MINUTES
of the RadioAstron Teleconference on March 18, 2010

N. Kardashev chaired the teleconference.

The agenda of the teleconference and the list of participants are attached to the Minutes.

N. Kardashev informed the participants on the progress in mission development.

- He expressed his strong feelings that launch date will be delayed by a few months relative to the previously announced window in June 2010. And he ensured the participants that tests of scientific complex are going reasonably well.
- The meteorological satellite ELECTRO-L is not fastened with RadioAstron development, i.e. RadioAstron may be launched first.

V. Andreyanov presented new information about tests at LA.
During past 3 months Flight Payload was assembling and testing in Lavochkin. Last teleconference was in December 2009. Main works were to correct the technical errors and failures detected earlier during systems tests:

- Cable network inside FC was repaired. The thermal resistors in FC have been corrected.
- Checking of the commands' execution and telemetric outputs was continued through Navigator service systems.
- Servo mechanism for VIRK tracking antenna are testing separately. Flight model of the VIRK electronics was placed on support construction, nearby SRT electronics (not on SC Navigator), and the interfaces were checked.
- Wrong operation of thermostat inside one Flight H-maser was detected. It was sent for repairing to the design company in N. Novgorod.
- Flight SRT antenna petals were tuned, covered with multi-layer vacuum isolation and integrated preliminary as whole reflector (but without top antigravity equipment and without accurate measurements).
- There is problem for future EMC test: the unechoic chamber in Lavochkin is not ready.
- ASC and Lavochkin continue to design common IOC Program that joins 3 parts of the IOC, namely: SRT, communication system VIRK-TS and satellite Navigater IOC.

Tests of Pushchino TS by the Venus Express satellite (A. Smirnov).

- Tests of the equipment of Pushchino TS were continued. Recently we used 8.4 GHz receiver together with K5 recording terminal to detect a signal from the Venus Express spacecraft. Recording was performed in 4-MHz bandwidth and 2 bit Nyquist sampling during several scans each about 1000 second duration. The data were transformed from K5 format into standard integer arrays and were transferred to Metsahovi for processing, and processed data were transferred from Metsahovi to JIVE for analysis. Results of the analysis proved a good phase stability of the Pushchino TS equipment used in the observations (4 degrees RMS over 1000 seconds).

- Our plan is to conduct overall test of up-down link using real VIRK transponder located in the area of 22-m radio telescope (on the roof of the main building of the PRAO).

Discussions on Tracking Station outside Russia.

- **S.Likhachev** informed the participants on the actions taken by the administration of Russian president on preparing letter at the government level requesting funding from NASA to support tracking station at the Green Bank. He explained that the activity was stopped in waiting of signing USA/Russia agreement on nuclear weapon.

- About TS in south hemisphere, Sergei presented information about ISA/RSA meeting in Rome where they considered a possibility of using facilities at the Italian communication center Malindi in Kenya. The peculiarity is that 10-m antenna at the Malindi station operates at 12.5 GHz instead of required 15 GHz. Proposal for future discussions was included into the Minutes of the meeting.

- Another possibility for discussions on RadioAstron TS in southern hemisphere will be open during the oncoming meeting between RSA and Space Office of South Africa. The meeting will be in April 2010, and corresponding item was included in the agenda.

- Sergey emphasized that ASC is ready to provide two samples of electronic equipment fo TS outside Russia.

News on **Correlation of Ground VLBI tests in RA mode** was presented by Vladimir Kostenko. There was 4-station VLBI experiment (Effelsberg, Medicna, Noto and Pushcino) at 4.8 GHz with RadioaStron frequency setup (RCP and RCP polarization channels with USB and LSB sidebands, each of 16-MHz width); RDR recording terminal was used in Pushchino, and Mk5A at western radio telescopes. Raw data from foreign stations were transferred to the ASC by ftp. Fringes between all stations, and with the expected SNR, were found as a result of the preliminary processing at the ASC software correlator. Some problems with the LO frequency at Pushchino were found. Details are presented at the ASC web-site. Also, RDR data were transformed into Mk5A format and they were sent to the MPIfR for parallel processing.

