

AraSim Status and Updates

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AraSim – What? Why?

- Simulation package for ARA
 - Parametrized shower model
 - RF emission
 - in-ice propagation
 - antenna
 - electronics (trigger, digitizer)
- Simulate the full signal chain
- Understand the response of the detector to our target flux

Where?

- Instructions for checking out at
 - <http://www.physics.ohio-state.edu/~connolly/AraSim/arainstr.html>
- Subversion repository
 - svn – username yourusername co
 - <https://delos.mps.ohio-state.edu/RadioSim/AraSim/AraSim>
- Contact Amy Connolly to get username and password (connolly@physics.osu.edu)

AraSim – How? Pt. 1 (Prerequisites)

- Root
- Boost
- Sqlite3 (for ara station geometry)
- AraRoot (only if you want data-like output and deployed station geometry information)
 - Needs sqlite3

AraSim - How? Pt. 2 (Running)

- Install prereqs, Checkout code from repository
- Compile – “make”
- Run – “./AraSim”
- If errors show up out of the box, contact Carl Pfendner (pfendner.1@osu.edu) or Amy Connolly

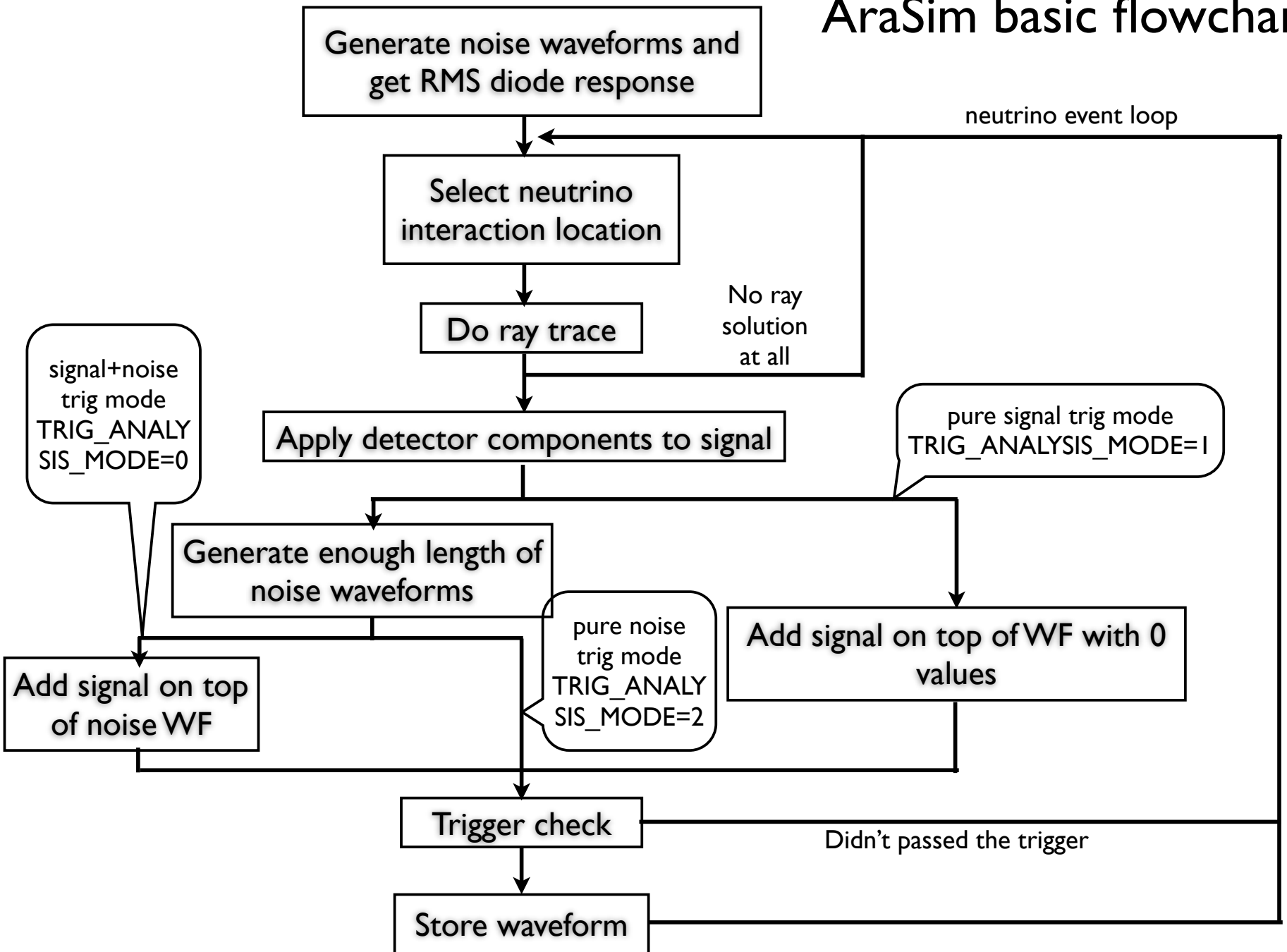
How? Pt. 3 – Customize Your Runs

- To change run parameters, change values found in the target setup file, e.g.
