

Baikonur-International Space Station : International Approach to Lunar Exploration

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On 20th November 1998 our aircraft made soft landing at the Baikonur airport. I was among onboard passengers - officials from Kazakhstan Space, press and diplomats. We all were invited to attend the launch of the International Space Station (ISS) first component (the Russian-made Zarya or Functional Cargo Module FGB) by Proton launch-vehicle at the Baikonur spaceport.

Two hours before ISS first module launch we joined the official delegations from NASA, Russian Space Agency (RSA), ESA, Canadian Space Agency (CSA) and NASDA to see the modified facilities of both "Energiya" Corp. and Khrunichev's Proton assembly-and-test building. Mr. Yuri Koptev, Chief of RSA and Mr. Dan Goldin, NASA Administrator actively were drinking russian tea and talking about crucial issues of the International Space Station and the future of Space Exploration.

In fact, Cold War is over and the world's top space powers accomplishments are stunning:

- *The first human flight in space in 1961;*
- *Human space flight initiatives to ascertain if and how long a human could survive in space;*
- *Project Gemini (flights during 1965-1966) to practice space operations, especially rendezvous and docking of spacecraft and extravehicular activity;*
- *Project Apollo (flights during 1968-1972) to explore the Moon;*
- *Space Shuttle's flights (1981 - present);*
- *Satellite programs;*
- *A permanently occupied space station "Mir" (during 1976-1999);*
- *A permanently occupied International Space Station presently underway.*

We and a few people approached them to learn much more particulars of their talking and to ask them most interesting questions.

The past history of the lunar exploration was tightly connected to the Cold War period.

The space age gained its start in a period of intense technical and social competition between east and west, represented by the Soviet Union and the United States. Competition resulted in the Soviet Union being the first to launch a satellite into Earth orbit, and served as a challenge and reminder to the United States that technological supremacy was not solely the province of the United States. The start of the Apollo programs a political decision based more on the perception of the political and technological rewards to be gained by attacking a truly difficult objective in a constrained

time period. The space race began, the United States won it, and a few years later, the Soviet Union collapsed.

In contrast to the successful American lunar program, the Soviet effort never reached the Moon. Soviet effort to send a Soviet cosmonaut to the Moon in the 1960s was failed. By 1964 the N-1 rocket program was in trouble. To reach the Moon, the rocket was built with thirty main engines. Getting them all to work proved more than Soviet engineers could achieve and the program was cancelled.

Fortunately, the Russians did not view the Apollo success as a reason to terminate their program, and they continued to develop capabilities in many areas. Also, during the post-Apollo time frame, space capability grew in Europe, with the formation of the European Space Agency, in Japan, China, and other countries.

Mr. Daniel Goldin was asked about ISS's contribution to the future of lunar exploration. He said that much more probably that we can get the capability to drop advanced spacecraft into the lunar gravity well and climb back out. In a lunar application, the spacecraft would shuttle from the International Space Station in Earth orbit to lunar orbit and would carry a heavy payload.

The next one question about a reasons to go back to the Moon was addressed to Mr. Koptev and he covered it as follows - there are many reasons to go back to the Moon, among the most important being to learn more about the history of the Earth/Moon system. By exploring the cratering record on the Moon, we can determine the frequency and size-distribution of asteroid impacts on the early Earth. Age-dating of lunar soil and rock layers will teach us about the history of the Sun and its future evolution...

After high tea we had one hour before launch and all guests were invited to look at the facilities of Baikonur spaceport. The weather was windy and cold. Mr. Antonio Rodotta, Chief of ESA was hatted in russian winter style, and Mr Daniel Goldin was in very elegant european black coat and he was looked like Russian bourgeois in early 20th . Both of them visited Baikonur at first time...

As the launch time approached more and more, two buses with foreign guests arrived to the viewing site. Russian tea-samovar (self-boiler) served with sweet rolls and cabbage - pie was prepared especially for people arrived. No one launch was prepared like this one.

Cameras started whirring. When countdown clock ticked away, all people has became highly concentrated. Nobody wanted to talk with anyone and everyone's eyes were fixed on the Proton to pick up any nuances from command point.

T minus 10 - 9 - 8...-2-1 - Liftoff of the ISS's first component. It was great moment. The launch went perfectly! Thank god. We took our first full breath since liftoff and then let out a big cheer, and cry, and deep satisfaction.

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The basis has been laid for a truly international approach to Space Exploration, including a Lunar one.

Many of us may be familiar with the famous phrase by Russian scientist Konstantin Tsiolkovsky: "Earth is the cradle of the mind, but one cannot live in the cradle forever."
We have got it.

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