The Astronomical Event Observatory Network (AEON) and Time Domain Follow-up from the Ground and Space
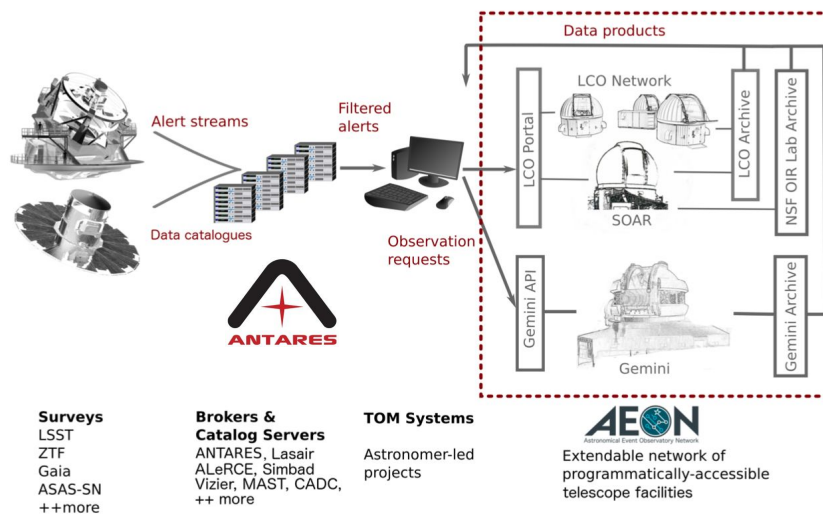
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2020 Decadal Survey: coordinated advances between ground and space facilities are required to understand the dynamic universe:

This poster presents AEON, a ground-based system of telescopes for follow-up, and potential synergies with space facilities.

NOIRLab's ANTARES Broker

Collects, catalogs, & classifies alerts

Users define filters, set watch lists

Output Kafka streams

Actively processing ZTF alerts, scaling to receive the full Rubin/LSST alert stream.

Target Observation Manager (TOM)

Import targets from brokers

Match targets with telescopes, coordinate observations, and manage data.

Easy to create with Las Cumbres' TOM Toolkit.

Expandable via plugins

TDA/MMA Follow-Up Network

Surveys
LSST
ZTF
Gaia
ASAS-SN
++more

Brokers & Catalog Servers
ANTARES, Lasair ALeRCE, Simbad Vizier, MAST, CADC, ++ more

TOM Systems
Astronomer-led projects

AEON
Astronomical Event Observatory Network
Extendable network of programmatically-accessible telescope facilities

Recommendations

Ground and space-based facilities should adopt common standards and APIs to improve software interoperability.

- Machine readable and scalable alert and communication standards: e.g. (Rubin/Kafka/GCN)
- APIs for programmatic observations submission and feedback - TOMs should be able to communicate with both ground and space observatories
- Programmatic data retrieval from archives

Form a working group or advisory committee of TDAMM stakeholders (e.g. NASA, NOIRLab, SciMMA, etc) to:

- Communicate ongoing and new activities
- Provide a forum for community input
- Discuss/coordinate joint facility proposal processes
- Promote and provide training on TDAMM tools

Astronomical Event Observatory Network (AEON)

AEON compatibility:

- APIs for observation requests, observatory feedback
- Queue observing mode
- Data archive with API access

Current members:

- Las Cumbres network
- SOAR 4m (AEON nights) using Las Cumbres' scheduler
- Gemini 2x8m (queue)

Expect to include Rubin in-kind telescope contributions

New Gemini Development

Gemini will better support AEON via the Gemini Program Platform (GPP), the core of a new user experience:

- Easier to use for proposal/ observation preparation
- GN/GS observations in the same program
- Focus on automation
- Scheduler infrastructure
- Code maintainability

The related GEMMA project will deliver:

- Automated scheduler
- Real-time data reduction