 - NNU
 - EXPONENT
 - POWERTHRESHOLD
 - POSNU_RADIUS
- In AraSim folder, two user guides with some guidelines on how to use AraSim/change parameters
 - AraSim_doc.pdf
 - UserGuideTex/AraSimGuide.pdf
- Comments about new updates to the code in log.txt
- List of flux models
 - README_EXPONENT (which EXPONENT is which flux model)

What? Pt. 1 – Basic Structure

- Repository
 - branches (personal versions of AraSim)
 - releases (official versions of AraSim, still version 1.0)
 - trunk (most recently updated version, not necessarily stable/correct)
- Main source file: AraSim.cc
- Sub classes source/header files: Settings.cc, Detector.cc, Report.cc, Events.cc, ...
- Default variable setting file: setup.txt (setup folder)
- Main output file: ./outputs/AraOut.root
- Flux models: ./fluxes/

AraSim basic flowchart



Updates

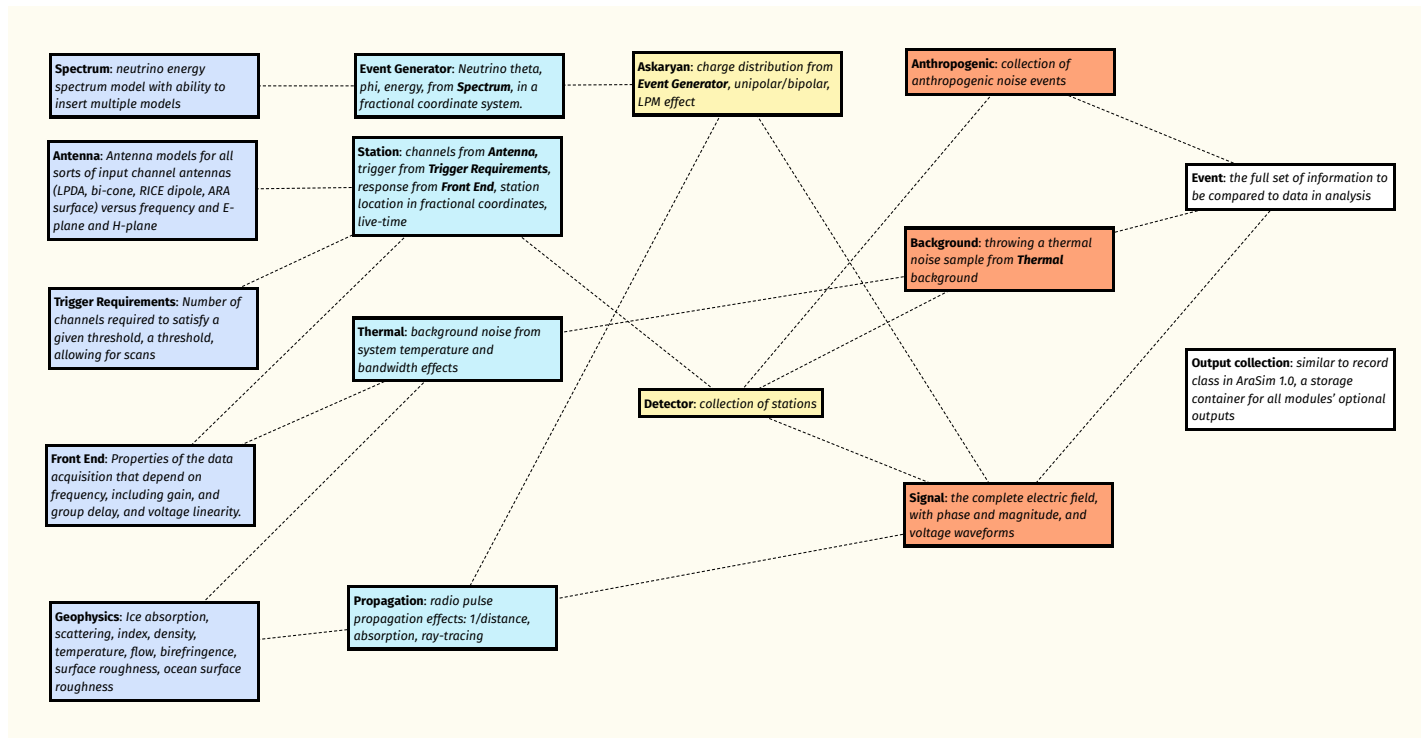
- Already implemented
 - Implemented station A2 and A3 geometry
 - Using already for tests of analysis methods
- Planned/in development
 - Noise calibration for A2/A3
 - Modularization
 - Ease of modification
 - Improvements to RF emission model
 - Improvements to antenna models
- AraSimQC – Brian Clark will discuss next

