

## MINUTES of the RadioAstron Teleconference on May 16, 2007

N. Kardashev chaired the teleconference.

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

The main intent of the teleconference was to review a current status of the mission development.

1. **Yu. Kovalev explained the status of the exploratory MFS proposal.** The proposal has been submitted to conduct VLBI observations (5-8 hours) of one radio source in K band (18-26 GHz) using existing frequency performance at the two DSN 70-m radio telescopes (Goldstone, and Robredo). MPIfR will provide disks for recording, and correlation will be done with the MPIfR correlator in Bonn. The proposal has passed through NRAO referee process with a positive decision. But there are technical remarks from the DSN technical group. These remarks, aimed to improve the proposal, will be accounted soon, and the proposal will be passed to the scheduling group.

2. **V. Andreyanov informed the participants about the status and progress in technical developments achieved since the last teleconference of February 2007:**

2.1. At the last teleconference it was reported that spacecraft service module "Navigator" has been tested on vibration. Now, mass-dimension model of SRT has been prepared for the mechanical tests as well. We use 3 real reflector petals and 24 mass simulators. Focus position and 3 petals' profiles have been measured before the tests for comparison with the results of such measurements to be done after the vibration tests.

2.2. Flight models fabrication of the electronics continues. The new formatters are ready and now tested in ASC. As we are planning, new 6-cm RCVs will be manufactured in June. The Old Australian 18 cm RCVs were re-tested 5 months ago, and all were found to be OK.

2.3. New modification of the antenna feed is now prepared for the comparative test in a combination with 22 m reflector in Pushchino; this reflector has the same F/D ratio as SRT.

2.4. The flight antenna reflector petals (the carbon-fiber covers and support construction) have been manufactured, but not yet tuned in order to achieve an accurate form.

2.5. EM of the SHM (designed by the Vremya-Ch., Nizhniy Novgorod) has been tested on electrical parameters; the required frequency stability is provided. The vibration test of this model was successfully carried out last month.

2.6. The simulators of the ground segments (TS, GRT, time-frequency equipment, recorders, and 2-station correlator) are in preparation for ZBT with flight device complex.

2.7. The Flight SRT electronics, VIRK system and reflector construction ought to be ready for integration during this year.

2.8. The Russian Space Agency will determine a new launch date during this year also.

2.9. A Program for the acceptance tests of the flight SRT has already been designed and will be agreed with Lavochkin Association. The Program contains the following four stages: the electronics tests in ASC (including ZBT), the reflector tests in the Lavochkin, the open containers tests and the complete assembling of the SRT complex in the Lavochkin (i.e., the reflector construction + electronics in the closed containers + hydrogen masers).

**V.** Andreyanov explained to N. Bartel that the two H-maser standards on board of the spacecraft will be installed for the purpose of redundancy.

