

# TACH: Time domain Astrophysics Coordination Hub



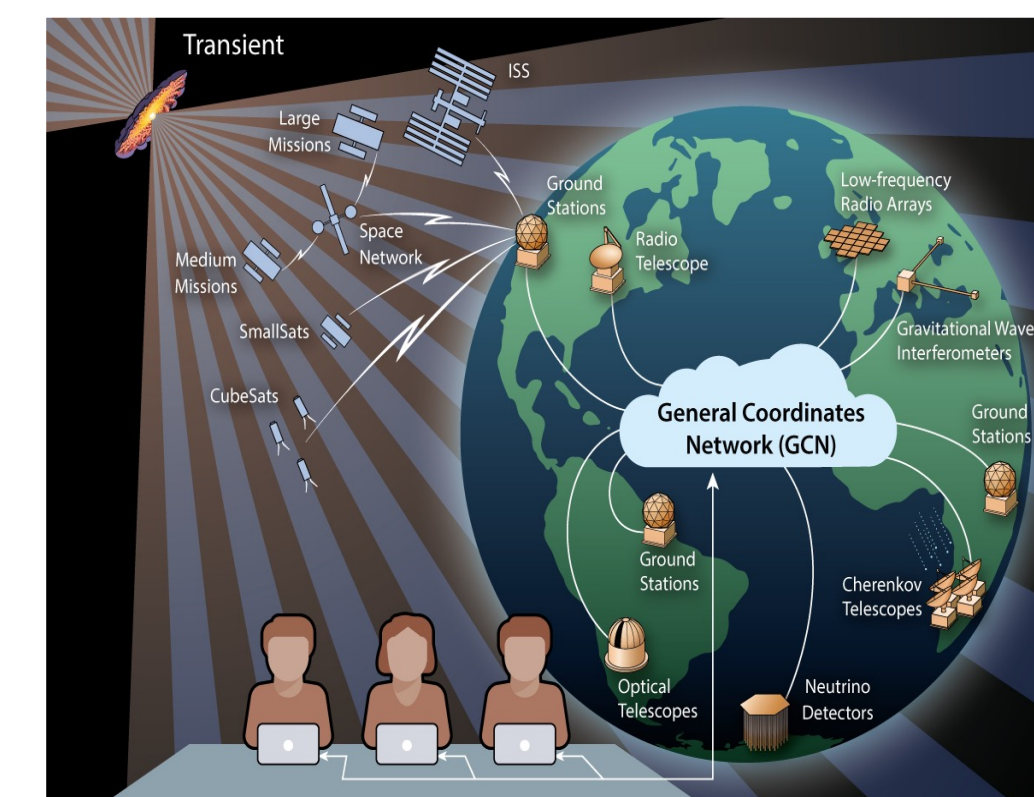
Donggeun Tak<sup>1</sup> on behalf of the TACH team.

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## TACH and the new General Coordinates Network

Principle investigator: Judith Racusin

- Improving the Gamma-ray Coordinates Network (GCN)
- Contributions to multi-instrument use software, including mhealpy
- Modernized alert streams utilizing Kafka and Avro Schema
- Event-based reporting in partnership with the Transient Name Server
- Queryable HEASARC databases, archival and real-time
- Improved useability, including the Web Portal and the GCN Viewer



## A modern update for the backbone of multi-messenger astronomy

Lead: Leo Singer

- One common protocol for all alert formats and types (Kafka)
- Highly available Kafka broker cluster in AWS
- Single sign-on and self-service subscription management through public science portal
- Under testing and will be available by the end of this year

## GRB naming server

Lead: Eric Burns, Ofer Yaron (TNS)

- Automated assignment of GRB Name (GRB YYMMDDX)
- Archival identification tying instrument identifiers to alphabetical name assignment
- Being built by the Transient Name Server, and will be integrated into TACH reporting
- Tied to multi-instrument GRB catalog
- Underlies event-based reporting

## The GCN viewer

Leads: Donggeun Tak, Meredith Gibb

- Event-based database of gamma-ray bursts, gravitational waves, neutrino events
- Full archive and automatic update of all GCN notices and circulars
- Ease of access to full alert information and bibliographic data
- Queryable by event name, event type, date range, and etc
- A prototype of the GCN viewer is publicly available
- Will merge into the new science portal, compatible with the Kafka system



Gamma-ray Coordinates Network Viewer  
Time-domain Astronomy Coordination Hub (TACH)

GCN Viewer - TACH project

The Time-domain Astronomy Coordination Hub (TACH) is a NASA GSFC project aiming to improve upon and build new tools to serve the community in easy exchange of information and to enable coordination for transient and variable sources.

One of an effort is the Gamma-ray Coordinate Network (GCN) Viewer. The GCN Viewer combines 30 years of transient notification, follow-up, and community coordination via GCN with a new real-time database ingesting GCN notices and circulars, and automatically associating them with new GRBs, GWs, neutrinos, or other sources, including detection of the same events by multiple triggering instruments.

Learn more about the TACH project here.

