

Presentation of ROT-54/2.6

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Jurisdiction Armenia Program

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Radio Optical Telescope ROT-54/2.6

(National Institute of Metrology, Armenia)

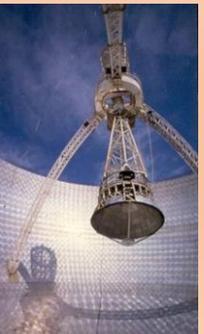
Placed on the mount Aragats, Armenia,

- The Latitude: 40.3508609°
- The Longitude : 44.2417924°
- The Altitude: 1711 m

giant Spherical Antenna is a unique instrument for studying the Universe (Radio Astronomy) and for Deep Space Communication.

ROT-54/2.6 history-1

- The construction: 1980-1985
- Finishing adjusting works in 1987
- By State Committee of USSR under the Inventions this type of radio telescopes as exception of the invention was appropriated a name of the author. Thus systems of this type refer to as "**Herouni Mirror Radio Telescope** "
- The terrible earthquake in 1988 does not destroy Antenna fortunately
- Planned observations headed by Prof. Paris Herouni started (1987-1990). It was red superstar flax detected, many presentations were conducted in USSR and abroad



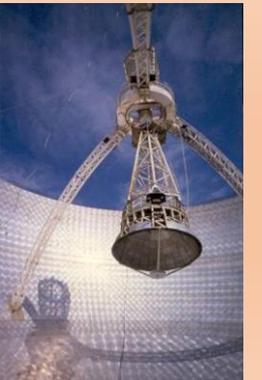
Parameter	Wavelength (mm)					
	200	30	8	3 (expected)	2 (expected)	1 (expected)
Beam width	25'	3.7'	1'	22"	14"	7'
Effective surface, m ²	560	560	540	520	482	350
Gain	2*10 ⁵	8*10 ⁶	10 ⁸	7*10 ⁸	1.5*10 ⁹	4.4*10 ⁹
Efficiency	0.7	0.7	0.67	0.65	0.6	0.4
Self noises , K ^o	5	4	2.8	3	To be measured	
Sensitivity (ratio of Eff. Surf to self noises)	112	140	193	173	To be measured	



ROT-54/2.6 history -2

- Measurements of Radio telescope's Antenna parameters were done during the energetic crisis in Armenia (1990-1995), some new sources of radio radiation were found in Universe by Dr. A. Sargsyan,
- Restructuring works on Radio telescope's managing system's computational system were done (1995-2010). Replacing by PC, adjusting and new special software programming works, renovation and design of new feeding antennas, modernization of feeding system of Antenna were done, scientific collaboration with Astronomical Society of Russia and National Technical University of Athens were organized in a different topics, a number of NPUA students have done their Bachelor, Master and Ph.D. graduating thesis's here.





