UNITED NATIONS OFFICE
FOR OUTER SPACE AFFAIRS

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Keldysh Institute of Applied Mathematics
Russian Academy of Sciences

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Brief information

Keldysh Institute of Applied Mathematics (Russian Academy of Sciences) was founded in 1953 to solve complex mathematical problems involved in national projects of space exploration, atomic and thermonuclear energy application, etc. This goal was meant to be achieved by developing and using appropriate computer hardware and software facilities. The Institute founder and first director (1953-1978) was President of the USSR Academy of Sciences Mstislav Keldysh.
Since its first years the Institute activity oriented to solving large scale applied problems is based on the results of fundamental scientific research in mathematics, mechanics, cybernetics, informatics, etc.

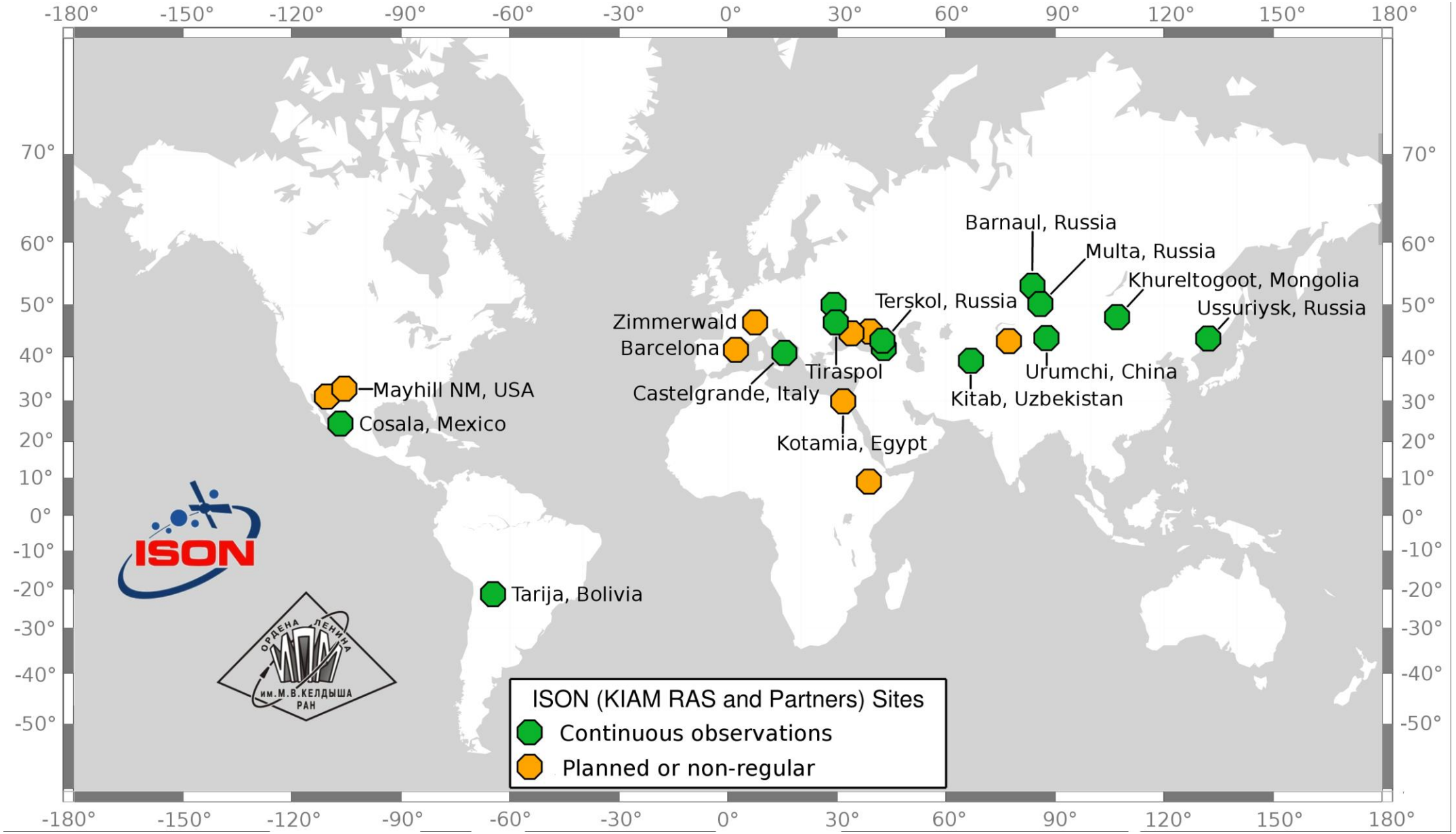
More information

Российская академия наук

INTERNATIONAL SCIENTIFIC OPTICAL NETWORK (ISON)

- ISON is an initiative coordinated by Keldysh Institute of Applied Mathematics of the Russian Academy of Sciences (KIAM RAS).
- Main observational targets: space debris, asteroids, gamma-ray burst afterglows.
- KIAM RAS maintains the database of space objects based on ISON's observational data.

