

SNEWS Update

Neutrino 2006

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- **What's new since Nu2004**
- **Review of operational mode/nomenclature**
- **Operational mode history**
- **Other news**
- **To do**



**see poster in
tomorrow's
session**

News since last SNEWS meeting at Neutrino 2004

- Server has been running smoothly at BNL,
regular shift checks by SNEWS
'subgroup' members
- Sept 2004: SNEWS technical paper published,
New J. Phys 6: 114 [astro-ph/0406214](#)
- 2004-2005: Operational Mode document
developed, with detailed coincidence
criteria and produced
(see SNEWS working group page)

Reminder of operational mode (version 1.0)

**GOLD alert: clean, unambiguous
AUTOMATED alert, to
experimenters and astronomers**

**SILVER alert: coincidence with
one or more problems, to
experimenters only (NOT lost, just delayed)**

- calibration or other tag on any alarm
- too few in coincidence at distant locations
- history of high rate

Experiments define procedure for each

Review of Definitions

Packet types

PING: test only

ALARM: action depends on level flag

RETRACTION: remove alarm from queue in
time windows (for given expt)

Level flags (decided by individual experiment)

TEST: for test queue

POSSIBLE: for alarm queue, lower quality

GOOD: for alarm queue, all OK

RETRACTED: removal packet (redundant)

OVERRIDE: for alarm queue, confirmed good

GOLD alert must have *all* of the following conditions met: (otherwise, it's SILVER)

1. A two- or more fold coincidence within 10 seconds



(can modify for more experiments)

2. At least two experiments at different laboratories (automatically satisfied in current mode)



3. Two or more alarms flagged as GOOD



4. Rate of alarms in past time intervals for at least 2 experiments involved must not be too high (require $< 1/100$ yr accidental coincidence)



Notes on Rate Lookback Criterion

For intervals $\{T_i\}=\{10 \text{ min}, 1 \text{ hr}, 10 \text{ hr}, 1 \text{ d}, 3 \text{ d}, 1 \text{ wk}, 1 \text{ mo}\}$

require *consistency with $\sim 1/\text{week}$ rate*

For the $\{n_i\}$ alarms sent by each experiment,

require the Poisson probabilities $\{P\}$

$$\mathcal{P}_i = \sum_{n=n_i}^{\infty} (\lambda_{\max} T_i)^n e^{-\lambda_{\max} T_i} / n!$$

