

## **Status of The Future JAXA Earth Observation Missions**

This document reports on the status of ALOS, GOSAT and GPM.

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### **1. Introduction**

Japan Aerospace Exploration Agency (JAXA) is currently running or planning a number of earth observation programs. Advanced Land Observing Satellite (ALOS) is scheduled to be launched in the Japanese fiscal year 2004. Greenhouse Gases Observing Satellite (GOSAT) is currently under phase B and scheduled to be launched in the Japanese fiscal year 2007. Global Precipitation Measurement (GPM) is currently under phase B and scheduled to be launched in the Japanese fiscal year 2007.

### **2. ALOS (Advanced Land Observing Satellite)**

ALOS has been developed to contribute to the fields of mapping, precise land coverage observation, disaster monitoring, and resource surveying. It enhances land observation technologies acquired through the development and operation of its predecessors, the Japanese Earth Resource Satellite-1 (JERS-1, or Fuyo) and the Advanced Earth Observing Satellite (ADEOS, or Midori).

ALOS has three sensors: the Panchromatic Remote-sensing Instrument for Stereo Mapping (PRISM), which is comprised of three sets of optical systems to measure precise land elevation; the Advanced Visible and Near Infrared Radiometer type 2 (AVNIR-2), which observes what covers land surfaces; and the Phased Array type L-band Synthetic Aperture Radar (PALSAR), which enables day-and-night and all-weather observation.

ALOS's remote-sensing equipment enables precise land coverage observation and can collect enough data by itself for mapping on a scale of 25,000 to 1. It is expected to play an important role in cartography by providing maps of Japan and other countries, including those in the Asia-Pacific region, which is one of ALOS's main objectives. Other objectives include regional observation for harmonization between the environment and development on Earth, domestic and overseas disaster monitoring and resource surveys, and technological development for future Earth-observing projects. Its contributions to the mitigation of environmental destruction and natural disasters will make it an essential satellite for our future. It is scheduled to be launched in the Japanese fiscal year 2004.

### **3. GOSAT (Greenhouse Gases Observing Satellite )**

GOSAT is a satellite monitoring the distribution of the density of carbon dioxide, which is one Greenhouse gas. GOSAT project has been jointly developed by JAXA and Japan's

Ministry of the Environment. JAXA is responsible for the development of the satellite itself and an observing sensor, while the Ministry is mainly in charge of the utilization of the data obtained.

So far, the number of ground-based carbon dioxide observation points has been limited, and they have been distributed unequally throughout the world. GOSAT will enable the precise monitoring of the density of carbon dioxide by combining global observation data sent from space with data obtained on land, and with simulation models.

In addition, observation of methane, another Greenhouse gas, has been considered.

GOSAT is currently under phase B and scheduled to be launched in the Japanese fiscal year 2007.

#### **4. GPM (Global Precipitation Measurement)**

GPM is a follow-on and expanded mission of the current on-going TRMM. GPM is one of the earth observation satellite programs, mainly initiated by JAXA, the Communications Research Laboratory (CRL) and NASA. GPM is, like TRMM, composed of one sun non-synchronous orbit satellite (a core satellite)-borne a precipitation radar and a microwave scanning radiometer, and more than one sun synchronous orbit satellite-borne a microwave scanning radiometer (constellation of sub-satellites).

The core satellite is expected to be able to measure detailed precipitation activities, using both of the dual frequency precipitation radar and the microwave scanning radiometer. The data acquired by such measurement will permit of sophisticating the presumed algorithm of quantitative rain measurement in the microwave scanning radiometer. The sub-satellite will conduct the precipitation measurement of the microwave scanning radiometer and the measurement will become more reliable by utilizing the presumed algorithm.

The sub-satellite constellation will be launched by NASA, ESA and other space organizations in the world. The number of satellites will be around eight. It is possible to get a global rainfall distribution in every 3 hours when the microwave scanning radiometers aboard these 8 polar orbit satellites collect and process the data. GPM plans real-time transmission of the global rainfall distribution data. This real-time data can be utilized not only for scientific research, but for social fields, including weather forecast, flood prediction, water resource management.

GPM is currently under phase B and scheduled to be launched in the Japanese fiscal year 2007.

## 5. References

Further information about the various JAXA earth observation missions can be found on the following URLs which offers the possibility to download many supporting relevant documentation:

[http://www.jaxa.jp/missions/projects/sat/eos/alos/index\\_e.html](http://www.jaxa.jp/missions/projects/sat/eos/alos/index_e.html)

[http://www.jaxa.jp/missions/projects/sat/eos/gosat/index\\_e.html](http://www.jaxa.jp/missions/projects/sat/eos/gosat/index_e.html)

[http://www.eorc.jaxa.jp/GPM/index\\_e.htm](http://www.eorc.jaxa.jp/GPM/index_e.htm)