ISON/KIAM RAS OPTICAL TELESCOPE NETWORK



ISON/KIAM RAS OPTICAL TELESCOPE NETWORK

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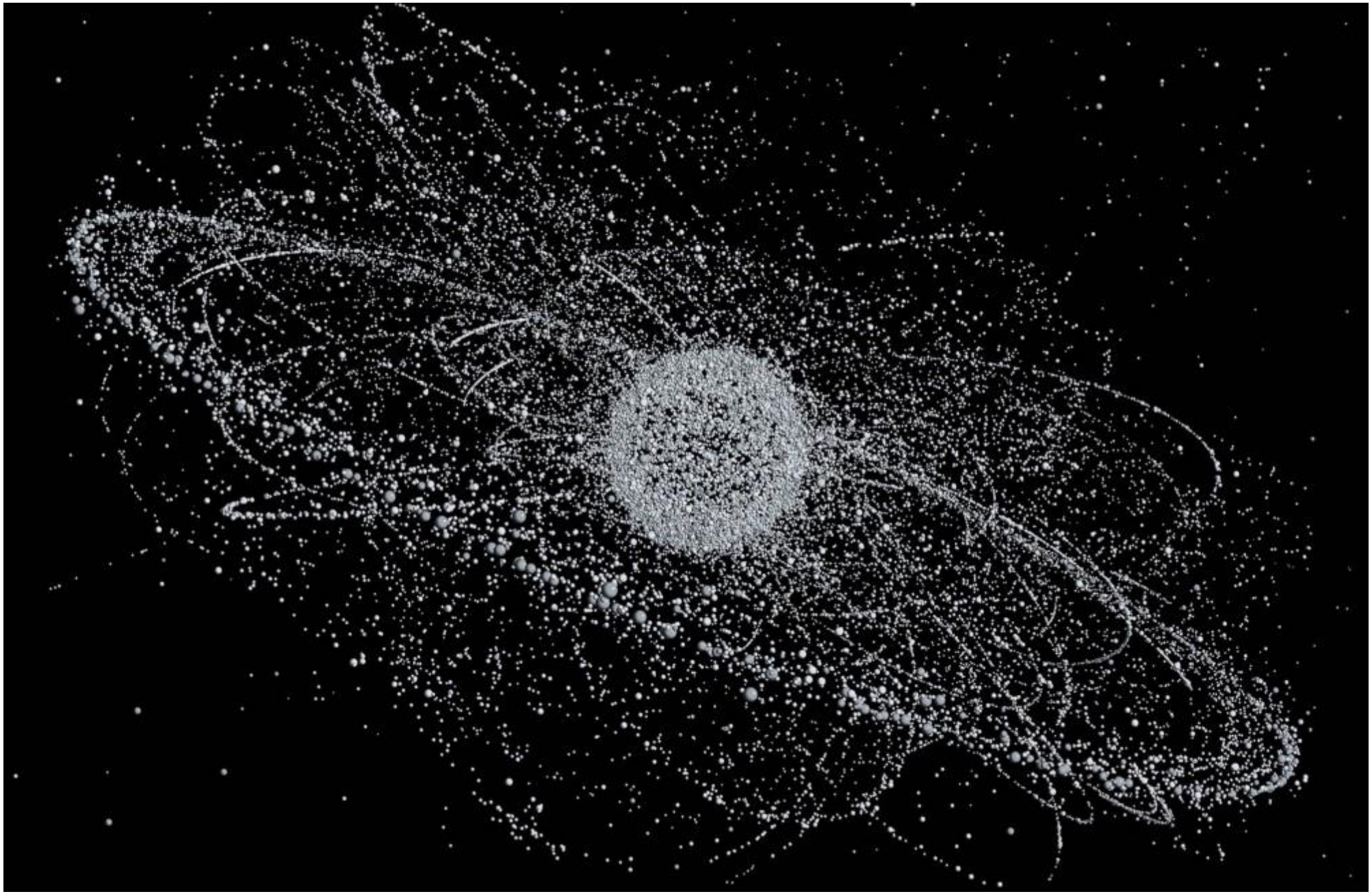
ISON/KIAM RAS OPTICAL TELESCOPE NETWORK

THE RECIPE FOR SUCCESSFUL OBSERVATIONS

- Proper strategy: survey, tracking, etc.
- Optimal planning
- Telescope control
- Image processing
- Remote control
- Accurate timing



ISON/KIAM ORBITAL DATABASE IN 2020

- About 6 thousand objects in high Earth orbits (HEO)
- About 3 thousand objects in geosynchronous equatorial orbits (GEO)
- Orbital data of about 4 thousand of HEO and GEO objects were obtained using ISON/KIAM own optical measurements
- Statistical modelling of space debris environment.

MONITORING OF EVENTS IN GEO

- Post-mission removing
- Insertions
- Close Approaches
- Disintegrations
- Maneuvers

PHOTOMETRY SUMMARY

- Regular photometric observations of objects in LEO/MEO/GEO/HEO starting 2019
- Brightness amplitude resolution: at least 0.1 mag
- Typical exposure time: 1—10 s
- Limiting magnitude: 15 mag for tracking, 12.5 mag for streaks
- Obtained periods: from 0.331 s to ~ 2 h
- Rotation period precision down to 0.001 s
- Light curves for ~200 satellites obtained to date
- Full GEO coverage for photometric observations.

ISON ASTEROID OBSERVATIONS

- Search of new asteroids and comets (missed in the dedicated asteroid surveys with large telescopes).
- Photometry observations of asteroids and comets for studying their physical properties
- Follow-up observations of newly discovered objects
- Participation in the International Asteroid Warning Network campaigns
- In total, 11 telescopes at 9 sites have participated observation campaigns of 59 asteroids and 10 comets throughout 2019—2020