



ACROSS Community Support in ROSES-26 and beyond

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The contents of this talk are subject to future decisions by NASA on budgetary and programmatic priorities.

The discussions contained herein are intended to motivate conversation with community such that any future ACROSS funding calls will enhance science, capabilities, or opportunities that the community needs.



Another way of saying this:

- **Part of our core vision for ACROSS is to have funding calls available that enable the community to perform TDAMM science in ways that currently are difficult or impossible**
 - This is all subject to quite a lot of change
 - ROSES-25 looks a lot different than ROSES-24.
 - We don't know what ROSES-26 will look like
- **What exactly we may be able to offer will depend on a number of factors:**
 - The budget allocated to an ACROSS community funding program
 - NASA Programmatic priorities including things like the status of missions and emphasis (workforce development/cyber-infrastructure/AI-ML/Science)
 - The Status of ACROSS infrastructure (e.g. ToO Toolkit, State & Status API Endpoints, ACROSS-TOOLS)
 - The outcomes of this workshop!
 - Etc. etc.



Workshop Outcomes

- The outcome of this workshop is important!
- It's not just a white-paper - we view this as the *potential* start of a regular community-wide collaboration that we aim to support (e.g. **executing these Rare, High-Importance Transient event observing plans, and planning for future iterations of this workshop and white paper**).
- It also demonstrates the need for future capabilities (e.g. **streamlined multi-mission ToO's**)
- Developing cyber-infrastructure and automated decision making capabilities to enable this kind of TDAMM science (e.g. **developing TDAMM community oriented software infrastructure and AI/ML-forward interfaces**).



Funding Call Focuses:

Potentially Shorter Timescale for Implementation

- Executing these Rare, High-Importance Transient event observing plans
- Planning for future iterations of this workshop and white paper

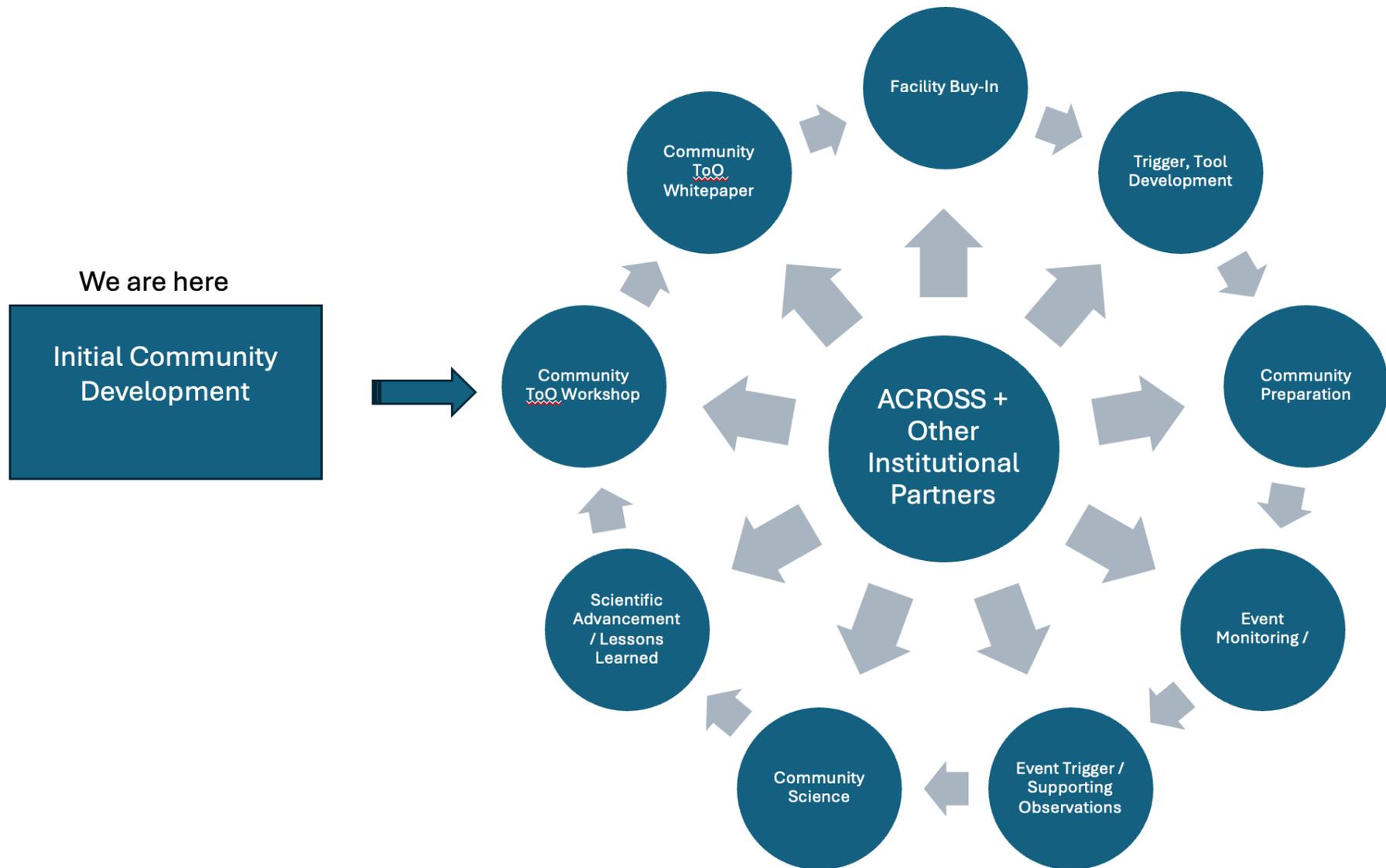
Potentially Longer Timescale for Implementation

