Special Astrophysical Observatory of RAS

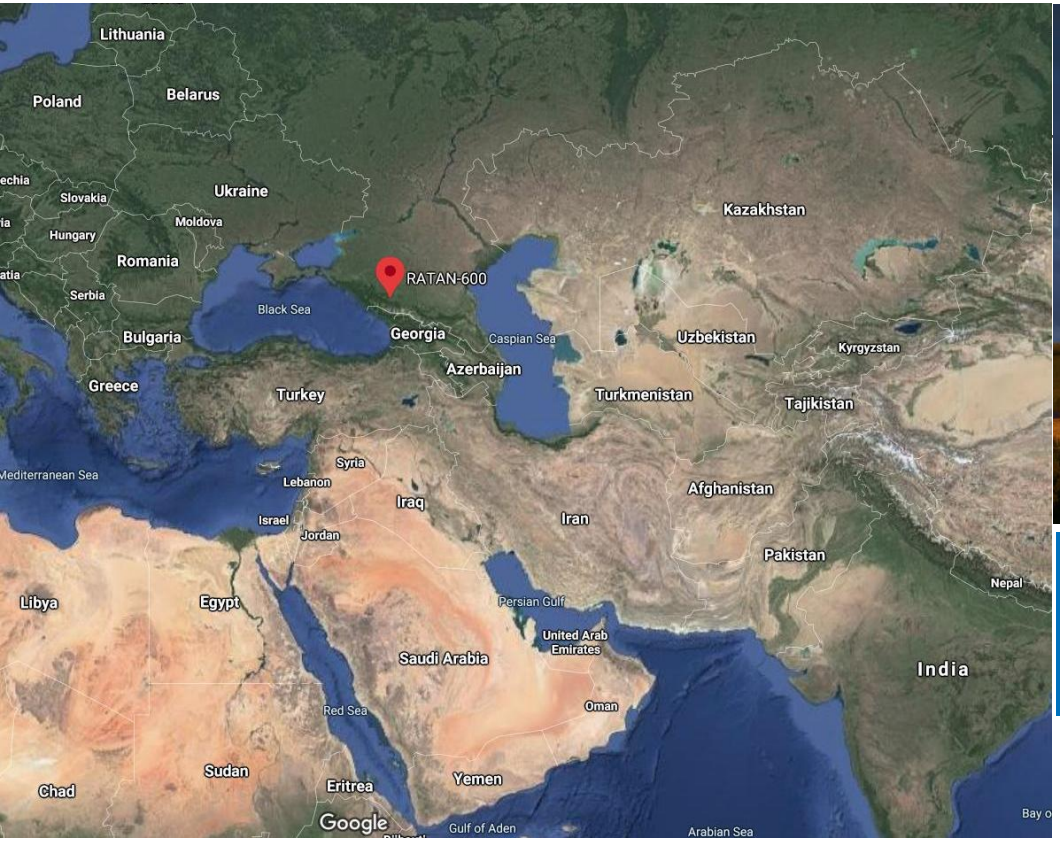
the open access center

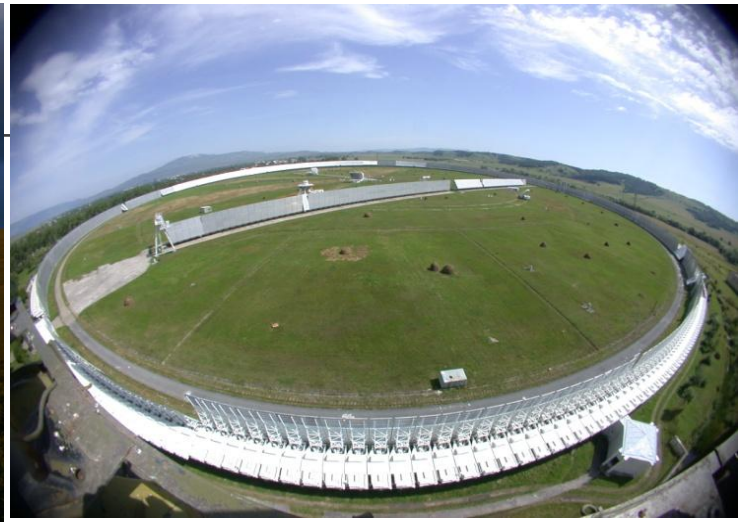
BTA & RATAN-600

Sotnikova Yulia V., Deputy Director

17.12.2021

1. Location and facility (1966 - 2021)





610
Collective use centers

360
Unique scientific facilities

7
Megascience class facilities

- **Big Telescope Azimuthal (BTA): 6 m**
- **RATAN-600 radio telescope: 600 m**

Research: stars, planets and protoplanet systems, the Solar system and the Sun, the Galaxy, galaxies, CMB, the interstellar medium, Instruments and Methods.

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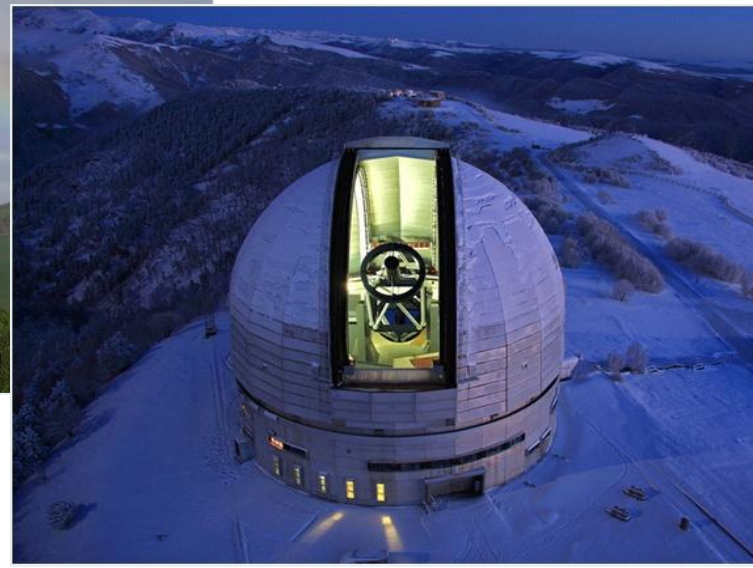
2. The facility uniqueness



The RATAN-600 is the largest radio telescope in the world with the variable profile antenna:
- a large geometric area and a high angular resolution;
- instantaneous radio spectra 1-30 GHz.

Methods:
- flux density measurements at 1-30 GHz;
- radio emission intensity and polarization measurements at 3-18 GHz;
- flux density measurements at 5 GHz with a high time resolution (60 μs).

The BTA is the largest Russian optical telescope:
- the mirror size;
- the relevant scientific equipment and methods;
- a geographical location.

Methods:
- galaxies' 3D panoramic spectroscopy;
- speckle interferometry method;
- high-resolution spectroscopy;
- ultra-high time resolution photospectropolarimetry.

https://www.sao.ru/Doc-en/Telescopes/

3. Access to the facility

The Responsible Observer (RO) is the SAO scientific staff member who is in charge of scientific method/methods.

The Principal Investigator (PI) is a telescope user (internal or external).

The Responsible Observer:

- ✓ A direct or remote access to the facilities;
- ✓ Equipment management;
- ✓ The telescope systems monitor (website, server);
- ✓ Make technical decisions.

The Principal Investigator:

