# 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 : 10th. November, 1995

**(2)** Proposal title : The parsec-scale and sub-parsec scale jet of Virgo A

| **(3)** | INVESTIGATORS | INSTITUTION |
|---|---|---|
| P.I. | Bill Junor | University of New Mexico |
| co-I. | John A. Biretta | Space Telescope Science Institute |
| co-I. | Frazer N. Owen | National Radio Astronomy Observatory |
| co-I. | Mitchell C. Begelman | University of Colorado / JILA |
| co-I. | | |
| co-I. | | |
| co-I. | | |
| co-I. | | |
| co-I. | | |

**(4)** Principal Investigator (or contact person) details...

Name : Bill Junor
Address : IfA, Dept. of Phys. & Astro.
: University of New Mexico
: 800 Yale Blvd., N.E., Albuquerque
: NM 87131, USA

Internet : bjunor@astro.phys.unm.edu
Other e-mail :
Fax : 505-277-1520
Telephone : 505-277-2616

**(5)** Proposal Abstract :

We propose to image the bright radio jet in Vir A (3C274) within $\sim 5\,pc$ of the core at both $\lambda 6\,cm$ and $\lambda 18\,cm$ to investigate the detailed morphology of the knots and limb-brightened features. This will provide insights regarding the initial collimation of the jet, its interaction with the external medium, and the nature of stationary features in this relativistic flow. The proposed observations would complement an extensive program of Earth-based observations, either in hand or to be scheduled soon.

**(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:

| | Experiment 1 | Experiment 2 | Experiment 3 | Experiment 4 |
|---|---|---|---|---|
| Source name | 1228+126 (Vir A) | 1228+126 (Vir A) | | |
| RA (hh mm ss.s) | 12 30 49.42358 | 12 30 49.42358 | | |
| Dec (dd mm ss) | 12 23 28.0440 | 12 23 28.0440 | | |
| J2000 or B1950? | J2000 | J2000 | | |
| Observing frequency band (GHz) | 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) | 50 | 10 | | |
| No. of correlating passes (if >1) | | | | |
| Measured total flux density (Jy) | 180 | 70 | | |
| Measured correlated flux density on > 5000 km baseline (Jy) | 1.0 (unresolved) | 1.0 (estimated) | | |
| Image RMS needed (mJy/beam) | 0.1 | 0.1 | | |
| *Ground Radio Telescopes:* | | | | |
| *Preferred choice:* | | | | |
| Number of medium telescopes | 20 | 16 | | |
| Number of large telescopes | 4 | 4 | | |
| Suggested array given at Item (14) | ☑ | ☐ | ☐ | ☐ |
| *Minimum acceptable:* | | | | |
| Number of medium telescopes | 10 | 10 | | |
| Number of large telescopes | 2 | 2 | | |
| Suggested array given at Item (14) | ☐ | ☐ | ☐ | ☐ |
| *Length of observation:* | | | | |
| Preferred length (orbits) | 4 | 4 | | |
| Minimum acceptable length (orbits) | 3 | 3 | | |
| *Scheduling constraints*: | | | | |
| Preferred P.A. of beam *major* axis (deg) | 291 | 291 | | |
| '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) | 97-05 to 97-07 | 97-05 to 97-07 | to | to |
| *For monitoring programs*: | | | | |
| Number of observations | | | | |
| Mean interval (days) | | | | |
| Acceptable variance from mean (days) | | | | |

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

We wish to produce images at both $\lambda 6\,cm$ and $\lambda 18\,cm$ that we can compare with the images produced from the global $\lambda 18\,cm$ campaign. Those observations most recently achieved image r.m.s. noise of $\sim 0.3\,mJy/beam$ with arrays of $\sim 16$ antennas which included at least the EVN + VLBA + several other antennas. Consequently, this plus several Pacific antennas + South Africa constitute our preferred array. The preferred large antennas are (Jodrell or Madrid), Green Bank, Goldstone, and Tidbinbilla. The minimum array is the VLBA + Goldstone.

Depending on the array which can be provided, the observation could be scheduled in either June - July 1997, og June - July 1998. The former gives better resolution, but would require more antennas for a reasonable image.

The core has a flat spectrum. Correlated flux density on baselines $> 5000\,km$ at $5\,GHz$ has been estimated from $\lambda 18, 1.3\,cm$ VLBI.

**(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**