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NATIONAL RADIO ASTRONOMY OBSERVATORY
Charlottesville, Virginia

NATIONAL RADIO ASTRONOMY OBSERVATORY
CHARLOTTESVILLE, VA.

Quarterly Report

NOV 01 1983

July 1, 1983 - September 30, 1983

RESEARCH PROGRAMS

<u>140-foot Telescope</u>	<u>Hours</u>
Scheduled observing	1220.00
Scheduled maintenance and equipment changes	430.50
Scheduled tests and calibration	503.50
Time lost due to: equipment failure	63.50
power	5.75
weather	13.25
interference	0.50

The following continuum program was conducted during this quarter.

<u>No.</u>	<u>Observer</u>	<u>Program</u>
A69	M. Andrews (Iowa State) J. Basart (Iowa State)	Map at 7 GHz four gamma-ray fields.

The following line programs were conducted during this quarter.

<u>No.</u>	<u>Observer</u>	<u>Program</u>
A65	C. Albert (Naval Academy) L. Hobbs (Chicago) F. J. Lockman	Mapping of hydrogen around high latitude stars.
B392	R. Brown	Observations at 6 cm of radio recombination-line emission from a complete sample of QSOs.
N5	E. Churchwell (Wisconsin) A. Nash (Wisconsin)	Observations at 6 cm of H ₂ CO absorption toward dark clouds.
N6	E. Churchwell (Wisconsin) A. Nash (Wisconsin)	Observations at 3.3 cm of HC ₃ N absorption toward dark clouds.
R175	L. Rickard (Howard) B. Turner	Search at four frequencies between 7.2 and 7.4 GHz for the $2\pi_{1/2}$, J = 3/2 state of CH.

<u>No.</u>	<u>Observer</u>	<u>Program</u>
R208	L. Rickard (Howard)	Studies of carbon recombination lines at 3.9 cm.

The following very long baseline programs were conducted, and the stations used in the observations are coded as follows:

A - Arecibo 1000 ft	N - NRL 85 ft
B - Effelsberg MPIR 100 m	O - Owens Valley 130 ft
F - Fort Davis 85 ft	Sk - Kirunda, Sweden 60 ft
G - Green Bank 140 ft	So - Onsala 20 m
H - Hat Creek 85 ft	Wn - Westerbork, n = 1-14 x 26 m
I - Iowa 60 ft	Yn - VLA, n = 1-27 x 25 m
K - Haystack 120 ft	

<u>No.</u>	<u>Observer</u>	<u>Program</u>
B382V	L. Baath (Chalmers) F. Briggs (Pittsburgh) M. Davis (NAIC) K. Johnston (NRL) D. Jones (Caltech) J. Romney (MPIR, Bonn) B. Ronnang (Chalmers) S. Unwin (Caltech) A. Wolfe (Pittsburgh)	Monitoring of the 932-MHz absorption line in AO 0235+164, with telescopes A, G, O, and Sk.
B385V	L. Baath (Chalmers) F. Briggs (Pittsburgh) M. Davis (NAIC) K. Johnston (NRL) D. Jones (Caltech) J. Romney (MPIR, Bonn) B. Ronnang (Chalmers) S. Unwin (Caltech) A. Wolfe (Pittsburgh)	Monitoring of low-frequency variables at 932 MHz, with telescopes A, B, G, O, and Sk.
C27V	J. Biretta (Caltech) M. Cohen (Caltech) D. Jones (Caltech) K. Lind (Caltech) R. Moore (Caltech) G. Seielstad (Caltech) S. Unwin (Caltech)	Monitor of superluminal sources at 6 cm, with telescopes B, F, G, H, I, K, O, and Yn.
C63V	F. Briggs (Pittsburgh) C. Chang (Pittsburgh) A. Wolfe (Pittsburgh)	Sensitive search at 21 cm for small-scale structure in the neutral component of the interstellar medium, with telescopes A, G, and Yn.

<u>No.</u>	<u>Observer</u>	<u>Program</u>
F7V	A. Foley (Leiden)	Observations at 6 cm of low-frequency variable sources, with telescopes B, G, O, and Yn.
G30V	B. Geldzahler (NRL) K. Johnston (NRL) J. Spencer (NRL) E. Waltman (NRL)	Observations at 6 cm of OJ 287, with telescopes B, F, G, H, I, K, N, O, Wn, and Yn.
L24V	R. Linfield (Calif., Berkeley)	Search at 6 cm for superluminal expansion in 4C 49.92, with telescopes B, F, G, K, and O.
L25V	J. Doiron (Iowa) J. Lestrade (JPL) R. Mutel (Iowa) A. Niell (JPL) R. Phillips (Haystack) R. Preston (JPL)	Observations at 6 cm of RSCVn binary systems, with telescopes B, F, G, K, O, and Yn.
W23V	G. Seielstad (Caltech) S. Unwin (Caltech) J. Benson R. C. Walker	Monitor 3C 120 at 6 cm, with telescopes A, B, F, G, H, I, K, O, So, and Yn.
X12V	N. Cohen (CFA)	Search at 6 cm for milliarcsecond hot spots in 3C 305, with telescopes F, G, K, O, and Yn.
X13V	H. Aller (Michigan) B. Burke (MIT) L. Molnar (CFA) R. Mutel (Iowa) R. Potash (Brandeis) M. Reid (CFA) D. Roberts (Brandeis) A. Rogers (Haystack) J. Romney (MPIR, Bonn) J. Wardle (Brandeis)	Attempt at 4990 MHz to map the known polarization of BL Lacertae, with telescopes B, F, G, O, and Yn.