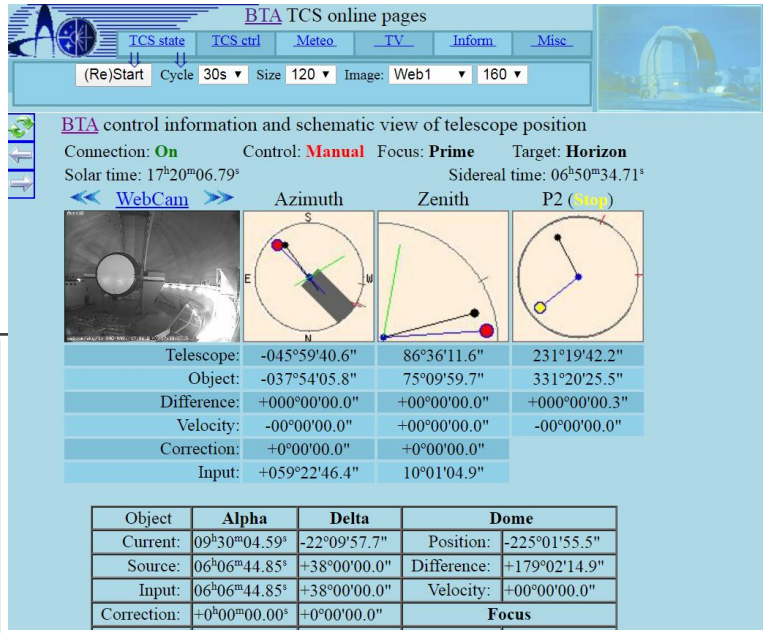
- ✓ Prepare the observational files/materials;
- ✓ Monitor telescope systems;
- ✓ Make a scientific decision (an observation strategy).

Access:

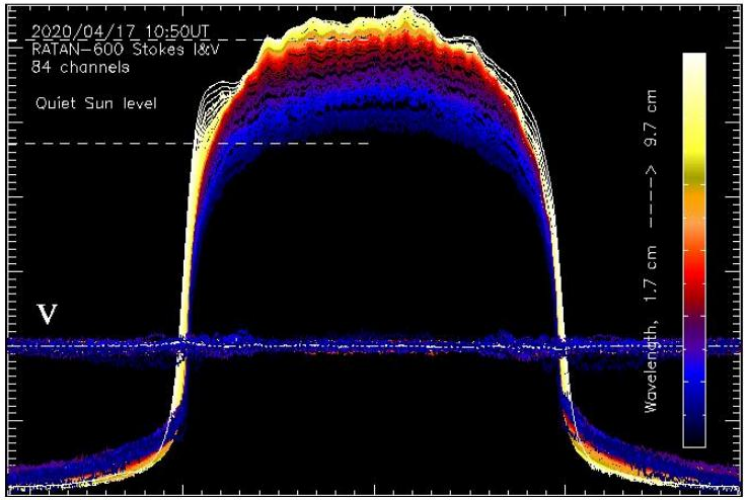
- computers and local network;
- software;
- data archive, databases;
- a transport and an accommodation.

The PI responsibility:

Publication with reference to the using equipment.



Available resource: the BTA control information (website)



Available resource: the RATAN observation information (website)

4. A regulated access to the facility

The Russian Telescope Time Allocation Committee (RTTAC by the MSHE)

https://www.sao.ru/hq/Komitet/index-en.html

Russian Academy of Sciences
Special
Astrophysical Observatory

Russian Telescope Time Allocation Committee

RTTAC:

Home
News
About
Committee
Proposals
Contacts

Quick Start

This site contains information for Russian and foreign astrophysicists applying for telescopes under the authority of RTTAC, the Russian Telescope Time Allocation Committee.
Information on the Committee and basic documents is available here.

Important Dates:

FEB 1, 2020	Call for Proposals started
MAR 10, 2020 23:59:59	Deadline
APRIL 20-23, 2020	RTTAC Session, Conference

Quick Links:

Proposal Rules	Go
Circulars Description (PDF)	BTA-6m, RATAN-600,

- ✓ Free of charge, the competitive basis
- ✓ Proposal system (PS)
- ✓ Observational requests are submitted during two specified periods:
  01 Feb – 10 Mar
  01 Aug – 10 Sep
- ✓ The same rules for all types of users.

Key points

- ✓ A, B, C and D priority of the proposal (the highest, high, low and rejected);
- ✓ top priority: alert observations;
- ✓ current observation schedule is available on the SAO website for each time period.

Scientific expertise (RTTAC)

- ✓ positive decision of technical experts;
- ✓ scientific importance;
- ✓ multi-wave and cooperative programs;
- ✓ efficiency of a program, publication;
- ✓ development of new methods;
- ✓ support of young scientists.

