**NEAR TERM**

From UNAC 1.1 – to – UNAC 1.2

- More QA work & tests of whether solid-earth tides are significant
- See Benson's presentation

UNAC verifications efforts per JAC discussions:

1) Duplicity check
   - checks against WDS, 4th Interferometric, SBC9, etc.
   - visibility modeling of selected archival NPOI data
     * e.g., 9 stars of Bill Hartkopf's concern (100's of night of visibility data that could be potentially checked) *(obvious place for NRL/Lowell assistance)*

2) URAT+1.3m bootstrap comparison
   - 1.3 m obs background stars w/UNAC stars in gaps b/w detectors
   - URAT (UCAC4) positions of background stars to determine differential reference frame coordinates
   - 1.3 m measurement + ND9 camera to observe target star and place on differential reference frame.

3) Direct UNAC—URAT comparison

4) Position comparison of radio stars

**SHORT TERM**

<u>After UNAC is published, then what?</u>

* Per likely discussions at 8-9 Sept AD-NOFS "astrometry summit" meeting, future UNAC and UBAD observing more directed towards corroboration of Gaia bright star astrometry.

* What expanded role for NPOI multiplicity surveys of bright stars (in "imaging mode") & binary observations?

<u>To-Do list before capable of re-starting UNAC observations:</u>

* RECOAT/REINSTALL ALL 4 SIDEROSTAT CAT'E-EYES
  - small NOFS vacuum chamber

All 4 metrology "coops":

* Need to service all coop vacuum pumps

* Flush & refill coop chillers and heat exchanger/heater boxes

* Install new coop temperature controllers

* Seriously seal the pier-to-pier tunnels to prevent rodent entry

* Repair 4 damaged optical anchors, align all (25)

* Realign 5-metrology (21)

* Remove some extraneous cabling & check room seals

**Scheduling & Productivity of Future UNAC Observations:**

* For UNAC 1.1., less holidays, there were 637 nights available for observing.

* Some data were collected on 408 nights of the 637 scheduled nights (64%).

* Applying a ≥ 80 scans/night cut leaves 186 nights (186/637 = 29%) before starting pipeline processing.

* These ratios are roughly consistent with the oft-quoted statistics that 1/3 of all nights in Flagstaff are completely lost to bad weather, 1/3 are "partly cloudy," and 1/3 are clear all night.

* Pipeline filters for bad seeing, < 3 working siderostats, usable 5-beam metrology, etc. further reduced the number of nights to ~ 81.

* With additional filtering rigor, there were only 60 unique nights that contributed to the final UNAC 1.1 results (59 stars), implying an "observing efficiency" ratio of 59/637 ~ 0.1 star/scheduled night in final catalog!

**HOWEVER:**

* We now know that continuing to observe in astrometry mode with < 3 astrometric stations (per spec output) is *pointless*. In the future, if we can't observe with "locked" baselines, then we should immediately switch to imaging!!!

* Ideally, we stay in centered feed mode and do astrometry when the seeing is good. As a fall back, we make switching to/from centered-feed mode (w/ wo/Cterm metrology) EASY.

* In the past, we were also very conservative in # of nights each star was observed (up to 20-25 nights!). UNAC 1.1 stats indicate ~12 good nights probably adequate.

* Following these "rules" could have a big effect on long-term wide-angle productivity, perhaps getting us back towards 1/3, instead of 0.1 of nights contributing really usable data.

**THEREFORE:**

*An Example:* Were we to schedule 180 nights/year for UNAC observations, but strictly follow above rules, we might get 60 *good* nights/year and expand UNAC to 400+ stars in 5-6 years (with lots of partial nights "converted" to various imaging programs).

**Installation of 1.8m telescopes (a rough schedule; current CNMOC budget numbers)**

FY15 ($2.0M):
- Fences & road mods for 4 stations
- Buildings/domes/piers/electrical for 3 stations

FY16 ($3.7M):
- Contract for installation of 3 telescopes in domes
- New telescope control system contract (based on PC_SIDcons)
- Contract for vacuum feed system (2 new vacuum can designs)
- Purchase AO system components

FY17 ($4.5M):
- Cterm & telescope metrology component purchases
- IR beam combiners & fringe tracking prototypes
- Full automation of LDL alignment
- Upgrade control building facilities

FY18 ($4.4M):
- Final array integration & test (including metrology)
- Installation of AO upgrades at each telescope
- 1.8m array operations & maintenance

FY19 ($2.5M):
- 1.8m array operations & maintenance