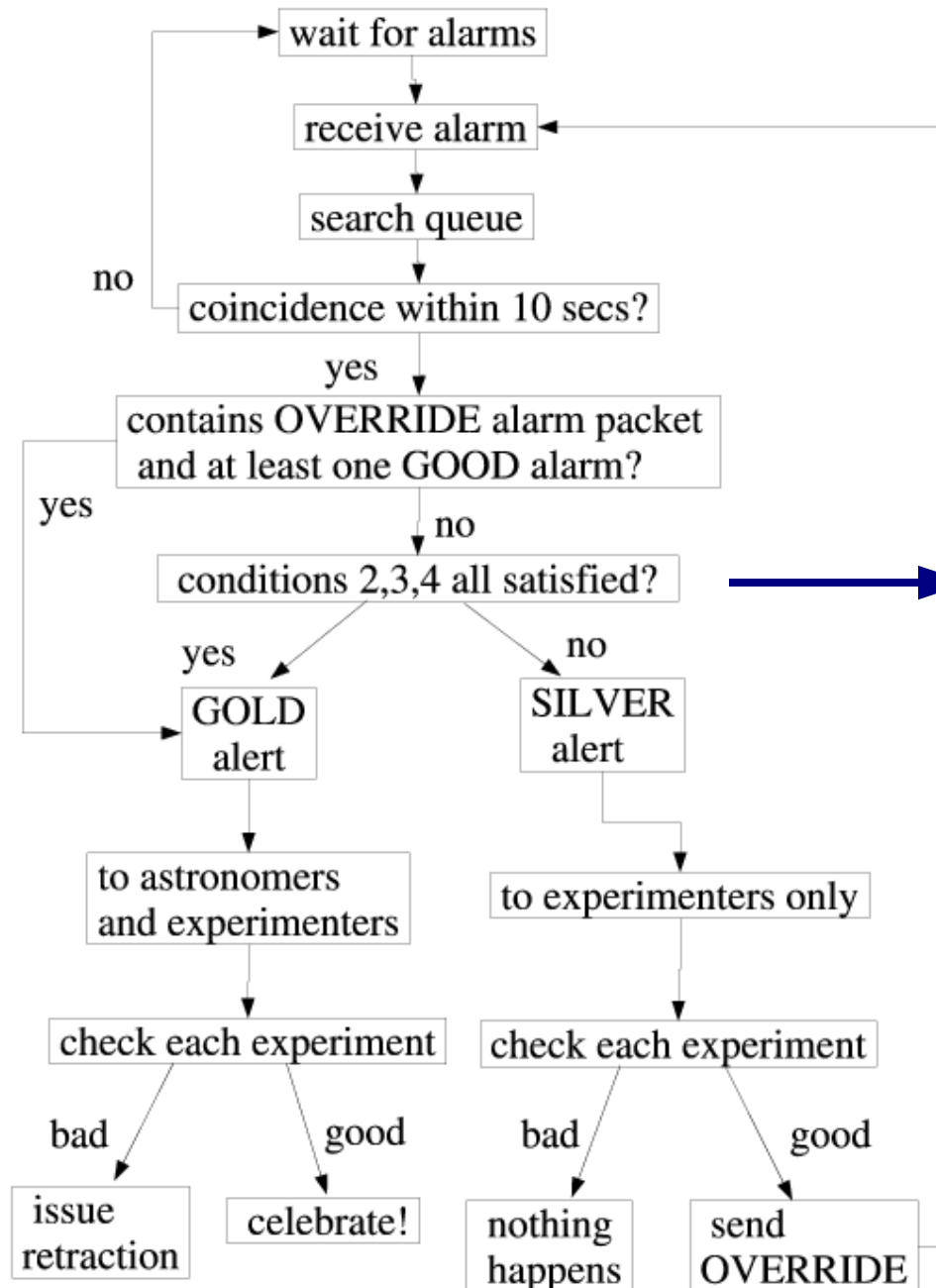
each to be greater than P_{thr}

$P_{\text{thr}}=0.5\%$ corresponds to requirement of

$\{n_i\} < \{1, 2, 2, 3, 4, 5, 11\}$ for each experiment

Operational Mode Summary Flowchart

(see technical paper
for details)



**no past high rate,
all flagged as good,
at least 2 in different labs**

- **AMANDA/IceCube added in June 2005**

- typical time delay 200-600 s
- Iridium satellites with 24 hr coverage

- **Operational mode 2.0 in effect July 1, 2005**

- 4 experiments: SK, SNO, LVD,
AMANDA/IceCube
- 1/week \Rightarrow 1/10 days rate suppression
for $<1/\text{century}$ 2/4 accidental coincidence
- automated output to astronomer
mailing list, Sky & Telescope