- Streamlined multi-mission ToO's
- Developing TDAMM community oriented software infrastructure and AI/ML-forward interfaces

I won't discuss the bottom two possibilities as they are unlikely to be solicited in the short term due to programmatic and budgetary constraints.

ROSES-26+FY27 is the earliest we might expect to be able to roll out the first two

Proposed Rare, High-Important Transient Community Observing Plan Workflow:





Executing Rare, High-Importance Transient Event Observing Plans



Assumptions:

- The community observing plans at this stage are for events that are rare enough that the combined total event rate is $\sim 1/\text{year}$; and where each individual event could be challenging to propose for due to its rarity.
- The community ToO's emphasize early time observations where reducing latency between event and observations is most important
- Scientists can submit GI/ToO's to supplement community observations
- We have to work within the current NASA proposal framework
- This means that the impact on extant GO/GI programs should be low
- An ACROSS community support funding call should make significantly more funding available to the community than is represented by any potential loss of ToO funding for the initial trigger; though it may be in a different format.



Executing Community Observing Plans

- **Community Observing Plans will require some effort to be successful, including:**
 - **Monitoring alert streams for potential events**
 - **Executing the ToO's**
 - **Coordinating with observatories/the community**
 - **Reducing and making the data publicly available**
- **To make sure the community remains at the center of this effort, we need to provide support to the community to carry out much of the above effort.**
- **ACROSS as an organization can support some of this, e.g. [Coordination](#)**
- **Would also like to support science efforts that have difficulty getting funded with current calls - e.g. events with $\ll 1/\text{yr}$ occurrence rate**



Executing Community Observing Plans

- **Community Observing Plans will require some effort to be successful**
 - **Monitoring alert streams for potential events** Community?
 - **Executing the ToO's** ACROSS?
 - **Coordinating with observatories/the community** ACROSS?
 - **Reducing and making the data publicly available** Community?

Science is done by the **community**, coordination can be done by **ACROSS**.
These lines can and will blur, so we **need** to ensure that we have open avenues for communication and feedback.



Two Different Paths

- **Monitoring alert streams for potential events**
- **Reducing and making the data publicly available (on rapid time scales)**

Two Potential Paths for funding the above effort:

- 1. ACROSS Science Leaders - multi-year (though possibly <1FTE) graduate student or postdoc awards to NON-NASA institutions (similar to FINNEST, Hubble) with a “service” component that would obligate a student/postdoc to serve in a “burst scientist” type role.**
- 2. Community Infrastructure teams: Multi-year grants to research groups to develop data analysis pipelines either particular observatories or particular event types, with some commitment to deliver prompt, science ready data products for particular triggers or observations.**

Both of these are well suited to partnering with across funding agencies and could be extended to NOIRLAB/NRAO/etc



ALTERNATIVE 1: ACROSS Science Leaders

- Award should cover service component + some amount of independent research
- Burst-Scientist Service component, duties may include:
 - Monitoring Alert Streams for potential components
 - Communicating with the community via GCN/Slack/etc about potential triggers/trigger execution status with external community members
 - A point of contact for the community to raise issues they can bring to ACROSS
 - Reducing Data, making available to the community
 - Role in In helping organize future TDAMM community workshop

