GCOM-W AND GCOM-C PROJECT STATUS

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1. INTRODUCTION

JAXA initiated GCOM (Global Change Observation Mission) to monitor the global earth surface and contribute to the research of the climate change and operational usage. By using the satellite observation data in the climate system model, it is expected that the prediction accuracy of the climate change will be improved. This information will be useful for making a policy against the climate change.

2. OVERVIEW OF GCOM

GCOM contains of 2 kinds of satellites, GCOM-W series satellites and GCOM-C series satellites. The W of GCOM-W stands for "water" and GCOM-W will contribute to the observation related to the global water and energy circulations, which installs AMSR2 (Advanced Microwave Radiometer 2). On the other hand the C of GCOM-C stands for "climate" and GCOM-C will contribute to the surface and atmospheric measurements related to the carbon cycle and radiation budget, which installs SGLI (Second Generation Global Imager).

Table 1. The characteristics of GCOM-W1 and GCOM-C1

	GCOM-W1	GCOM-C1
Orbit	Sun synchronous orbit (A-Train orbit) Altitude：699.6km（on Equator） Inclination：98.2° Local sun time：13:30±15min	Sun synchronous orbit Altitude：798km（on Equator） Inclination：98.6° Local sun time：10:30±15 min
Life	5 years	5 years
Launch	JFY 2011 by H-IIA Rocket	JFY 2014 by H-IIA Rocket
Satellite scale	5.1m（X）×17.5m（Y）×3.4m（Z）（on-orbit）	4.6m（X）×16.3m（Y）×2.8m（Z）（on orbit）
Satellite mass	1991kg	2020kg
Power generation	More than 3880W（EOL）	More than 4250W（EOL）

GCOM is long-term mission to require observation for more than 10 years. For this purpose it is planned that three consecutive generations of satellites of 5 year design life enables over 13 year observation in total, taking account of one year overlap in orbit. [1]

3. GCOM-W1

3.1. Satellite system

GCOM-W1 is the first generation of GCOM-W series satellites. The characteristics of GCOM-W1 system are shown in Table 1. The satellite has been developed since 2007. AMSR2 CDR was finished in January, 2009 and flight model has been manufactured. The AMSR2 integration has been performed and the environmental test will be performed in summer, 2010. The system CDR finished in December 2009. Now the flight models of bus components are under the electrical and environmental tests. The system test of the GCOM-W1 flight model will be performed from autumn, 2010. GCOM-W1 is planned to be launched in JFY (Japanese Fiscal Year) 2011. Figure 1 shows the configuration of GCOM-W1 in orbit. [2]

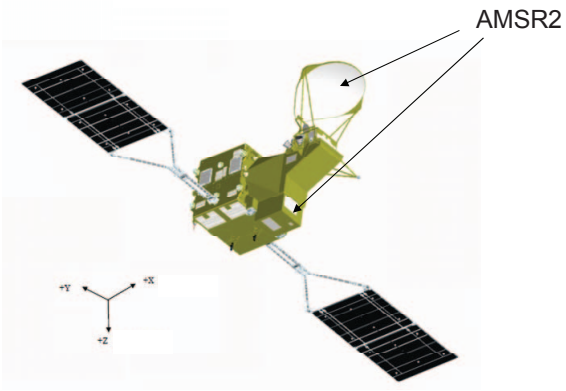

Figure 1. In-orbit configuration of GCOM-W1

3.2. AMSR2

AMSR2 is the follow-on instrument of AMSR-E installed on AQUA. AMSR2 has receivers of 6 channels, from 6.9 GHz to 89 GHz. These are basically same as AMSR-E, but 7.3 GHz channel was newly added to mitigate the RF interference. The diameter of the main reflector becomes larger to about 2 m. The thermal control of the hot load has been improved and then its surface temperature will be much more stable than AMSR-E. [3]

4. GCOM-C1

4.1. Satellite system

GCOM-C1 is also the first generation of GCOM-C series satellites, whose characteristics are shown in Table 1. The design of bus system is common between GCOM-W1 and GCOM-C1. The development has started in 2009 and the designs of engineering models of SGLI and some bus components have been performed. GCOM-C1 is planned to be launch in JFY 2014.

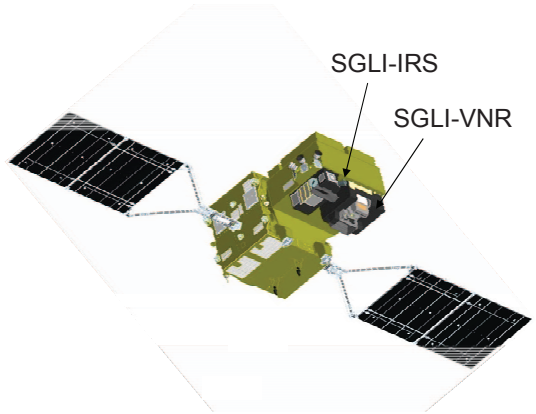

Figure 2. In-orbit configuration of GCOM-C1

4.2. SGLI

GCOM-C1 installs SGLI, which consists of VNR (Visible and Near-Infrared Radiometer) and IRS (Infrared Scanner). The VNR has 11 channels of non-polarized observation and 2 channels of polarized observation, from 380 nm to 870 nm wave length. The IRS has 4 shortwave infrared channels (from 1.05 to 2.21 micro meters wave length) and 2 thermal infrared channels (10.8 and 12 micro meters wave length). The swath of the VNR is 1150 km cross track and that of the IRS is 1400 km.

5. DATA ACQUISITION AND DESTRIBUTION

The global observation data are received at Svalbard station in Norway once per orbit. Therefore the data latency of near real-time level 1 products will be achieved in 2.5 hours after the observation time in case of GCOM-W1. GCOM-W1 and GCOM-C1 have capability of direct readout that their real-time observation data can be downlinked to the ground stations.

6. INTERNATIONAL COOPERATION

GCOM-W1 will join the A-Train constellation. The position of the orbit is a few minutes prior to AQUA. JAXA is discussing with NOAA to make cooperation in data exchange, Calibration and validation, and data reception support. Both agencies and JPL have performed the feasibility study that the Dual-Frequency Scatterometer provided by NOAA/JPL will be installed on GCOM-W2 together with AMSR3.

7. CONCLUSION

The development of GCOM-W1 and GCOM-C1 is performed as planned. The study for GCOM-W2 is already started. GCOM has been going ahead steadily as a long term observation mission.

8. REHERENCES

[1] K. Imaoka, M. Kachi, H. Fujii, H. Murakami, M. Hori, A. Ono, T. Igarashi, K. Nakagawa, T. Oki, Y. Honda, and H. Shimoda, ”Global Change Observation Mission (GCOM) for monitoring carbon, water cycles, and climate change,” *Proceedings of the IEEE*, in press.

[2] M. Kachi, K. Imaoka, H. Fujii, A. Shibata, M. Kasahara, Y. Iida, N. Ito, K. Nakagawa, and H. Shimoda, ”Status of GCOM-W1/AMSR2 development and science activities,” *in Proc. SPIE Europe Remote Sensing*, 2008.

[3] M. Kachi, K. Imaoka, H. Fujii, M. Kasahara, N. Ito, K. Nakagawa, T. Oki, and H. Shimoda, ”Long-term observations of water and climate by AMSR-E and GCOM-W,” *in Proc. SPIE Europe Remote Sensing*, 2009.