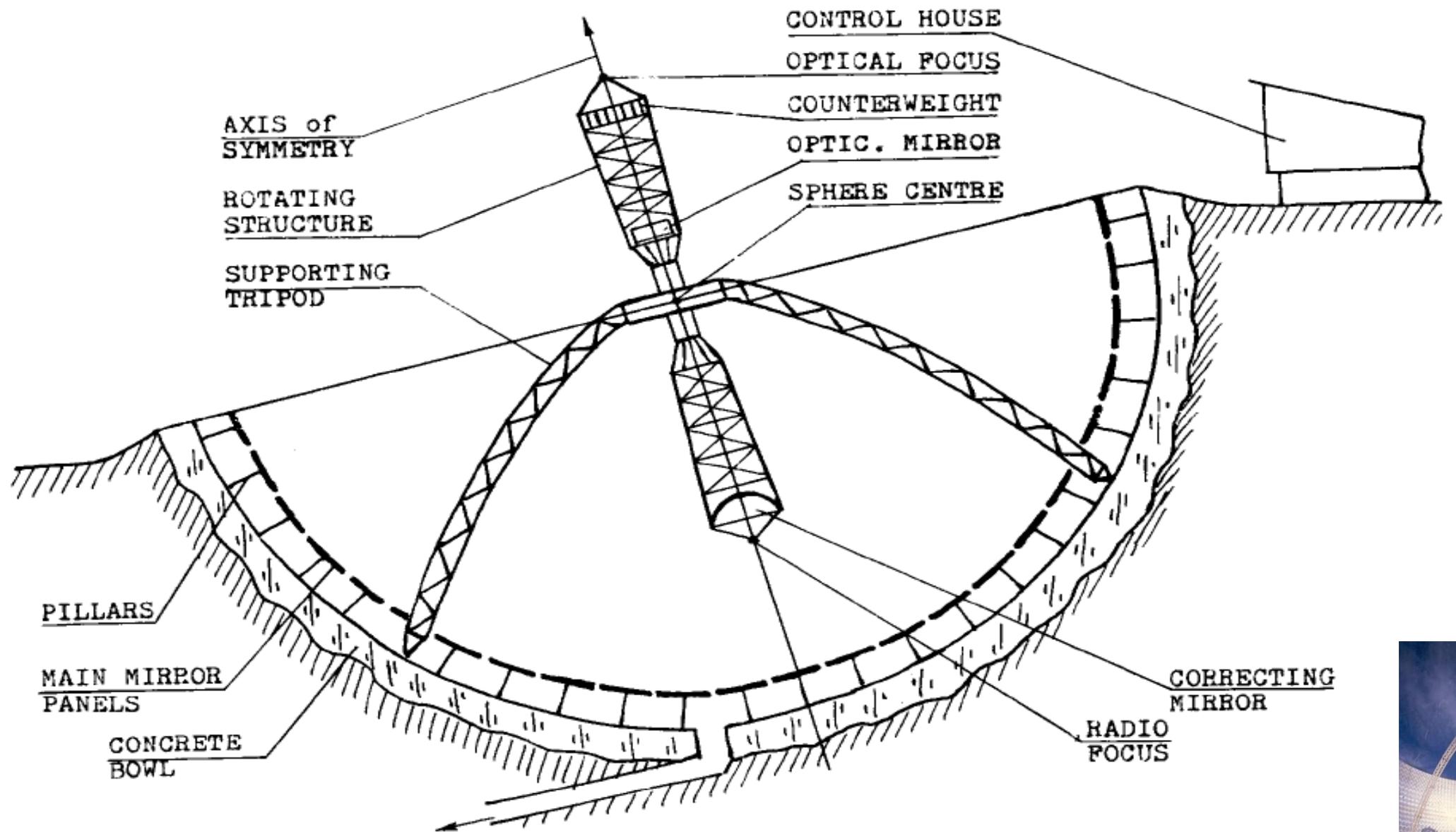
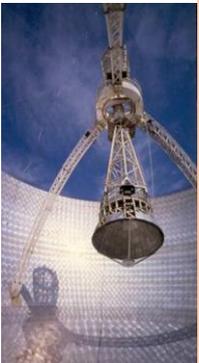
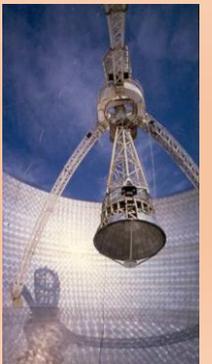
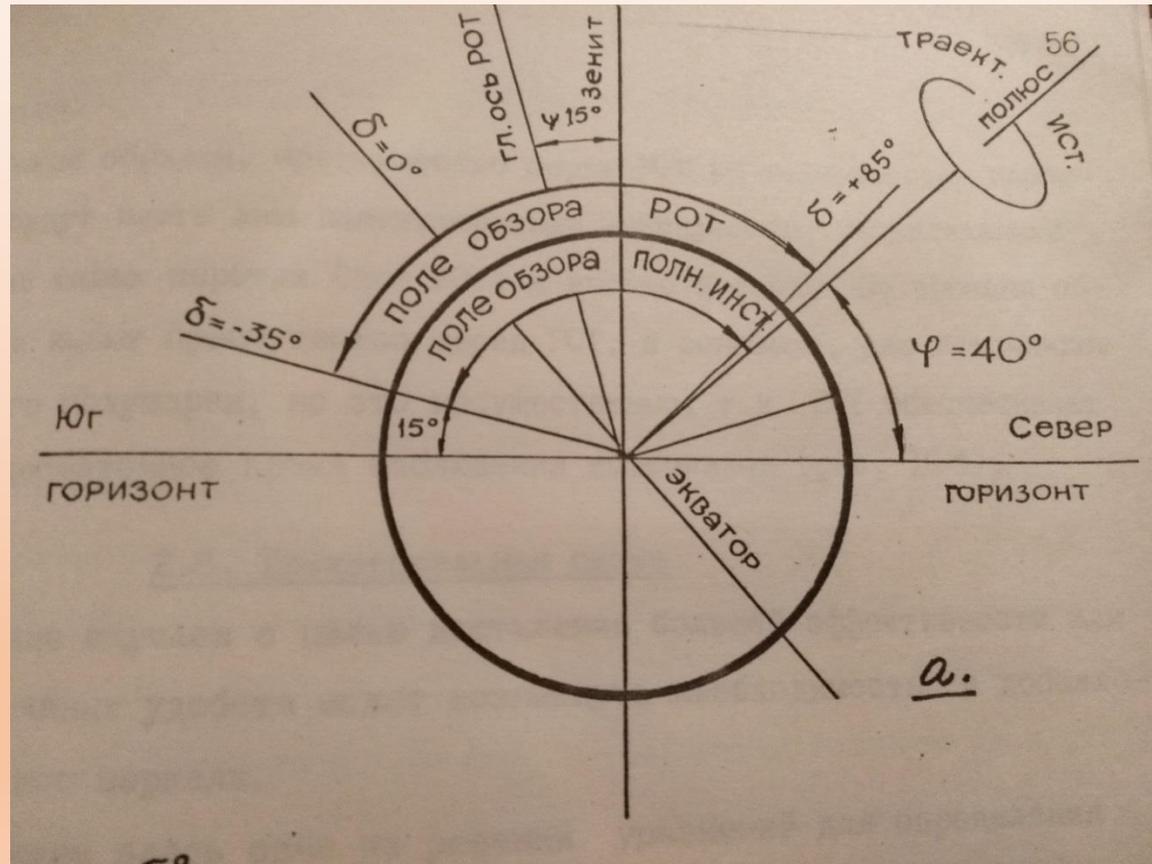