3. **A. Smirnov described achievements and plans in the development of the Pushchino tracking station:**
  - 3.1. The three-frequency Feed system for the 22-m radio telescope is under testing and tuning at the test facilities of the Special Constructing Bureau of the Moscow Power-Engineering Institute.
  - 3.2. A majority of the electronic equipment has been manufactured and delivered from the subcontractor to the ASC. Now the equipment is being subjected to tests in the laboratory.
  - 3.3. According to the general plan, this summer we are going to assemble the feed-system at the radio telescope in Pushchino with subsequent measurements of the antenna efficiency. Later on, in autumn, the electronic equipment will be assembled at the radio telescope as well.
  - 3.4. A work on the necessary infrastructure at Pushchino is continuing.
  - 3.5. At present, we are working on the design of the Dynamical Test Set (DTS), which will simulate check signals with a Doppler shift and a varying delay. The DTS will be used to check TS electronic complex in the operational mode.
4. **G. Langston reported the status of the Green Bank Tracking Station:**
  - 4.1. He confirms the approach to utilize for RadioAstron and VSOP-2 the tracking station 20-m antenna, which will be tested this year by operations for some other project.
5. **S. Likhachev informed the participants about negotiations with South Africa, Canada and USA** on the possibility to provide a tracking station for the RadioAstron mission. Some discussion of the question was held among the participants of the teleconference (K.Kellerman, N. Bartel), but, generally speaking, there is no notable progress in all three directions. The ASC and the RSA continue their effort to keep the problem on air. Particularly, there is some information that a special item was included in the agenda of the meeting between Putin and Bush during G8 Summit in Germany in June.
6. **J. Dickey explained to participants the situations with 30-m radio telescope in Ceduna.** The telescope may certainly be used for co-observing with the RadioAstron, and/or, under some circumstances, the blocks of observing time could be provided for RadioAstron tracking. Electronic equipment for the TS operations is not available at the site. Such equipment should be provided by the ASC with the subsequent tests at the telescope.
7. **M. Popov gave information about the QUASAR VLBI System in Russia on behalf of A. Finkelshtein.** Institute of Applied Astronomy (IAA) in St-Petersburg has three 32-m radio telescopes operating in the International VLBI Service (IVS) network. The telescopes are located near St-Petersburg (Svetloe), at the North Caucasus (Zelenchukskaya), and in Siberia (Badary). They are equipped with 1.65, 4.85 and 22 GHz receivers (43, 27, and 75 K system temperature respectively). Recording terminals are compatible with the RadioAstron recording format. More information may be found at the WEB-site: [www.ipa.nw.ru](http://www.ipa.nw.ru).
8. **S. Likhachev ensured the participants that ASC will provide disk-oriented recording terminals,** at least for the Russian ground radio telescopes network and for all tracking stations. The IAA will provide compatible data acquisition systems (DAS) for the network. Compatibility with Mk5 format will be achieved through a copying routine. The ASC is developing now a 5-6 station software correlator for the RadioAstron mission. The correlator is based on the IBM multiprocessing system. S. Likhachev asked the participants for assistance in getting some sample of the S2 tapes recorded with VSOP experiments, to be used in the check-out tests of the correlator.
9. **D. Jauncey asked ASC to investigate a possibility to launch with RadioAstron a capsule with the ash of the first radio astronomer G. Reber.** N. Kardashev explained that a formal letter addressed to the Chair of the Russian Space Agency (Perminov) and to the President of the Russian Academy of Science (Osipov) from the radio astronomical community is needed. D.Jauncey volunteered to prepare a draft of the letter.
10. **No final agreement was achieved concerning the date of the next RadioAstron general meeting in Moscow.**
11. **Report on the execution of the action items** formulated at the previous teleconference:

11.1. Action item to form a Science Advisory Committee has not solved yet and caused a new discussion. So, the AI stays open.

12. **New action items:**

12.1. E. Fomalont -- to investigate possibilities to obtain a sample of S2 tapes corresponding to some VSOP experiments. The tapes are needed to test ASC correlator.

12.2. D. Jauncey -- to prepare a draft of the letter from astronomical community to Russian officials concerning of placing on board of the RadioAstron spacecraft a capsule with the ash of the first radio astronomer Groete Reber.

12.3. The ASC -- to provide a presentation of the RadioAstron project at the Meeting in Manchester in October 2007.

12.4. The ASC -- to choose a proper date for the next general RadioAstron meeting in Moscow.

**Agenda of the RadioAstron teleconference  
May 16, 2007 (14:00 UT)**

1	Corrections to the Agenda and introductory notes on the status of the RadioAstron mission	N. Kardashev
2	RadioAstron project status and progress	V. Andreyanov
3	Pushchino tracking station (TS)	A. Smirnov
4	Green Bank tracking station	G. Langston
5	Status of TS in South Africa and Canada	S. Likhachev
6	TS and radio telescope of Tasmania University	J. Dickey, G. Tsarevsky
7	Radio interferometric network "QUASAR"	A. Finkelshtein
8	Data recording and correlator in Russia	S. Likhachev
9	Status of the DSN proposal for GRT tests in MFS mode	Yu.Yu. Kovalev
10	Special issue	D. Jauncey
11	RadioAstron meeting in Moscow in November 2007	N. Kardashev
12	Review of Action Items	M. Popov
13	New Action items	M. Popov
14	Proposed date for the next teleconference (September, 2007)	

**List of participants:**

Andreyanov V. ASC, Russia  
 Baan W. Astron, the Netherlands  
 Bartel N. York University, Canada  
 Dickey J. Tasmania University, Hobart, Australia  
 Fomalont E. NRAO, USA  
 Jauncey D. ATNF, Australia  
 Kanevsky B. ASC, Russia  
 Kardashev N. ASC, Russia  
 Kellermann K. NRAO, USA  
 van 't Klooster K. ESA, the Netherlands  
 Kogan L. NRAO, USA  
 Kovalev Yu.Yu. MPIfR/ASC  
 Lobanov A. MPIfR, Germany  
 Langston G. NRAO, USA  
 Likhachev S. ASC, Russia  
 Lister M. Purdue University, USA  
 Minter A. NRAO, USA  
 Popov M. ASC, Russia  
 Preston R. JPL, USA  
 Romney J. NRAO, USA (was not able to connect)  
 Smirnov A. ASC, Russia  
 Tsarevsky G. ASC, Russia