

# Public Alerts

LIGO-Virgo Low-latency Analysis Group

# Reminders

- LIGO/Virgo low-latency alerts for transient event candidates
  - Notices and circulars available through the Gamma-ray Coordinates Network (GCN)
  - Event candidates will be publicly available in <https://gracedb.ligo.org>
    - MDC events are there now: [search “category: MDC”](#)
  - There will be no human vetting for **Preliminary** notices
- LIGO/Virgo Public Alerts User Guide & Support
  - <https://emfollow.docs.ligo.org/userguide/quickstart.html> (Version 6; [changes](#))
  - Feedback or requests for information to: [emfollow-userguide@support.ligo.org](mailto:emfollow-userguide@support.ligo.org)
- Mailing list
  - Please sign up to the public openlvem mailing list; anyone can subscribe
  - Instructions at <https://wiki.gw-astronomy.org/OpenLVEM>
  - We will use it to announce changes of configuration, plans, etc

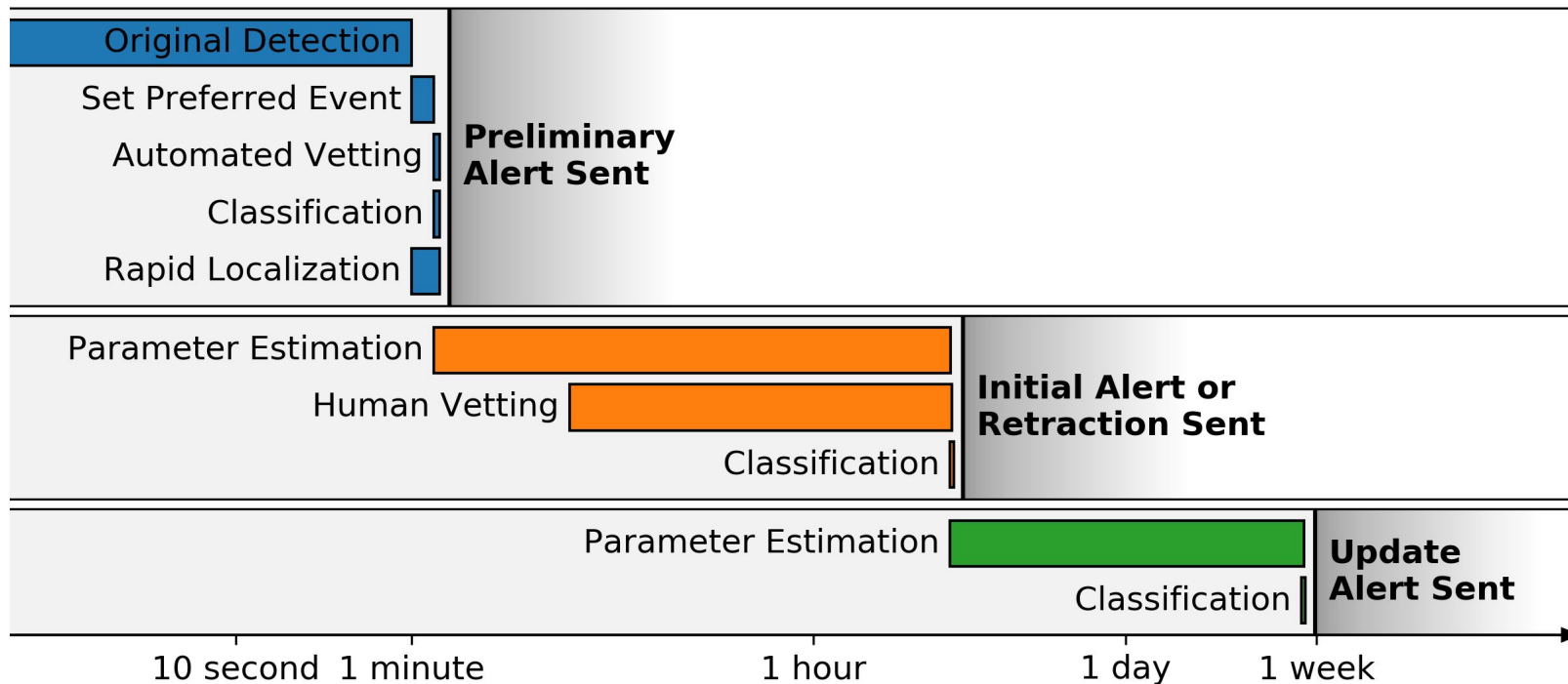
# Current status of low-latency analysis system

- Compact binary and unmodeled burst pipelines are running
  - a. Burn-in period ~days to stabilize background estimation.
  - b. Waiting for enough stable data.
- Pipeline for automated notices is close to complete
  - a. Testing continues; use MDC events for testing purposes.
  - b. End-to-end test is under discussion; nature may provide it for us.
- ER14: public alerts after human vetting for interesting candidates
- O3: transition to automated alerts at the start of O3
- Tests and transitions will be announced on the openlvem mailing list
  - a. Watch that space

# Updated Detection Rate Estimates for O3

- Binary neutron stars (BNS)
  - Up to 1/month of data taken; median is 2/year of data taken
  - Median 90% credible localization 120-180 deg<sup>2</sup>; 12-21% localized < 20 deg<sup>2</sup>
- Binary black holes (BBH)
  - 1/month to 1/week of data taken
- Neutron-star black-hole binaries (NSBH) & other transients
  - Uncertain & unknown
- **LIGO-Virgo target contamination of public alerts**
  - **Contamination ~10% of public alerts across all categories together**
  - **BNS, NSBH & other transients may individually have higher contamination**
  - **False alarm rate set at ~1/(2 months) for binaries and 1/yr for other transients**

# GCN Notice times after a gravitational-wave signal



# Alert contents

<https://emfollow.docs.ligo.org/userguide/content.html>

# Inference: classification

- Five numbers, summing to unity, giving probability that the source belongs to the following five categories:
  - Terrestrial, BNS, MassGap, NSBH, BBH
  - GW150914:  $5e-40$ , 0.00, 0.06, 0.01, 0.93
  - GW170817:  $1e-48$ , 1.00, 0.00, 0.00, 0.00