Technical expertise (SAO experts)

- ✓ technical feasibility;
- ✓ restrictions & risks;
- ✓ adequacy of the requested time.

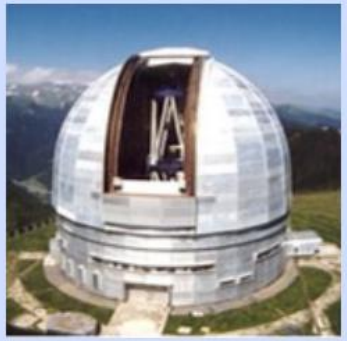
The RTTAC activity

- ✓ the sessions (twice a year);
- ✓ the Telescope users conferences (twice a year).

SAO RAS

Application process

The online proposal system

Big Telescopes	
	
BTA 6m	RATAN 600m
Online form	Online form
Information	Information

Necessary documentation for users

- ✓ Committee Regulations
- ✓ Procedure rules
- ✓ Proposal Submission Regulations
- ✓ Access to the scientific facility
- ✓ Circulars with Instrument Description
- ✓ Observed Data Archives Regulations

Steps for Users

- ✓ Acquaintance with documentation;
- ✓ Registration in an online proposal system PS;
- ✓ Creating and registration a Proposal in PS

The proposal structure

- ✓ **A technical part**: Title, Brief description, PI, Co-I, Proposal type (long-term, short-term, one-time), Period of time, Mode of observation, List of objects.
- ✓ **A scientific part**: Annotation, Type of objects, Scientific problem, Methods, Motivation, Publication.

https://www.sao.ru/hq/ Komitet/requests.html

5. Procedures and an internal access policies for external users

RATAN-600 Observation Schedule from January 1 to June 30, 2020. Executive Secretary: request@sao.ru

	North sector	South+Flat	South sector
JANUARY	**Feed-cabin 1** **(01-31):** Radio variability of the Galactic X-ray binaries with relativistic jets[1], Trushkin S. (SAO RAS). Responsible Erkenov A.K. **(01-24):** Radio properties of the Narrow-Line Seyfert 1 Galaxies, Lahteenmaki Anne (Metsahovi Radio Observatory, Finland). Responsible: Erkenov A.K. **(01-24):** Radio properties of the blazars on the long time scales, Mufakharov T. (Shanghai Astronomical Observatory, China). Responsible Erkenov A.K. **(25-31):** Radio properties of OH Megamaser (OHM) galaxies, Zhongzu Wu (Guizhou University, China). Responsible Erkenov A.K.	**Feed-cabin 3** **(01-31):** The Sun five-azimuth observations 4. Responsible Milenko V.S. **Feed-cabin 2** **(01-31):** Radio variability of the Galactic X-ray binaries with relativistic jets[1], Trushkin S. (SAO RAS). Responsible Erkenov A.K. **(01-31):** Radio properties of the blazars on the long time scales, Mufakharov T. (Shanghai Astronomical Observatory, China). Responsible: Erkenov A.K. **(01-31):** Radio properties of the Narrow-Line Seyfert 1 Galaxies, Lahteenmaki Anne (Metsahovi Radio Observatory, Finland). Responsible Erkenov A.K. **Feed-cabin 3** **(10-31):** The Sun multi-azimuth observations [5]. Responsible Milenko V.S.	**Feed-cabin 2** **(01-31):** Radio variability of the Galactic X-ray binaries with relativistic jets1, Trushkin S. (SAO RAS). Responsible Erkenov A.K.

