

# ALARM SYSTEMS IN TANGO

## Evolution and Convergence

ALBA Synchrotron  
Barcelona



**PANIC** is a distributed Alarm System for TANGO, developed at **ALBA Synchrotron**. It evaluates user-friendly Rules stored in the Tango DB, executing Actions if needed.

In collaboration with **Elettra Sincrotrone**, it has evolved to adopt **IEC62682** norm and combine existing Tango Alarm Systems, from few alarms to several thousands.

PANIC is currently in use at ALBA, MAX IV, Solaris and SKA institutes, as well as in several private companies.

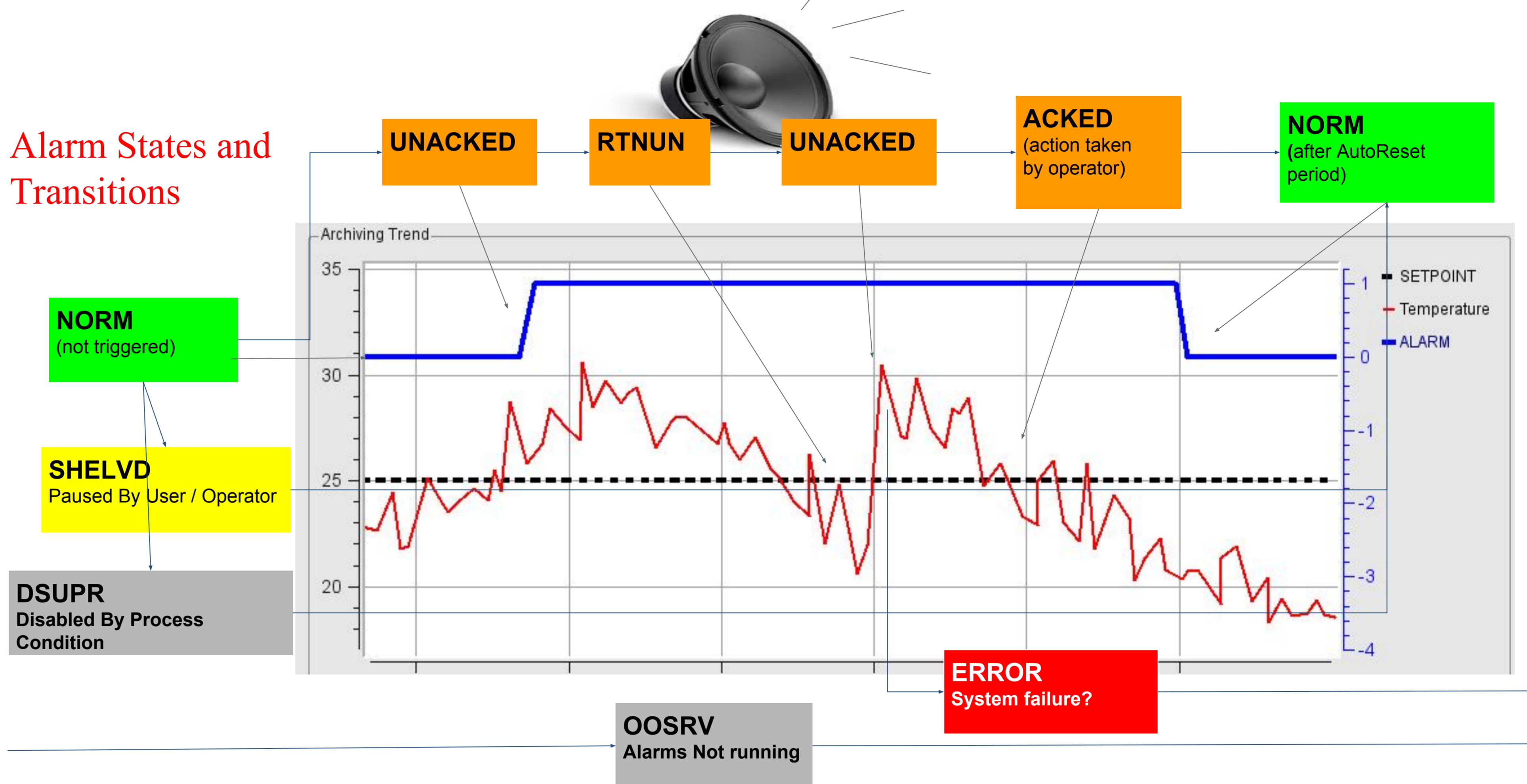
### What's an Alarm System?