300-foot Telescope

	<u>Hour</u>
Scheduled observing	1695.50
Scheduled maintenance and equipment changes	321.00
Scheduled tests and calibration	187.50
Time lost due to: equipment failure	211.50
power	9.25
weather	0.00
interference	2.00

The following continuum programs were conducted during this quarter.

<u>No.</u>	<u>Observer</u>	<u>Program</u>
A59	H. Aller (Michigan) M. Aller (Michigan) R. Fanti (Bologna) A. Ficarra (Bologna) F. Mantovani (Bologna) L. Padrielli (Bologna)	Observations at 1400 and 2695 MHz of low-frequency variable sources selected from the Bologna-Michigan program.
B335	T. Balonek (New Mexico) W. Dent (Massachusetts) W. Kinzel (Massachusetts) C. O'Dea (Massachusetts)	Polarization and flux-density measurements of variable radio sources at 2695 MHz.
B389	J. Broderick (VPI & SU) B. Dennison (VPI & SU) K. Mitchell (VPI & SU) S. O'Dell (VPI & SU) J. Condon H. Payne	Observations at 606, 880, and 1400 MHz of low-frequency variable sources.
H178	D. Heeschen	Observations at 9 cm to study the variability of extragalactic radio sources.

The following line programs were conducted during this quarter.

<u>No.</u>	<u>Observer</u>	<u>Program</u>
B391	N. Borsch (Leiden) N. Krumm (Cincinnati)	Search for hydrogen emission in the direction of Galaxy voids.
B401	R. Brown	Observations over the frequency range 500-1000 MHz to search for highly redshifted 21-cm absorption and recombination lines in QSOs.
B407	J. Broderick (VPI & SU) R. Brown	Survey at 9 cm of extragalactic ionized gas associated with uncondensed (very young) galaxies, radio quiet QSOs, and optically unidentified radio sources.
G265	R. Giovanelli (NAIC) M. Haynes	Continued observations of hydrogen in galaxies found in clusters and superclusters.

The following scintillation measurement was conducted during this quarter.

<u>No.</u>	<u>Observer</u>	<u>Program</u>
H189	D. Backer (Calif., Berkeley) C. Heiles (Calif., Berkeley) M. Stevens (Calif., Berkeley)	Survey near 330 MHz, a section of sky centered on the Galactic plane for sources exhibiting interstellar scintillation.

Very Large Array

The quarter was scheduled 100% of the time.

Astronomical	1700.0 hours	(77.0%)
Test	508.0 hours	(23.0%)

The average downtime was 7.16%.

The following research programs were conducted with the VLA during this quarter:

<u>No.</u>	<u>Observer</u>	<u>Program</u>
A24	R. Antonucci	Search for free-free absorption in radio galaxy cores. 2, 6, 18, and 20 cm.
AA25	R. Antonucci J. Ulvestad	Extended structures around blazars. 20 cm.
AB129	B. Burke (MIT) J. Hewitt (MIT) D. Roberts (Brandeis)	Monitoring double quasar 0957+561. 6 cm.
AB167	R. C. Bignell E. Seaquist (Toronto)	Monitoring SNR in NGC 4449. 6 and 20 cm.
AB182	J. Burns (New Mexico) T. Balonek (Calif., Berkeley) E. Hummel (MPIR, Bonn)	Monitoring the cores of extended radio sources and spiral galaxies. 2, 6, and 20 cm.
AB225	J. Burns (New Mexico) T. Balonek (Calif., Berkeley) C. MacCallum (Sandia Labs) S. Gregory (Bowling Green)	The wide-angle, tailed galaxy 1919+479. 6 and 20 cm.
AB228	R. White (STScI) R. Becker (VPI & SU)	Multifrequency observations of early-type stars. 2 and 20 cm.
AB229	D. Banhatti (TIFR, India) S. Ananthakrishnan (TIFR, India) A. Rao (TIFR, India)	Steep spectrum, few arcsecond sources. 2 and 6 cm.

