



The Retraction of **S190518bb**

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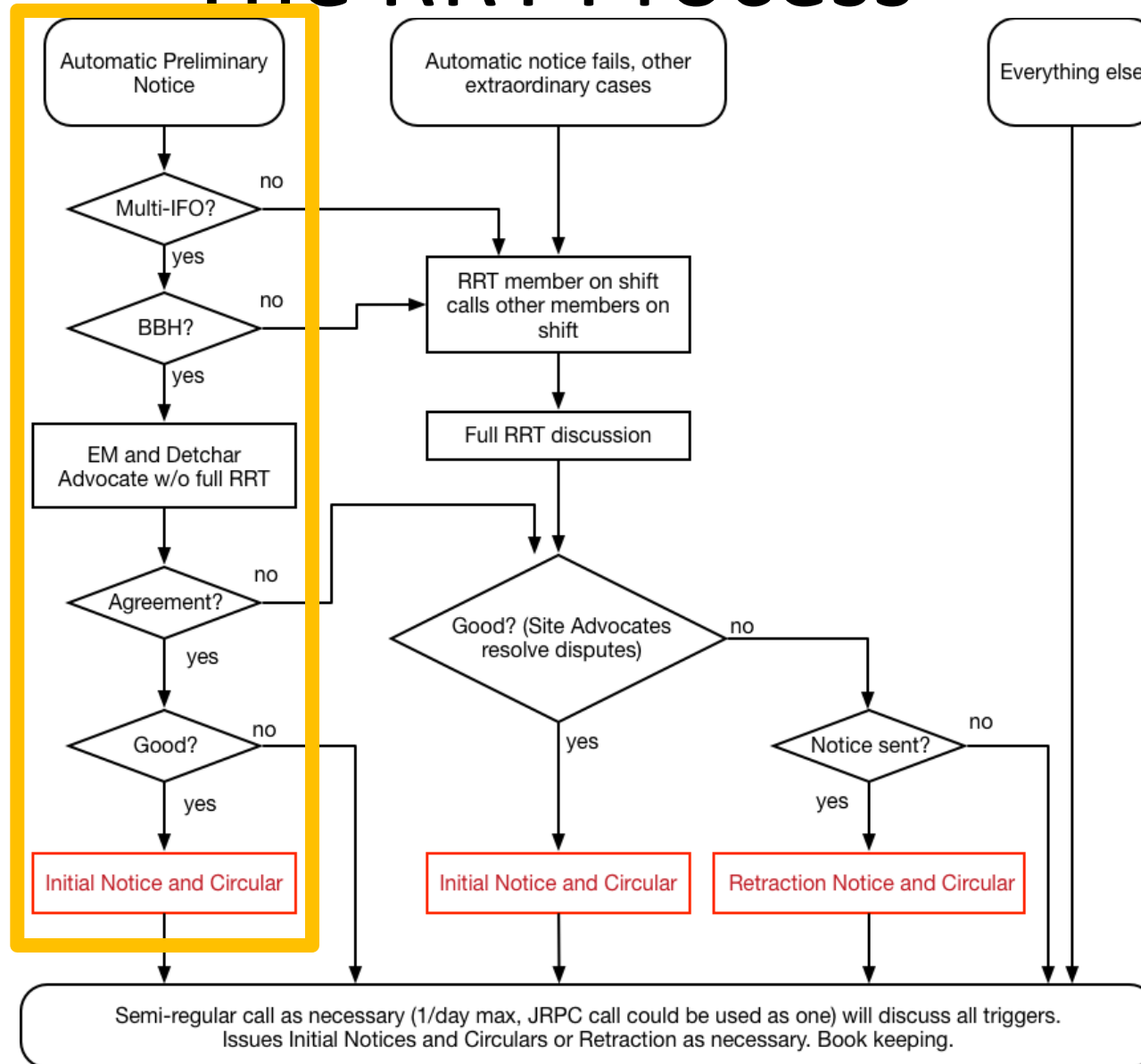
For the LVC



Rapid Response Team

- React quickly to GW candidates found by low-latency search pipelines.
- Composition:
 - Advocate from each site (i.e. Run Coordinator).
 - Low-Latency Advocate
 - Detector Characterization experts from LSC and Virgo.
 - Pipeline Expert
 - GraceDB Expert
 - On-shift operator from each site.