schedule fragment

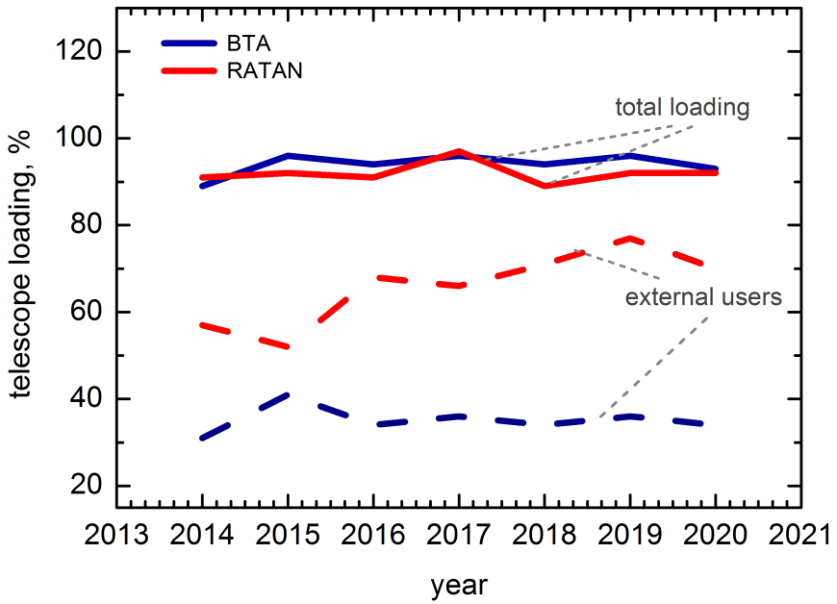
https://www.sao.ru/ratan/schedule/2020/half1.html

5. Telescope loading statistics

SAO RAS

BTA

year	max., h	Real time, h		loading	external users
		overall	external		
2016	2851	2542	790	89%	31%
2017	3323	3175	1309	96%	41%
2018	2397	2260	772	94%	34%
2019	3128	3007	1083	96%	36%
2020	4322	4027	1357	93%	34%



RATAN-600

year	max., h	Real time, h		loading	external users
		overall	external		
2014	8784	8022	4600	91%	57%
2015	8760	8054	4228	92%	52%
2016	8784	7992	5415	91%	68%
2017	8231	7973	5230	97%	66%
2018	8760	7812	5602	89%	71%
2019	6445	5968	5009	92%	83%
2020	7404	6864	4805	92%	70%

The reserved telescope time is ~5-15%;

The telescopes maintenance is ~5-15%.

6. Main users of the facility

About 30 international users (for the last 3 years)

The principal reasons for joined foreign users:

- ✓ **A solution of real astrophysical problems. The study involved two or more countries.**
- ✓ **Targeted grants and funded programs among countries (often for universities).**
- ✓ **Alert events in cosmic objects when multi-wavelength studies are necessary;**
- ✓ **A multichannel astronomy research when research in different channels are necessary (an electromagnetic and gravitational ones and elementary particles).**

Curtin University

SAO RAS

ASU ALABAMA STATE UNIVERSITY

EUROPEAN VLBI NETWORK

UNIVERSITY OF OXFORD

Shanghai Astronomical Observatory

ICRANet

National Institute for Astrophysics

FINCA Finnish Centre for Astronomy with ESO

Max-Planck Institute for Radio AStronomy

Metsahovi Radio Observatory

University of Ioannina

INAF ISTITUTO NAZIONALE DI ASTROFISICA

SKALNATÉ PLESO

International Center for Relativistic Astrophysics Network

NRAO

National Radio Astronomy Observatory

OMNIA IN NUMERO ET MENSURA 1887

BYURAKAN Astrophysical Observatory

SMITHSONIAN INSTITUTION WASHINGTON, D.C.