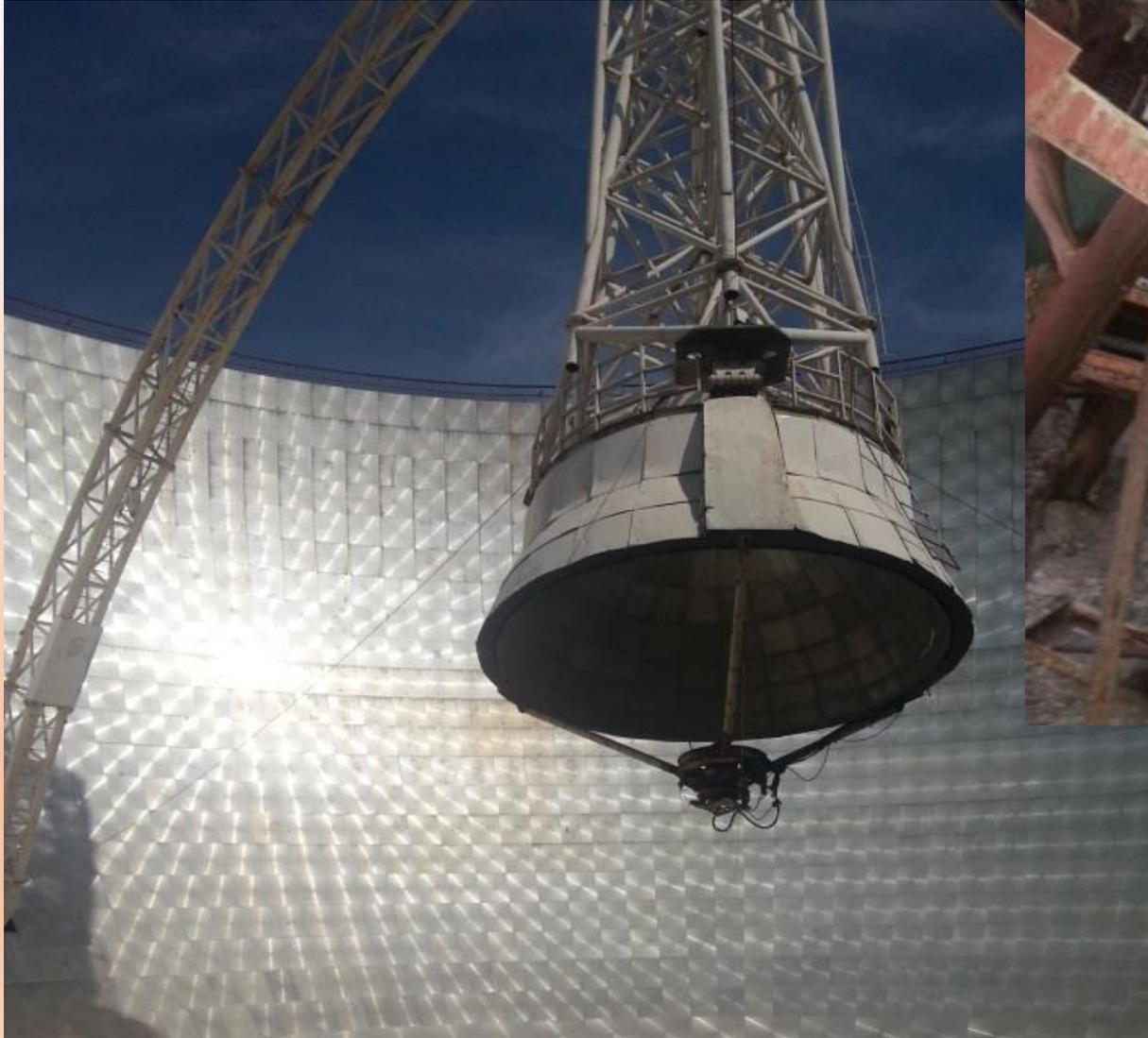
Figure 3 Arrangement of Radio-Optical Telescope ROT-32/54/2.6