Most of this work is the kind of grad student/postdoc work that is already occurring at some level



ALTERNATIVE 1: ACROSS Science Leaders

- **ACROSS Science Leaders**
 - **N per year awarded, each award X% of a FTE for Y years**
 - **$N * Y * X\%$ FTE total**
 - **How many FTE do we need for this effort?**
- **Funds <50-100?>% of a student/postdoc**
 - **100% awards are better, but in a funding constrained environment we need to ensure we have enough people to cover unexpected leave/sickness and sufficient breadth of expertise for the various science cases and instruments for data reduction**
- **Could be students, postdocs, or a mix thereof**
 - **Intended to be part workforce development, give motivated early career researchers a central place in the community to gain experience and take on leadership roles**
 - **Can help support students/postdocs who work on rare events and struggle with consistent funding streams**

ALTERNATIVE 2: Community Infrastructure Teams



- **Multi-year awards to develop, maintain, and operate pipelines to rapidly reduce and make available data acquired from Community Triggers of Rare, High-Importance Transient Events**
- **Could be focus awards on either reducing a broad spectra of data for a particular type of event (e.g. KNe data); or data from a particular observatory for a broad range of event types (e.g. JWST)**
- **Requirement to commit to a short-timescale turn-around (~hours-days depending on the need/quality) to make science-ready data publicly available**

ALTERNATIVE 2: Community Infrastructure Teams



- **Members of these teams may need to perform duties similar to the “Burst Scientist Duties discussed previously.**
 - **This may mean monitoring alert streams and triaging triggers**
 - **And/Or interfacing with ACROSS on suitability of potential triggers if event based (e.g. is this a likely KNe?);**
 - **And/Or suitability of observatory triggers if instrument based (e.g. does this meet our JWST trigger criteria?).**

Again, *most* of this work is the kind of grad student/postdoc work that is already occurring at some level



Other ways of supporting Observing Plans

Ground-Based Observing Support of RHITE



- **NASA Facilities are necessary but not sufficient to achieve the science goals of many of these events**
- **We could potentially make funding available to make otherwise proprietary data publicly available on short timescales - e.g. part of the “public” community trigger data.**
 - **This would have to be reduced, science ready, and delivered to a public portal on ~hours-days timescales**
- **Should have applicability to a wide range of triggers (e.g 10m-class ToO interrupts, small telescope network time), or be a capability that is crucial to a trigger but currently missing (Rapid Radio follow-up?)**
- **Part of the budget justification could include purchasing telescope time, instrument development, support for students, etc.**



Executing Transient Observing Plans

- **ACROSS Visiting Students/Incubator Program**
 - **SMALL awards to have a student or postdoc work with ACROSS scientists for weeks-to-months during the summer**
 - **Focussed on kickstarting projects using ACROSS API/Tools**
 - **OR integrate into current community tools/workflows**



Planning for Future Iterations of This Workshop and White Paper

Preparatory Science for future White Paper Updates



- Small pots of money to do science to inform future white paper updates
- **MUST** have a hypothesis that could result in a recommendation to change future versions of the white papers, e.g.:
 - light-curve predictions for a new theoretical model
 - Archival study demonstrating particular timescales where more observations of an event are needed
 - Sample study discussing modifying the triggering criteria for likely events
- **MUST** Result in a ~1 page statement recommending (potentially null) white paper modifications
- Could have an explicit theory and observational categories to ensure diversity of input
- Recommendation statements could be reviewed prior to future TDAMM community trigger workshops/whitepapers



Take-aways

- **Our core vision for ACROSS is to have funding calls that support community TDAMM science in ways that are otherwise challenging**
- **In the short term, that is likely to be focussed on enabling the work necessary to make these consensus observing plans a success**
 - **This could be through grad-student/postdoc awards**
 - **or broader community infrastructure development**
- **In the longer term we have a broader scope of work we would like to support, including**
 - **TDAMM Cyber Infrastructure**
 - **Streamlining multi-mission ToO's**
- **What and how we are able to provide depends upon NASA's budgetary and programmatic priorities; and the feedback from you all at meetings like this**



Backup Slides



One thing to keep in mind - lots of constraints

- **Calls for Proposals do not exist in a vacuum**
- **NASA NRA's have institutional constraints.**
 - **Overlap between calls is discouraged - e.g. generally speaking a proposal shouldn't be valid for 2 different calls***
 - **There are institutional and legal requirements that have to be adhered to**
 - **Reviews are expensive, but also required*, as resources must be distributed fairly**