IEC 62682:2014 "Management of Alarm Systems for the Process Industries" definition:

- Alarm Systems function is to notify abnormal process conditions and support the operator response.
- The Alarm System is **NOT** part of the protection or safety systems, but complementary to them.
- The Alarm System is part of the Operator Response and the **HMI** (even if non-graphical).

ALARM = My/Control/System/Temperature > My/User/Setting/Setpoint  
ACTION(alarm:command,b1/ct/spkr/Talk,"Temperature is High!")

### Alarm States and Transitions

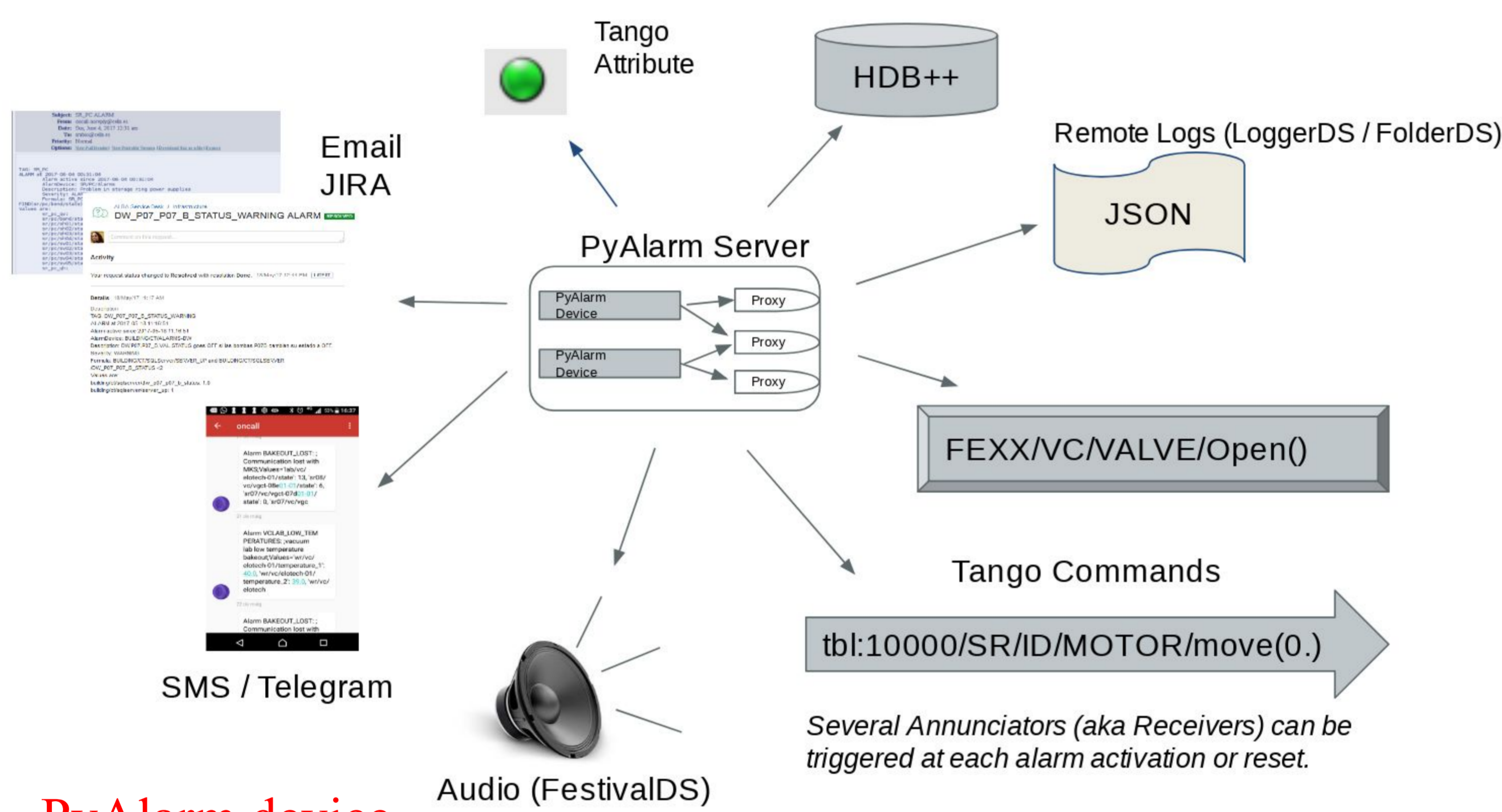


Tango Alarm Systems continuously monitor control variables; evaluating **formulas** on them and triggering state changes and **annunciators** for alarm activation, **acknowledge** and **recovery** (following IEC 62682).

