VLA UTILIZATION REPORT DECEMBER 1989

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AA-104	Andre, P. Montmerle, T. Feigelson, E.	NRAO-TUC Saclay Penn State	Emission from embedded sources in Rho Ophiuchi cloud core.	2,3.8,6	21,22, 23	15.0
AB-414	Becker, R. White, R.	Calif, Davis STScI	Monitoring radio stars HD193793 and P Cygni.	2,6	23	2.0
AB-525	Braun, R. van Gorkom, J. Walterbos, R. Kennicutt, R. Norman, C.	Dwingeloo Columbia/NRAO-VLA Calif, Berkeley Steward Observatory STScI	The interstellar media of nearby galaxies.	20 cm line	1	14.5
AB-534	Baum, S. Leahy, P. Perley, R. Riley, J. Scheuer, P.	NFRA NRAO-VLA NRAO-VLA MRAO MRAO	A survey of nearby hotspots.	3.8	26,31	3.9
AB-541	Bally, J. Wilson, R. Yusef-Zadeh, F.	Bell Labs Bell Labs Northwestern Univ	The Orion Superbubble.	20,90	21,22	16.0
AB-551	Berkhuijsen, E. Beck, R. Hummel, E.	MPIR, Bonn MPIR, Bonn NRAL	Structure of the magnetic field in the central region of M31.	6,20	19	6.0
AB-556	Burns, J. Gisler, G. Perley, R.	New Mexico State LANL NRAO-VLA	Perseus cluster of galaxies.	90	15	12.0
AC-256	Capetti, S. Ferrari, A. Massaglia, S. Trussoni, E. Morganti, R. Fanti, R. Parma, P. de Ruiter, H.	Instituto di Fisica Instituto di Fisica Instituto di Fisica Instituto di Fisica Bologna Bologna Bologna Bologna	Knots in low luminosity radio galaxy jets.	6	30	7.2
AC-259	Carilli, C. Perley, R. Dreher, J.	CFA NRAO-VLA NASA/Ames	Cygnus A.	1.3	2	12.0
AC-263	Cordes, J. Hankins, T. McKinnon, M.	Cornell NMIMT NMIMT	Radio pulsars in the directions of selected galactic sources.	20,90	15	5.0
AC-264	Condon, J. Broderick, J.	NRAO-CV Virginia Poly Inst	UGC galaxies.	6	8,26	16.0
AD-188	Drake, S. Simon, T. Florkowski, D. Stencel, R. Bookbinder, J. Linsky, J.	SASC Hawaii USNO Colorado CFA Colorado	Variability of M supergiants: alpha orionis.	2,6	17	3.0
AD-238	Drake, S. Linsky, J. Judge, P.	SASC Colorado Colorado	Survey of cool giants and supergiants.	2,3.8	23	16.0
AE-61	Eilek, J. Owen, F. Leahy, P.	NMIMT NRAO-VLA NRAO-VLA	Abell clusters without cooling cores.	3.8,6	1	1.0
AF-175	Fischer, M. Gibson, D. Gonzalez, P.	Silver High School Lincoln Lab La Plata Jr. High	Observations over 176 day cycle of 4U1820-30.	6,20	28	2.0
AF-179	Fomalont, E. Hogan, C. Partridge, B. Windhorst, R.	NRAO-CV Steward Obs Haverford Arizona State	CBR fluctuations.	3.8	28,30	20.0
AG-292	Guhathakurta, P. van Gorkom, J. Knapp, G.	IAS/Princeton Columbia/NRAO-VLA Princeton	"Cirrus".	20 cm line	6,8	12.0
AG-295	Gregg, M.	Mt Stromlo Obs	HI observations of the Bootes Void galaxies.	20 cm line	1,4	20.0
AG-298	Goldstein, S.	Virginia	Low surface brightness spiral arms in M33 and M74.	90	16	8.0
AG-299	Goldstein, S.	Virginia	Diffuse radiation from globular clusters.	90	17	6.0
AG-301	Giovanelli, R. Haynes, M.	NAIC Cornell	Intergalactic HI cloud.	20 cm line	22	5.0
AH-349	Hollis, J. Wagner, M. Oliversen, R.	NASA/GSFC NASA/GSFC NASA/GSFC	Large scale structure of cataclysmic binary 0623+71.	6	11	12.1

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AH-351	Haschick, A. Baan, W.	Haystack Obs Arecibo	HI emission in a Quasar/Galaxy pair.	20	31	4.0
AH-371	Hogg, D. Roberts, M. Bregman, J.	NRAO-CV NRAO-CV NRAO-CV	Radio emission from hydrogen-rich SO galaxies.	20	8,21	3.1
AH-372	Hibbard, J. van Gorkom, J. Schweizer, F.	Columbia Columbia/NRAO-VLA Carnegie Inst	Interacting and merging galaxies.	20 cm line	4	8.0
AH-373	Habbal, S. Gonzalez, R. Harvey, K.	CFA NRAO-VLA Solar Phys Rsrch Co	Time-varying phenomena at the solar limb.	6	8,9	16.4
AH-376	Henning, P. Kerr, F.	Maryland Maryland	HI selected sample of galaxies.	20 cm line	10	21.0
AH-377	Hawkins, G. Zuckerman, B.	Calif, Los Angeles Calif, Los Angeles	HI around red giant W Hydrae.	20 cm line	28	4.0
AH-378	Henkel, C. Wilson, T. Baan, W.	MPIR, Bonn MPIR, Bonn Arecibo	Formaldehyde (H_2CO) emission in NGC253.	6 cm line	31	6.0
AH-379	Herter, T. Shupe, D. Chernoff, D.	Cornell Cornell Cornell	Structure of infrared cirrus clouds.	20 cm line	7,11	16.0
AH-382	Ho, P. Martin, R. Turner, J. Jackson, J.	Harvard Steward Obs Calif, Los Angeles MPIE, Munich	Extragalactic Ammonia.	1.3 cm line	9,27	14.5
AJ-181	Johnston, K. Gaume, R. Stolovy, S. Wilson, T. Wamsley, M. Menten, K.	NRL NRL NRL MPIR, Bonn MPIR, Bonn CFA	CH_3OH masers associated w/OMC-1.	1.3 cm line	20	3.0
AK-234	Kundu, M. White, S. Schmahl, E. Gopalswamy, N.	Maryland Maryland Maryland Maryland	Microwave & millimeter imaging of solar flares.	1.3,2	14,16	13.5
AK-237	Knapp, G. Bowers, P.	Princeton NRL	Search for HI in the circumstellar envelopes of evolved stars.	20 cm line	17	18.0
AL-200	Leahy, P. Muxlow, T.	NRAO-VLA NRAL	Spectral mapping of classical radio sources.	2,3.8	14,15,19	25.0 w/Move/Op
AL-206	Loushin, R. Crutcher, R. Troland, T.	Illinois Illinois Kentucky	HI zeeman effect toward dense interstellar clouds.	20 cm line	30	8.0
AP-170	Perley, R. Taylor, G. Inoue, M. Kato, T. Tabara, H. Aizu, K.	NRAO-VLA NRAO-VLA Nobeyama Obs Utsunomiya Utsunomiya Rikkyo	Very large Faraday rotation in Hydra A.	3.8	21	4.0
AP-180	Price, R. Duric, N. Campbell, B.	New Mexico New Mexico New Mexico	Nearby spirals.	3.8	1	5.0
AR-209	Reipurth, B. Rodriguez, L.	ESO, Chile UNAM	HH 80-81 spectral indices.	2	31	6.0
AR-215	Rupen, M. Ho, P.	CFA Harvard	The interacting pair NGC4631/4656.	20 cm line	18	8.0
AR-216	Reid, M. Menten, K.	CFA CFA	Measurement of the size and temperature of Mira variables.	1.3,2 3.8	2	8.5
AR-217	Rudolph, A. Mundy, L. de Geus, E. Palmer, P.	Maryland Maryland Maryland Chicago	Ammonia observations of low-luminosity outflows.	1.3 cm line	18	11.0
AS-333	Sramek, R. Weiler, K. van der Hulst, J. Panagia, N.	NRAO-VLA NRL Westerbork STScI	Statistical properties of radio supernovae.	2,6	21,23	8.0
AS-378	Seaquist, E. Taylor, A.	Toronto Calgary	Survey of symbiotic stars.	3.8	22,28	5.0
AS-388	Seaquist, E. Smolinski, J.	Toronto Copernicus Astron Ctr	Supergiant binary HR8752.	1.3,2,3.8, 6,20	1	3.5
AS-389	Smith, B. Lord, S. Bushouse, H.	Texas NASA/Ames Northwestern Univ	HI structure in Arp 215 (NGC 2782) and Arp 284 (NGC 7714/5).	20 cm line	9	18.0

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AV-165	Velusamy, T.	TIFR	CTB80.	90	24	1.5
AV-166	Velusamy, T.	TIFR	Composite SNR G18.95-1.1.	6,20,	24	1.0
	Venugopal, V.	TIFR		90		
AV-170	Viallefond, F.	Meudon	HI-CO emission in galaxies w/various	20 cm	14	9.0
	Downes, D.	IRAM	star formation.	line		
	Radford, S.	IRAM				
	Solomon, P.	Radio Millimetrique				
AW-234	Williams, B.	Delaware	HI synthesis of four compact groups of	20 cm	5,7	17.1
	van Gorkom, J.	Columbia/NRAO-VLA	galaxies.	line		
AW-246	Wootten, A.	NRAO-CV	Circumstellar photochemistry: Si C2	1.3 cm	5	10.0
	Sahai, R.	Chalmers	and HC7N.	line		
		NRAO Staff	Baselines/Startup/Pointing			49.7
			Calibrator Observations			23.8
			Electronics, etc.			45.9
			Software			31.9
			Move/Operations			2.7
			Standard field observations			12.1
			General tests			67.4
			Holiday/Shutdown			36.9

The average downtime for the month of December 1989 was approximately 4.5 percent.

$$\text{Average downtime of operational antennas} = \frac{\text{Total number of antenna-hours of operational antennas lost due to hardware and software failures during scheduled observing}}{\text{Total number of antenna-hours of operational antennas scheduled}} \times 100$$

Where "antenna hours" definition is: An array consisting of N antennas operating for Y hours is defined to have YN antenna hours operation.

The array was scheduled 95.1 percent (709.1 hours) of the time: 65.6 percent (489.7 hours) to astronomical programs, 15.9 percent (118.4 hours) to scheduled test/calibration, and the remaining 13.5 percent (101.1 hours) went to scheduled maintenance.

The array was in the D configuration from December 1 through December 31.

The total number of programs run for the month of December, 1989 was 51.

The following independent proposals shared simultaneous observing time (2.7 hours total simultaneous observing):

Move/Op/AL200 2.7

900105PDH/sm

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Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AA-98	Anglada, G. Estalella, R. Rodriguez, L. Torrelles, J. Canto, J.	Barcelona Barcelona UNAM IAA, Spain UNAM	Ammonia circumstellar structure associated with the HH34 jet.	1.3 cm line	9	7.1 w/VP98
AB-414	Becker, R. White, R.	Calif, Davis STScI	Monitoring radio stars HD193793 and P Cygni.	2,6	13	1.5
AB-525	Braun, R. van Gorkom, J. Walterbos, R. Kennicutt, R. Norman, C.	NFRA Columbia/NRAO-VLA Calif, Berkeley Steward Obs STScI	The interstellar media of nearby galaxies.	20 cm line	30	9
AC-259	Carilli, C. Perley, R. Dreher, J.	CFA NRAO-VLA NASA/Ames	Cygnus A.	1.3	11	12 w/VP98
AC-264	Condon, J. Broderick, J.	NRAO-CV Virginia Poly. Inst.	UGC galaxies.	6	16	10.5
Ad Hod	Lonsdale, C.	Haystack Obs			5	0.5
AD-188	Drake, S. Simon, T. Florkowski, D. Stencel, R. Bookbinder, J. Linsky, J.	SASC Hawaii USNO Colorado CFA Colorado	Variability of M supergiants: alpha orionis.	2,6	13	2.5
AE-61	Eilek, J. Owen, F. Leahy, P.	NMIMT NRAO-VLA NRAO-VLA	Abell clusters without cooling cores.	3.8,6	30	7 w/Move/Op
AF-185	Fruchter, A.	Carnegie Inst	The integrated flux of millisecond pulsars in globular clusters.	20,6	12	6
AG-267	Gottesman, S. Hawarden, T.	Florida UKIRT	HI observations of NGC1512 and NGC5291.	20 cm line	1	4.5
AG-292	Guhathakurta, P. van Gorkom, J. Knapp, G.	Princeton Columbia/NRAO-VLA Princeton	"Cirrus".	20 cm line	29	7
AG-297	Gaume, R. Pauls, T. Johnston, K. Wilson, T.	NRL NRL NRL MPIR, Bonn	Protostars in NGC 2024.	1.3 cm line	13	8
AH-301	Hjellming, R. Gehrz, R. Taylor, A. Seaquist, E.	NRAO-VLA Minnesota Calgary Toronto	Monitoring radio novae.	1.3,2, 3.8,6,20	1	4
AH-337	Hankins, T. Horton, E.	NMIMT Dartmouth College	Measurements of the Crab pulsar average profile.	3.8 pulsar	1	4.5
AH-343	Holmes, G. Garrington, S. Saikia, D. Conway, R.	NRAL NRAL NRAL NRAL	Depolarization asymmetry and jet sidedness of FR 1 sources.	6	15,17	8
AH-367	Hummel, E. Pedlar, A. Davies, R.	NRAL NRAL NRAL	The B-field structure in NGC 3310.	3.8,6	18,21	16 w/VK24
AH-369	Hummel, E.	NRAL	Polarization measurements of NGC 4631.	3.8,6	22,25 26,28	41.5
AH-370	Hummel, E. van der Hulst, J.	NRAL Kapteyn Lab	The B-field in interacting systems: NGC2207/IC2163 and NGC4038/39.	3.8,6	10,26	24.8
AH-372	Hibbard, J. van Gorkom, J. Schweizer, F.	Columbia Columbia/NRAO-VLA Carnegie Inst	Interacting and merging galaxies.	20 cm line	6,7,8 13,19,22	30.8 w/VW54,VP98
AH-374	Hunter, D. Gallagher, J. van Woerden, H.	Lowell Obs AURA, Inc Kapteyn Lab	HI in amorphous irregular galaxies.	20 cm line	6,11,13	18 w/VW54
AH-375	Hunter, D. Gallagher, J. van Woerden, H.	Lowell Obs AURA, Inc Kapteyn Lab	Relationship between star formation and HI in irregular galaxies.	20 cm line	7,10	13.5 w/VW54,VP98
AH-385	Han, X. Hjellming, R.	NMIMT/Beijing Obs NRAO-VLA	Imaging the radio remnant of V404 Cyg X-ray nova.	3.6	21	5
AL-150	Lestrade, J. Preston, R.	JPL JPL	Statistical properties of RSCVn stars.	6	19,20	4.7
AL-200	Leahy, P. Muxlow, T.	NRAO-VLA NRAL	Spectral mapping of classical radio sources.	2,3.8	24	9.5

