The FORMOSAT-2, formerly called ROCSAT-2, is the second satellite of Taiwan. It is a small satellite of 746 kg mass designed for two remote sensing missions: earth observation and imaging of upward lightning (red sprite). FORMOSAT-2 had been launch from Vandenberg, California on May 20, 2004. Fourteen days after launch, the satellite had been propelled from 723 km parking orbit to 891 km mission orbit, with functional checkout completed. In this paper, the earth observation results from June 2004 to February 2005 shall be presented.

There are two payloads on the satellite. The primary payload is an advanced remote sensing instrument (RSI) with the characteristics of high performance, low mass and simplicity in design. Some major capabilities of RSI are 2 m in ground sampling distance (GSD) for panchromatic and 8 m GSD for multi-spectral, 24 km in swath, and 8% of duty cycle. The first image as shown in Figure 1 was received on June 4, 2004. It is an image of the oceanic area outside Hsinchu County. Up to now, many images have been taken and used in typhoon disaster evaluation, pollution monitoring, etc. Figure 2 shows the flood of Shueili area of Taiwan after Minduli Typhoon. The tsunami induced by the strong earthquake occurred in the South Asia region on Dec. 25, 2004 had caused very serious disaster. FORMOSAT-2 observed that area continuously for almost 1 month. An image is shown in Figure 3 as an example. NSPO provided free images to many institutes in many countries for search and rescue applications. Figure 4 shows the areas observed by FORMOSAT-2, including Indonesia, Thailand, Sri Lanka, Maldives, and India. Its daily repetitive capability of FORMOSAT-2 provides excellent information for day-to-day change investigation which can not be obtained from other satellites.

The secondary payload of FORMOSAT-2 is an imager of sprite, the upper atmospheric lightning (ISUAL). There is a kind of natural phenomenon with the lightning discharge goes upward from thundercloud to ionosphere. We usually call it red sprite. Other phenomena such as airglow, elves, blue jet, aurora, gravity wave, etc. are to be observed, too. The first image of sprite as shown in Figure 5 was captured on July 4, 2004. Many events with distribution shown in Figure 6 have been observed.

The mission life of FORMOSAT-2 is 5 years and the design life is 7 years. A year-by-year performance report shall be issued in the future.
Figure 1 First image taken by FORMOSAT-2.

Figure 2 Flood of Shueili area after Mindouli Typhoon.
Figure 3 Tsunami disaster after South Asia earthquake.

Figure 4 Observing areas of FORMOSAT-2 over South Asia Tsunami.
Figure 5 First sprite event captured by ISUAL.

The first Sprite image recorded on 22:40:24, 4 July, 2004 (Taiwan time) over Philippines.

Figure 6 Distribution of events observed by ISUAL.