Space Japan Milestone

From Russia with ROCKOT

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ROCKOT during transportation

--Prologue

On 30th October 2003 at 16:43 local time, ROCKOT launch vehicle soared into the sky from Plesetsk with “roaring sound” like its name in Russian lauguage.

It has been 3 years and 5 months since our staff has visited this Plesetsk Cosmodrome for the first time for the preliminary survey as the potential launch service provider for USEF’s SERVIS-1 satellite.

--ROCKOT launch vehicle

Rockot launch vehicle utilizes SS-19 inter-continental ballistic missile, a relic of cold war era, as its first and second stage, together with newly developed third stage engine for satellite injection into the orbit. It is manufactured by Khrunichev State Research and Production Center in Moscow. This company also produces large PROTON launch vehicle as well

as MIR space station.

Launch service of Rockot is conducted by Eurockot GmbH, a joint venture between EADS with 51% share, and Khurunichev with 49% share. Therefore, our contract counterpart is Eurockot, a German enterprise. However, for the detailed technical interface, we have to deal with Russian engineers directly. Very few Russian engineer speak English, therefore all discussion was done with interpreters both ways. The Russian engineers are no doubt very capable, but much more “serious” “steady” and “conservative” than our friends in Germany. Therefore, at the beginning of the program, both parties had been puzzled for one reason or another, but as the time passed we became get used to each other. Moreover, it has been confirmed that the similarity of “Space Community Tribe” far exceeds the difference of culture or political system.

Fairing installation on SERVIS

--Plesetsk Cosmodrome

Plesetsk is located at 63 degrees north latitude and 40 degreed east longitude, and almost close to the Arctic region. It has been the launch site for ICBM aiming the western countries with numerous launch complexes in the 50km by 50km vast area. Detail is not disclosed and this place is known as “one of the most secret place on earth”. One of the launch complexes is used for commercial satellite launch and the facility is modified by German technology. About 3km from this launch pad, a building called MIK is

located which is for the assembly and preparation of satellite as well as upper stage and fairing assembly.
Before our contract, radio frequency link between MIK and launch tower did not exist. Since our satellite will use RF link for the final checkout after the satellite is mounted on top of launch vehicle, we asked them to install antenna and related equipments on the roof of MIK and launch tower, as well as radio transparent window on the side of rocket fairing. This newly installed facility turned out to work quite well.

--October 29, 2003
Day of launch, October 29 has finally came after about 6 weeks of launch campaign. Plesetsk is located about 800km north of Moscow. Since there is only limited hotel accommodation there, those people who go to watch the launch have to stay in Moscow and commute by the chartered jet.
As we were waiting for the bus to go to the domestic airport, there was a ring from Tokyo, saying that a very strong magnetic storm has appeared on the surface of the sun and it may affect the electronic devices on orbit, and that they are discussing the possibility of postponing the launch!
Since we have no choice, we took bus to the airport anyway and waited for their technical discussion. Finally the decision to "GO" was announced and we stepped into chartered jet of YAK-40.

SERVIS launch crew

After about 2 hours of flight, the plane landed in Plesetsk and we

immediately headed to MIK where we are supposed to watch the launch.
Since this is a military facility, many soldiers on Russian Space Force are guarding the area and we were strictly prohibited to take photos through the window.
Rockot launch vehicle can be launched under very severe weather condition since it is the ICBM. It could be launched whether it is raining, snowing or no visibility provided that the outside temperature is above minus 55 degrees C! However, the wind velocity should not exceed 45 meters per second at 15km altitude.
As we have been waiting for the launch and only 30 minutes before the time, the launch was suddenly stopped and postponed by the Russian Force because the wind velocity was 70 meters per second. Of course we had to accept the decision and we stepped on the bus with disappointment and headed to the airport.
At the runway of the airport, as we get off the bus, there was a big surprise waiting for us. That is the unbelievably vast amount of Aurora which covers almost the entire sky of this Arctic city. We were so lucky that we were at this area on the day of very strong magnetic storm. Everybody has cheered up again and it implied successful launch for next day.

--October 30, 2003
On 30th of October, it was beautiful weather in Moscow and we flew to Plesetsk again. Unfortunately, low cloud covered the area. As we visited MIK again, the atmosphere of launch team was different from that of yesterday. It may be because the wind velocity is lower than yesterday, not to mention that Defence Minister Ivanov is not at the site today.
At 20 minutes before launch time, we moved to the observation deck on the upper floor of MIK, and everybody was handed with gas mask in case of accident, as Rockot used highly toxic dimethyl hydrazine as fuel and nitrogen tetraoxyde as oxdyzer.
All the announcement and countdown is done in Russian and we listen to the translator's voice.
At minus 10 minutes, the service tower has moved and finally the Rockt launch vehicle appeared.
As its figure is going to melt into the darkness of Northern Russian evening, sudden blast with bright red flame came and the launch vehicle lifted off.
It climbed rather fast, compared with larger launch vehicle like H-2A, and

as it disappeared into the cloud, we could only hear the remaining sound.
It is 1 hours and 36 minutes until the spacecraft separation after lift off. It is so long since the aiming orbit height is 1000km altitude.
During this time, we took bus again and headed to Mission Control Center (MCC) near the airport to confirm the successful spacecraft injection into the orbit.
At MCC, we can confirm the flight status by large display screen.
At planned time, we confirmed the spacecraft separation. One minutes later, JAXA's Kiruna ground station in Sweden received the signal from the spacecraft and moments later, solar paddle deployment was also confirmed.
Actual orbit height was 997km (1000km planned) and inclination was 99.52degrees (99.5 degrees planned).

--Epilogue
Thus the launch of SERVIS-1 by Rockot was 100% success. During the course of preparation for the last several years, we encountered many difficulties but the complete success pays everything.
For almost all Russian engineers, their visit to Japan for technical discussion during this period was their first experience. All of them seemed to be very nervous and with high tension at the beginning, but as we continue discussion for several days and with drinking and talking after work, they gradually start to melt, and smile start to appear upon their expression. It has been our great joy that each time as they leave Japan, they leave with great comfort and in favor of Japan.
Now that the program finished with great success, we believe that we could contribute for the promotion of Russian-Japanese cultural and economical cooperation.