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AL-212	Linsky, J. Veale, A. Byrne, B. Butler, C. Rodono, M. Neff, J.	Colorado Colorado Armagh Obs Armagh Obs Catania NASA/GSFC	Flares and active regions on the BY Draconis star CC Eridani.	3.8	1	1
AO-93	Owen, F. O'Dea, C.	NRAO-VLA NFRA	Nearby Abell clusters.	90	16	8.5
AP-167	Pauls, T. Schwartz, P. Johnston, K.	NRL NRL NRL	G159.6-18.5: Possible high galactic latitude SNR with 100 micron emission.	90	20	6
AP-176	Puche, D. Carignan, C. Goss, M.	NRAO-VLA Montreal NRAO-VLA	HI studies of the M101 group galaxies.	20 cm line	12	6
AR-205	Reynolds, S.	North Carolina State	Young supernova remnants.	6,20	5	8
AR-210	Rodriguez, L. Torrelles, J. Ho, P. Canto, J.	UNAM IAA, Spain CFA UNAM	The ammonia disk associated with HH1-2.	1.3 cm line	28	10
AR-211	Richter, O. McMahon, P. van Gorkom, J. Ferguson, H.	STScI Columbia Columbia/NRAO-VLA John Hopkins	HI survey of the Hydra I cluster of galaxies.	20 cm line	1	3
AR-213	Rucinski, S. Udalski, A.	York Univ York Univ	The rapidly rotating active giant, FK Comae.	2,3.5, 6,20	1	1
AS-374	Scalise, E. Rodriguez, L.	INPE, Brazil UNAM	Bright, unassociated IRAS sources with water maser emission.	2	18	4
AS-378	Seaquist, E. Taylor, A.	Toronto Calgary	Survey of symbiotic stars at 8.4 GHz.	3.5	25	2.5
AT-101	Torrelles, J. Verdes-Montenegro, L. Ho, P. Rodriguez, L. Canto, J.	IAA, Spain IAA, Spain CFA UNAM UNAM	The thin rotating molecular disk in Cephus A.	1.3 cm line	26	10
AV-157	van Breugel, W. Mc Carthy, P. Lilly, S. Spinrad, H.	LLNL Calif, Berkeley Hawaii Calif, Berkeley	B2 Jansky radio sources.		8	1.0
AW-235	Weinberg, D. van Gorkom, J. Szomoru, A. Gunn, J. Guhathakurta, P. Fruchter, A.	Princeton Columbia/NRAO-VLA Kapteyn Lab Princeton Columbia Carnegie Inst	A search for low luminosity HI rich dwarf galaxies.	20 cm line	12,17,18, 21,24,25 27	70.5
BG-01	Gwinn, C. Manchester, R.	Calif, Santa Barbara CSIRO	Speckles in a pulsar's scattering disk.	18 cm phased array VLB	17	5
VB-93	Booth, R. Kus, A. Wilkinson, P.	Onsala Onsala NRAL	Cores of steep spectrum compact QSOs-3C380.	3.6 cm	19	10.3
VB-98	Barthel, N. Lestrade, J. McClintock, J. Phillips, R. Shapiro, I. Preston, R.	CFA JPL/Obs de Paris CFA Haystack Obs CFA JPL	Cyg X-1.	3.6 cm	20	12.0
VB-99	Barthel, N. Biretta, J.	CFA NRAO-VLA	3C84.	18 cm phased array VLB	3,4	36.5
VG-61	Garrett, M. Wilkinson, P. Porcas, R. Quirrenbach, A. Walsh, D.	NRAL NRAL MPIR, Bonn MPIR, Bonn NRAL	Gravitationally lensed quasar 0957+561.	18 cm phased array MK III VLB	7	19.3
VG-62	Gwinn, C. Moran, J. Reid, M. Zheng, X. Peng, Y.	Calif, Santa Barbara CFA CFA Nanjing Univ Nanjing Univ	Study of OH megamaser in III Zw 035.	18 cm phased array VLB	10	6.1
VH-51	Heflin, M. Lawrence, C. Burke, B. Shapiro, I.	MIT Caltech MIT CFA	The gravitational lens system 2016+112.	18 cm phased array VLB	9	11.3

VLA UTILIZATION NOVEMBER 1989 (cont)

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
VK-24	Kus, A. Booth, R. Marecki, A.	Onsala Onsala TRAO	Cores of steep spectrum compact QSOs- 3C286.	3.6 cm single dish phased array VLB	20 w/AH367/Test	12.1
VL-57	Lonsdale, C. Phillips, R. Barthel, P. Muxlow, T.	Haystack Obs Haystack Obs Kapteyn Lab NRAL	The hotspot in 3C263.1.	18 cm phased array MK III VLB	6	11.7
VM-103	Mutel, R. Spangler, S.	Iowa Iowa	Measuring the inner scale of interstellar turbulence.	2.8,6 18 cm phased array MK III VLB	7	7.5
VN-18	Neff, S. Antonucci, R. Pedlar, A.	NASA/GSFC Calif, Santa Barbara NRAL	NGC1068 core.	18 cm phased array MK III VLB	8	1.9
VP-91	Phillips, R. Titus, M. Lestrade, J.	Haystack Obs Haystack Obs JPL/Obs de Paris	Winds from the Hot O-Giant stars.	18 cm phased array MK III VLB	10	4.0
VP-98	Pearson, T. Readhead, A.	Caltech Caltech	Second epoch maps of four sources.	18 cm single dish VLB	9,11 w/AA98,AH372 AH370,AH375, AC259,Baselines	31.4
VS-84	Sakurai, T. Spangler, S. Mutel, R. Armstrong, J.	Iowa Iowa Iowa NRL	Studies of density turbulence in outer corona.	6,18 cm phased array VLB	4,6	9.0
VW-54	Walker, R. Benson, J. Unwin, S. Pilbratt, G.	NRAO-VLA NRAO-CV Caltech ESTEC	World array observation of 3C120.	18 cm single dish VLB	6 w/AH372,AH374, AH375	15
		NRAO Staff	Electronics, etc.			40.5
			Baseline/Startup/Pointing			41.0
			Move/Operations			22.4
			Software			34.3
			General Test			31.9
			Holiday/Shutdown			26.0

The average downtime for the month of November 1989 was approximately 5.3 percent.

$$\text{Average downtime of operational antennas} = \frac{\text{Total number of antenna-hours of operational antennas lost due to hardware and software failures during scheduled observing}}{\text{Total number of antenna-hours of operational antennas scheduled}} \times 100$$

Where "antenna hours" definition is: An array consisting of N antennas operating for Y hours is defined to have YN antenna hours operation.

The array was scheduled 96.4 percent (696.0 hours) of the time: 73.8 percent (532.6 hours) to astronomical programs, 12.3 percent (88.6 hours) to scheduled test/calibration, and the remaining 10.4 percent (74.8 hours) went to scheduled maintenance.

The array was in the CD configuration from November 1 through November 2.
D configuration from November 2 through November 30.

The total number of programs run for the month of November, 1989 was 52.

The following independent proposals shared simultaneous observing time (56.4 hours total simultaneous observing):

AE61/MOVE/OP	5.4
VK24/AH367	4.3
VK24/TESTS	0.2
VP98/AA98	6.0
VP98/AC259	4.2
VP98/AH370	6.9
VP98/AH372	1.0
VP98/AH375	5.1
VP98/BASELINES	8.1
VW54/AH372	4.1
VW54/AH374	6.0
VW54/AH375	4.9

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Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AB-414	Becker, R. White, R.	Calif, Davis STScI	Monitoring radio stars HD193793 and P Cygni.	2 and 6	8	1.5
AB-525	Braun, R. van Gorkom, J. Walterbos, R. Kennicutt, R. Norman, C.	NFRA Columbia/NRAO-VLA Calif, Berkeley Steward Obs. STScI	The interstellar media of nearby galaxies.	20 cm line	20	6.9
AB-546	Bastian, T. Anantharamaiah, K. van Grokom, J.	NRAO-VLA TIFR Columbia/NRAO-VLA	Recombination lines from the Symbiotic binary H1-36.	3.6 cm line	9,13, 29,31	20.0
AC-256	Capetti, S. Ferrari, A. Trussoni, E. Morganti, R. Fanti, R. Parma, P. de Ruiter, H.	Inst. di Fisica Inst. di Fisica Inst. di Fisica Bologna Bologna Bologna Bologna	Knots in low luminosity radio galaxy jets.	6,20	1	7.0 w/VO05
AC-262	Campbell, B.	New Mexico	Radio emission from new young stellar objects.	6	8,17, 18,28	15.5
AD-188	Drake, S. Simon, T. Florkowski, D. Stencel, R. Bookbinder, J. Linsky, J.	NASA/GSFC Hawaii USNO Colorado CFA Colorado	Variability of M supergiants: alpha orionis.	2,6	12	3.0
AD-238	Drake, S. Linsky, J. Judge, P.	NASA/GSFC Colorado Colorado	Survey of cool giants and supergiants.	2,3.5	21,29	7.0
AD-240	de Pater, I. Palmer, P. Snyder, L.	Calif, Berkeley Chicago Illinois	Comet Okazaki.		14,15	20.1
AE-61	Eilek, J. Owen, F. Leahy, P.	NMIMT NRAO-VLA NRAO-VLA	Abell clusters without cooling cores.	3.5,6	1	5.0
AF-178	Franx, M. de Zeeuw, P. van Gorkom, J.	CFA Caltech Columbia/NRAO-VLA	The dark halo and shape of IC2006.	20 cm line	16,17,18, 19,20,22	30.0
AF-184	Freudling, W. Haynes, M. van Gorkom, J. Huchtmeier, W.	Cornell/NAIC Cornell/NAIC Columbia/NRAO-VLA MPIR, Bonn	Structure of the Magellantic Stream.	20 cm line	8,12, 13,14	29.0
AG-267	Gottesman, S. Hawarden, T.	Florida UKIRT	HI observations of NGC1512 and NGC5291.	20 cm line	13	4.5
AG-278	Garcia-Barreto, J.	UAEM	Barred galaxies NGC1022 and NGC1326.	2,6,20	27	4.0
AG-287	Gaume, R. Claussen, M. Goss, W.	NRL NRL NRAO-VLA	H and He recombination lines in Sgr B2.	1.3 cm line	28	10.0
AG-293	Gregorini, L. Vettolani, G. Parma, P. de Ruiter, H.	Bologna Bologna Bologna Bologna	Optically selected dumbbells.	6	27,29	11.0
AG-302	Glendenning, B. Kronberg, P.	Toronto Toronto	Search for variability in NGC2146.	6	1	2.0
AH-301	Hjellming, R. Gehrz, R. Taylor, A. Seaquist, E.	NRAO-VLA Minnesota Calgary Toronto	Monitoring radio novae.	1.3,2, 3.6,6,20	31	6.0
AH-355	Hewitt, J. Cappallo, R. Corey, B. Lonsdale, C. Niell, A. Phillips, R. Lestrade, J. Preston, R.	Princeton Haystack Haystack Haystack Haystack Haystack JPL/Bureau de Longitudes JPL	VLBI reference sources near dMe stars.	3.5,20	4,5 30	20.0
AH-383	Hjellming, R.	NRAO-VLA	Recurrent nova V745 Sco.	3.6,6 20	7,19	2.0
AI-37	Impey, C. Foltz, C. Weymann, R. Hewett, P.	Steward Obs. MMT Obs. Mt. Wilson Cambridge	The nature of optically selected quasars.	6	31	5.0