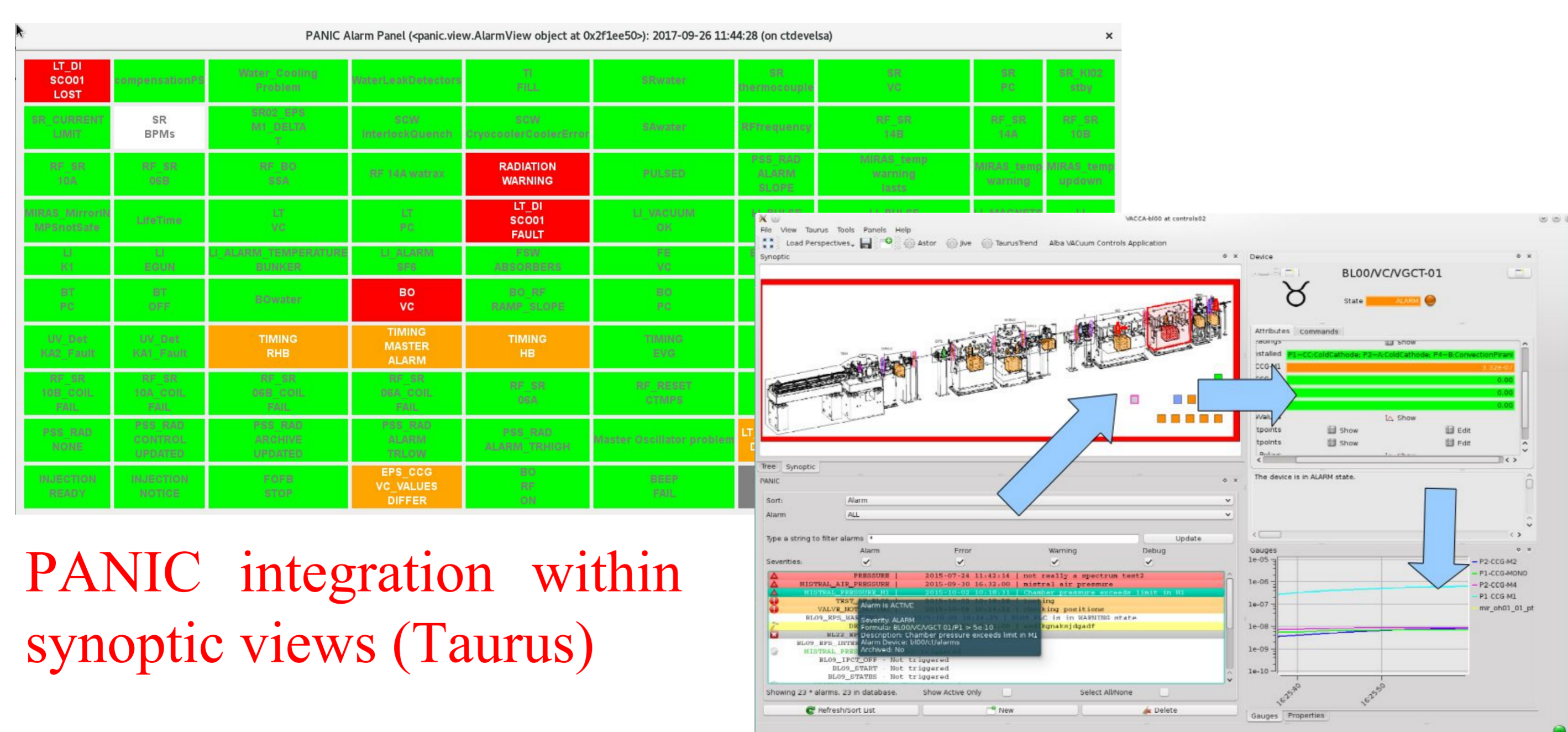
### The PANIC Ecosystem

PANIC API is build on top of two device servers: **PyAlarm** (ALBA, Python, versatile, polled) and **AlarmHandler** (Elettra, C++, fast, event-based). Each device connects to the attributes specified by its rules, triggering actions and on each alarm state transition.