Schematic view East - West (ICAP 1989, P.M. Herouni "The First Radio Optical Telescope")

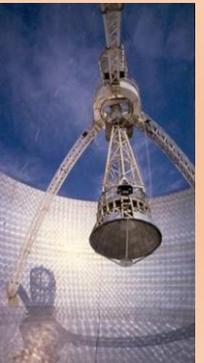
The main symmetry axis is oriented towards a direction $+25^\circ$ to “South” leaving 15° with respect to the local zenith at 40° , the latitude of the location of the telescope. A beam pointing is available from 35° elevation (“South”) to 85° elevation (“Nord”).





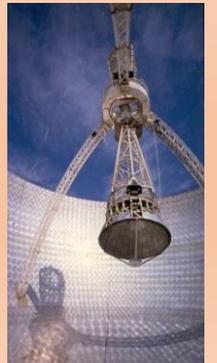
Today's situation

- The spherical main reflector is in a very reasonable state, with perspective for further improvement
- The current status of the control of the sub-reflector and telescope assembly (movable part) is, that there is no control possible.
- There has been no movement of the cardan suspension in the last 6 years.
- A main issue is, that one side of the East-West axis inside the cardan housing has a defect control arm.



Predictable future

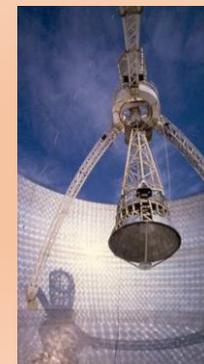
We are going to collaborate with JIVE and join to the EVN soon.



Predictable future

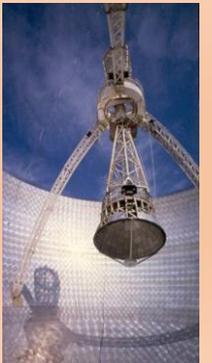
As the 54m spherical telescope ROT - 54/2.6 have a low antenna temperature ($\sim 5^\circ$ K, even less than it), its radio-noise will not exceed the level of 1-2 mJy, if the receiver will have the band pass of 1 GHz and the integration time of 1 sec.

The radio telescope will enable to study very weak objects (the sensitivity of VLA is in the same order). For space objects it is possible to do the simultaneous radio and optical observations. This study will help to complete the results obtained with the best radio telescopes and make a new Catalog of radio sources.



Predictable future

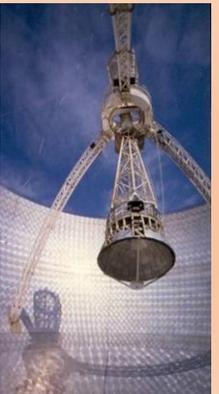
With a perspective for utilization up into the millimeter wave regime, the ROT- 54/2.6 radio optical telescope's antenna can be “electrically “ larger than the Arecibo antenna.





Road Map

The ROT's upgrade is necessary.



For the upgrade to be done, some crucial points can be identified:

- A main issue is, that one side of the East-West axis inside the cardan housing has a defect control arm.
- A lubrication and inspection of moving parts is important.
- Renovation and test of the radio telescope's 28 automatic control systems.
- Upgrade and tests of the interfaces.
- Upgrading of the arsenal of receivers.
- Modernization of the pointing and guiding system of the radio telescope using the new computing system.
- Implementation of the data-analysis system, use of new methods of digital analysis of the observation data and for deviation corrections too.
- Preparation of the scientific programs, scientific collaborations, fundraising.
- etc.



Presentation of ROT-54/2.6

An aerial photograph of the ROT-54/2.6 radio telescope. The telescope is a large, circular, metallic structure with a central feed horn and a complex support structure. It is situated in a snowy, mountainous area with some buildings and trees in the background. The sky is clear and blue.

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