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AJ-178	Jackson, J. Ho, P. Rodriguez, L. Moran, J.	MPI, Garching Harvard UNAM CFA	NH_3 toward the bipolar HII region NGC6334A.	1.3 cm line	19	3.0
AK-232	Kormendy, J. Westpfahl, D. Fisher, R. van Gorkom, J.	Hawaii NMIMT NRAO-GB Columbia/NRAO-VLA	Dark matter in late-type dwarf galaxies.	20 cm line	7,9, 11,29	17.0
AL-201	Lasenby, J. Lasenby, A. Yusef-Zadeh, F.	MRAO MRAO Northwestern	A search for Zeeman splitting of the HI line in Sgr A.	20 cm line	21	8.5
AL-204	Lustig, A. Hunstead, R.	Sydney Sydney	Extended cluster sources.	6,20	9,23	11.9
AL-206	Loushin, R. Crutcher, R. Troland, T.	Illinois Illinois Kentucky	HI Zeeman effect toward dense interstellar clouds.	20 cm line	17	8.0
AM-278	Menten, K. Reid, M.	CFA CFA	HC3N towards Sgr B2.	3.5 cm line	12	6.0
AN-49	Norris, R. Roy, A. Allen, D. Sramek, R.	Australia Telescope Sydney Anglo-Australian Obs. NRAO-VLA	Extremely luminous but cool far-infrared galaxies.	3,18	25,29	7.5
AN-53	Niell, A. Lestrade, J. Lonsdale, C.	Haystack Obs. de Paris Haystack	VLBI phase reference sources near AE Aquarii.	3.6,20	7	3.0
AP-170	Perley, R. Taylor, G. Inoue, M. Kato, T. Tabara, H. Aizu, K.	NRAO-VLA NRAO-VLA Nobeyama Obs. Utsunomiya Utsunomiya Rikkyo	Very large Faraday rotation in Hydra A.	3.5	1	4.0
AP-173	Phillips, R. Lestrade, J.	Haystack JPL/Bur.de Longitudes	Search for compact reference sources near radio-bright B-stars.	6,20	6	12.0
AP-175	Pedlar, A. Anantharamaiah, K. van Gorkom, J. Goss, W.	NRAL TIFR Columbia/NRAO-VLA NRAO-VLA	Recombination line from Sgr A.	20 cm line	16	8.0
AR-211	Richter, O. McMahon, P. van Gorkom, J. Ferguson, H.	STScI Columbia Columbia/NRAO-VLA John Hopkins	HI survey of the Hydra I cluster of galaxies.	20 cm line	20,21, 22,23,28	31.5
AR-212	Rucinski, S. Seaquist, E.	York Univ. Toronto	RS CVn systems: short time scales.	6,20	2	25.5 w/Move/Op
AR-213	Rucinski, S. Udalski, A.	York Univ. York Univ.	The rapidly rotating active giant, FK Comae.	2,3.5, 6,20	7,8,9, 12,13, 16,17,19, 24,27	15.0
AS-333	Sramek, R. Weiler, K. van der Hulst, J. Panagia, N.	NRAO-VLA NRL Westerbork STScI	Statistical properties of radio supernovae.	2,6,20	24	1.0
AS-349	Seaquist, E. Bell, M.	Toronto Hertzberg	Molecular absorption against Cen A.	1.3,2 cm line	7,8,30 15	20.5
AS-378	Seaquist, E. Taylor, A.	Toronto Calgary	Survey of symbiotic stars at 8.4 GHz.	3.5	6,9, 29,31	7.0
AS-381	Sandqvist, A. Karlsson, R. Whiteoak, J.	Stockholm Obs. Stockholm Obs. CSIRO	OH in the Sgr A molecular clouds.	18 cm line	26	8.0
AS-383	Szczepanski, J. Ho, P. Jackson, J. Armstrong, J.	MIT Harvard MPI, Garching NRL	Gas feeding of the galactic center region.	1.3 cm line	22,23	18.0
AS-385	Simkin, S. Sadler, E. van Gorkom, J.	Michigan State Anglo-Australian Tele. Columbia/NRAO-VLA	HI content of powerful radio galaxies.	20 cm line	8,9,10, 12,13,14, 15,21,25	33.2
AS-388	Seaquist, E. Smolinski, J.	Toronto Copernicus Astr. Ctr.	Supergiant binary HR8752.	1.3,2, 3.5,6,20	16,24	6.5
AT-94	Taylor, A. Seaquist, E. Kenyon, S.	Calgary Toronto CFA	Continued monitoring of the symbiotic stars Z and CH Cyg.	1.3,2, 6,20	5	7.8
AT-103	Tacconi, L. van Woerden, H.	Dwingeloo Kapteyn Inst.	SO galaxies with molecular gas.	20 cm line	30	15.5

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AW-237	Wehrle, A. Jones, D.	Caltech JPL	Optical jets in NGC1097.	20,90	23,24, 25	12.0
AW-238	Wolter, A. Gioia, I. Maccacaro, T. Stocke, J. Morris, S.	CFA CFA CFA Colorado Mt. Wilson	Study of radio properties of x-ray selected BL Lac objects.	2,6, 20,90	26	6.0
AW-239	White, S. Kundu, M.	Maryland Maryland	Flare stars at high frequencies and impulsive phase of optical flares.	2	3	8.0 w/Move/Op
AW-240	Wootten, H. Mundy, L. Wilking, B.	NRAO-CV Maryland Missouri	The star-forming center of a proto-stellar disk.	1.3 cm line	20	8.0
AY-32	Yusef-Zadeh, F. Anantharamaiah, K. Bastian, T.	Northwestern TIFR NRAO-VLA	Zeeman splitting in H92 Alpha emission from G0.1+0.08.	3.6 cm line	24	8.0
VO-05	O'Dea, C. Baum, S. Murphy, D.	NFRA NFRA JPL	GHz peaked spectrum radio sources.	6 cm VLB	1	24.1 w/AC256
		NRAO Staff	Baselines, Pointing, Delays			52.8
			Electronics, etc.			48.0
			Move/Operations			22.4
			Software			36.0
			General Tests			50.2

The average downtime for the month of October 1989 was approximately 8.8 percent.

$$\text{Average downtime of operational antennas} = \frac{\text{Total number of antenna-hours of operational antennas lost due to hardware and software failures during scheduled observing}}{\text{Total number of antenna-hours of operational antennas scheduled}} \times 100$$

Where "antenna hours" definition is: An array consisting of N antennas operating for Y hours is defined to have YN antenna hours operation.

The array was scheduled 100.0 percent (747.1 hours) of the time: 72.7 percent (542.9 hours) to astronomical programs, 16.1 percent (120.2 hours) to scheduled test/calibration, and the remaining 11.2 percent (84.0 hours) went to scheduled maintenance.

The array was in the BC configuration from October 1 through October 2.
BCD configuration from October 2 through October 4.
CD configuration from October 4 through October 31.

The total number of programs run for the month of October, 1989 was 49.

The following independent proposals shared simultaneous observing time (16.5 hours total simultaneous observing):

AR212/Move/Op	5.4
VO05/AC256	6.0
AW239/Move/Op	5.1

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VLA UTILIZATION SEPTEMBER 1989

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AB-414	Becker, R. White, R.	Calif, Davis STScI	Monitoring radio stars HD193793 and P Cygni.	2 and 6	29	1.5
AB-456	Burke, B. Hewitt, J. Roberts, D.	MIT Princeton Brandeis	Monitoring Lens 0957+561.	6	27	2.0
AB-534	Baum, S. Leahy, P. Perley, R. Riley, J. Scheuer, P.	NFRA NRAO-VLA NRAO-VLA MRAO MRAO	A survey of nearby hotspots.	3.5	14	1.5 w/VC55
AC-230	Cummins, N. Owen, F.	Maine NRAO-VLA	3C442 (NGC 7236/7237/Anon).	90	22	4.6
AC-231	Claussen, M. Gaume, R. Johnston, K. Wilson, T.	NRL NRL NRL MPIR, Bonn	The W3 (continuum) star forming region.	1.3,2, 6 and 18	3,16, 18,20	42.0 w/VC55, VZ19
AC-246	Carilli, C. van Gorkom, J. Stocke, J.	NRAO-VLA NRAO-VLA/Columbia Colorado	The quasar-galaxy pair, 3C232, NGC 3067.	6 and 20	18	2.0
Ad Hoc	Gioia, I.	CFA			23	0.5
Ad Hoc	Jaffe, W.	Leiden			23	0.3
AD-188	Drake, S. Simon, T. Florkowski, D. Stencel, R. Bookbinder, J. Linsky, J.	SASC Hawaii USNO Colorado CFA Colorado	Variability of M supergiants: Alpha Orionis.	2 and 6	19	3.0
AD-236	Dickel, J. Williamson, C. Mufson, S.	Illinois Illinois Indiana	Magnetic field orientation in SNR IC 443.	6	4	13.0
AE-061	Eilek, J. Owen, F. Leahy, P.	NMIMT NRAO-VLA NRAO-VLA	Abell clusters without cooling cores.	3.5 and 6	15,19, 29,30	31.6 w/VC55, VA25,VG60
AG-289	Ge, J. Owen, F. O'Dea, C.	NMIMT NRAO-VLA NFRA	Survey of Abell distance class 4.	20	7,14	12.0 w/VC55, VW52
AH-355	Hewitt, J. Cappallo, R. Corey, B. Lonsdale, C. Niell, A. Phillips, R. Lestrade, J. Preston, R.	Princeton Haystack Haystack Haystack Haystack Haystack Bureau de Longitudes/JPL JPL	VLBI reference sources near dMe stars.	3.5 and 20	8,14	4.2 w/VW52
AH-383	Hjellming, R.	NRAO-VLA	Recurrent nova V745 Sco.	3.6,6 20	17,23	2.9
AK-228	Kenney, J. Wang, Z.	Caltech Caltech	The HI distributions in 3 HI-rich low-mass spirals.	20 cm line	11,17	10.0 w/VZ19
AK-229	Kenney, J.	Caltech	The CO and HI morphology of the barred spiral galaxy NGC 7479.	20 cm line	13	6.0 w/VC55
AK-231	Keto, E. Klein, R. Bertoldi, F.	Lawrence Livermore Lawrence Livermore Calif, Berkeley	Sequential star formation.	3.5 and 20 cm line	11	4.0
AK-238	Kulkarni, S. Goss, M.	Caltech NRAO-VLA	ZZ Ceti variable G29-38.	20	26	3.0 w/VA25
AL-150	Lestrade, J. Preston, R.	JPL/Bur. de Longitudes JPL	Statistical properties of RSCVn stars.	6	16,17, 23,30	4.5
AL-200	Leahy, P. Muxlow, T.	NRAO-VLA NRAL	Spectral mapping of classical radio sources.	2 and 3.6	1,19	21.2 w/AL200
AL-202	Lewin, W. Tan, J. Hjellming, R. Mitsuda, K. Penninx, W. van Paradijs, J.	MIT MIT NRAO-VLA ISAS Amsterdam Amsterdam	Low mass x-ray binary GX5-1.	3.6,6 and 20	1,2,3, 4,5	42.5 w/AL210
AL-210	Lewin, W. Tan, J. Hjellming, R. Mitsuda, K. Penninx, W. van Paridijs, J.	MIT MIT NRAO-VLA ISAS Amsterdam Amsterdam	Low-mass x-ray binary GX13+1.	3.6,6 and 20	1,2,3, 4,5	42.5 w/AL202

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AM-266	Mirabel, I. Rodriguez, L. Reid, M.	Puerto Rico UNAM CFA	Anomalous OH emission in star-forming regions.	18 cm line	2	5.5
AM-270	Morganti, R. Fosbury, R. Serego Alighieri, S. Tadhunter, C.	ESO ESO ESO ESO	The radio structures of PKS 2Jy radio sources.	6	9,11,15	14.0 w/Move/Op, VC55
AM-274	Mangum, J. Wootten, A.	NRAO-CV NRAO-CV	Formaldehyde emission in Orion-KL.	6 cm line	5	6.5
AM-277	Masson, C. Keene, J.	CFA Caltech	A search for high velocity ammonia (1,1) emission in L1551.	1.3 cm line	11	8.0
AN-49	Norris, R. Roy, A. Allen, D. Sramek, R.	Australia Telescope Sydney Anglo-Australian Obs NRAO-VLA	Extremely luminous but cool far-infrared galaxies.	3,18	29	5.5 w/VQ3
AP-178	Pauls, T. Wilson, T. Johnston, K. Gaume, R.	NRL MPIR, Bonn NRL NRL	Molecular cloud collapse and protostars in Orion-KL.	1.3 cm line	8,22 27	33.0 w/VA25
AP-179	Palmer, P. de Pater, I. Snyder, L.	Chicago Calif, Berkeley Illinois	Comet Brorsen-Metcalf.	3.5 and 6 cm line	2,3,7, 9,10	47.5
AR-209	Reipurth, B. Rodriguez, L.	ESO, Chile UNAM	HH 80-81 spectral indices.	2,3.5,6 and 20	18	9.0
AS-333	Sramek, R. Weiler, K. van der Hulst, J. Panagia, N.	NRAO-VLA NRL Westerbork STScI	Statistical properties of radio supernovae.	2,6 and 20	4	1.5
AS-378	Seaquist, E. Taylor, A.	Toronto Calgary	Survey of symbiotic stars at 8.4 GHz.	3.5	16,26, 28	7.6 w/VA25
AS-379	Stanford, A. Code, A.	Wisconsin Wisconsin	HI in colliding galaxies.	20 cm line	28	12.0 w/VA25,VQ3
AS-384	Strom, R. van Paradijs, J. van der Klis, M.	NFRA Amsterdam Amsterdam	Double radio sources associated with x-ray binaries.	1.3,2, 3.6,6	8,10	16.1
AT-095	Terzian, Y. Bignell, R. van Gorkom, J. Phillips, T.	Cornell NRAO-VLA NRAO-VLA/Columbia Cornell	Angular expansion of planetary nebulae/Epoch II.	6	2	4.0
AU-035	Ulvestad, J.	JPL	Thermal emission from Markarian 231.	2,6 and 20	1	2.0
AV-167	Vallee, J. MacLeod, J.	Royal Obs Herzberg Inst	Study of the HII region S64=W40.	20 and 92 cm line	9	3.0
AV-168	Vallee, J. Avery, L. Irwin, J.	Royal Obs Herzberg Inst Herzberg Inst	Ionised disks and jets associated with multi-lobed outflows.	2	9	6.0
VA-23	Alberdi, A. Marcaide, J. Marscher, A. Shaffer, D.	MPIR, Bonn IAA, Granada Boston Interferometrics	4C 39.25	1.3 cm phased array VLB	16	12.2
VA-25	Akujor, C. Porcas, R.	Nigeria MPIR, Bonn	Optically quiet quasars.	6 cm single dish MK II VLB	26,28 29	23.5 w/VC52,AK238, AP178,AS378, AS379,AE61
VB-94	Barthel, P. de Bruyn, A. Schilizzi, R. O'Dea, C. Wieringa, M.	Kapteyn Lab NFRA NFRA NFRA Leiden	Cores in giant core-dominated quasars.	6 cm phased array MK II VLB	30	11.5
VC-52	Corey, B. Elosegui, P. Falco, E. Gorenstein, M. Rogers, A. Shapiro, I. Campbell, R.	Haystack Obs IAA, Granada CFA Millipore Corp Haystack Obs CFA Harvard	Time delay for gravitational images of 0957+561.	6 cm phased array MK III VLB	26	17.0 w/VA25
VC-54	Conway, J. Unwin, S. Pearson, T. Readhead, A.	Caltech Caltech Caltech Caltech	Compact double 0710+439.	6 cm phased array MK II VLB	25	13.8