<u>No.</u>	<u>Observer</u>	<u>Program</u>
AB234	R. Becker (VPI & SU) D. Helfand (Columbia)	A distance determination for the SNR G29.7-0.3. 21-cm line.
AB236	W. Baan (NAIC) J. Schmelz (Penn State) A. Haschick (Haystack)	OH and HI absorption in NGC 660 and NGC 520. 18-cm line
AB237	P. Barthel (Leiden) G. Miley (Leiden) R. Schilizzi (NFRA, Dwingeloo) C. Lonsdale (Jodrell Bank)	Morphology and spectral index of 50 high redshift quasars. 2 and 6 cm.
AB238	R. Beck (MPIR, Bonn) E. Hummel (MPIR, Bonn) R. Wielebinski (MPIR, Bonn)	Linearly polarized emission from nearby spiral galaxies. 6 and 20 cm.
AB240	D. Backer (Calif., Berkeley) W. M. Goss	Astrometry of the 1.5 millisecond pulsar. 6, 18, and 22 cm.
AB242	J. Bookbinder (Harvard) L. Golub (CFA)	A stars. 6 cm.
AB244	R. Brown	The effect of free-free opacity on the continuum structure of 3C 245. 2 and 6 cm.
AB248	D. Backer (Calif., Berkeley) R. Sramek	Astrometry of the compact source in Sgr A. 6 cm.
AB249	G. Bignami (IFC-CNR, Italy) P. Caraveo (IFC-CNR, Italy) R. Lamb (Iowa State)	Gamma ray source 2CG195+04. 6 and 20 cm.
AC42	E. Churchwell (Wisconsin) D. Abbott (Colorado/JILA) J. Bieging (Calif., Berkeley)	Monitoring flux of OB supergiants. 2, 6 and 20 cm.
AC63	C. Chang (Pittsburgh) A. Wolfe (Pittsburgh) F. Briggs (Pittsburgh)	Search for very small-scale structure in HI absorption. 21-cm phased array VLB.
AC69	R. Crutcher (Colorado/JILA) J. Bieging (Calif., Berkeley)	OH absorption towards Orion B. 18-cm line.
AC75	J. Condon C. Kotanyi J. van Gorkom	HI maps of active spiral galaxies. 21-cm line.
AC76	J. Condon W. Keel (KPNO)	Giant HII regions in active spirals. 20 cm.

<u>No.</u>	<u>Observer</u>	<u>Program</u>
AC77	B. Clark R. Perley A. Bridle	Survey of B3 sources. 20 cm.
AC79	M. Claussen (Caltech) G. Heiligman (Caltech) K. Lo (Caltech)	Water masers in external galaxies. 1.3-cm line.
AC81	M. Claussen (Caltech) K. Lo (Caltech) J. van Gorkom	Monitoring flux of galactic center source. 1.3, 2 and 6 cm.
AD79	E. Salpeter (Cornell) J. Dickey (Minnesota)	A rich cluster of galaxies. 21-cm line.
AD83	L. Davis (Arizona)	Bright interacting galaxies. 20 cm.
AD94	I. de Pater (Arizona) K. Weiler (NSF) R. Fanti (Bologna) C. Fanti (Bologna)	Monitoring polarization in variable sources. 2, 6, and 18 cm.
AD98	G. Dulk (Colorado) T. Bastian (Colorado) G. Hurford (Caltech) D. Gary (Caltech)	Spike bursts on the sun. 20 cm.
AD100	I. de Pater (Arizona) W. Ip (MPIA, FRG)	Radio occultations by comets: structures of sources in the paths of periodic comets. 6 and 20 cm.
AD103	P. Diamond (Onsala)	Bipolar nebulae: continuum emission. 1.3, 2 and 6 cm.
AD104	S. Drake (Colorado/JILA) J. Linsky (Colorado/JILA)	Long period RS Can. Ven. binaries. 6 cm.
AD105	L. Davis (KPNO) E. Seaquist (Toronto)	OH mapping of bipolar nebula M1-92. 18-cm line.
AD106	J. Dreher (MIT) K. Johnston (NRL) W. J. Welch (Calif., Berkeley)	Ultra-compact HII components of W49N. 1.3, 6, and 20 cm.
AD108	N. Duric (Toronto) E. Seaquist (Toronto) P. Crane L. Davis (KPNO)	The active spiral galaxy NGC 3310. 2 cm.
AE21	R. Ekers R. Laing (RGO, UK)	Microwave decrement in the direction of the galaxy cluster 0016+16. 2 and 20 cm.