Noise and Threshold Calibration

- Model after the method used to calibrate the Testbed simulation to data
- Best fit of gains, temperatures
 - Rayleigh fits to each frequency bin
- Threshold calibration may need something a little more complicated than the Testbed
 - the thresholds are servo-ed, somewhat time dependent

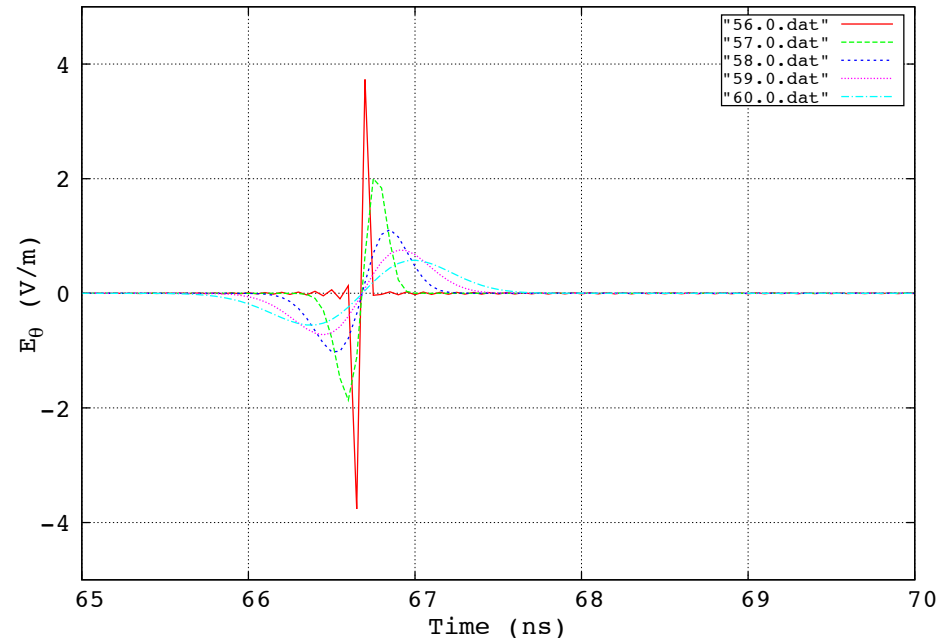
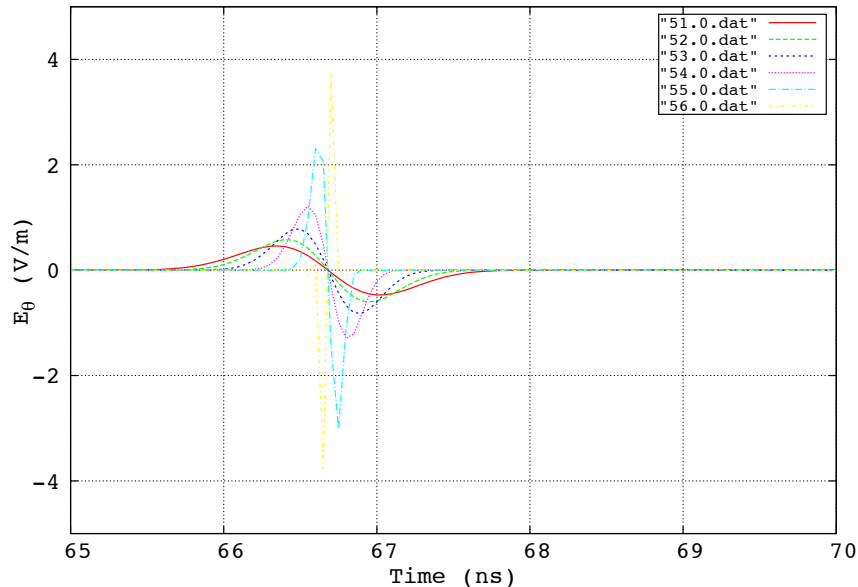
AraSim Modularization

- Jordan Hanson - New CCAPP (Center for Cosmology and Astroparticle Physics) fellow at OSU
- Working together - plan on developing AraSim modularization



In Progress

- Based on Ralston 2002
- Attempts to properly take into account near field and far field properly



Backup slides