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
VC-55	Conway, J. Readhead, A. Venturi, T. Marr, J. Backer, D. Wright, M. Wrobel, J. Phillips, R. Porcas, R. Baath, L. Mantovani, F.	Caltech Caltech Caltech/IRA Calif, Berkeley Calif, Berkeley Calif, Berkeley NRAO-VLA Haystack Obs MPIR, Bonn Onsala IRA	3C84 using frequency synthesis.	1.3 cm single dish MK II VLB	13,15,16 w/AC231,AE61, AM270,AK229, AB534,AG289	35.9
VF-22	Fanti, C. Fanti, R. Perus, A. Cotton, W. Schilizzi, R. Foley, A. Spencer, R.	Bologna Bologna Bologna NRAO-CV NFRA NFRA NRAL	Study of 3C138.	6 and 18 cm phased array MK III VLB	24	10.5
VG-60	Giovanni, G. Wehrle, A. Comoretto, G. Feretti, L. Venturi, T.	Bologna Caltech OAA Bologna Bologna	A sample of low power (FRI) radiogalaxies.	6 cm MK III VLB	24,30	10.8 w/AE61
VH-52	Hummel, C. Schalinski, C. Krichbaum, T. Quirrenbach, A. Johnston, K. Witzel, A.	MPIR, Bonn MPIR, Bonn MPIR, Bonn MPIR, Bonn NRL MPIR, Bonn	Wiggly jet-quasar 1928+93.	1.3 cm phased array VLB	15	12.5
VL-49	Lestrade, J. Boloh, L. Mutel, R. Niell, A. Preston, R.	JPL JPL Iowa Haystack Obs JPL	Mapping of RS CVn binaries.	6 cm phased array MK III VLB	25,29	11.5 w/VQ3
VM-103	Mutel, R. Spangler, S.	Iowa Iowa	Inner scale of interstellar turbulence using phase structure functions.	2.8,6 and 18 cm phased array VLB	22	7.3
VO-05	O'Dea, C. Baum, S. Murphy, D.	NFRA NFRA JPL	GHz peaked spectrum radio sources.	6 cm phased array VLB	24,25, 27	17.7
VP-94	Pauliny-Toth, I. Alberdi, A. Zensus, A. Cohen, M.	MPIR, Bonn MPIR, Bonn NRAO-VLA Caltech	2134+004.	1.3 cm phased array VLB	17	8.6
VQ-3	Quirrenbach, A. Witzel, A. Krichbaum, T. Hummel, C.	MPIR, Bonn MPIR, Bonn MPIR, Bonn MPIR, Bonn	Variable quasar 0917+62.	6 cm single dish MK II VLB	29	15.1 w/AS379, Tests,AN49
VS-83	Schilizzi, R. Barthel, P. Miley, G.	Dwingeloo Groningen Leiden	Core of the giant radio galaxy 3C236.	6 cm phased array MK III VLB	23	14.2
VS-84	Sakurai, T. Spangler, S. Mutel, R. Armstrong, J.	Iowa Iowa Iowa JPL	Density turbulence in outer corona.	6 and 18 cm phased array VLB	28	10.0
VW-52	Wehrle, A. Unwin, S. Cohen, M.	Caltech Caltech Caltech	Monitoring the superluminal motion in 3C345.	1.3 cm single dish MK II VLB	14 w/AG289,AH355	6.6
		NRAO Staff	Baselines, Pointing, Delays			36.4
			Electronics, etc.			42.4
			Software			20.5
			General Tests			34.6
			Voyager telemetry			41.0
			Move/Operations			6.9

The average downtime for the month of September 1989 was approximately 3.9 percent.

$$\text{Average downtime of operational antennas} = \frac{\text{Total number of antenna-hours of operational antennas lost due to hardware and software failures during scheduled observing}}{\text{Total number of antenna-hours of operational antennas scheduled}} \times 100$$

Where "antenna hours" definition is: An array consisting of N antennas operating for Y hours is defined to have YN antenna hours operation.

The array was scheduled 100.0 percent (722.0 hours) of the time: 81.4 percent (587.5 hours) to astronomical programs, 9.9 percent (71.6 hours) to scheduled test/calibration, and the remaining 8.7 percent (62.9 hours) went to scheduled maintenance.

The array was in the BC configuration from September 1 through September 30.

The total number of programs run for the month of September, 1989 was 55.

The following independent proposals shared simultaneous observing time (141.5 hours total simultaneous observing):

AL202/AL200	8.5	VG60/AE61	4.0
AL202/AL210	8.5	VQ3/AN49	5.5
AM270/MOVE/OP	6.9	VQ3/AS379	6.7
VA25/AE61	4.9	VQ3/TESTS	2.5
VA25/AK238	3.0	VQ3/VL49	0.4
VA25/AP178	5.7	VW52/AG289	3.6
VA25/AS378	2.5	VW52/AH355	3.0
VA25/AS378	1.7	VZ19/AC231	1.4
VA25/AS379	5.3	VZ19/AK228	5.5
VA25/VC52	0.3	VZ19/AL150	0.1
VC55/AB534	1.5		
VC55/AC231	10.4		
VC55/AE61	9.1		
VC55/AG289	3.4		
VC55/AK229	6.0		
VC55/AM270	2.5		
VC55/TEST	3.2		

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VLA UTILIZATION AUGUST 1989

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AA-101	Aschwanden, M. Benz, A. Bastian, T. Dennis, B.	Colorado ETH NRAO-VLA NASA/GSFC	Decimetric solar radio bursts.	18 and 20	1,4,7, 10,13	22.5
AB-414	Becker, R. White, R.	Calif, Davis STScI	Monitoring radio stars HD193793 and P Cygni.	2 and 6	6	1.5
AB-548	Briggs, F. Garwood, R. Wolfe, A.	Pittsburgh Pittsburgh Pittsburgh	HI absorption at z~ 3 in PKS 0336-017.	90 cm line	28	8.1
AC-253	Carilli, C. van Gorkom, J. Stocke, J.	NRAO-VLA NRAO-VLA/Columbia Colorado	Deep HI imaging of the quasar galaxy pair 3C232-NGC 3067.	20 cm line	6,12	17.0
AC-254	Cordova, F. Hjellming, R.	Penn State NRAO-VLA	Serendipitous x-ray source E0458+65.	2,3.6, 6,20	31	6.0
AC-255	Cool, A. Ho, P.	Harvard Harvard	NH3 condensations in the Orion KL Nebula.	1.3 cm line	18,21, 24	24.0
AC-257	Corbelli, E. Schneider, S.	Cornell Massachusettes	HI in the outer disks of galaxies.	20 cm line	3	15.0
AD-188	Drake, S. Simon, T. Florkowski, D. Stencel, R. Bookbinder, J. Linsky, J.	SASC Hawaii USNO Colorado CFA Colorado	Variability of M supergiants: alpha orionis.	2 and 6	10	2.0
AD-237	Drake, S. Simon, T.	SASC Hawaii	Survey of the open cluster NGC 2264.	3.5 and 6	19	14.2
AE-58	Edelson, R.	Colorado	CfA Seyfert galaxies.	90	23	3.6
AF-182	Fruchter, A. Goss, W. Stinebring, D. Taylor, J.	Carnegie Inst. NRAO-VLA Princeton Princeton	Elipsing millisecond pulsar.	90	1	6.5
AG-289	Ge, J. Owen, F. O'Dea, C.	NMIMT/NRAO-VLA NRAO-VLA Dwingeloo	Survey of Abell distance class 4.	20	11	8.1
AH-295	Habing, H. Goss, W. Winnberg, A. van Langevelde, H.	Leiden Obs. NRAO-VLA Onsala Leiden Obs.	Monitoring OH/IR stars at the galactic center.	18 cm line	30	2.1
AH-301	Hjellming, R. Gehrz, R. Taylor, A. Seaquist, E.	NRAO-VLA Minnesota Calgary Toronto	Monitoring radio novae.	1.3,2,3.6, 6,20	20	2.1
AH-350	Hjellming, R. Cordova, F.	NRAO-VLA Penn State	HI absorption study of the Gem-Mon remnant.	21 cm line	20	12.0
AH-353	Hurt, R. Turner, J.	Calif, Los Angeles Calif, Los Angeles	Maffei 2.	2,6 20 cm line	26	6.1
AH-366	Hjellming, R. Han, X.	NRAO-VLA NMIMT/Beijing	X-ray nova V404 Cyg: Monitoring Cyg X-3.	3.5,6 20	8,18, 24,29	8.8
AJ-177	Johnston, K. Gaume, R. Walmsley, C. Wilson, T. Henkel, C.	NRL NRL MPIR, Bonn MPIR, Bonn MPIR, Bonn	The "PIG" in Orion.	1.3 cm line	29	8.0
AL-211	Linsky, J. Brown, A. Doyle, J. Neff, J.	Colorado Colorado Armagh Obs. NASA/GSFC	RS CVn System II Pegasi.	2,6, 20	15,16	15.1
AM-275	McKinnon, M. Hankins, T.	NMIMT NRAO-VLA/NMIMT	Analysis of the pulse core component PSR0329+54.	3.5,20, 90	27	5.1
AN-49	Norris, R. Roy, A. Allen, D. Sramek, R.	Australia Telescope Sydney Anglo-Australian Tele. NRAO-VLA	Extremely luminous but cool far-infrared galaxies.	3 and 18	13,25 30	12.4
AO-84	O'Dea, C. Baum, S.	Dwingeloo Dwingeloo	Radio properties of giant galaxies in cooling flows at 327MHz.	90	27	9.1
AP-170	Perley, R. Taylor, G. Inoue, M. Kato, T. Tabara, H. Aizu, K.	NRAO-VLA NRAO-VLA Nobeyama Obs. Utsunomiya Utsunomiya Rikkyo	Very large Faraday rotation in Hydra A.	3.5	3,15, 28,29	20.5

VLA UTILIZATION AUGUST 1989 (cont)

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AP-174	Partridge, B. Danese, L.	Haverford Padova	Galaxies in the CFA deep redshift survey.	20	1,4,5	20.4
AR-208	Rudnick, L. Anderson, M. Wang, Y.	Minnesota Minnesota Minnesota	3C33 North hot spot.	6 and 20	30	6.5
AS-333	Sramek, R. Weiler, K. van der Hulst, J. Panagia, N.	NRAO-VLA NRL Westerbork STScI	Statistical properties of radio supernovae.	2,6 20	21	2.1
AS-369	Shaw, M. Richter, O. Sparke, L.	Manchester STScI Wisconsin	HI observations of warped spiral UGC 7170.	20 cm line	11,13	10.0
AS-375	Strauss, M. Partridge, B.	Calif, Berkeley Haverford	Radio flux and morphology of ultra-luminous IRAS galaxies.	6 and 20	4,5	17.1
AT-95	Terzian, V. Bignell, R. van Gorkom, J. Phillips, T.	Cornell NRAO-VLA NRAO-VLA/Columbia Cornell	Angular expansion of planetary nebulae/Epoch II.	6	26	8.0
AV-169	van Moorsel, G. Zinnecker, H. Johansson, L.	ESO MPI,Garching ESO	Blue compact dwarf galaxies with broad HI profiles.	20 cm line	25	9.8
AW-238	Wolter, A. Gioia, I. Maccacaro, T. Stocke, J. Morris, S.	CfA CfA CfA Colorado Mt. Wilson	Study of radio properties of x-ray selected BL Lac objects.	2,6, 20,90	2,7, 14,17	10.3
AW-241	Willson, R. Lang, K.	Tufts Tufts	UX Ari: a search for thermal plasma.	2,3.8, 6,20	7,10	8.0
		NRAO Staff	Baselines, Pointing, Delays			42.6
			Electronics, etc.			62.8
			Software			35.0
			Standard Field Observation			11.4
			General Tests			17.0
			Voyager telemetry			255.1
			Move/Operations			4.0

The average downtime for the month of August 1989 was approximately 3.0 percent.

$$\text{Average downtime of operational antennas} = \frac{\text{Total number of antenna-hours of operational antennas lost due to hardware and software failures during scheduled observing}}{\text{Total number of antenna-hours of operational antennas scheduled}} \times 100$$

Where "antenna hours" definition is: An array consisting of N antennas operating for Y hours is defined to have YN antenna hours operation.

The array was scheduled 100.0 percent (746.1 hours) of the time: 77.1 percent (575.2 hours) to astronomical programs, 9.8 percent (73.1 hours) to scheduled test/calibration, and the remaining 13.1 percent (97.8 hours) went to scheduled maintenance.

The array was in the BC configuration from August 1 through August 31.