It was some discussion on the prospects of usage **correlators outside Russia** for RadioAstron data reduction. A. Lobanov informed the participants on the activities planned by the MPIfR and the Socorro Correlator people to develop approach on accepting RDR-format records by western correlators. Another important item concerns the responsibility and the format of a delay model for the spacecraft. James Anderson from the MPIfR shall visit Socorro in May to work on the above mentioned issues. V.Kostenko, S.Likhachev, Yu.Kovalev, A.Lobanov exchanged with information on some specific questions on possible cooperation in preparing possibility to use correlators outside Russia for RadioAstron.

M. Popov reported on the results of **activities of the IOC FS working team**. The team member had several separate teleconferences during the reported period. They

established approach on getting observing time for FS observations via direct applications to the administration of the radio telescopes (GBT, Effelsberg, Arecibo, Medicina, Noto). Estimates of necessary observing time from the mentioned radio telescopes will be given via simulations for selected orbit and the list of prospective fringe finders for the orbit with launch on September 24 2010.

E.Fomalont informed the participants on the content of **the proposal sent to the VLBA** requesting 8 hours of observing time at P, L, C, K bands for a list of a dozen of bright fringe finders. The observations may be conducted under the condition of successful launch of the spacecraft, but in advance to the IOC FS period. The objective of the observations is to determine which sources are the best for the fringe searching with the RadioAstron at small space-ground baseline projections. Italian radio telescopes in Noto and/or Medicina were also requested in the proposal to provide the longest ground baselines.

There was active discussion **on the RadioAstron activities time line** prepared by the ASC. The main dispute was concerned with the date for the first AO and duration of the ESP stage of the mission. Most of the criticism was expressed by E.Fomalont who was for late AO and long ESP. For such a case the open question is of how to manage with timely application for ground radio telescope observing time for the ESP. It was recommended to organize a special teleconference on the matter.

Action items

There were three AIs formulated at the previous teleconference: 1) To compose time-line of activities in mission preparation and subsequent operations; it was done and has been just discussed. 2) To develop plan of the prelaunch ground VLBI observations in RadioAstron modes (frequency setup and recording formats); such plan exists, and observations at 6 cm were conducted (see item 5 of this minutes). 3) To initiate activities in using correlators outside Russia; it was done (see item 3 of the minutes).

New action items.

1) To organize a special teleconference for discussion of **RadioAstron activities time line .**
2) To present detailed report on results of correlation of the VLBI observations Effelsberg-Pushchino-Noto-Medicina.

Next teleconference to be held in the end of May 2010.

Agenda of the RadioAstron teleconference March 18, 2010

	Corrections to the Agenda	N. Kardashev
1	Project status	N. Kardashev
2	Technical tests of the SC and science payload in LA	V. Andreyanov
3	Tests of Pushchino TS by Venus Express satellite and VLBI	Kanevski/Smirnov/Gurvits

	and VLBI	
4	TS outside Russia	Discussion
5	Correlation of Ground VLBI tests in RA mode	Likhachev/Kostenko
6	Corelators outside Russia	Likhachev/Lobanov/Romney
7	Report from the IOC FS team	M.Popov
8	Pre-launch VLBA measurements of fringe finders	E.Fomalont
9	RadioAstron activities time line	M.Popov
10	Action items	M.Popov

Chairman: N.Kardashev

List of participants:

Andreyanov V.	ASC, Russia
Bartel N.	York Univ., Canada
Fomalont E.	NRAO USA
Giovannini G.	IRA/INAF, Italy
Gurvits L.	JIVE, The Netherlands
Kardashev N.	ASC, Russia
Kellermann K.	NRAO, USA
Vant Klooster	ESA, The Netherlands
Kogan L.	NRAO, USA
Kostenko V.	ASC, Russia
Kovalev Y.Y.	ASC, Russia
Langston G.	NRAO, USA
Larionov M.	ASC, Russia
Likhahev S.F.	ASC, Russia
Lobanov A.	MPIfR, Germany
Popov M.	ASC, Russia
Romney J.	NRAO, USA
Salter C.	NAIC, USA