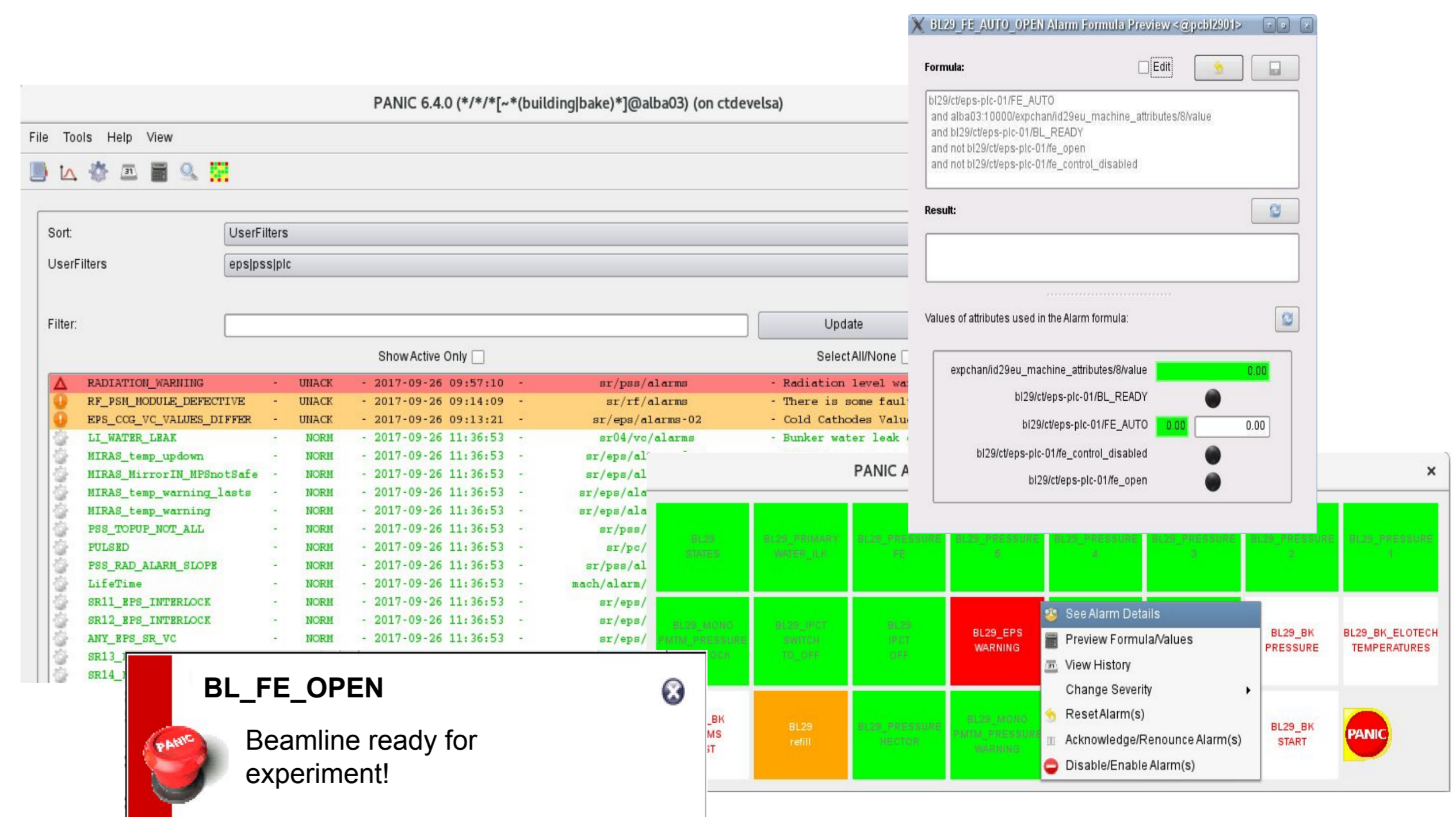
The PANIC API exports the alarm system as a whole and enables external services via TANGO commands: logging, snapshoting, SMS, speech, email, pop-ups and automated response actions amongst others.



PyAlarm device and annunciators



PANIC integration within synoptic views (Taurus)



User experience has heavily influenced GUI development, providing user authentication and customizable user views.



"EVOLUTION AND CONVERGENCE OF ALARM SYSTEMS IN TANGO", PCAPAC 2018, HSINCHU, TAIWAN  
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