The total number of programs run for the month of August, 1989 was 32.

The following independent proposals shared simultaneous observing time (4.0 hours total simultaneous observing):

AP170/Move 4.0

890801PDH/sm

VLA UTILIZATION JULY 1989

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AA-91	Appleton, P. Joseph, R.	Iowa State Imperial College	Mapping the HI in infrared active/ inactive pairs.	20 cm line	30	8.5
AA-101	Aschwanden, M. Benz, A. Bastian, T. Dennis, B.	Colorado ETH NRAO-VLA NASA/GSFC	Decimetric solar radio bursts: Coordinated with the Zurich microwave spectrometer.	18 and 20	29	4
AA-103	Andernach, H.	INPE	3C40 and NGC 7385.	90	29	2
AB-414	Becker, R. White, R.	Calif, Davis STScI	Monitoring HD193793 and P Cygni.	2 and 6	23	1.5
AB-456	Burke, B. Hewitt, J. Roberts, D.	MIT Haystack Obs. Brandeis	Monitoring 0957+561.	6	16	2
AB-525	Braun, R. van Gorkom, J. Walterbos, R. Kennicutt, R. Norman, C.	NFRA NRAO-VLA/Columbia Calif, Berkeley Steward Obs. STScI	The interstellar media of nearby galaxies.	20 cm line	9,10	20
AB-532	Bridle, A. Fomalont, E.	NRAO-CV NRAO-CV	Polarimetry of lobes of 3C288.	2 and 3.5	27	1.6
AB-534	Baum, S. Leahy, P. Perley, R. Riley, J. Scheuer, P.	NFRA NRAO-VLA NRAO-VLA MRAO MRAO	A survey of nearby hotspots.	3.5	1	18
AB-536	Bosma, A. Athanassoula, E.	Obs. de Marsielle Obs. de Marsielle	Flaring HI disks.	20 cm line	6	24
AB-540	Birkinshaw, M. Davies, R.	Harvard Oxford	Elliptical galaxies.	6	25,26	6.6
AB-550	Baum, S. O'Dea, C.	NFRA NFRA	A search for extended emission around GHz-peaked spectrum radio sources.	6 and 20	8	12
AB-551	Berkhuijsen, E. Beck, R. Hummel, E.	MPIR, Bonn MPIR, Bonn NRAL	Structure of the magnetic field in the central region of M31.	6,20 and 90	27	6
AC-251	Curiel, S. Raymond, J. Rodriguez, L. Canto, J.	CFA CFA UNAM UNAM	Spectral index of radio sources associated with molecular outflows.	2 and 6	26,31	6
AC-252	Carignan, C.	Montreal	HI studies of gas-rich dwarf irregulars.	20 cm line	15	16
AD-188	Drake, S. Simon, T. Florkowski, D. Stencel, R. Bookbinder, J. Linsky, J.	SASC Hawaii USNO Colorado CFA Colorado	Monitoring M Supergiant Alpha Ori.	2 and 6	16	3
AF-156	Fich, M. Taylor, A.	Waterloo Manchester	A complete survey in the galactic plane.	6 and 20	21	5.5
AF-167	Frail, D. Seaquist, E. Bode, M. Roberts, J.	Toronto Toronto Lancashire Poly. Lancashire Poly.	Nova remnant GK Persei.	6 and 20	6	5
AF-180	Fey, A. Spangler, S.	Iowa Iowa	Enhanced interstellar scattering due to HII regions.	6 and 20	20	5
AG-269	Ge, J. Owen, F.	NMIMT NRAO-VLA	High faraday rotation in cooling flow clusters.	3.6,6 and 20	14,21	13
AG-275	Gottesman, S. Hunter, J. Mahon, M.	Florida Florida Florida	Peculiar spindle galaxy NGC 2685.	21 cm line	29	8.5
AG-288	Gussie, G. Taylor, A.	Calgary Calgary	Survey of circumnebular neutral hydrogen absorption in planetary nebulae.	20 cm line	27,30	24
AG-290	Goss, W. Cowan, J. Ekers, R. Sramek, R. Roberts, D.	NRAO-VLA Oklahoma Australian Telescope AT/NRAO-VLA NRAO-VLA	A search for very young supernova remnants in our galaxy.	20	3,19	9
AG-294	Gregorini, L. Padrielli, L. Parma, P.	Bologna Bologna Bologna	Radio galaxies of intermediate strength.	20	4	2.5

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AH-295	Habing, H. Goss, W. Winnberg, A. van Langevelde, H.	Leiden Obs. NRAO-VLA Onsala Leiden Obs.	Monitoring OH, IR stars at the galactic center.	18 cm line	1	2
AH-343	Holmes, G. Garrington, S. Saikia, D. Conway, R.	NRAL NRAL NRAL NRAL	Low and intermediate luminosity (FR1) radio sources.	6,18 and 21	28	14
AH-352	Hoffman, G. Salpeter, E. Wakamatsu, K.	Lafayette College Cornell Gifu	Giant arc around IC 1209.	20	13	1.6
AH-354	Hurford, G. Gary, D.	Caltech Caltech	Optically thin solar burst sources.	1.3 and 2	1	12
AH-358	Hunter, D. Gallagher, J. van Woerden, H.	Lowell Obs. Lowell Obs. Kapteyn Lab.	The spatial distribution of HI in amorphous irregular galaxies.	20 cm line	22,24, 27	18
AH-359	Hunter, D. Gallagher, J. van Woerden, H.	Lowell Obs. Lowell Obs. Kapteyn Lab.	Star formation and HI in irregular galaxies.	20 cm line	21	12
AH-361	Hughes, V. MacLeod, G. Moriaty-Schieven, G.	Queen's Univ. Queen's Univ. Queen's Univ.	New HII regions.	6	29	12
AH-362	Hines, D. Wills, B.	Texas Texas	IRAS quasars-radio structure and optical polarization.	6	15	6
AH-364	Hunt, G. Patnaik, A. Salter, C. Shaver, P.	NRAO-VLA NRAL TIFR ESO	High surface brightness SNRs and SNRs with "blow-outs".	90	28	7
AH-366	Hjellming, R. Han, X.	NRAO-VLA NRAO-VLA	X-Ray nova V404 Cyg: Monitoring Cyg X-3.	3.5,6 and 20	6,18 22	6.0
AI-38	Irwin, J.	Herzberg	NGC 4775/4 system.	20 cm line	16	9.5
AJ-179	Johnston, K. Webster, W. Seidelman, P. Altenhoff, W.	NRL NASA USNO MPIR, Bonn	Spectra of minor planets.	1.3,2 and 3.5	9,13	24 w/Move/Op
AK-225	Klein, U. Reuter, U. Wielebinski, R. Kronberg, P. Lesch, H.	Bonn MPIR, Bonn MPIR, Bonn Toronto Heidelberg	Tracing the magnetic field in M82.	2,6,20 and 90	23	12
AK-230	Katz, N. Wallington, S. Gunn, J. Knapp, G. van Gorkom, J.	Princeton Princeton Princeton Princeton Columbia/NRAO-VLA	Elliptical galaxy NGC855.	6 and 20 cm line	16,17, 20,24	36.5
AK-231	Keto, E. Klein, R. Bertoldi, F.	Lawrence Livermore Calif, Berkeley Calif, Berkeley	Massive star forming regions.	3.5 and 20 cm line	7	8.5
AK-232	Kormendy, J. Westpfahl, D. Fisher, J. van Gorkom, J.	Hawaii NRAO-GB NRAO-GB NRAO-VLA/Columbia	Dark matter in late-type dwarf galaxies.	20 cm line	2,3,8	24.0
AL-174	Lawrence, C. Davies, R. Lasenby, A. Myers, S. Readhead, A.	Caltech Manchester Cambridge Caltech Caltech	MWB fields.	3.5	3	5
AL-205	Leous, J. Feigelson, E. Montmerle, T. Myers, P.	Penn State Penn State Saclay CFA	Young stars near molecular cores in Taurus.	6 and 20	8	10 w/Move/Op
AO-89	Owen, F. Cummins, N.	NRAO-VLA Maine	Radio sources in Zwicky clusters.	20	14,24	12.0 w/Test
AP-164	Palmer, P. Yusef-Zadeh, F. Goss, W. Lasenby, A. Lasenby, J.	Chicago Northwestern Univ. NRAO-VLA Cambridge Cambridge	Sgr B1/Sgr B2 complex of HII regions.	2,6 and 20	1	4.6
AP-174	Partridge, B. Danese, L.	Haverford College Padova	Galaxies in the CFA deep redshift survey.	20	31	9.6

VLA UTILIZATION JULY 1989 (cont)

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AP-176	Puche, D. Carignan, C. Goss, W.	Montreal Montreal NRAO-VLA	HI studies of the M101 group galaxies.	20 cm line	20,22	16
AP-177	Parma, P. de Ruiter, H. Fanti, R. Morganti, R.	Bologna Bologna Bologna Bologna	Naked jets.	20	17	8
AR-205	Reynolds, S.	North Carolina State	Young supernova remnants.	6,20 and 90	5	7.4
AS-333	Sramek, R. Weiler, K. van der Hulst, J. Panagia, N.	AT/NRAO-VLA NRL Westerbork STScI	Statistical properties of radio supernovae.	2,6 and 20	17,23	8
AS-374	Scalise, E. Rodriguez, L.	INPE UNAM	IRAS sources with detected H_2O maser emission.	2 and 6	23	3
AS-382	Schmelz, J. Gonzalez, R.	Lockheed NRAO-VLA	Solar bursts.	3.5,6 and 20	18	7
AV-165	Velusamy, T.	TIFR	CTB80.	90	3	5
AV-166	Velusamy, T.	TIFR	G18.95-1.1.	6,20 and 90	3	5
AW-234	Williams, B. van Gorkom, J.	Delaware NRAO-VLA/Columbia	HI synthesis of compact groups of galaxies.	20 cm line	10	16
AW-238	Wolter, A. Gioia, I. Maccacaro, T. Stocke, J. Morris, S.	CFA CFA CFA Colorado Mt. Wilson	BL Lac objects.	2,6,20 and 90	1,7,26	7.5
AY-24	Yusef-Zadeh, F. Palmer, P.	Northwestern Univ. Chicago	Mosaic the orion nebula.	2 and 6	4	10
		JPL Staff	Voyager/Observation		4,11,18 25	40
		NRAO Staff	Baseline/Startup/Pointing			45.0
			Electronics, etc.			50.8
			Software			36.6
			Students			3.0
			General Tests			29.8
			Move/Operations			8.4

The average downtime for the month of July 1989 was approximately 5.4 percent.

$$\text{Average downtime of operational antennas} = \frac{\text{Total number of antenna-hours of operational antennas lost due to hardware and software failures during scheduled observing}}{\text{Total number of antenna-hours of operational antennas scheduled}} \times 100$$

Where "antenna hours" definition is: An array consisting of N antennas operating for Y hours is defined to have YN antenna hours operation.

The array was scheduled 100.0 percent (746.1 hours) of the time: 77.4 percent (577.7 hours) to astronomical programs, 10.9 percent (81.0 hours) to scheduled test/calibration, and the remaining 11.7 percent (87.4 hours) went to scheduled maintenance.

The array was in the BC configuration from July 1 through July 31.

The total number of programs run for the month of July, 1989 was 55.

The following independent proposals shared simultaneous observing time (10.6 hours total simultaneous observing):

AJ179/Move/Op	5.4
AL205/Move/Op	3.0
AO089/Test	2.2

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VLA UTILIZATION JUNE 1989

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AA-102	Allen, J. Molnar, L. Mutel, R.	Iowa Iowa Iowa	Monitoring and mapping of Cygnus X-1.	1.3,2,3.6, 6,18,20	19	10
AB-414	Becker, R. White, R.	Calif, Davis STScI	Monitoring the radio flux of the radio stars HD193793 and P Cygni.	2 and 6	15	2 w/VF21
AB-456	Burke, B. Hewitt, J. Roberts, D.	MIT Princeton Brandeis	Time variation of 0957+561.	6	19	2.3
AB-517	Biretta, J. Owen, F.	CFA NRAO-VLA	Proper motion of the M87 jet.	2	17	4.7 w/VF21
AB-540	Birkinshaw, M. Davies, R.	Harvard Oxford	Elliptical galaxies.	6	15	3 w/VF21
AB-544	Becker, R. Helfand, D. Zoonematkermani, S. White, R.	Calif, Davis Columbia Columbia STScI	A search for new galactic SNR.	6	22	10.1
AB-545	Becker, R. Helfand, D. Zoonematkermani, S. White, R. Keto, E.	Calif, Davis Columbia Columbia STScI Lawrence Livermore	A search for ultracompact HII regions in the galaxy.	6	21	8
AB-547	Buta, R. Higdon, J.	Alabama Texas	HI in ringed barred spiral NGC 5850.	20 cm line	14	8 w/VF21
AC-244	Carilli, C. Perley, R. Dreher, J. Bridle, A. Cotton, W.	NRAO-VLA/MIT NRAO-VLA MIT NRAO-CV NRAO-CV	Cygnus A.	3.6	26	8
Ad Hoc	O'Dea, C.	Dwingeloo			10	0.5
Ad Hoc	Zijlstra, A.	Kapteyn Lab.			10	0.5 w/VB97
AD-188	Drake, S. Simon, T. Florkowski, D. Stencel R. Bookbinder, J. Linsky, J.	SASC Hawaii USNO Colorado CFA Colorado	Variability of the radio emission in M Supergiant Alpha Ori.	2 and 6	5	3
AD-234	Dulk, G. Kucera, T. Bastian, T. Rottman, G. Orrall, F.	Colorado Colorado NRAO-VLA Colorado Hawaii	Solar coronal abundances: Heavy elements to hydrogen via x-ray to radio flux ratios at the limb.	20	20,21	19.7
AF-175	Fischer, M. Gibson, D. Gonzalez, P.	Silver High School Lincoln Laboratory La Plata Jr. High	176 day cycle of 4U1820-30.	6 and 20	8	2
AF-183	Fruchter, A.	Carnegie Inst.	Integrated radio flux from millisecond pulsars in globular clusters.	20	12	8
AG-289	Ge, J. Owen, F. O'Dea, C.	NMIMT NRAO-VLA NFRA	Survey at Abell distance class 4 clusters.	20	6	4
AH-354	Hurford, G. Gary, D.	Caltech Calteoh	Optically thin solar burst sources.	1.3,2	30	12.5
AH-355	Hewitt, J. Cappallo, R. Corey, B. Lonsdale, C. Niell, A. Phillips, R. Lestrade, J. Preston, R.	Princeton Haystack Obs. Haystack Obs. Haystack Obs. Haystack Obs. Haystack Obs. JPL JPL	VLBI reference sources near dMe stars.	3.5 and 20	1	14.5
AH-357	Habbal, S. Gonzalez, R. Harvey, K.	CFA NRAO-VLA Solar Physics Research	Solar activity.	2,3.5, 6	18	11.5
AH-362	Hines, D. Wills, B.	Texas Texas	IRAS quasars-radio structure and optical polarization.	6	4,5	7.5
AH-366	Hjellming, R. Han, X.	NRAO-VLA NMIMT/Beijing	X-ray nova V404 Cyg: Monitoring Cyg X-3.	3.5,6 and 20	3,4,5,8, 13,18,19, 21,24	22.9 w/VF21 AM206
AK-216	Kulkarni, S. Hester, J. Evans, C.	Caltech Caltech Caltech	Search for emission nebula surrounding PSR 1957+20.	20,6, 3.5	23	8