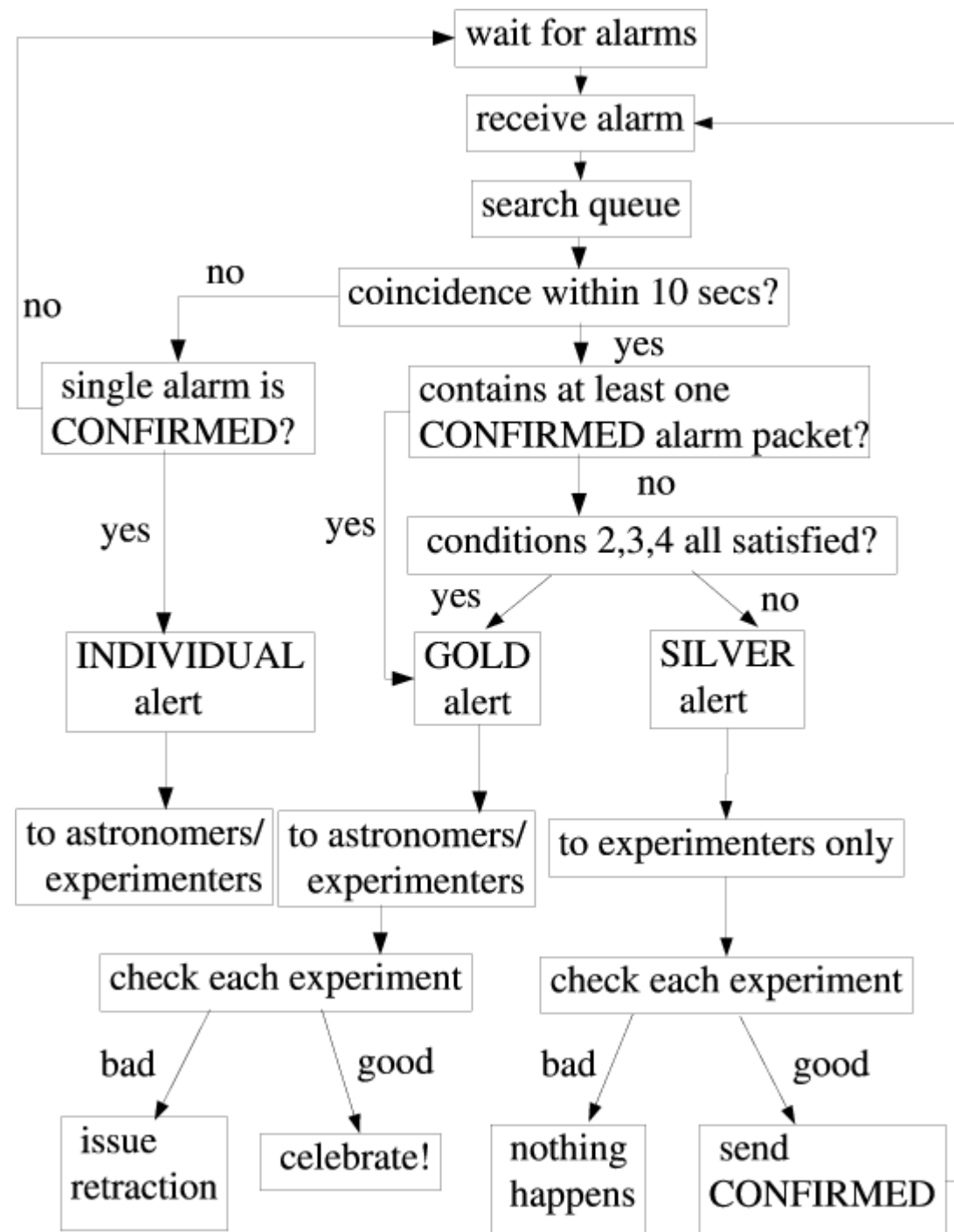
New Operational Mode Document, 3.0

In effect April 16, 2006

Same as the previous version, except:

- new datagram structure allows for additional information (optional):**
 - duration**
 - number of events**
 - direction (RA, dec) + uncertainty**
- OVERRIDE renamed to CONFIRMED**
- INDIVIDUAL alert mode now possible for CONFIRMED alarm: alert forwarded to SNEWS mailing list**

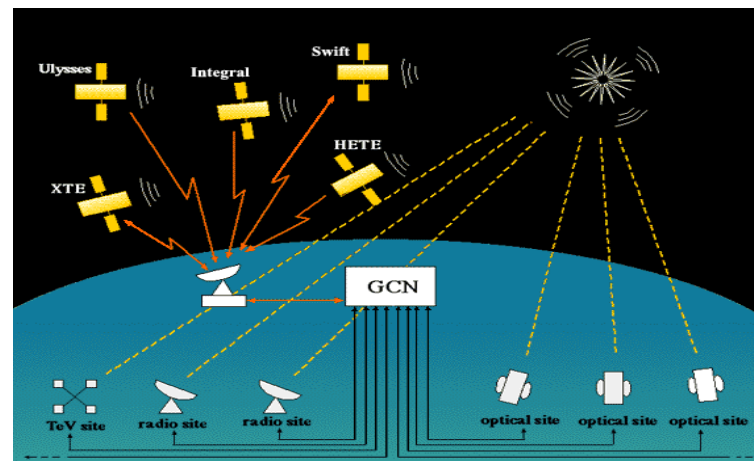
New flowchart



Coincidence code was modified to reflect changes

Other News

- **GCN: GRB Coordinates Network (S. Barthelmy), for fast GRB and other transient followup**



- **Wide network of subscribers with different capabilities (wavelengths, fields of view)**
- **Code for connection written although not yet implemented**
(technical issue, will solve in next few months)
- **Before April 2006: all experiments automated except SNO; SNO input is now automated.**

To Do

- **More experiments; adjust operational mode as experiments are added and leave**
- **Finish setting up GCN connection**
- **Wider connection: International Virtual Observatory Alliance**
- **Gravitational waves: work started to adapt SNEWS code to inter-GW network**

Summary

**SNEWS server running smoothly at BNL;
SK III, LVD, SNO, AMANDA/IceCube
now completely automated input**

**Version 3.0 of operational mode in effect;
includes individual alert mode, so
that if there is no coincidence and a
CONFIRMED alert, experiments can take
advantage of SNEWS alert infrastructure**

Work for wider connection underway