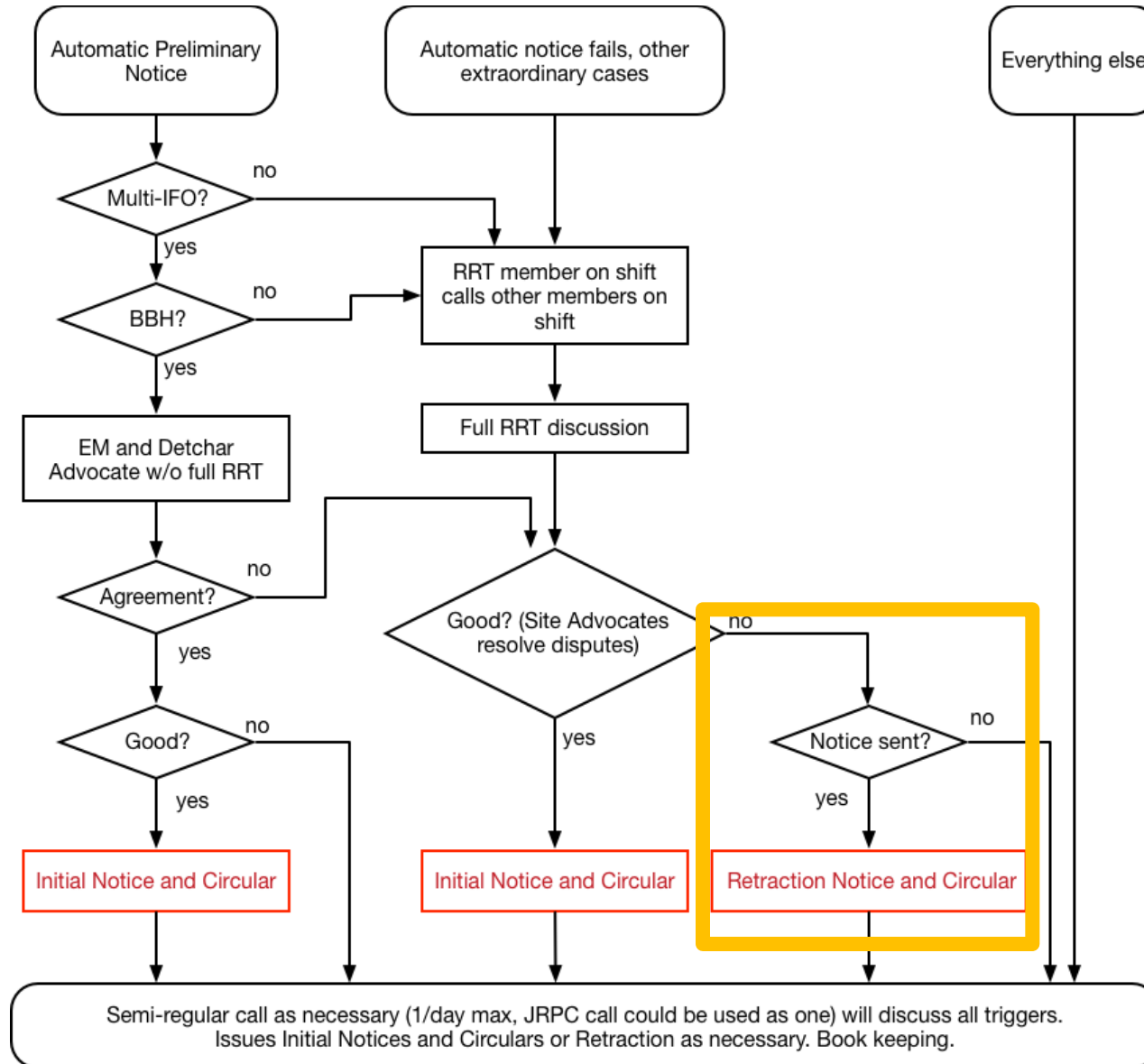
The RRT Process



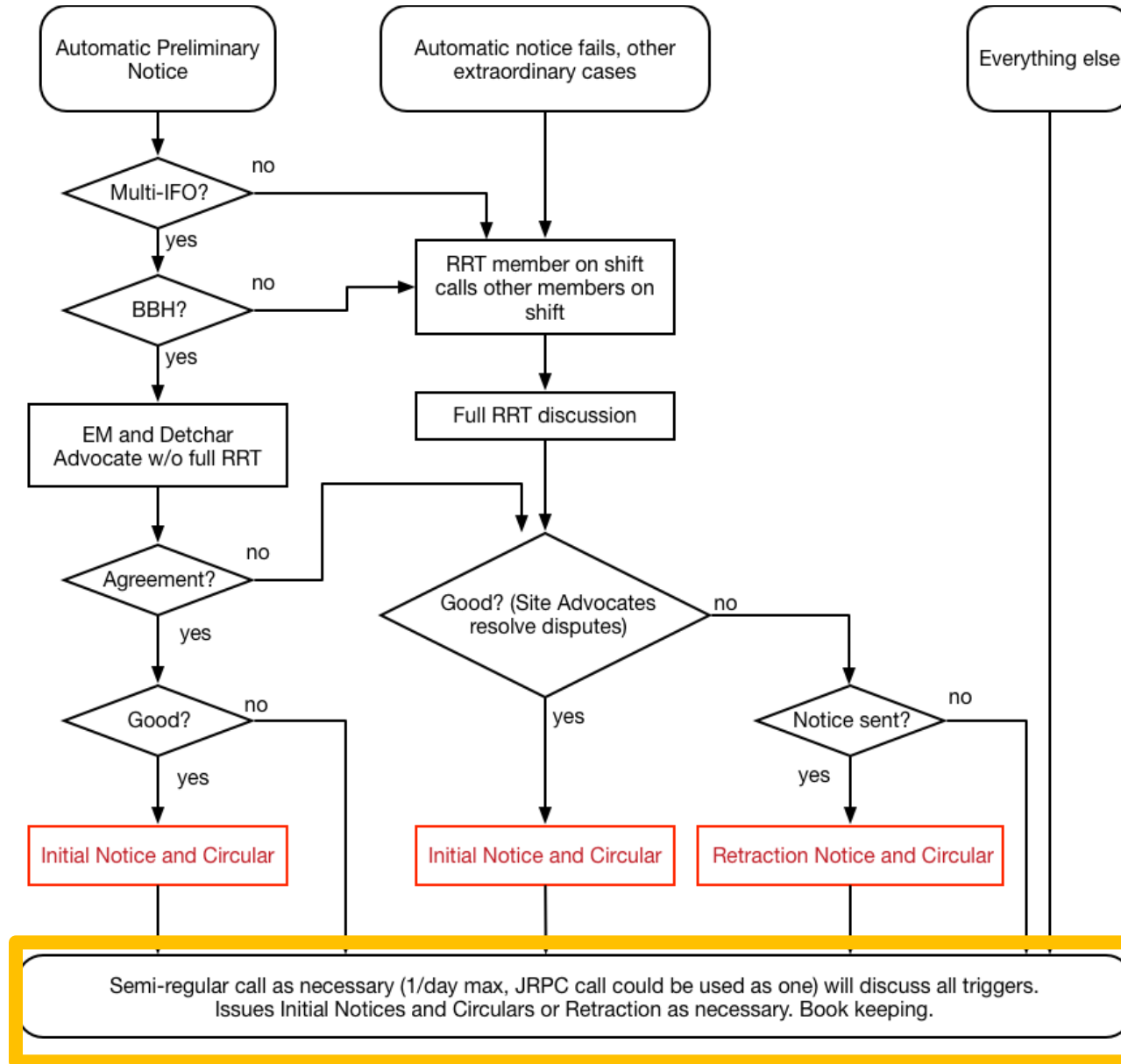
The RRT Process



The RRT Process



The RRT Process



Retraction of S190518bb



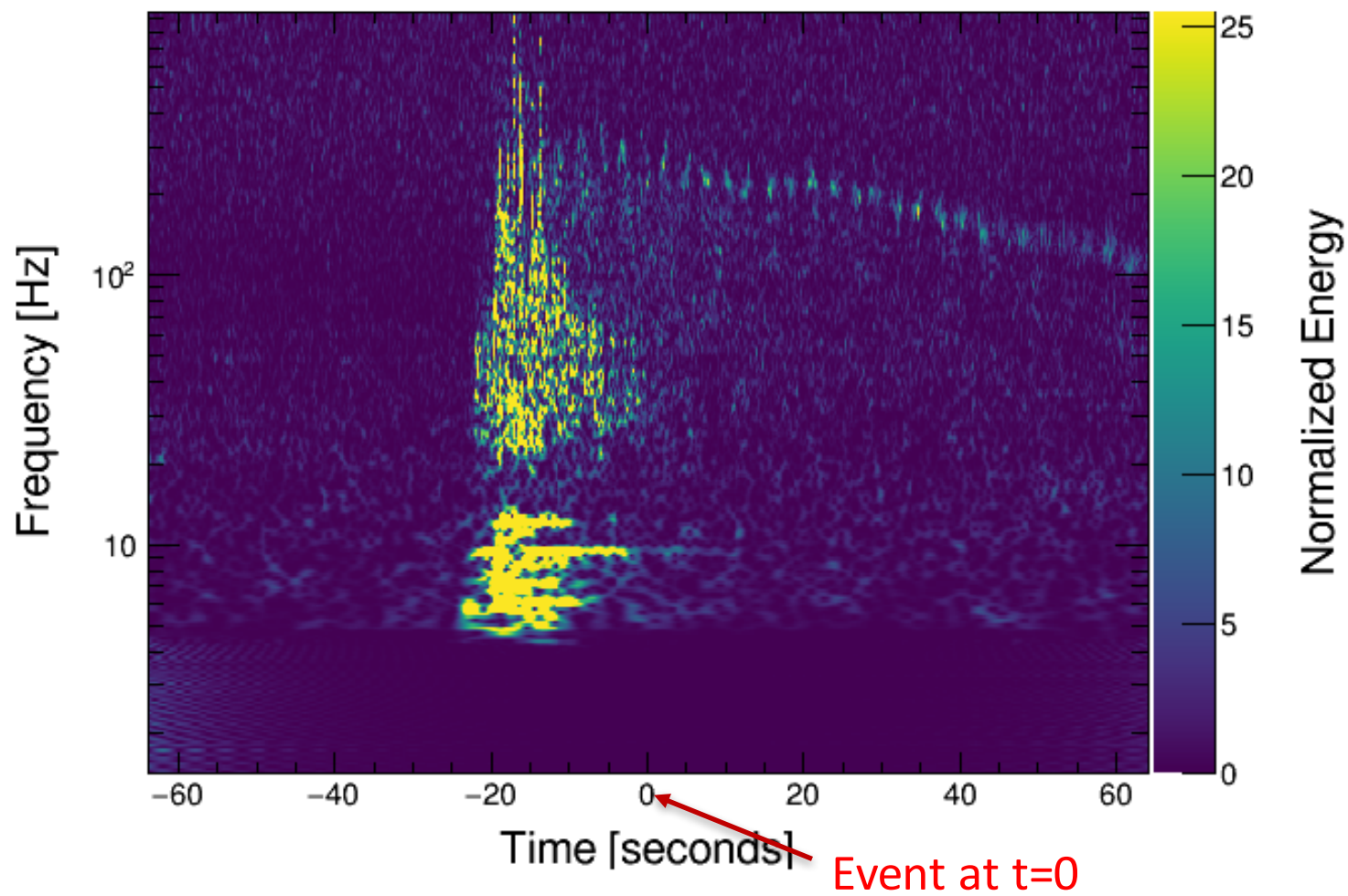
- Seen by all detectors (HLV)
- Preferred event from GstLAL pipeline (also detected by SPIR pipeline).
- Automatic Preliminary Notice was sent ~6 minutes after the event:
 - FAR: $1.004e-08$ [Hz] (one per 1152.6 days) (*one per 3.16 years*)
 - PROB_NS: **1.00** [range is 0.0-1.0]
 - PROB_REMNANT: **1.00** [range is 0.0-1.0]
 - PROB_BNS: 0.75 [range is 0.0-1.0]
 - PROB_TERRES: **0.24** [range is 0.0-1.0]
- NS and Remnant probabilities meant that this event could garner a lot of attention.

RRT Meeting for S190518bb



