass, soil moisture and water bodies. The first Sentinel-1 satellite is planned for launch in 2013.
• Sentinel-2 is a polar-orbiting, multispectral high-resolution imaging mission for land monitoring providing, for example, imagery of vegetation, soil and water cover and coastal areas. The first Sentinel-2 satellite is planned for launch in 2014.
• Sentinel-3 is polar-orbiting, multi-instrument mission to measure variables such as land colour with high-end accuracy and reliability. The first Sentinel-3 satellite is planned for launch in 2014.

Beside the operational Sentinel system ESA currently assesses the feasibility of novel instrument concepts within its Earth Explorer Programme. Two candidate missions are dedicated to provide novel information about the terrestrial Earth surface.
• Biomass is a polar-orbiting, all-weather, day-and-night radar imaging mission designed to measure biomass of the global forests and its change with time.
• Fluorescence Explorer (FLEX) is a polar-orbiting, spectral imaging mission. FLEX aims to provide global maps of vegetation fluorescence, which can be converted into an indicator of photosynthetic activity.
This talk will inform the community about the observation capability and data policy of these missions. Further examples of data products will be presented and their characteristics will be discussed.