



## **The results of the critical design of the mission instruments of GOSAT-2**

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The GOSAT-2 is the successor satellite to the GOSAT which is the satellite dedicated to the measurements of the greenhouse gases such as carbon dioxide and methane. GOSAT was launched in January of 2009 and has been operated for about seven years.

The development of the GOSAT-2 has been continued for two years, and through the preliminary and critical design phase the detail of the design of the mission instruments were fixed as well as the bus system design. The mission instruments of the GOSAT-2 are TANSO-FTS-2 and TANSO-CAI-2. TANSO-FTS-2 is the Fourier Transform Spectrometer observing greenhouse gases such as Carbon Dioxide and Methane and TANSO-CAI-2 is the imager observing the aerosols and clouds to compensate the TANSO-FTS-2 data and to grasp the movements of the aerosols such as PM<sub>2.5</sub>.

The mission instruments will adopt the same kinds of instruments as GOSAT. But some improvements will be carried.

Based on the results of the preliminary design, the design had been refined in the critical design phase and the results of the design meets all of the requirements on the mission instruments derived from the mission requirements to understand CO<sub>2</sub> and CH<sub>4</sub> sources and sinks and carbon cycle precisely.

To improve the measurement accuracy, the signal to noise ratio will be increased by the extension of the aperture size from 64mm to 73mm and cooling the after optics as well as the thermal detectors. And to increase the number of the useful data, GOSAT-2 will equip the function to avoid the clouds during the observation using the images obtained by the monitor camera in FTS.

To observe the carbon monoxide, the 2.3 $\mu$ m observation channel will be added. This function will be realized by the extension of the 2.0 $\mu$ m observation band to 2.3 $\mu$ m.

The pointing angle in the along track direction will be extend from 20 degrees of GOSAT to 40 degrees to expand the observation area over the ocean where the sun glint is observed. This will make it possible to increase the number of the observation points over the ocean and contribute to the global observation including the ocean.

The data of the TANSO-CAI on GOSAT has been used to eliminate the data contaminated by the clouds and compensate TANSO-FTS data for the influences of the aerosols. But the performance of the TANSO-CAI-2 on GOSAT-2 will be improved to enforce the aerosols observation ability to detect the PM<sub>2.5</sub> by the increasing the observation bands number including the around 340nm wavelength.

The manufacturing of the flight model was started based on the critical design.

In this presentation, the results of the critical design of the mission instruments of GOSAT-2 will be presented.