VLA UTILIZATION JUNE 1989 (cont)

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AK-227	Kucera, T. Kiplinger, A. Dulk, G. Bastian, T.	Colorado Colorado Colorado NRAO-VLA	Fine structures in solar flares.	2,3.5, 6	23,24	23.8
AL-208	Lang, K. Willson, R.	Tufts Univ. Tufts Univ.	The final SMM-VLA collaboration.	20 and 90	25,27	20
AM-206	Molnar, L. Reid, M. Johnston, K.	CFA CFA NRL	Scattering size of Cygnus X-3.	20 and 90	4,5,6	10.6 w/AH366
AM-272	Meaburn, J. Pedlar, A. Hummel, E.	Manchester NRAL NRAL	Dwarf galaxy IC 1613.	6 and 20	10	11 w/VB97
AM-276	Muhleman, D. Grossman, A. Slade, M. Jurgens, R. Ostro, S.	Caltech Caltech JPL JPL JPL	Radar echoes from Titan.	3.5	3,4, 5,6	21.5
AN-52	Nitta, N. Kai, K. Nakajima, H. Kosugi, T. Bastian, T. Dennis, B.	Nat'l Astron Obs Nat'l Astron Obs Nat'l Astron Obs Inst of Astron NRAO-VLA NASA/Goddard	Separation of thermal and nonthermal components in solar flares.	1.3,2, 3.6	14,17	23.8 w/VF21
AO-87	Owen, F. Eilek, J. Cornwell, T.	NRAO-VLA NMIMT NRAO-VLA	M87.	90	26	4
AO-88	Owen, F. Eilek, J.	NRAO-VLA NMIMT	M87.	3.6	23	4
AP-164	Palmer, P. Yusef-Zadeh, F. Goss, W. Lasenby, A. Lasenby, J.	Chicago Northwestern Inst NRAO-VLA Cambridge Cambridge	Sgr B1/Sgr B2 complex of HII regions.	2,6, 20	29,30	10.9
AR-205	Reynolds, S.	North Carolina State	Young supernova remnants.	6,20,90	28	9.1
AS-355	Sumi, D. Burns, J. Zhao, J.	Illinois New Mexico New Mexico	3C317, the central galaxy in the cooling flow cluster Abell 2052.	6,20, 90	25	6
AS-380	Singal, A. Salter, C.	TIFR TIFR	1331-09, A giant radio galaxy.	6,20, 90	24	5.2
AS-382	Schmelz, J. Gonzalez, R.	Lockheed NRAO-VLA	Coronal magnetic structures.	3.5,6, 20	6,19	7.0 w/VF21
AS-387	Schmahl, E. White, S. Kundu, M.	Maryland Maryland Maryland	Flare energetics with the SMM x-ray polychromator.	3.5,6, 20	26,29	20
AW-230	Wrobel, J. Unger, S.	NRAO-VLA RGO	Monitoring of the Seyfert NGC 5548.	3.5	5,20	2
AW-236	Wieringa, M. Katgert, P.	Leiden Leiden	WSRT steep spectrum sources.	20	3,4	24.1
AY-33	Yin, Q. Heeschen, D. Saslaw, W.	Peking Univ NRAO-CV Virginia	Nine starburst galaxies.	6,20, 90	5,18	7.5
VAH-45	Feigelson, E.	Penn. State	PMC stars.	20 phased array VLB	18,19	11.8
VB-95	Biretta, J. Harris, D. Stern, C.	CFA CFA CFA	Structure of the M87 jet.	90 cm phased array VLB	11	12.4
VB-97	Briggs, F. Garwood, R.	Kapteyn Lab Pittsburgh	A possible Z=3 absorption.	90 cm single dish MK II VLB	10	10.4 w/AM272, Ad Hoc
VF-21	Fanti, C. Fanti, R. Parma, P. Venturi, T. Schilizzi, R. Spencer, R. van Breugel, W. Ren-Dong, N.	Bologna Bologna Bologna Bologna Dwingeloo NRAL Calif, Berkeley Beijing	The small CSS radio sources. w/AN52, AB547, AB414, AB540, AB517,Test, AH366, VK25, AS382	18 cm VLB	13,14, 15,17, 19	58.2 phased array 39.2 single dish
VK-25	Kapahi, V. Hough, D.	JPL JPL	Cores of double radio quasars with misaligned outer lobes.	18 cm phased array VLB	18,19	11.1 w/VF21

VLA UTILIZATION JUNE 1989 (cont)

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
VM-105	Miley, G. Chambers, K. Schilizzi, R. Roland, J.	Leiden STScI Dwingeloo Leiden	Fine structure in distant radio galaxies.	92 cm phased array VLB	8,10	48.5
VP-91	Phillips, R. Titus, M. Lestrade, J.	Haystack Obs Haystack Obs JPL	Winds from hot O-giant stars.	18 cm phased array MK III VLB	18	4.2
		JPL Staff	Tests		12	4.4
			Voyager/Observation		6,13, 20,27	43.1
		NRAO Staff	Baselines/Startup/Pointing			49.6
			Electronics, etc.			39.0
			Move/Operations			11.9
			Software			28.0
			General Tests			33.9

The average downtime for the month of June 1989 was approximately 5.7 percent.

$$\text{Average downtime of operational antennas} = \frac{\text{Total number of antenna-hours of operational antennas lost due to hardware and software failures during scheduled observing}}{\text{Total number of antenna-hours of operational antennas scheduled}} \times 100$$

Where "antenna hours" definition is: An array consisting of N antennas operating for Y hours is defined to have YN antenna hours operation.

The array was scheduled 100.0 percent (722.0 hours) of the time: 77.6 percent (560.5 hours) to astronomical programs, 11.6 percent (83.9 hours) to scheduled test/calibration, and the remaining 10.7 percent (77.6 hours) went to scheduled maintenance.

The array was in the BC configuration from June 1 through June 30.

The total number of programs run for the month of May, 1989 was 46.

The following independent proposals shared simultaneous observing time (52.1 hours total simultaneous observing):

Ad Hoc/VB97	0.5
AB414/VF21	2.0
AB517/VF21	4.7
AB540/VF21	3.0
AB547/VF21	8.0
AH366/AM206	2.5
AH366/VF21	0.5
AH366/VF21	0.5
AM272/VB97	9.9
AN52/VF21	11.7
AN52/VF21	2.0
AS382/VF21	1.7
VF21/tests	3.0
VF21/tests	2.0
VF21/VK25	0.1

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VLA UTILIZATION MAY 1989

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AA-99	Appleton, P. Basart, J. Siqueira, P.	Iowa State Iowa State Iowa State	Continuum structure of the Elliptical galaxy NGC 5903.	6 and 20	15	8.5
AB-414	Becker, R. White, R.	Calif, Davis STScI	Monitoring the radio flux of the radio stars HD193793 and P Cygni.	2 and 6	14	1.5
AB-456	Burke, B. Hewitt, J. Roberts, D.	MIT Princeton Brandeis	Time variation of 0957+561.	6	18	2
AB-525	Braun, R. van Gorkom, J. Walterbos, R. Kennicutt, R. Norman, C.	NRAO-VLA NRAO-VLA Calif, Berkeley Steward Obs. STScI	The interstellar media of nearby galaxies.	20	2,20	12
AB-531	Becker, R. Helfand, D. White, R.	Calif, Davis Columbia STScI	Survey of the Galactic Plane.	20	1,2	18
AC-247	Cordes, J. Hankins, T. McKinnon, M.	Cornell NMIMT NMIMT	A search for pulsars.	20	12	3.9
AC-248	Clegg, A. Cordes, J.	Cornell Cornell	Rapid intensity variation from interstellar OH masers.	18 cm line	10	7.5
AD-188	Drake, S. Simon, T. Florkowski, D. Stencel, R. Bookbinder, J. Linsky, J.	SASC Hawaii USNO Colorado Colorado Colorado	Variability of the radio emission in M Supergiant Alpha Ori.	2 and 6	15	2
AD-220	Dubner, G. Arnal, E. Winkler, F. Goss, W.	IAFE IAR Middlebury College NRAO-VLA	The SNR Puppis A.	20 and 90	14,15	8
AD-231	Dahlem, M. Wielebinski, R. Klein, U. Mebold, U.	MPIR, Bonn MPIR, Bonn Bonn Bonn	Peculiar filaments in the halo of NGC 1808.	6 and 20	26,27, 28,29	20
AE-60	Elias, N. Koch, R.	Pennsylvania Pennsylvania	Close binary star evolution: Serpentids.	3.6 and 6	13	9.1
AF-73	Fomalont, E. Geldzahler, B.	NRAO-CV NRL	Core of Fornax A.	2	12	6.3
AF-174	Frail, D. Cordes, J. Hankins, T. Seaquist, E. Weisberg, J.	Toronto Cornell NMIMT/NRAO-VLA Toronto Carleton College	HI absorption measurements against pulsars in the inner galaxy.	20 cm line	22,27	10
AF-182	Fruchter, A. Goss, W. Stinebring, D. Taylor, J.	Carnegie Inst. NRAO-VLA Princeton Princeton	Eclipsing millisecond pulsar.	90	21,25, 26	11
AG-267	Gottesman, S. Hawarden, T.	Florida UKIRT	HI observations of NGC 5291.	20 cm line	13	8
AG-278	Garcia-Barreto, J.	UAEM	Barred galaxies NGC 1022 and NGC 1326.	2,6 and 20	16	4
AG-282	Gopal Krishna Subrahmanya, C. Steppe, H. Swarup, G.	TIFR TIFR IRAM TIFR	Ultra steep spectrum radio sources.	6 and 20	1,10	8.5
AG-284	Garwood, R. Dickey, J.	Pittsburgh Minnesota	Survey at low latitudes.	20 cm line	23	6.5
AG-285	Gomez, Y. Moran, J. Rodriguez, L.	UNAM CFA UNAM	Angular expansion of NGC 6302.	3.5	17	4
AG-287	Gaume, R. Claussen, M. Goss, W.	NRL NRL NRAO-VLA	H and He recombination lines in Sgr B2.	1.3 cm line	14	10
AH-295	Habing, H. Goss, W. Winnberg, A. van Langevelde, H.	Leiden Obs. NRAO-VLA Onsala Leiden Obs.	Monitoring OH, IR stars at the galactic center.	18 cm line	14	2
AH-299	Helfand, D. Becker, R.	Columbia Calif, Davis	Survey of the galactic plane.	90	27,28 29	24

