P1-4

Computational aspects of Space-VLBI missions ("Radioastron" and "Millimetron")

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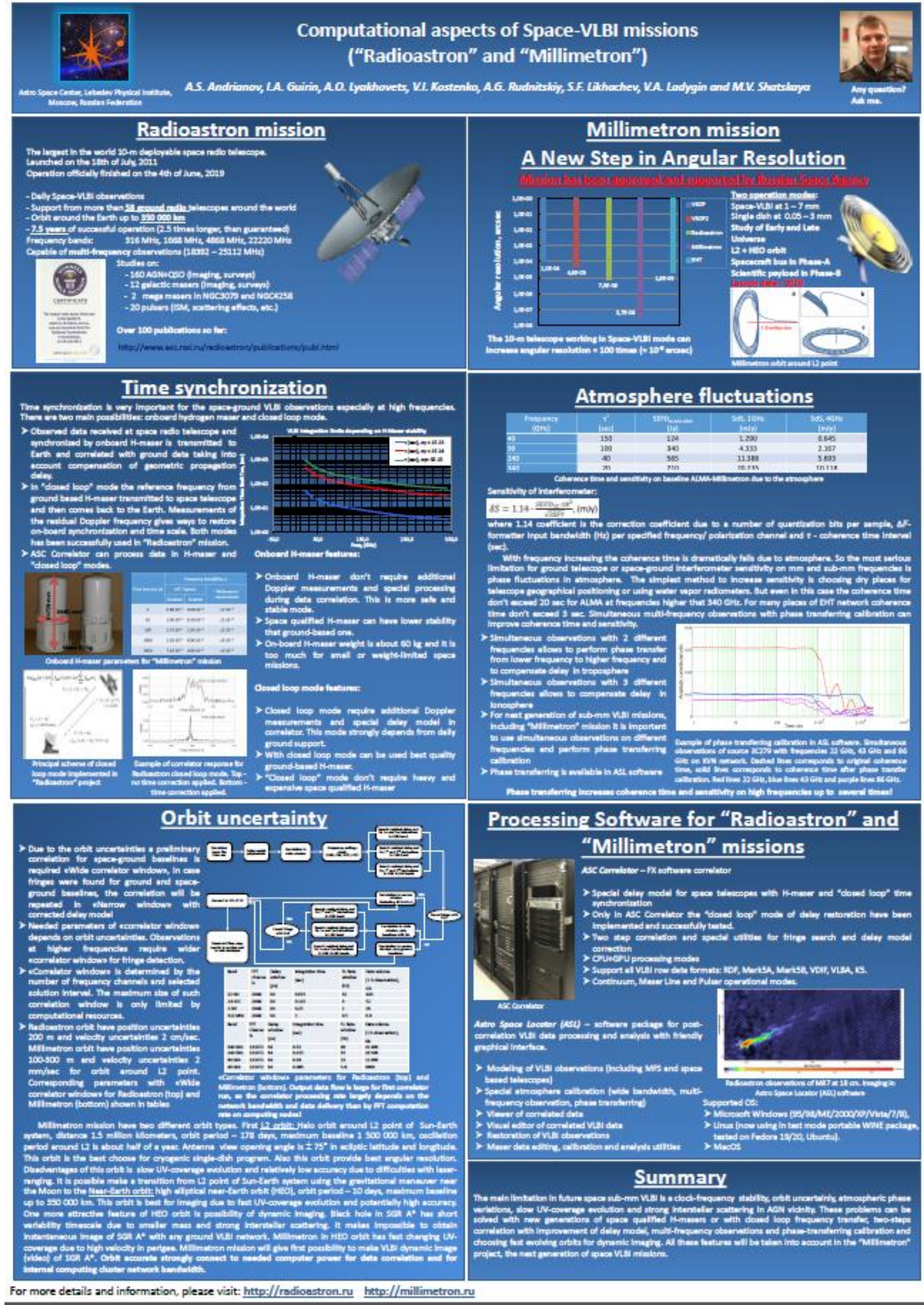
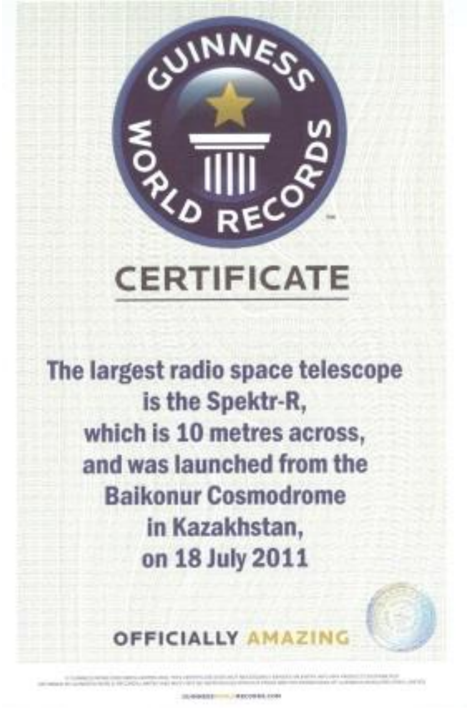