<u>No.</u>	<u>Observer</u>	<u>Program</u>
AE22	R. Edelson (Caltech)	CFA Seyfert galaxies. 6 and 20 cm.
AE24	B. Edgar (Minnesota) L. Rudnick (Minnesota)	The jet-piece in 3C 33.1. 18 and 20 cm.
AE25	R. Ekers J. van Gorkom W. M. Goss (Groningen) U. Schwarz (Groningen)	Sgr A East. 2 cm.
AF56	M. Felli (Arcetri) M. Simon (SUNY, Stony Brook)	Structure of S106 IRS4 and CRL490. 1.3 cm.
AF57	D. Florkowski (USNO)	RY Scuti. 1.3, 2, 6, and 20 cm.
AF63	S. Faber (Calif., Berkeley) E. Raimond (NFRA, Dwingeloo) G. Knapp (Princeton) J. Gallagher (Illinois) J. van Gorkom	HI distribution in the elliptical galaxy NGC 1052. 21-cm line.
AF65	A. Fabian (IFA, UK) S. Phinney (IFA, UK) J. Condon	Inner jet structure in NGC 4896. 6 cm.
AF67	J. Fix (Iowa) R. Mutel (Iowa)	Time variations in OH masers. 18-cm line.
AF68	J. Fix (Iowa) J. Neff (Iowa)	Sizes and temperatures of asteroids. 2 cm.
AF70	K. Fricke (Gottingen, FRG) P. Biermann (MPIR, Bonn). A. Witzel (MPIR, Bonn) K. Johnston (NRL)	Search for compact, nonthermal activity in barred spirals. 6 cm.
AF71	M. Fich (Calif., Berkeley) D. van Buren (Calif., Berkeley)	HI shells around HII regions. 21-cm line.
AG101	G. Geldzahler (NRL) B. Rust (NBS)	Search for cosmological compliments to quasars. 20 cm.
AG111	R. Giovanelli (NAIC) M. Haynes	HI in the system of UGC 11964 - UGC 11968 = NGC 7241. 21-cm line.
AG112	B. Geldzahler (NRL)	Central compact source in SNR 3C 58. 2 and 6 cm.
AG113	B. Geldzahler (NRL)	Bright quasar 3C 138. 1.3 and 2 cm.

<u>No.</u>	<u>Observer</u>	<u>Program</u>
AG114	G. Garay (Chile) J. Moran (CFA) M. Reid (CFA)	Small-scale structure in the Orion nebula. 6 and 20 cm.
AG117	D. Gibson (NMIMT/Colorado) J. Linsky (Colorado/JILA) J. Warwick (Colorado) C. Hayenga (NMIMT)	dMe stars--quiescent emission. 2, 6, and 20 cm.
AG118	W. M. Goss E. Fomalont R. Manchester (CSIRO) A. Lyne (Jodrell Bank)	Positions of 3 pulsars. 20 cm.
AG121	S. Guilloteau (Grenoble) M. Walmsley (MPIR, Bonn) A. Baudry (Obs. Bordeaux, France)	Quasi-thermal 6-cm OH in W3(OH). 6-cm line.
AG125	B. Geldzahler (NRL) B. Rust (NBS)	High redshift quasars--possible cosmological complements. 2, 6, and 20 cm.
AH99	R. Hjellming R. Newell (Scott Sci. & Tech.)	Antares. 2, 6, and 20 cm.
AH100	T. Heckman (Maryland) B. Balick (Washington) W. van Breugel (KPNO) G. Miley (Leiden) J. Dickey (Minnesota)	HI in absorption and emission in NGC 3801 = 4C 14.52. 21-cm line.
AH124	G. Helou (Cornell) J. Dickey (Minnesota)	HI in face-on spiral galaxies. 21-cm line.
AH127	J. Herman (Leiden) H. Habing (Leiden) B. Baud (Groningen)	OH/IR stars--3d structures and distances. 18-cm line.
AH130	J. Hutchings (DAO, Canada) A. Gower (Victoria, Canada)	Deep search for quasars selected by optical morphology. 6 cm.
AH131	P. Ho (CFA) T. Rengarajan (CFA/TIFR, India)	Ammonia observations of infrared protostars with deep 10 μ m silicate absorptions. 1.3-cm line.
AH139	R. Hjellming K. Johnston (NRL)	SS433. 2 and 6 cm.
AJ81	W. Jaffe (STScI)	High redshift clusters. 6 and 20 cm.

<u>No.</u>	<u>Observer</u>	<u>Program</u>
AJ92	D. Jaffe (Calif., Berkeley) P. Ho (CFA) R. Genzel (Calif., Berkeley) D. Downes (IRAM, France)	Ammonia observations of warm molecular condensations around "protostars." 1.3-cm line.
AJ95	K. Johnston (NRL) B. Geldzahler (NRL) J. Spencer (NRL) R. Hjellming	Evolution of a flare in Cyg X-3. 1.3, 2, 6, and 20 cm.
AJ97	K. Johnston (NRL) D. Florkowski (USNO) C. Wade	Astrometry of stars. 6 cm.
AJ98	K. Johnston (NRL) C. Wade P. Seidelmann (USNO) G. Kaplan (USNO) W. Webster (Goddard)	Mapping Ceres. 2 cm.
AJ99	K. Johnston (NRL) R. Sramek E. Fomalont D. McCarthy (USNO) K. Hilddrup	Quasar astrometry and earth's rotation. 6 cm.
AK76	P. Kronberg (Toronto) S. Button (Toronto) E. Zukowski (Toronto) K. Kim (Toronto) A. Boksenberg (RGO, UK)	Rotation measure survey. 2, 6, 17, 19, and 22 cm.
AK77	K. Kellermann W. Altenhoff (MPIR, Bonn)	Pluto. 6 cm.
AK78	S. Kwok (Calgary)	Structure of compact planetary nebulae. 6 cm.
AK84	S. Kwok (NRC, Canada) R. C. Bignell	Slow nova HM Sag. 1.3, 2, 6, and 20 cm.
AK85	P. Katgert (Leiden) M. Oort (Leiden) W. Windhorst (Leiden)	Morphology of weak sources. 20 cm.
AK87	K. Kellermann P. Crane	3C 147. 2 cm.
AK89	C. Kotanyi C. Balkowski (Meudon) J. van Gorkom	HI survey of the Virgo Cluster. 21-cm line.

