

Date: January 31, 2013

To: U.S. Naval Observatory (USNO)

Topic: Quarterly report for period: October – December 2012

Solicitation Number N00189-12-R-Z082

Contract Number N00189-12-C-Z065

Issuing Office DODAAC N00189

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**Statement of Work**

1. Maintain overall operational readiness of the 10-antenna VLBA as required to carry out observations as described here, including configuration management and control, infrastructure, station and receiver maintenance.
2. Maintain overall operational readiness of the VLBA correlator for the processing of global geodetic observations for maintenance of and improvements to the Celestial Reference Frame (CRF).
3. Provide up to 550 hours per year (1.5 hours per day) of high priority access to the VLBA. This access will include making the Mauna Kea (MK) and Pie Town (PT) VLBA antennas available for observations with the dual-band S/X system for determination of the UT1-UTC parameter. VLBA operations will schedule and observe such daily observations within an 8-hour observing window as specified by USNO. Recorded data will be made available to USNO operations for transfer to a correlator specified by USNO (usually in Washington) for rapid data processing.
4. Provide priority back-up correlator operations using NRAO’s VLBA software correlator in case of failure of the USNO correlator.
5. Maintain the CRF cooperatively with the USNO through support of the bi-monthly “RDV” observations. Data products will be made available to USNO in the both the FITS-IDI and Mark4 data formats.
6. Deliver all quasar data correlated by the VLBA correlator to the VLBA data archive for universal public access after expiration of the NRAO established proprietary period (currently 1 year).
7. Maintain a post-correlation data processing capability for analysis of quasar observations. At the present time this will be through the Astronomical Image Processing System (AIPS). Over the performance period of this contract this may change to the Common Astronomy Software Applications (CASA) package, in which case a overlap period suitable for validation of CASA will be ensured.

**UT1-UTC Phase-in period:** Initial observations at a cadence of no less than 4 observations per week will begin upon start of the contract (nominally July 20, 2012). Routine daily observing will begin 45 days later (August 29, 2012). Initial Operating Conditions status will be achieved within 60 days of start (September 19, 2012).

**Provisions for downtime:** VLBA antennas have a high but not 100% uptime. Downtime is usually caused by one of two factors: extreme weather (especially, but not exclusively, at Mauna Kea) and periodic maintenance. When predictable, NRAO will give advanced warning to USNO. Some options for downtime recovery exist and will be made available to USNO on request on a best effort basis. These likely include, but may not be limited to:

1. A temporary shift in the 6 hour observing window.
2. Densification of observing after recovery
3. Observations made with one or both of the MK and PT stations being replaced by other VLBA stations.
4. If only one of MK and PT is down the other may be used to augment geodetic observations made with other US or international antennas.

**Contract Period of Performance:** July 20, 2012 to July 19, 2017

**Deliverables**

1. Recorded data made available within 2 hours of completion of UT1-UTC observations for transfer directly from recording systems at MK and PT VLBA antennas
2. Correlated data in both FITS-IDI and Mark4 formats as produced by the VLBA correlator from bimonthly observations made by VLBA and other VLBI antennas around for the purpose of maintaining and improving the CRF. Data will be made available within 1 month of observing.
3. Quarterly reports to USNO regarding the status of implementation and operations in support of this contract.

**Daily Observations**

NRAO performs daily observations using the Mauna Kea (MK) and Pie Town (PT) VLBA antennas. The observations are made using the dual-band S/X system for determination of the UT1-UTC parameter. VLBA operations schedules and observes daily observations within an 8-hour observing window as specified by USNO. Recorded data is available to USNO operations for transfer to a correlator specified by USNO (usually in Washington) for rapid data processing. Daily observation data collection started in August 2012.

# Daily Observation Reports

* [August 2012 Report](https://safe.nrao.edu/wiki/pub/NM/Electronics/USNOVLBASupport/August_USNO_Report-1.xlsx)
* [August 2012 Report - USNO feeback](https://safe.nrao.edu/wiki/pub/NM/Electronics/USNOVLBASupport/August_USNO_Report-USNO_feedback.xlsx)
* [September 2012 Report](https://safe.nrao.edu/wiki/pub/NM/Electronics/USNOVLBASupport/Sept_2012_USNO_Report.xlsx)
* [October 2012 Semi-Monthly Report](https://safe.nrao.edu/wiki/pub/NM/Electronics/USNOVLBASupport/Oct_2012_USNO_Semi-Monthly_Report.xlsx)
* [October 2012 Full Report](https://safe.nrao.edu/wiki/pub/NM/Electronics/USNOVLBASupport/Oct_2012_USNO_Report.xlsx)
* [October 2012 Full Report - USNO Feedback](https://safe.nrao.edu/wiki/pub/NM/Electronics/USNOVLBASupport/Oct_2012_USNO_Report-feedback.xlsx)
* [November 2012 Full Report](https://safe.nrao.edu/wiki/pub/NM/Electronics/USNOVLBASupport/Nov_USNO_Report.xlsx)
* [November 2012 Full Report - USNO feedback](https://safe.nrao.edu/wiki/pub/NM/Electronics/USNOVLBASupport/2012-11_USNO_Report_feedback.xlsx)
* [December 2012 Full Report](https://safe.nrao.edu/wiki/pub/NM/Electronics/USNOVLBASupport/Dec_2012_USNO_Report.xlsx)
* [December 2012 Full Report - USNO Feedback](https://safe.nrao.edu/wiki/pub/NM/Electronics/USNOVLBASupport/2012-12_USNO_Report_feedback.xlsx)

The October, November and December reports follow. There was 1 day, October 25 where Pie Town data were unavailable. There was 1 day, November 14, where data were unavailable from either site and in December all data were collected.





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**Monthly Meetings**

Monthly meetings are held on the second Thursday of every month. Meeting notes are posted on a WiKI page, <https://safe.nrao.edu/wiki/bin/view/NM/Electronics/WebHome>. The meeting notes from the November 8, 2012 meeting is given here as an example.

**USNO VLBA Support Meeting**

November 8th, 2012 Time 11 pm Socorro, 1pm Eastern

Phone: 575-835-7170

USNO Attendees: Ken, Chris

NRAO Attendees: Steven, Peggy, Ephraim, Doug Gerrard

Agenda

* Previous Action items
  + **﻿NRAO**﻿: C-band update in November by Walter - Tabled
  + **NRAO**﻿: Have a partial observation report posted - Done
* Review of Monthly Summary of Daily Observations - Peggy
  + 2 issues (one is N2999 below)
    - N2298 (Oct 24) had 22? of 28? runs observed
    - Resolution is uncertain and needs to be determined. **﻿Action: Walter**﻿ **& Peggy to determine cause & options**
* N2999 Delayed due to maintenance - options for future?
  + Rx was warmed up day before due to maintenance and did not cool down in time.
  + Could NRAO have submitted LA as the site and sent pack. **Action: USNO to discuss this**
  + ﻿﻿
* C-band report - Walter
  + Wide-band C-band instead of S/X
  + **Tabled so that USNO can have Walter present**﻿
* Open issues
  + High Speed Internet Add-on RFQ was received and is in process. Current contract ends in December.
  + After Walter's visit, we should get a summary next meeting. **﻿Action: Walter**﻿
  + RDBE is installed at all sites now.
  + NRAO plans to give USNO a Thanksgiving observation
  + Is mid-month report needed? No, only monthly reports going forward.