# VSOP PROPOSAL COVER SHEETS

ID :

TR :

SR :

DEADLINE : 17 November, 1995
SEND TO : VSOP SOG, ISAS, 3-1-1 Yoshinodai, Sagamihara, Kanagawa 229, JAPAN

Please read Appendix C of Announcement of Opportunity for details on how to fill in this Cover Sheet.

**(1)** Date prepared : 4 November 1995

**(2)** Proposal title : Brightness Temperature Measurements of Two Very Compact Sources

| **(3)** | INVESTIGATORS | INSTITUTION |
|---|---|---|
| P.I. | Roger P. Linfield | Jet Propulsion Laboratory |
| co-I. | James S. Ulvestad | Jet Propulsion Laboratory |
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**(4)** Principal Investigator (or contact person) details...


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**(5)** Proposal Abstract :


We propose to observe two of the four most compact sources studied at 2.3 GHz in the TDRSS space VLBI experiments: 0420−014 and 1519−273. The purpose is to make accurate measurements of the brightness temperatures of these sources at both 1.6 and 5 GHz. By observing with the VLBA on the ground, our calibration accuracy (due to uniform, well-understood ground antennas, and to the multiple crossing points available with good u-v coverage) will be superior to that expected for the VSOP survey. For the most compact sources, good calibration accuracy on the longest space-ground baselines is crucial in making accurate brightness temperature measurements.

**(6)** Proposal Category (indicate all that apply):

Object type:

☑ AGN, ☐ Masers, ☐ Stellar, ☐ Other :

Experiment type:

☑ Single-observation, ☐ Monitoring, ☐ Polarization,
☐ Time-critical, ☐ Target of Opportunity, ☐ Other :

**(7)** VSOP spacecraft observing mode (see Section 3 and Table 5 of the VSOP Proposer's Guide):

☑ 2 channel x 16 MHz, 2-bit (Standard mode),
☐ 2 channel x 32 MHz, 1-bit,
☐ 1 channel x 32 MHz, 2-bit

Phase calibration tones:

☑ On (Standard continuum mode),
☐ Off (Standard spectral line mode)

(Include justification of any non-standard choice at (14) below)

**(8)** Ground radio telescope setup

Polarization :

☑ VSOP Standard (IEEE LCP), ☐ Non-standard :

Recording mode :

☑ As for VSOP spacecraft (Standard), ☐ Other :

**(9)** Investigator participation in scheduling

☑ PI (or co-I) wishes to participate in scheduling ground radio telescopes
☐ PI (or co-I) wishes to participate in scheduling the space radio telescope

**(10)** Preferred correlator (see Sections 9.11 and 12 of VSOP Proposer's Guide):

☐ No preference, ☐ Mitaka, ☑ Socorro, ☐ Other :

**(11)** Preferred post-correlation data analysis location:

☑ Home Institution, ☐ Mitaka, ☐ NRAO AOC, ☐ JIVE, ☐ Other

**(12)** Post-correlation data analysis assistance required:

☑ None, ☐ Consultation, ☐ Extensive help

**(13)** Details of proposed experiments

An 'experiment' is one or more observations of one source in one wavelength band.
A request to observe the same source in all 3 wavelength bands requires 3 columns to be filled in.
To observe the same source at the same frequency multiple times – a 'monitoring experiment' – requires only one column to be filled in.
Number of experiments in this proposal: 4