Radioastron mission
2011-2019

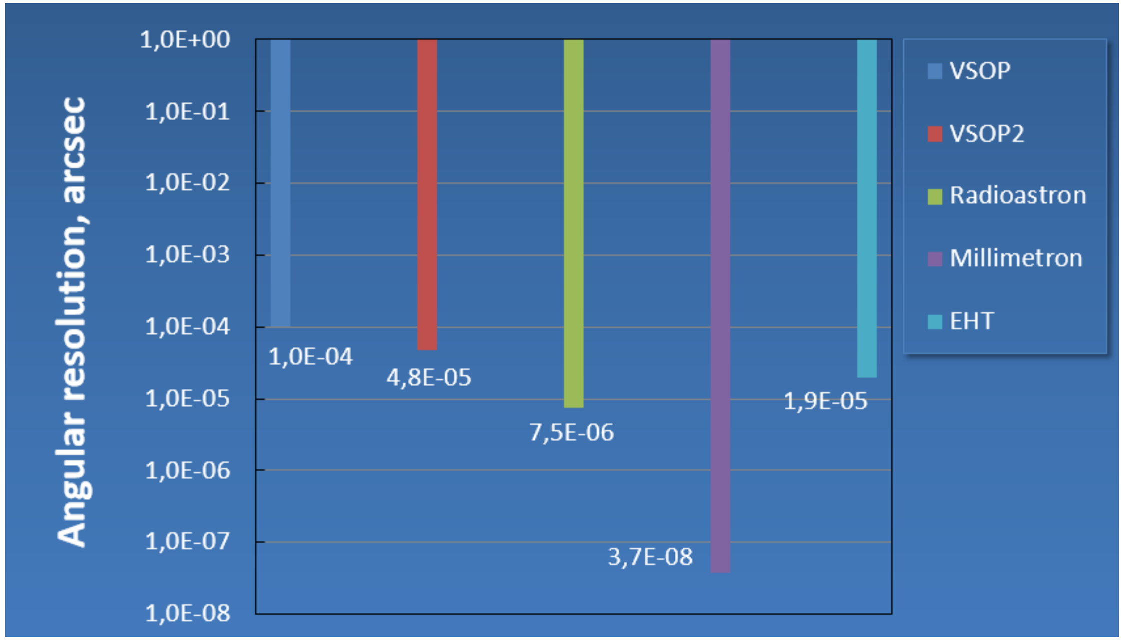
- The largest in the world 10-m deployable space radio telescope.
- Longest interferometer baselines in the world
- Broad frequency coverage of 0.3 – 22 GHz



In poster P1-4 is discussing :

- Main challenges for Radioastron data processing strongly determined of computer power mainly by time synchronization and orbits uncertainty
- Processing software for Radioastron mission (all software free to download)

