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EARTH OBSERVATION SYMPOSIUM (B1)
Future Earth Observation Systems (2)

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CARBONSAT - CANDIDATE FOR ESA EARTH EXPLORER 8 MISSION

Abstract

In response to the Call for Proposals regarding the Earth Explorer 8 Mission of ESA released in October 2009, CarbonSat was proposed and finally accepted by ESA for Phase A/B1 definition study. CarbonSat has been approved by ESA's Earth Observation Programme Board on 24 November 2010.

CarbonSat is proposed to observe Carbon dioxide (CO2) and methane (CH4), which are the most important manmade greenhouse gases (GHGs) and are driving global climate change.

CarbonSat results from the trade-off among resolution and swath width during CarbonSat mission definition studies. The proposed solution is a satellite design, which is able to provide global, CO2 and CH4 measurements with high spatial resolution 2 2 km. Key payload is an imaging Spectrometer for 500 km swath continuous nadir observations and sun-glint tracking, which covers the relevant absorption bands of CO2, CH4 and O2. The unique measurement capability significantly increases the number of cloud free measurements and will allow the "imaging" of strong local emission sources.

The data achieved with CarbonSat in combination with inverse modelling techniques will be able to provide information in a wide range of applications, such as: CO2 and CH4 regional flux updates, CO2 and CH4 emission monitoring of hot spots e.g. power plants and natural sources like volcanoes, CH4 emission monitoring of hot spots e.g. pipelines, oil/gas fields and geological CH4 sources. The proposed approach will allow a better discrimination between natural and man-made fluxes to improve the understanding of the impacts of GHG emission on the climate change.

The paper will present the CarbonSat satellite bus, instrument design and the proposed products to improve the knowledge about the distribution and strength of CO2 and CH4 sources and sinks.