<u>No.</u>	<u>Observer</u>	<u>Program</u>
AK90	P. Kronberg (Toronto) R. Sramek	Variable sources in M82. 2, 6, and 20 cm.
AK91	M. Kundu (Maryland) E. Schmahl (Maryland) S. Shevgaonkar (Maryland)	UV Ceti stars. 6 and 20 cm.
AK92	M. Kutner (Rensselaer) K. Mead (Rensselaer) A. Rydgren (Rensselaer)	Search for radio emission from PMS K stars. 6 cm.
AK93	H. Kuhr (Arizona) P. Stittmatter (Arizona) J. Stocke (Arizona)	Search for gravitational lens around the most luminous quasar 0014+81. 2, 6, and 20 cm.
AL52	R. Laing (RGO, UK) J. van Gorkom	HI absorption in NGC 5363. 20-cm line.
AL55	K. Lang (Tufts) R. Pallavicini (Arcetri) R. Willson (Tufts)	Active main sequence stars of late spectral type. 6 cm.
AL59	K. Lang (Tufts) R. Willson (Tufts)	Solar active regions. 2, 6, 18, and 21 cm.
AL60	C. Lawrence (MIT) C. Bennett (MIT) B. Burke (MIT) E. Turner (Princeton)	Snapshots of sources from the MIT survey. 6 cm.
AL61	R. Linfield (JPL) R. Perley	3C 390.3--radio galaxy with a VLB jet. 6 and 18 cm.
AL66	J. Linsky (Colorado/JILA) S. Drake (Colorado/JILA)	Late-type giants and supergiants. 2 and 6 cm.
AL67	R. Laing (RGO, UK) G. Pooley (Cambridge, UK) J. Riley (Cambridge, UK)	Spectral curvature in the radio galaxy 3C 452. 2 cm.
AM67	D. Meier (JPL) M. Ulrich (ESO, FRG) R. Preston (JPL) A. Wehrle (JPL)	Central regions of extended radio galaxies. 6 cm.
AM72	L. Molnar (CFA) M. Reid (CFA) R. C. Bignell	Polarization monitoring of BL Lac objects. 2, 6, and 20 cm.

<u>No.</u>	<u>Observer</u>	<u>Program</u>
AM81	T. Montmerle (CEN, France) L. Koch-Miramond (CEN, France) E. Feigelson (MIT) E. Falgarone (Meudon)	Nonthermal radio emission from x-ray detected stars in the Rho Oph dark cloud. 20 cm.
AM85	G. Miley (Leiden) G. de Waard (Leiden) J. van Gorkom T. Heckman (Maryland) B. Balick (Washington) W. van Breugel (Arizona)	Search for redshifted CO absorption. 1.3-cm line.
AM89	I. McHardy (Leicester, UK) A. Smith (Leicester, UK) R. Perley	Active galaxies and OVV's-- instantaneous spectra. 1.3, 2, 6, and 20 cm.
AM92	J. Moran (CFA) G. Garay (CFA) R. Genzel (Calif., Berkeley) M. Reid (CFA)	The size of the BN radio source. 1.3 cm.
AM93	R. Mutel (Iowa) D. Doiron (Iowa)	Flares in RS CVn stars. 2, 6 and 20 cm.
AM94	P. Myers (CFA) M. Reid (CFA) J. Keene (Caltech)	Dark cloud condensations with embedded stars: NH ₃ observations. 1.3-cm line.
AM95	L. Maraschi (IFC-CNR, Italy) R. Ekers J. van Gorkom	Search for HI in BL Lac object 2155-304. 21-cm line.
AM97	R. Mutel (Iowa) J. Lestrade (JPL, Paris Obs.)	A search for VLBI calibrator sources near HR 1099. 6 and 20 cm.
AM98	L. Molnar (CFA) M. Reid (CFA) J. Grindlay (Harvard)	Low-level emission from Cyg X-3. 1.3, 2, 6, 18, and 22 cm.
AO40	C. O'Dea F. Owen A. Gower (Victoria, Canada)	Narrow angle tails. 6 and 20 cm.
AO42	M. Ondrechen (Minnesota) J. van der Hulst (NFRA, Dwingeloo)	HI observations of M83. 20-cm line.