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AH-345	Hjellming, R. McKinnon, M. Hankins, T. Han, X.	NRAO-VLA NMIMT NMIMT/NRAO-VLA NMIMT/Beijing	A search for Quasi-periodic radio emission components in x-ray binaries.	3.5 and 20	9	3
AH-346	Helfand, D. Becker, R. Zoonematkermani, S.	Columbia Calif, Davis Columbia	A 327 MHz survey of the galactic plane.	90	3	3
AH-363	Hennessy, G. Owen, F. Eilek, J. Sarazin, C.	Virginia NRAO-VLA NMIMT Virginia	A search for depolarization in sources behind Abell clusters.	20	23,25	10
AH-365	Howarth, I. Brown, A.	Colorado Colorado	Mass loss rates for O-type stars.	3.5	13,14 30	18.1 w/Move/Op
AI-37	Impey, C. Foltz, C. Weymann, R. Hewett, P.	Steward Obs. MMT Obs. Mt. Wilson Cambridge	Survey of optically selected quasars.	6	20,26, 28,30	21 w/Move/Op
AK-222	Kundu, M. White, S. Gopalswamy, N.	Maryland Maryland Maryland	Solar continuum and coronal magnetic structure.	20 and 90	18,23	20.5
AL-150	Lestrade, J.-F. Preston, R.	JPL JPL	Statistical properties of RSCVn stars.	6	10	2.4
AL-191	Luttermoser, D. Judge, P. Linsky, J.	Colorado Colorado Colorado	Survey of Cool N-type carbon stars.	3.5	21	11.5
AL-195	Lang, K. Willson, R. Trottet, G. Kerdroan, A.	Tufts Tufts Obs. Paris Obs. Paris	Solar radio bursts-observations with Nancay.	90	11,14, 19,22, 26,28, 29	26
AL-204	Lustig, A. Hunstead, R.	Sydney Sydney	Extended cluster sources.	6 and 20	20,21	10
AM-270	Morganti, R. Fosbury, R. Alighieri, S. Tadhunter, C.	ESO ESO ESO ESO	The radio structures of Parkes 2 Jy radio sources.	6	26,27	12
AM-271	Morris, M. Yusef-Zadeh, F.	UCLA Northwestern	Proper motion of the galactic center threads.	20	19	7
AO-86	Owen, F. Perley, R.	NRAO-VLA NRAO-VLA	B3 classical doubles.	3.6	1	3.5
AR-196	Roberts, D. Brown, L. Kollgaard, R. Wardle, J. Perley, R.	Brandeis Brandeis Brandeis Brandeis NRAO-VLA	High dynamic range structure of the quasar 3C345.	3.5	2	3
AS-331	Sahai, R. Claussen, M.	Chalmers NRL	The enigmatic radio source in IRC+10216.	1.3,2 3.5	11	5
AS-333	Sramek, R. Weiler, K. van der Hulst, J. Panagia, N.	Australian Telescope NRL Westerbork STScI	Statistical properties of radio supernovae.	2,6 and 20	14,15, 30	8.5
AS-356	Surdej, J. Kellerman, K. Borgeest, U. Kayser, R. Magain, P. Refsdal, S. Swings, J.	Liege NRAO-CV Hamburg Obs. Hamburg Obs. ESO Hamburg Obs. Liege	Highly luminous quasars as gravitationally lensed objects.	2	2	2
AT-102	Torbett, M. Campbell, B.	Kentucky New Mexico	Radio survey of interacting binary stars.	3.5	19	9
AV-163	van Gorkom, J. Goss, W. Leahy, P.	NRAO-VLA NRAO-VLA NRAO-VLA	A search for strong magnetic fields in Sgr A West - Zeeman splitting in H 92 Alpha.	3.5 cm line	20,22	18
AW-230	Wrobel, J. Unger, S.	NRAO-VLA RGO	International monitoring of the Seyfert NGC 5548.	3.5	24	1.0
AW-231	Witzel, A. Zensus, A. Quirrenbach, A. Krichbaum, T. Schalinski, C. Hummel, C.	MPIR, Bonn NRAO-VLA MPIR, Bonn MPIR, Bonn MPIR, Bonn MPIR, Bonn	Investigation of rapid variability in extragalactic radio sources.	2,3.6, 20 and 92	3	121.4 w/Move/Op
AY-23	Yusef-Zadeh, F. Bally, J.	Northwestern Bell Labs	G359.54 + 0.18 and Sgr C.	2,6 and 20	18	8

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AZ-42	Zhao, J.	New Mexico	Long-term flux variations in Sgr A.	6	12	1.5
	Ekers, R.	Australian Telescope				
	Goss, W.	NRAO-VLA				
	Lo, K.	Illinois				
	Narayan, R.	Steward obs.				
		JPL Staff	Tests		11	4.0
			Voyager/Mission Readiness		17	10.0
			Voyager/Encounter Rehearsal		24	10.0
		NRAO Staff	Baselines/Startup/Pointing			42.0
			Electronics, etc.			50.7
			Move/Operations			44.5
			Software			37.0
			General Tests			81.9

The average downtime for the month of May 1989 was approximately 5.4 percent.

$$\text{Average downtime of operational antennas} = \frac{\text{Total number of antenna-hours of operational antennas lost due to hardware and software failures during scheduled observing}}{\text{Total number of antenna-hours of operational antennas scheduled}} \times 100$$

Where "antenna hours" definition is: An array consisting of N antennas operating for Y hours is defined to have YN antenna hours operation.

The array was scheduled 100.0 percent (746.1 hours) of the time: 67.2 percent (501.2 hours) to astronomical programs, 21.1 percent (157.3 hours) to scheduled test/calibration, and the remaining 11.7 percent (87.6 hours) went to scheduled maintenance.

The array was in the B configuration from May 1 through May 3.
BC configuration from May 3 through May 31.

The total number of programs run for the month of May, 1989 was 45.

The following independent proposals shared simultaneous observing time (22.2 hours total simultaneous observing):

AH365/Move/Op	3.7
AI37/Move/Op	3.4
AW231/Move/Op	2.7
AW231/Move/Op	7.0
AW231/Move/Op	5.3

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VLA UTILIZATION APRIL 1989

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AB-414	Becker, R. White, R.	Calif, Davis STScI	Monitoring the radio flux of the radio stars HD193793 and P Cygni.	2 and 6	23	2
AB-456	Burke, B. Hewitt, J. Roberts, D.	MIT Princeton Brandeis	Time variation of 0957+561.	6	25	2.5
AB-492	Bloeman, J. Duric, N.	Leiden New Mexico	A detailed spectral index study of 4 edge-on galaxies.	6,20 and 90	3	12
AB-515	Becker, R. Helfand, D. Zoonematkermani, S. White, R.	Calif, Davis Columbia Columbia STScI	Imaging of weak extended galactic sources.	6 and 20	29	8
AB-517	Biretta, J. Owen, F.	CFA NRAO-VLA	Proper motion of M87 jet.	2	9	6
AB-530	Burton, W. Dickey, J.	Leiden Leiden	HI absorption through galactic "Cirrus" clouds.	20 cm line	7	24
AB-532	Bridle, A. Fomalont, E.	NRAO-CV NRAO-CV	Polarimetry of lobes of 3C288.	2,3.5	17	10.5 w/VA24
AB-534	Baum, S. Leahy, P. Perley, R. Riley, J. Scheuer, P.	NFRA NRAO-VLA NRAO-VLA MRAO MRAO	A survey of nearby hotspots.	3.5	1,6	27 w/VW52
AB-536	Bosma, A. Anthanassoula, E.	Obs. Marsielle Obs. Marsielle	Flaring HI disks of edge-on galaxies.	20 cm line	8	24
AC-231	Claussen, M. Gaume, R. Johnston, K. Wilson, T.	NRL NRL NRL MPIR, Bonn	Study of the W3 star forming region.	1.3,2,6 and 18 cm line	29	8.9
AC-246	Carilli, C. van Gorkom, J. Stocke, J.	NRAO-VLA NRAO-VLA Colorado	Quasar-galaxy pair 3C232, NGC 3067.	20	13	2 w/VW52
AD-160	de Pater, I.	Calif, Berkeley	Jupiter patrol.	6 and 20	22,23	13
AD-188	Drake, S. Simon, T. Florkowski, D. Stencel, R. Bookbinder, J. Linsky, J.	SASC Hawaii USNO Colorado Colorado Colorado	Variability of the radio emission in M Supergiant Alpha Ori.	2 and 6	17	3.5 w/VA24
AD-222	de Pater, I. Gulkis, S. Romani, P. Abreya, S.	Calif, Berkeley JPL NASA/Goddard Michigan	Uranus.	1.3,2,6 and 20	2	8 w/VZ19
AD-233	Dickel, H. Goss, W. van der Werf, P.	Illinois NRAO-VLA Kapteyn Lab.	HI observations of DR21.	20 cm line	6	12.5
AF-167	Frail, D. Seaquist, E. Bode, M. Roberts, J.	Toronto Toronto Lancashire Poly. Lancashire Poly.	Second epoch of the Nova remnant GK Persei.	6 and 20	10	6.5
AF-175	Fischer, M. Gibson, D. Gonzalez, P.	Silver High School Lincoln Lab. La Plata Jr. High	176 day cycle of 4U1820-30.	6 and 20	1	2 w/VW52
AG-269	Ge, J. Owen, F.	NMIMT NRAO-VLA	High faraday rotation in cooling flow clusters.	3.6,6 and 20	2	8
AG-277	Gussie, G. Taylor, A.	Calgary Calgary	Survey of circumnebular neutral hydrogen absorption in planetary nebulae.	20 cm line	30	12
AG-280	Ge, J. Owen, F.	NMIMT NRAO-VLA	Faraday rotation measure in A1795.	3.6	27	8.5
AG-282	Gopal-Krishna Subrahmanya, C. Steppe, H. Swarup, G.	TIFR TIRF IRAM TIFR	Ultra-steep spectrum radio sources.	6 and 20	19	1
AG-284	Garwood, R. Dickey, J.	Pittsburgh Minnesota	A galactic absorption survey at low lattitudes.	20 cm line	10	8
AH-295	Habing, H. Goss, W. Winnberg, A. van Langevelde, H.	Leiden NRAO-VLA Onsala Leiden	Monitoring OH, IR stars at the galactic center.	18 cm line	1	2 w/VW52

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AI-35	Inoue, M. Perley, R. Carilli, C. Kato, T. Tabara, H. Aizu, K.	Nobeyama NRAO-VLA NRAO-VLA Utsunomiya Utsunomiya Rikkyo	High quality mapping of large Faraday rotation source Hyd A.	2 and 6	28	8
AK-220	Kristian, J. Windhorst, R. Fomalont, E. Kellermann, K.	Mt. Wilson Arizona State NRAO-CV NRAO-CV	Deep VLA survey: positions and structures.	6	21,22 23,26	40
AK-224	Kameya, O. Kawabe, R. Morita, K. Ishiguro, M. Campbell, B.	Nobeyama Nobeyama Nobeyama Nobeyama New Mexico	Searoh for OH maser and continuum counter parts of new H_2O masers in the NGC 7538 region.	6 and 18 cm line	23	5
AL-154	Langston, G. Heflin, M. Burke, B. Lawrence, C.	MIT MIT MIT CIT	Time Variation of 2016+112.	6	5	1.0
AL-184	Linsky, J. Bookbinder, J. Brown, A. Skinner, S. Butler, J. Byrne, B. Doyle, J.	Colorado Colorado Colorado Colorado Armagh Obs. Armagh Obs. Armagh Obs.	Flare star G1644; observations with IUE and ginga.	2,6 and 20	10,11	8 w/VF20
AL-190	Leckband, J. Spangler, S.	Iowa Iowa	Compact radio sources near and behind the Cygnus loop.	2 and 6	12	6 w/VF20
AL-192	Langston, G. Heflin, M. Lehar, J. Burke, B. Lawrence, C.	NRL MIT MIT MIT CIT	Variation of gravitational lens 2016+112.	3.5 and 6	28	3
AO-87	Owen, F. Eilek, J. Cornwell, T.	NRAO-VLA NMIMT NRAO-VLA	M87.	90	18	6
AO-88	Owen, F. Eilek, J.	NRAO-VLA NMIMT	M87.	3.6	29	8.1
AP-166	Pottasch, S. Zijlstra, A. Ratag, M. Bignell, C.	Kapteyn Lab. Kapteyn Lab. Kapteyn Lab. NRAO-VLA	Very young planetary nebulae.	2 and 6	11	7
AP-170	Perley, R. Taylor, G. Inoue, M. Kato, T. Tabara, H. Aizu, K.	NRAO-VLA Calif, Los Angeles Nobeyama Utsunomiya Utsunomiya Rikkyo	Very large Faraday rotation in Hydra A.	3.5	30	8
AP-171	Penninx, W. van der Klis, M. Lewin, W. Makishima, K. van Paradijs, J.	Amsterdam Exosat MIT Tokyo Amsterdam	Low mass x-ray binary 4U1820-30.	2,6 and 20	25	6.5
AR-204	Riley, J. Warner, P.	MRAO MRAO	The jet and dynamics of 4C 74.26.	20 and 90	22	6
AR-205	Reynolds, S.	North Carolina State	Small-scale structure in young supernova remnants.	6,20 and 90	14	10 w/VW52
AR-208	Rudnick, L. Anderson, M. Wang, Y.	Minnesota Minnesota Minnesota	3C33 north.	6 and 20	1	12.5 w/VW52
AR-209	Reipurth, B. Rodriguez, L.	ESO, Chile UNAM	Herbig-Haro objects 80 and 81.	2,3.5, 6 and 20	19	6
AS-333	Sramek, R. Weiler, K. van der Hulst, J. Panagia, N.	Australian Telescope NRL Westerbork STScI	Statistical properties of radio supernovae.	2,6 and 20	5,20 24	12.5
AS-358	Saikia, D. Garrington, S.	NRAL NRAL	Depolarization and viewing angles of one-sided radio sources.	6,18 and 20	1	5.5 w/VZ19

VLA UTILIZATION APRIL 1989 (cont)