Astronomical Observatory of Belgrade

asu

GUANGZHOU UNIVERSITY

ARIES ऐरीज

Aryabhatta Research Institute

Astronomical Institute of the Czech Academy of Sciences

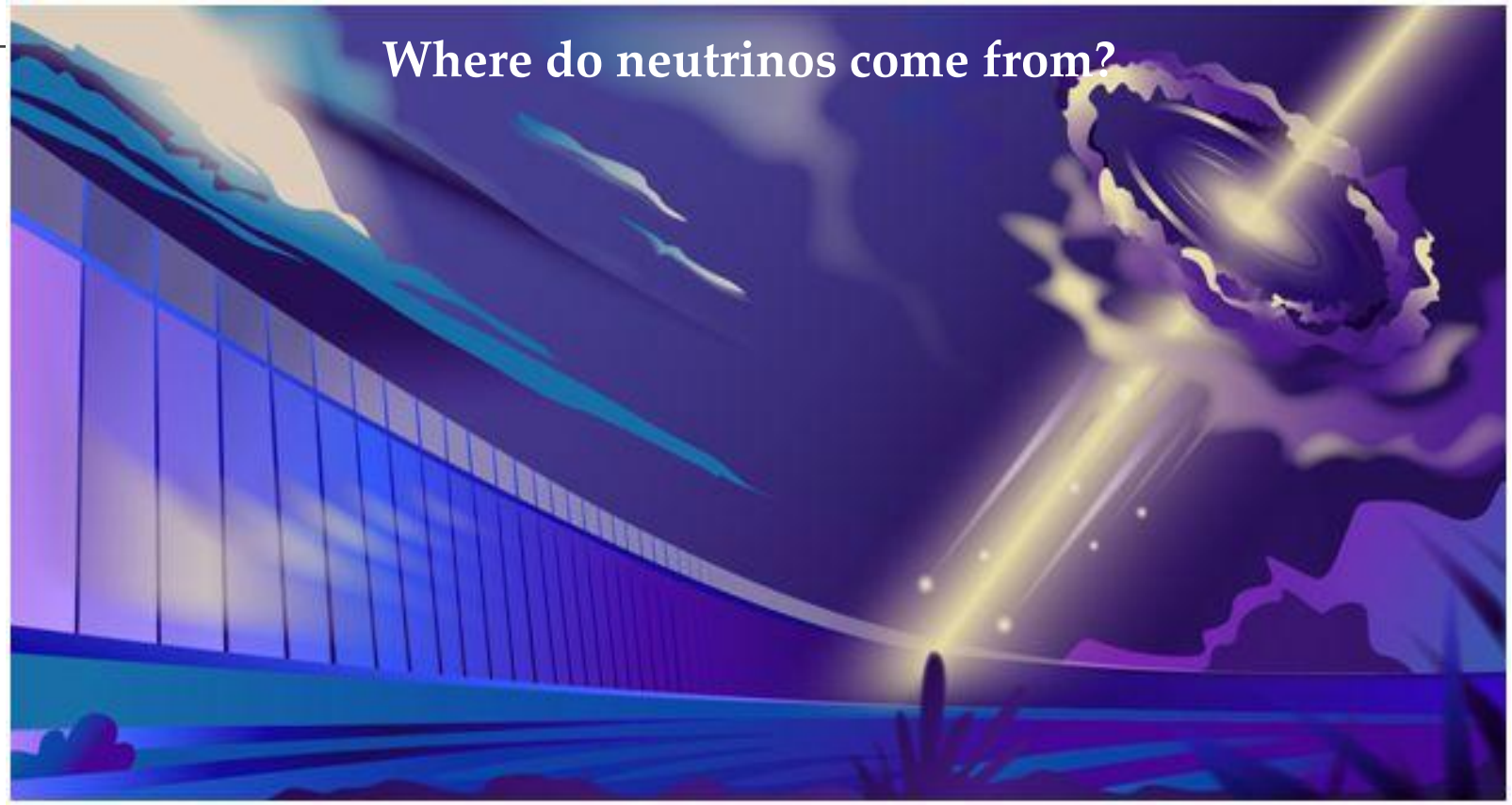
TARTU OBSERVATORY space research centre

RATAN-600 in the multichannel astronomy era (2020-2021)

Current programs

1. IceCube trigger: monthly monitoring of the new high-energy neutrino candidates (Institute for Nuclear Research).

2. RATAN-600 in multichannel astronomy: a complete sample of AGNs with VLBI-compact jet as indicators of high-energy neutrinos (Astro Space Center of RAS).



The Russian RATAN-600 telescope helps to understand the origin of cosmic neutrinos. Illustration by Daria Sokol, MIPT ©

11. Contact details

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