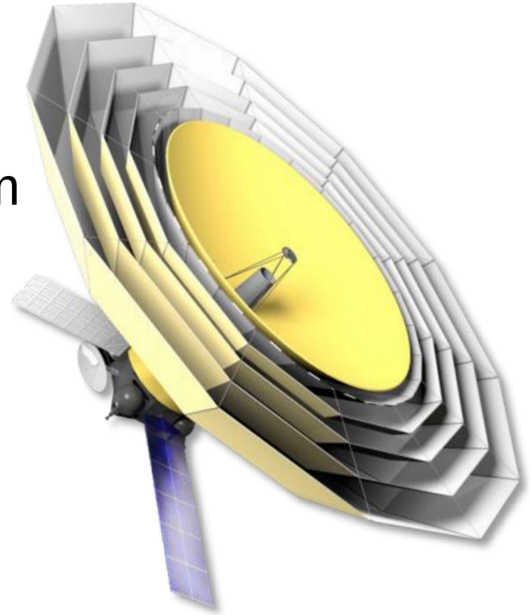
Millimetron mission (2029)
A New Step in Angular Resolution



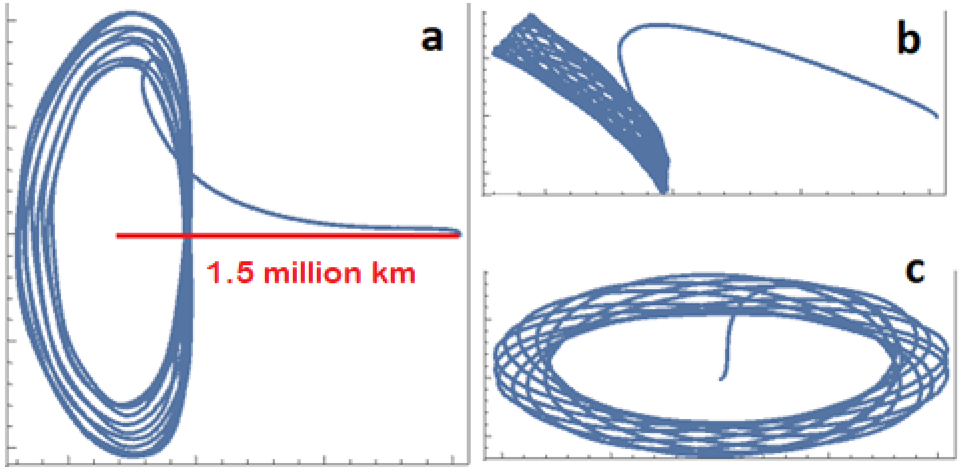
<u>Two operation modes</u>:

- Space-VLBI at 1 – 7 mm
- Single dish at 0.05 – 3 mm

Study of Early and Late Universe
L2 + HEO orbit



- The 10-m telescope working in Space-VLBI mode can increase angular resolution ≈ 100 times (up to ≈ 10^{-8} arcsec)
- <u>Mission has been approved and supported by Russian Space Agency</u>



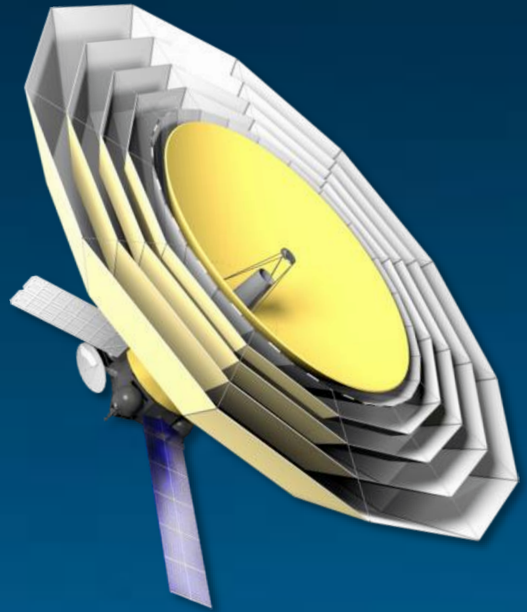
The main limitation for future sub-mm VLBI (Millimetron, EHT, etc)

- Clock-frequency stability - solution is a space qualified H-masers or closed loop time synchronization

- Orbit uncertainly – solution is two-steps correlation with improvement of delay model. Orbit accuracy is strongly determine the rated computer power.

- Atmospheric phase variations – solution is simultaneous multi-frequency observation and phase transferring.

- Slow UV-coverage evolution and difficulties with dynamic imaging – solution is usage of the High Elliptical Earth Orbit of space telescope.



Thank you for your attention!

More information are available in poster P1-4