<u>No.</u>	<u>Observer</u>	<u>Program</u>
AP46	R. Perley A. Bridle B. Clark R. Ekers J. Burns (New Mexico) G. Grueff (Bologna) J. Douglas (Texas)	Survey of B3 objects. 20 cm.
AP69	J. Pedelty (Minnesota) L. Rudnick (Minnesota) T. Jones (Minnesota)	Depolarization in compact extragalactic sources. 2, 6, 18, and 20 cm.
AR69	A. Rao (TIFR, India) S. Ananthakrishnan (TIFR, India)	Low latitude, small size objects. 1.3, 2 and 6 cm.
AR85	L. Rodriguez (Mexico) P. Persi (Inst. Astp. Spaz., Italy) M. Ferrari-Toniolo (Inst. Astp. Spaz., Italy)	Stars with IR excesses. 2 and 6 cm.
AR86	N. Rao (TIFR, India) V. Venugopal (TIFR, India)	Extreme hydrogen deficient stars. 2 and 6 cm.
AR87	M. Reid (CFA) P. Myers (CFA) G. Garay (CFA)	Ammonia emission from compact HII regions. 1.3-cm line.
AR90	P. Roelfsema (Groningen) W. M. Goss (Groningen) D. Retallack R. C. Bignell	Recombination lines in NGC 7027: H76 α . 2-cm line.
AR91	P. Roelfsema (Groningen) W. M. Goss (Groningen) D. Retallack R. Rubin (NASA, Ames)	Recombination-line observations of HII regions. 2-cm line.
AR92	V. Radhakrishnan (Raman Inst.) C. Salter (TIFR, India) K. Johnston (NRL) R. Ekers J. van Gorkom	HI absorption in compact objects in SNR. 20-cm line.
AR95	M. Reid (CFA) R. Genzel (Calif., Berkeley) M. Silber (Calif., Berkeley) J. Carlstrom (Calif., Berkeley) J. Moran (CFA)	Water masers in Orion. 1.3-cm line.

<u>No.</u>	<u>Observer</u>	<u>Program</u>
AR98	L. Rudnick (Minnesota) T. Jones (Minnesota) J. Pedelty (Minnesota) D. Walsh (Jodrell Bank) I. Browne (Jodrell Bank) D. Shone (Jodrell Bank)	Spectra of weak nuclear cores. 2, 6, and 20 cm.
AS79	S. Spangler (Iowa) W. Cotton	Monitoring of low-frequency variables. 1.4, 5, 15, and 20 cm.
AS80	R. Sramek J. van der Hulst (NFRA, Dwingeloo) K. Weiler	Supernovae SN 1980k in NGC 6946 and SN 1979c in M100. 6 and 20 cm.
AS136	W. Sanders (New Mexico)	Search for emission from Hyades stars. 6 cm.
AS149	S. Simkin (Wisconsin) H. Su (Purple Mt. Obs.) J. van Gorkom	HI observations of Seyferts of different morphological type. 21-cm line.
AS154	P. Schwartz (NRL) M. Frerking (JPL)	Spectra of L1529 and L1455. 1.3, 2, and 20 cm.
AS159	M. Sitko (Minnesota) G. Schmidt (Arizona) R. Moore (Aerospace) L. Rudnick (Minnesota)	The eruptive QSO 0846+513. 2, 6, and 20 cm.
AS162	E. Seaquist (Toronto) A. Taylor (Toronto)	Possible jets in symbiotic stars. 2 and 6 cm.
AS164	D. Saikia (TIFR, India) J. van Gorkom C. Kotanyi (ESO, FRG)	Sersic-Pastoriza galaxies. 6 and 20 cm.
AS167	P. Scheuer (Cambridge, UK) R. Laing (RGO, UK) R. Perley	Cygnus A hot spots. 1.3 and 2 cm.
AS170	P. Schwartz (NRL) T. Simon (Hawaii) B. Zuckerman (Calif., LA) M. Dyck (Hawaii)	T Tauri. 2 and 6 cm.
AS171	S. Spangler (Iowa) R. Laing (RGO, UK)	Spectral curvature in the radio galaxy 3C 192. 2 cm.

<u>No.</u>	<u>Observer</u>	<u>Program</u>
AS172	A. Starke (Bell Labs) M. Vietri (Princeton)	Search for gravitational lenses: quasars with CII absorption. 1.3, 2, and 6 cm.
AT33	J. Turner (Calif., Berkeley) P. Ho (CFA)	Massive star formation in the nuclear region of M31 and M33. 2 cm.
AT34	T. Thuan (Virginia) E. Hummel (MPIR, Bonn)	HI absorption in NGC 520. 21-cm line.
AT35	A. Taylor (British Columbia) P. Gregory (British Columbia) T. Stevenson (British Columbia) E. Seaquist (Toronto)	"Short term" galactic variable sources. 6 and 20 cm.
AT38	K. Turner (Arecibo) Y. Terzian (Cornell)	Four bright cometary nebulae. 2 and 6 cm.
AU16	J. Ulvestad	Radio galaxy 3C 459. 1.3, 2 and 6 cm.
AU17	S. Unger (Jodrell Bank) A. Pedlar (Jodrell Bank)	S0 galaxy NGC 1218 (3C 78). 6 cm.
AV76	J. van der Hulst (NFRA, Dwingeloo) P. Crane D. Lawrie (Ohio State) H. Ford (STScI)	SNR candidate in M51. 6 and 20 cm.
AV87	W. van Breugel (Arizona) T. Heckman (Maryland) G. Miley (Leiden)	3C 171, a distant, strong radio galaxy with optical-line emission. 1.3, 2, 6, and 20 cm.
AV90	W. van Breugel (Arizona) R. Schilizzi (NFRA)	Curved jet in MK 501. 1.3, 2, 6, and 20 cm.
AV92	J. van Gorkom U. Schwarz (Groningen) J. Bregman (NFRA, Dwingeloo)	H76 α mapping of the galactic center. 2-cm line.
AV93	S. Vogel (Calif., Berkeley) R. Genzel (Calif., Berkeley)	Hot molecular gas in Sgr B2. 1.3 cm line.
AV96	J. van der Hulst (NFRA, Dwingeloo) R. Sramek K. Weiler (NSF)	Radio supernova in NGC 4258. 6 and 20 cm.