Useful links:

- GCN/TAN System Status
- GCN: The Gamma-ray Coordinates Network
- Subscribe to Notices or Circulars

GCN Viewer Updates:

- The GCN Viewer (v1.1) is updated to add share option for Events and Circulars (January 4, 2022).
- The GCN Viewer (v1.0) is released (November 3, 2021).
- The GCN Viewer (v0.3) is internally presented (March 29, 2021).
- The GCN Viewer (v0.2) is under beta testing (January 28, 2021).

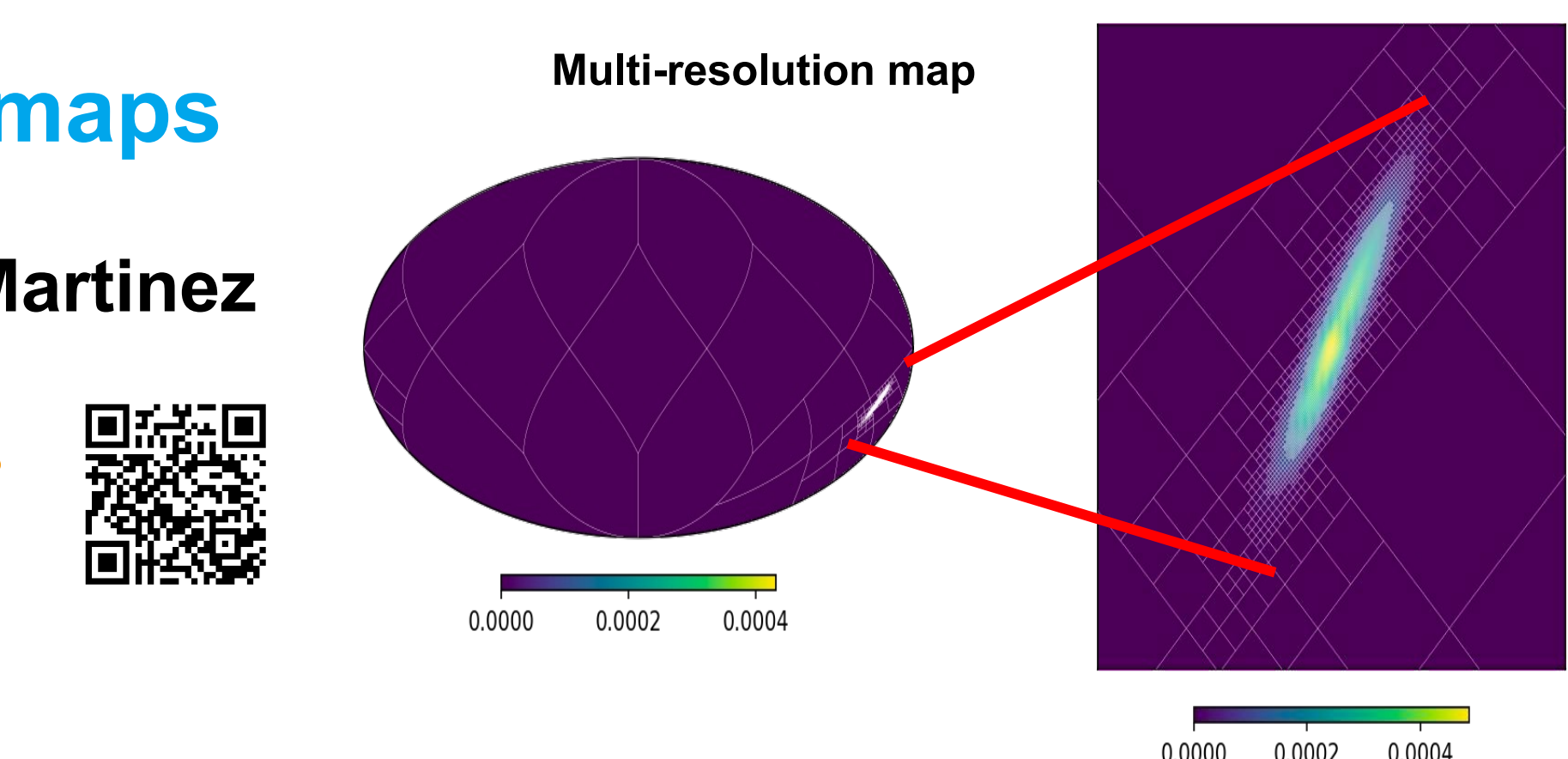
<https://heasarc.gsfc.nasa.gov/tachgcn>

Please send suggestions, questions, feedback, and bug reports to TACH help.

## mhealpy:generalizing the use of healpixmaps

Lead: Israel Martinez

- HEALPix is a discrete all-sky representation that allows for statistical association and combined localizations
- Multi-resolution maps allow for light-weight maps even for sub-arcsecond resolution
- mhealpy is an object-oriented wrapper for healpy, the python implementation of HEALPix (I. Martinez-Castellanos et al., 2022; arxiv:2111.11240)
- Allows use of LVK, Fermi-GBM, IPN, Swift-BAT, and combined maps



<https://mhealpy.readthedocs.io/en/latest/index.html>