| | Experiment 1 | Experiment 2 | Experiment 3 | Experiment 4 |
|---|---|---|---|---|
| Source name | 0420−014 | 0420−014 | 1519−273 | 1519−273 |
| RA (hh mm ss.s) | 04 23 15.8 | 04 23 15.8 | 15 22 37.7 | 15 22 37.7 |
| Dec (dd mm ss) | −01 20 33 | −01 20 33 | −27 30 11 | −27 30 11 |
| J2000 or B1950? | J2000 | J2000 | J2000 | J2000 |
| Observing frequency band (GHz) | 1.6 | 5 | 1.6 | 5 |
| *Continuum observations:* | | | | |
| Standard VSOP freq. channels? | ☑ | ☑ | ☑ | ☑ |
| Channel A range (MHz) | | | | |
| Channel B range (MHz) | | | | |
| *Spectral line observations:* | | | | |
| Ch.A spectral line rest freq. (MHz) | | | | |
| Ch.A LSR velocity (km/s) | | | | |
| Ch.B spectral line rest freq. (MHz) | | | | |
| Ch.B LSR velocity (km/s) | | | | |
| Min. spectral channels per IF channel | | | | |
| Correlator averaging time (sec) | | | | |
| FWHM of field of view required (mas) | | | | |
| No. of correlating passes (if >1) | | | | |
| Measured total flux density (Jy) | 1.6 | 4.4 | 1.5 | 1.8 |
| Measured correlated flux density on > 5000 km baseline (Jy) | 1.0 | 2.8 | 1.0 | 1.2 |
| Image RMS needed (mJy/beam) | 5 | 5 | 5 | 5 |
| *Ground Radio Telescopes:* | | | | |
| *Preferred choice:* | | | | |
| Number of medium telescopes | 10 | 10 | 10 | 10 |
| Number of large telescopes | 0 | 0 | 0 | 0 |
| Suggested array given at Item (14) | ☑ | ☑ | ☑ | ☑ |
| *Minimum acceptable:* | | | | |
| Number of medium telescopes | 6 | 6 | 6 | 6 |
| Number of large telescopes | 0 | 0 | 0 | 0 |
| Suggested array given at Item (14) | ☐ | ☐ | ☐ | ☐ |
| *Length of observation:* | | | | |
| Preferred length (orbits) | 3 | 3 | 3 | 3 |
| Minimum acceptable length (orbits) | 2 | 2 | 2 | 2 |
| *Scheduling constraints*: | | | | |
| Preferred P.A. of beam *major* axis (deg) | | | | |
| 'No holes' $(u,v)$ coverage? | ☑ | ☑ | ☑ | ☑ |
| *Or* maximum resolution $(u,v)$ coverage? | ☐ | ☐ | ☐ | ☐ |
| Preferred range of dates for scheduling (for monitoring experiments give range for 1st observation only) | 97-02-10 to 97-03-15 | 97-02-10 to 97-03-15 | 98-04-01 to 98-05-31 | 98-04-01 to 98-05-31 |
| *For monitoring programs*: | | | | |
| Number of observations | | | | |
| Mean interval (days) | | | | |
| Acceptable variance from mean (days) | | | | |

**(14)** Additional notes to the scheduler :

1) VLBA is preferred array because superior calibration gives more accurate $T_b$, and because of possibility of rapid frequency-switching (see Note 4 below).
2) Correlated flux densities are estimated using total flux densities and 2.3-GHz visibilities found in TDRSS experiments: 0.63 at 1.4 Earth diameters for 0420−014, and 0.66 at 2.0 Earth diameters for 1519−273.
3) If VLBA is used, only two orbits are required if judicious scheduling picks the 13-hour period when sources are up at VLBA.
4) Simultaneous 1.6- and 5-GHz observations (one 16-MHz channel each) are acceptable to reduce use of space and ground resources. We would use one VSOP channel at 1.6 GHz and one at 5 GHz. Ground telescopes would switch between 1.6 and 5 GHz roughly every 10 minutes. Sources are strong and compact enough that SNR is not a problem.
5) Narrow time window on 0420−014 to get crossing points.

**(15)** Attach a scientific and technical justification, not in excess of 2 pages of text and 2 pages of figures. Up to one page of $(u,v)$ plots per source may optionally be included.
(Refer to the VSOP Announcement of Opportunity for detailed instructions.)
Preprints and reprints will not be forwarded to the Scientific Review Committee.

Send two paper copies of the complete proposal to:
VSOP Observing Proposals
VSOP Science Operations Group
Institute of Space and Astronautical Science
3-1-1 Yoshinodai, Sagamihara
Kanagawa 229 JAPAN
In addition, e-mail the completed LaTeX file to submit@vsopgw.isaslan1.isas.ac.jp

Cover Sheets of accepted proposals will be made available to the astronomical community.

**Proposals must be received at ISAS by 17 November 1995**