<u>No.</u>	<u>Observer</u>	<u>Program</u>
AW48	C. Wade P. Seidelmann (USNO) K. Johnston (NRL) G. Kaplan (USNO)	Asteroid astrometry. 2 and 6 cm.
AW78	J. Wardle (Brandeis) R. Laing (RGO, UK)	Variability of the central components of extended radio sources. 2 and 6 cm.
AW90	T. Wilson (MPIR, Bonn) K. Johnston (NRL) C. Walmsley (MPIR, Bonn) W. Batrla (MPIR, Bonn)	The structure of 2-cm H ₂ CO in DR21. 2-cm line.
AW93	A. Wilson (Maryland) A. Lawrence (RGO, UK) S. Unger (Jodrell Bank) M. Elvis (CFA)	An X-ray selected sample of galaxies. 6 and 20 cm.
AW96	T. Wilson (MPIR, Bonn) C. Walmsley (MPIR, Bonn) W. Batrla (MPIR, Bonn) J. Bieging (Calif., Berkeley)	Two ammonia clouds with large optical depths. 1.3-cm line.
AW97	D. Walsh (NRAL, UK) I. Browne (NRAL, UK) D. Shone (NRAL, UK) L. Rudnick (Minnesota)	A complete sample of QSOs mapped with Merlin. 6 and 18 cm.
AZ23	X. Zheng (CFA) M. Schneps (CFA)	Recombination-line emission toward ON1. 1.3 and 2-cm line.
VAH13	N. Cohen (CFA)	3C 305. 6-cm, 3 antenna VLB.
VAH24	M. Roberts	Polarization of BL Lac. 6-cm, 3 antenna VLB.
VG32	M. Gorenstein (CFA) R. Bonometti (CFA) N. Cohen (CFA) E. Falco (CFA) I. Shapiro (CFA)	Double quasar 0957+561. 6-cm phased array MK III VLB.
VP43	R. Porcas (MPIR, Bonn) D. Graham (MPIR, Bonn) R. Booth (Onsala) P. Wilkinson (Jodrell Bank)	Double quasar 0957+561. 6-cm phased array MK III VLB.

ELECTRONICS

Charlottesville

Design work on 8.3-GHz cooled FET amplifiers and 237-MHz amplifiers has been performed with good results. A plan to buy cooled 23-GHz amplifiers for the VLA and to develop HEMT (high-electron-mobility-transistor) low-noise devices is being investigated.

Construction of a 90-115 GHz Schottky diode receiver and a 115-GHz superconducting junction receiver has been initiated. Development of mixers and multipliers for the 240 to 350 GHz range continues.

The VLA tape archives system and image storage system are complete except for integration and manuals. Work is continuing on the 12 Mb/s VLBI cassette recorder system.

Green Bank

The 1.3-1.8 GHz cooled FET receiver has been completed and tested. Observations on the 140-ft at 18 and 21 cm showed that the system temperature at zenith was 23 K to 25 K over both the 1360-1430 MHz and the 1610 to 1720-MHz bands. Aperture efficiency varied from about 58% at the middle of these bands to about 54% at the band edges.

The second channel of the 5-25 GHz upconverter-maser receiver was installed in the 140-ft Cassegrain house. Performance of the new "B" channel is similar to the "A" channel that has been in use for several years with one exception: system temperatures at the excited CH frequencies, about 7.3 GHz, are in the 57 K to 67 K range, whereas the A channel is about 150 K. The difference is due to a slightly broader upconverter bandwidth. Although the beam-splitter, which will allow simultaneous use of both receivers, is still in design, both receivers are accessible by rotation of the subreflector. This allows reasonably rapid switch-over between various combinations of polarization and observing band.

The second channel of the L/C/X band VLBI receiver for Fort Davis was completed and shipped.

Construction and testing of the new interferometer continues. System tests of the entire RF link, in Green Bank, will commence shortly. A second set of path attenuation measurements between Green Bank and the Monteverville site was performed. The results were close to those predicted and should give ample operating margin under all conditions except very heavy precipitation. Design, test, and assembly of the digital link continues.

Tests of the effects of GPS satellite-spread spectrum communications on radio astronomy frequencies of interest in L-band were performed. The satellites do pose an interference problem.

Support is being given to a Berkeley group in testing and constructing a receiver at 2.7 GHz for use in Green Bank.