- Promptly after event (18 May 19 19:19:21 UTC) the RRT met to decide on whether to send an **Initial Notice** and **Circular**, or a **Retraction Notice** and **Circular**.
- Noticed some issues right away:
 - Hanford instrument was dominant contributor to Network SNR for the event.
 - Noise seen in Hanford strain channel starting 20 seconds before the event.
 - LIGO DetChar experts identified it as scattered light noise, usually related to some local seismic activity.

H1:GDS-CALIB_STRAIN,reduced at 1242242379.923 with Q of 45.3



RRT Meeting for S190518bb



- We discussed whether any of our data quality methods were effective in mitigating the noise, and ran some quick tests.
- Pipeline and DetChar experts agreed that the candidate should be retracted due to the effect of the noise.
- Retraction notice sent at 19:57:17 UTC. Approximately **38 minutes** after the event.



Retraction Circular S190518bb

- TITLE: GCN CIRCULAR
- NUMBER: 24591
- SUBJECT: LIGO/Virgo S190518bb: Retraction of GW compact binary merger candidate
- DATE: 19/05/18 20:08:37 GMT
- FROM: Geoffrey Mo at LIGO <geoffrey.mo@ligo.org>

- The LIGO Scientific Collaboration and the Virgo Collaboration report:
- The trigger S190518bb is no longer considered to be a gravitational wave signal.
- The data in LIGO-Hanford was highly non-stationary leading up to the reported trigger time.

The Underlying Cause

- Later examination of the Hanford environmental channels revealed an unusual small-magnitude seismic event.
- Investigations are ongoing.

