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 : 10. November 1995

(2) Proposal title : Physics of the Jet in Quasar 3C 345 at Light-Year Resolution

(3)	INVESTIGATORS	INSTITUTION
P.I.	J. A. Zensus	NRAO
co-I.	A. Lobanov	NRAO
co-I.	S. C. Unwin	Caltech
co-I.	K. J. Leppänen	Metsähovi
co-I.		
co-I.		
co-I.		
co-I.		
co-I.		

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

Name : J. A. Zensus
Address : NRAO
: 520 Edgemont Road
: Charlottesville, VA 22903-2475
: USA

Internet : azensus@nrao.edu
Other e-mail :
Fax : [1] (804) 296-0278
Telephone : [1] (804) 296-0231

(5) Proposal Abstract :

We propose VSOP imaging of the quasar 3C 345 (3 epochs at 18 cm, 3 at 6 cm, and 8 at 1.3 cm). Building on our ongoing ground monitoring campaigns, this project will enable us to study this archetype of a high-luminosity, core-dominated, superluminal source with unprecedented angular resolution, and to constrain models for the physical properties of parsec-scale radio jets. Our observational objectives are: (1) Measuring the epoch of occurrence, flux and size evolution, trajectories, velocities, and accelerations of superluminally moving regions; (2) Superior dynamic-range/resolution imaging of the complex jet brightness structure (total and polarized intensity and spectral index distribution); (3) Measuring the relative location and size (or an upper limit thereof) of the thus far unresolved central region; (4) Imaging the linear polarization intensity and determining the magnetic field strength and its spatial distribution along the jet.

(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 : DUAL POLARIZATION

Recording mode :

☐ As for VSOP spacecraft (Standard), ☑ Other : 4 channels x 16 MHz, 2-bit

(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: 3

	Experiment 1	Experiment 2	Experiment 3	Experiment 4
Source name	3C345	3C345	3C345	
RA (hh mm ss.s)	16 41 17.6080	16 41 17.6080	16 41 17.6080	
Dec (dd mm ss)	39 54 10.820	39 54 10.820	39 54 10.820	
J2000 or B1950?	B1950	B1950	B1950	
Observing frequency band (GHz)	1.6	5	22	
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)	8.0	5.2−13.2	4.6−18.5	
Measured correlated flux density on > 5000 km baseline (Jy)	4.3	1.2−2.8	1.0−5.3	
Image RMS needed (mJy/beam)	0.6	0.8	1.5	
Ground Radio Telescopes:				
Preferred choice:				
Number of medium telescopes	10	10	10	
Number of large telescopes	1	1	2	
Suggested array given at Item (14)	☐	☐	☐	☐
Minimum acceptable:				
Number of medium telescopes	7	7	7	
Number of large telescopes	0	0	1	
Suggested array given at Item (14)	☐	☐	☐	☐
Length of observation:				
Preferred length (orbits)	4	4	4	
Minimum acceptable length (orbits)	4	4	4	
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)	97-02-01 to 97-03-01	97-02-01 to 97-03-01	97-02-01 to 97-03-01	to
For monitoring programs:				
Number of observations	3	3	8	
Mean interval (days)	180	180	30	
Acceptable variance from mean (days)	60	60	10	

(14) Additional notes to the scheduler :

(1) For GRT: if 256 Mbit/s recording not available (on ground), use single polarization, 2 channels x 16 MHz, 2-bit. (2) P.I. wishes to participate in GRT scheduling to ensure optimum polarization calibration. (3) 1-orbit observation of polarization calibration source may be necessary. (4) VSOP monitoring is requested for periods when VSOP coverage is better than ground alone. FAKESAT simulations suggest that there will roughly be two 4-month periods of high-resolution (u,v) coverage: Feb-Jun 1997, and Feb-Oct 1998 (extending beyond AO1). We plan to concentrate the ground-monitoring on the periods in between these time ranges. Possible observing dates: 1997: Feb 1(1.3, 6, 18), Mar 1(1.3), April 1(1.3, 6, 18), May 1 (1.3), June 1 (1.3). 1998: Mar 1 (1.3), April 1 (1.3), May 1 (1.3, 6, 18)

(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