VLA OBSERVING APPLICATION

A
rcvd:

DEADLINES: 1st of Feb., June., Oct. for next configuration following review
INSTRUCTIONS: Each numbered item must have an entry or N/A
E-MAIL TO: propsoc@nrao.edu (different for some Rapid Response Science)
OR MAIL TO: Director NRAO, 520 Edgemont Rd., Charlottesville, VA 22903-2475

(1) Date Prepared: 21 October 2003

(2) Title of Proposal: Compact Source Survey in the Field of the Huygens-Titan Encounter

(3) AUTHORS (Add * for new location)	INSTITUTION	E-mail	G/U	Students Only For Thesis?	Students Only Ph.D. Year
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(4) Related VLA previous proposal number(s):

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(7) Scientific Category: ○ solar system ○ galactic ⊗ extragalactic ○ other:
Rapid Response Science: ○ Known Transient ⊗ Exploratory ○ Target of Opportunity

(8) Configurations (one per column) (A+Pt, A, B, C, D, BnA, CnB, DnC, Any)	B				
(9) Wavelength(s) (400, 90, 20, 6, 3.5, 2, 1.3, 0.7 cm)	6cm 3.6cm				
(10) Time requested (hours)	1.5				

(11) Type of observation: ○ continuum ○ spectroscopy ⊗ multichannel continuum ○ polarimetry ○ solar
(check all that apply) ○ pulsar ○ high-time resolution ○ Pie Town link ○ other:

(12) Suitable for dynamic scheduling? ⊗ Suitable ○ Unsuitable

(13) ABSTRACT (do not write outside this space)

The Huygens Probe will descend into the atmosphere of Titan on January 14th, 2005. Phase-referencing VLBI observations of the event will yield measurements of the probe trajectory with sub-kilometer accuracy, complementing the on-board scientific instruments and significantly enhancing the value of planetological data collected by the mission. To achieve the necessary astrometric accuracy we need to create a grid of sources in the target field for phase referencing. We propose conducting a multi-frequency study of the field with the VLA to identify a set of sources for VLBI follow-up. These sources, if found suitable, will be used as phase references in a later Global VLBI astrometric experiment with the Huygens' S-band telemetry signal as target. The proposed observations are an important step in achieving the desired goals, and will maximize the scientific output, of the international planetary science mission Cassini/Huygens.

NRAO use only
(08/03)

(14) Observer present for observations? ○ Yes ⊗ No Data analysis at? ⊗ Home ○ AOC or CV (2 weeks notice)

(15) Help required: ⊗ None ○ Consultation ○ Friend (extensive help)

(16) Spectroscopy only	line 1	line 2	line 3	line 4
Transition (HI, OH, etc.)				
Rest Frequency (MHz)				
Velocity (km/s)				
Observing frequency (MHz)				
Correlator mode				
IF bandwidth(s) (MHz)				
Hanning smoothing (y/n)				
Number of channels per IF				
Frequency Resolution (kHz/channel)				
Rms noise (mJy/bm, nat. weight., 1 hr)				
Rms noise (K, nat. weight., 1 hr)				

(17) Number of sources:	**46**

(If more than 10 please attach list. If more than 30 give only selection criteria and LST range(s).)

(18) NAME	Coordinates 1950 ○ 2000 ⊗ RA hh mm Dec. ± xx.x°	Conf.	λ (cm)	Corr. mode	Band-width per IF (MHz)	Total Flux (Jy)*	LAS	Required rms (mJy/bm)	Required dynamic range	Time request (hr)
Titan-Huygens 1 sq.deg.	07 43 +22 22.8	B	3.6,6	4	50	0.394 (21cm)	36″	0.140	7	1.5

*For spectral line, this should be the total flux at the peak of the line

Notes to the table (if any):

(19) Restrictions to elevation (other than hardware limits) or HA range (give reason): HA= ±4.25 hours, ⇒ el>30°. (u, v) coverage will be foreshortened less than a factor of 2, so the synthesized beam wil not have an axial ratio >2.

(20) Preferred range of dates for scheduling (give reason): Nov-Dec 2003: Observations while in B array, and completed with sufficient lead-time before the February 2004 VLBI session.

(21) Dates which are not acceptable:

(22) Special hardware, software, or operating requirements:

(23) Please attach a self-contained <u>Scientific Justification</u> **not in excess of 1000 words.** (Preprints or reprints will be ignored.)

Please include the full addresses (postal and e-mail) for first-time users or for those that have moved (if not contact author).

When your proposal is scheduled, the contents of the cover sheets become public information (Any supporting pages are for refereeing only).

v4.2 8/03