The holographic receiver was completed and shipped to Tucson. With the exception of a few start-up bugs, the system has performed as expected.

Water-vapor radiometers were installed on two interferometer antennas: 85-1 and the 45 foot. Cable and data-link interfaces were designed and debugged.

Work continues on the digital continuum receiver software, on Model IV autocorrelator IF harmonic distortion reduction (now down to 60 dB), and on front-end data-link assembly and testing.

Socorro

Installation of the cooled GaAsFET amplifiers for the 21-cm and 2-cm observing bands is continuing, with 24 antennas being completed by the end of the quarter.

After the reconfiguration of the array to A array (the most extended array), the interference problems that had delayed progress on the new 327-MHz receiver system were much improved. Measurements of the performance of the feed and of the phase stability of the ionosphere are underway.

Design and construction of a second master oscillator system were commenced. This system, when complete at the end of the year, will allow two separate sub-arrays of the VLA to have independent control over their observing frequencies.

Construction of a new subreflector rotation and focus drive system was completed and testing of the unit in the laboratory commenced. The new system is scheduled to be installed on antenna 12 during the next quarter.

Tucson

During this quarter the holographic method of measuring the surface of the 12-meter surface was tested. Several maps have been made, the latest being a 64 x 64 map which agrees well with the mechanical measurements that were made.

Further work on the 200-300 GHz receiver has reduced the radar interference problem to levels that are judged to be satisfactory. This receiver will be retested on the telescope during October.

Work is progressing on a new mixer receiver to cover the range 90-120 GHz. This should give a factor of two sensitivity improvement over the old 70-120 GHz receiver.

ENGINEERING

Design and drawings for the alternate installation of the elevation inductosyn on the 12-meter antenna were completed and sent to the shop for fabrication.

Assistance was provided in the design and installation of minor modifications to the 14.2-meter antenna to facilitate installation of cables and equipment.

Modifications to the 140-foot Cassegrain building were designed and installed to make space for the new receiver system.

Supervision assistance was provided in the contracting and the carrying out of the contract for painting part of the 300-foot structure.

An investigation into the cause of the breaking of panel support bolts on the 300-foot structure was initiated.

Panels from the 12-meter antenna were measured to check for any major deviations from the original surface measurements.

Studies, conceptual designs, and research continued for the VLBA sites and antennas.

COMPUTER DIVISION

Plans - An Observatory computer plan has been under development for a good part of 1983. This plan covers the NRAO's main computer purchases over the next five years. The overall plan is made up of individual plans developed for each of the observing sites, for Charlottesville, and for the VLBA project. These plans have been completed and a scientific review involving both NRAO scientific staff and outsiders is planned for October 5, 1983.

It is clear that the desired computer capacity to support the long-term needs of the combined VLA and VLBA is quite large, on the order of 40 to 80 million floating point operations per second. It is less clear at this time what part of the desired capacity is necessary, given the cost. Additional planning is expected to take several months.

Socorro - The first stage of a long-range computer plan for the VLA is now complete. This plan is in three separate parts: (1) a proposal for an immediate upgrade of the on-line (synchronous) computers; (2) a study of the expected distribution of the future observing at the VLA and also of the computer processing necessary to reduce these observations; and (3) an interpretation of this study to estimate the size of the computing facility necessary to meet the anticipated demand. A scientific evaluation of this plan together with the computer plans for the other NRAO facilities will be held in the next quarter.

The large capacity disc storage unit for the first VAX system was installed. Many of the frustrations with insufficient disc space have thereby been alleviated on this system.

The pipeline computers have now been reconfigured so that the bulk of the data is passed between neighboring computers by way of shared discs. This should produce a significant improvement in the input-output performance of all computers in the pipeline.

PERSONNEL

New Hires

Gustaaf van Moorsel	Systems Scientist	07/01/83
John T. Armstrong	Research Associate	07/06/83
Anthony N. Lasenby	Visiting Elec. Engineer I	07/26/83
William M. Goss	Visiting Scientist	08/02/83
Durgadas S. Bagri	Visiting Elec. Engineer I	08/18/83

Rehires

Patrick E. Palmer	Visiting Scientist	07/11/83
Zbigniew Nosal	Elec. Engineer II	08/08/83

Change in Status

Felix J. Lockman	Asst. Sci./Assoc. Sci.	07/01/83
R. Craig Walker	Assoc. Sci./Systems Sci.	07/01/83

Terminations

Craig R. Moore	Elec. Engineer I	06/24/83*
William E. Randolph	Scientific Programmer I	07/29/83
David R. Merritt	Research Associate	08/12/83
Zbigniew Nosal	Elec. Engineer II	08/17/83
W. Thomas Vestrand	Research Associate	08/19/83
Willem A. Baan	Vis. Asst. Scientist	08/24/83
Martha P. Haynes	Asst. Director, Green Bank Opns.	08/26/83
Marc Damashek	Sci. Programmer Analy. II	09/23/83
Patrick E. Palmer	Visiting Scientist	09/25/83
Robert H. Sanders	Visiting Scientist	09/30/83

*not included in the previous report