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AS-365	Sumi, D. Burns, J. Zhao, J. Sulkanen, M.	Illinois New Mexico New Mexico New Mexico	Central galaxies in the Arnaud x-ray sample of clusters of galaxies.	6	25	6.6
AS-366	Stocke, J. Foltz, C. Morris, S. Weymann, R.	Colorado Arizona Mt. Wilson Mt. Wilson	The radio properties of the "Broad absorption line" QSOs.	6	11,24	12 w/VF20
AU-35	Ulvestad, J.	JPL	Thermal emission from Markarian 231.	2,6 and 20	13	2 w/VW52
AV-157	van Breugel, W. McCarthy, P. Lilly, S. Spinrad, H.	Calif, Berkeley Mt. Wilson Hawaii Calif, Berkeley	B2 1 Jansky radio sources.	20	13,28	4 w/VW52
AV-164	van Breugel, W. Dey, A. Spinrad, H. McCarthy, P.	Calif, Berkeley Calif, Berkeley Calif, Berkeley Mt. Wilson	Mis-aligned radio galaxies at high redshift.	2,3.5, 6 and 20	20	24
AW-230	Wrobel, J. Unger, S.	NMIMT RGO	Monitoring of the Seyfert NGC 5548.	3.5	11,25	2 w/VF20
AZ-42	Zhao, J. Ekers, R. Goss, W. Lo, K. Narayan, R.	New Mexico Australian Telescope NRAO-VLA Illinois Steward Obs.	Long-term flux-variations of Sgr A.	6	24	1
EVN-8840	Felli, M. Massi, C.	Arcetri Arcetri	Theta 1 Orionis.	6 cm phased array MK III VLB	13	4
VA-24	Abraham, Z. Zensus, A. Kaufmann, P. Cohen, M. Schaal, E. Unwin, S. Nicolson, G.	INPE NRAO-VLA INPE Caltech INPE Caltech Hartebeesthoek Obs.	VLBI monitoring of the superluminal quasars 3C273 and 3C279.	6 cm single antenna VLB	17	10.9 w/AD188, AB532
VAH-44	Porcas, R.	MPIR,Bonn			2	5.0 w/tests, VP84
VF-20	Fiedler, R. Simon, R. Johnston, K. Dennison, B. Hjellming, R.	NRL NRL NRL VPI NRAO-VLA	Compact sources experiencing extreme scattering events.	6 cm single antenna VLB	11	24.5 w/AS366, tests,AW230, AL184,AL190, VL56,Pointing
VG-60	Giovanni, G. Wehrle, A. Comoretto, G. Feretti, L. Venturi, T.	Bologna JPL Arcetri Bologna Bologna	A sample of low power (FRI) radio galaxies.	6 cm phased array MK III VLB	13	7.0
VL-49	Lestrade, J. Boloh, L. Mutel, R. Niell, A. Preston, R.	JPL JPL Iowa Haystack Obs. JPL	15 RS CVn binaries for mapping and astrometry.	6 cm phased array MK III VLB	12,15	10.9
VL-56	Lestrade, J. Niell, A. Preston, R. Phillips, R. Hodges, M.	JPL Haystack Obs. JPL Haystack Caltech	Where is the radio emitting region in close binaries?	6 cm phased array MK III VLB	12,15, 16,19	34.5 w/VF20
VP-84	Phillips, R. Lestrade, J.	Haystack Obs. JPL	Exotic binary LSI+61°303.	1.3 cm phased array MK III VLB	2,3	9 w/VAH44
VP-88	Preuss, E. Alef, W. Hai, Q. Kellermann, K.	MPIR, Bonn MPIR, Bonn MPIR,Bonn/Beijing NRAO-CV	Structural variability in 3C111 and 3C390.3.	6 cm phased array VLB	16	14.5
VR-48	Roberts, D. Cawthorne, T. Wardle, J. Gabuzda, D.	Brandeis Brandeis Brandeis Simmons College	Second epoch survey of the linear polarization structures of BL Lac objects.	6 cm phased array MK III VLB	15	20.2
VW-52	Wehrle, A. Unwin, S. Cohen, M.	Caltech Caltech Caltech	Monitoring the superluminal motion in 3C345. w/Software,AV157,AC246, AU35,AR205	1.35 and 6 cm single dish VLB	1,13	26.7 w/AB534,AH295 AF175,AR208

VLA UTILIZATION APRIL 1989 (Cont.)

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
VW-53	Wrobel, J.	NMIMT	Is NGC3894 a subluminal yet asymmetric source?	6 cm phased array VLB	14	12.6
VZ-19	Zensus, A.	NRAO-VLA	3C273.	1.3 cm single dish VLB	1	10.5 w/AS358,
					Tests,	AD222
		JPL Staff	Tests		10	4
			Voyager Mission Readiness		20	10.0
			Voyager Capability Demonstration		26	10.0
		NRAO Staff	Baselines/Startup/Pointing			30.7
			Electronics, etc.			42.0
			Software			30.3
			General Tests			82.7

The average downtime for the month of April 1989 was approximately 5.6 percent.

$$\text{Average downtime of operational antennas} = \frac{\text{Total number of antenna-hours of operational antennas lost due to hardware and software failures during scheduled observing}}{\text{Total number of antenna-hours of operational antennas scheduled}} \times 100$$

Where "antenna hours" definition is: An array consisting of N antennas operating for Y hours is defined to have YN antenna hours operation.

The array was scheduled 100.0 percent (721.0 hours) of the time: 75.2 percent (542.1 hours) to astronomical programs, 14.8 percent (106.7 hours) to scheduled test/calibration, and the remaining 10.0 percent (72.2 hours) went to scheduled maintenance.

The array was in the B configuration April 1 through April 30.

The total number of programs run for the month of April, 1989 was 61.

The following independent proposals shared simultaneous observing time (77.6 hours total simultaneous observing):

AB532/VA24	10.5	TESTS/VAH44	4.4
AB534/VW52	2.5	TESTS/VF20	3.5
AC246/VW52	2.0	TESTS/VF20	4.5
AD188/VA24	0.5	TESTS/VZ19	1.0
AD222/VZ19	4.0	VL56/VF20	0.2
AF175/VW52	2.0	VP84/VAH44	0.6
AH295/VW52	2.0		
AL184/VF20	5.0		
AL190/VF20	6.0		
AR205/VW52	8.8		
AR208/VW52	4.0		
AS358/VZ19	5.5		
AS366/VF20	4.2		
AU35/VW52	2.0		
AV157/VW52	3.0		
AW230/VF20	1.0		
SOFTWARE/VW52	0.3		

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VLA UTILIZATION MARCH 1989

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AA-93	Alexander, P. Sopp, H. Pooley, G.	MRAO MRAO MRAO	Active nuclei in star-forming galaxies.	6 and 20	11	6
AA-95	Alexander, P. Pooley, G. Sopp, H.	MRAO MRAO MRAO	Circum-nuclear star formation in ultra-luminous galaxies.	2,6,20 and 90	27	8
AB-414	Becker, R. White, R.	Calif, Davis STScI	Monitoring the radio flux of the stars HD193793 and P Cygni.	2 and 6	11	1.5
AB-456	Burke, B. Hewitt, J. Roberts, D.	MIT Princeton Brandeis	Time variation of 0957+561.	6	24	2
AB-525	Braun, R. van Gorkom, J. Walterbos, R. Kennicutt, R. Norman, C.	NRAO/VLA NRAO-VLA/Columbia Calif, Berkeley Steward Obs. STScI	The interstellar media of nearby galaxies.	20 cm line	4,5,16, 19,21,22 23,28,30	81.3
AB-529	Baldwin, J. Dingley, S.	Cambridge Cambridge	One-sided jets in giant radio sources.	6 and 20	31	3.5
AB-534	Baum, S. Leahy, P. Perley, R. Riley, J. Scheuer, P.	NFRA NRAO/VLA NRAO/VLA MRAO MRAO	A survey of nearby hotspots.	3.5	31	9.5 w/VW52
AC-234	Chambers, K. Miley, G. van Breugel, W.	Johns Hopkins Univ. Leiden Calif, Berkeley	Study of radio galaxies with z>2.	2,6 and 20	12	18
AC-240	Churchwell, E. Wood, D.	Wisconsin CFA	Identifying massive stars embedded in molecular clouds.	2,3.5	19	16.3
AC-244	Carilli, C. Perley, R. Dreher, J. Bridle, A. Cotton, W.	NRAO/VLA NRAO/VLA MIT NRAO/CV NRAO/CV	Cygnus A at 8 GHz.	3.5	26	10
AC-247	Cordes, J. Hankins, T. McKinnon, M.	Cornell NMIMT/NRAO-VLA NMIMT/NRAO-VLA	Searching for pulsars with the VLA: preliminary tests.	20	6	4
Ad Hoc	Birkinshaw, M.	Harvard College Obs.			1	1.0
Ad Hoc	Leahy, P.	NRAO-VLA			1	.5
AD-188	Drake, S. Simon, T. Florkowski, D. Stencel, R. Bookbinder, J. Linsky, J.	SASC Hawaii USNO Colorado Colorado Colorado	Variability of the radio emission in M Supergiant Alpha Ori.	2 and 6	17	2
AE-55	Ekers, R. Cowan, J. Sramek, R. Goss, W. Roberts, D.	Australia Telescope CFA/Oklahoma Australia Telescope NRAO/VLA Oklahoma	Young SNR G25.52+0.22.	2,6, 20,90	11	2
AE-58	Edelson, R.	Colorado	Seyfert galaxies.	90	15,23	8.5
AF-156	Fich, M. Taylor, A.	Waterloo Calgary	Survey of galactic plane objects.	6 and 20	25	6
AF-172	Ferretti, L. Giovannini, G.	Bologna Bologna	Cluster radio galaxies of small size.	6	6	8.5 w/Move/Op
AF-174	Frail, D. Cordes, J. Hankins, T. Seaquist, E. Weisberg, J.	Toronto Cornell NMIMT Toronto Carleton College	HI absorption measurements against pulsars in the inner galaxy.	20 cm line	3	8
AG-277	Gussie, G. Taylor, A.	Calgary Calgary	Circumnebular neutral hydrogen absorption in planetary nebulae.	20 cm line	4	4
AG-286	Gary, D. Hurford, G.	Caltech Caltech	Partial eclipse of 1989 March 7.	20 and 90	7	6
AH-343	Holmes, G. Garrington, S. Saikia, D. Conway, R.	NRAL NRAL NRAL NRAL	Depolarization asymmetry and jet sidedness in low and intermediate luminosity (FR1) radio sources.	6,18, 21	14	9
AH-345	Hjellming, R. McKinnon, M. Hankins, T. Han, X.	NRAO/VLA NMIMT NMIMT NMIMT/Beijing Obs.	A search for Quasi-Periodic radio emission components in x-ray binaries.	3.5,6, 20	2	3

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AH-348	Hjellming, R. Han, X. Cordova, F.	NRAO/VLA NMIMT/Beijing Obs. LANL	Study of the "Z-source" low mass x-ray binaries.	6 and 20	10,31	16
AJ-175	Johnston, K. Gaume, R. Wilson, T. Walmsley, M. Mauersburger, R. Henkel, C.	NRL NRL MPIR, Bonn MPIR, Bonn MPIR, Bonn MPIR, Bonn	$^{15}NH_3$ masers associated with NGC7538-IRS1.	1.3 cm line	12	12
AK-151	Kundu, M. Jackson, P. White, S.	Maryland Maryland Maryland	Narrowband flares on red dwarf stars.	6 and 20	2	1.9
AK-200	Keto, E. Carral, P. Welch, J. Reid, M. Ho, P.	Lawrence Livermore Calif, Berkeley Calif, Berkeley CFA Harvard	Recombination line emission in ultra-compact HII regions.	1.3 and 3.6 cm line	17	16
AK-215	Kulkarni, S. Prince, T.	Caltech Caltech	Search for radio emission from 1E1740.7-2942.	6 and 20	2	7
AK-217	Kirkpatrick, R. Bignell, R.	LANL NRAO/VLA	Planetary nebula NGC 7009.	3.5 and 20	28	10.5
AK-219	Kapahi, V. D'Silva, S.	JPL TIFR	Bent quasars at Z<1.5.	6	18	15.2
AK-225	Klein, U. Reuter, U. Wielebinski, R. Kronberg, P. Lesch, H.	Bonn MPIR, Bonn MPIR, Bonn Toronto Heidelberg	Tracing the magnetic field in M82.	2,6,20 and 90	25	10
AL-150	Lestrade, J. Preston, R.	JPL JPL	Statistical properties of RSCVn stars.	6	2	1.6
AL-188	Langston, G. Heflin, M. Lehar, J. Burke, B. Lawrence, C.	NRL MIT MIT MIT Caltech	Variation of 2016+112.	2 and 6	4	2
AL-194	Lang, K. Willson, R.	Tufts Tufts	Dynamic spectra of stellar radio bursts.	20	3	12
AL-197	Lewin, W. Hjellming, R. Michelson, P. Mitsuda, K. Norris, J. Penninx, W. van Paradijs, J. Vaughan, B. Wood, K.	MIT NRAO/VLA Stanford Univ. ISAS NRL Amsterdam Amsterdam NRL NRL	Low-mass x-ray binary Sco X-1-VLA and Ginga observations.	6 and 20	10	8.5
AL-199	Li, Z. Han, X. Hjellming, R.	Nanjing Univ. NMIMT/Beijing Univ. NRAO/VLA	Long period binaries HD 207739 and 5 cet.	2,6, and 20	21	2
AM-227	Maccacaro, T. Gioia, I. Wolter, A. Stocke, J. Morris, S.	CFA CFA CFA Colorado Mt. Wilson	Extragalactic component of the extended medium sensitivity survey: an extension to the south.	6	1	0.5
AM-236	MacKenty, J. Burg, R. Griffiths, R.	STScI STScI STScI	Starburst and extragalactic HII galaxies.	6 and 20	16,17	8.7
AM-268	Masson, C. Keene, J.	CFA Caltech	A search for broad NH_3 emission in L1551.	1.3 cm line	21	8
AP-158	Pooley, G. Riley, J. Liu, R.	MRAO MRAO MRAO	Spectral ages of luminous radio sources.	2,6 and 21	20	9
AP-168	Pedlar, A. Anantharamiah, K. Goss, W. van Gorkom, J. Ekers, R.	NRAL NRAO/VLA NRAO/VLA NRAO-VLA/Columbia Australia Telescope	Galactic center.	90	18	7.9
AR-165	Rupen, M. Condon, J.	Princeton NRAO/CV	A systematic search for radio supernovae in nearby galaxies.	6	13	24
AR-206	Rodriguez, L. Moran, J. Gwinn, C. Anantharamiah, K.	CFA CFA CFA CFA	NGC 6334(B) at 327 MHz.	90	5	4.5

VLA UTILIZATION MARCH 1989 (cont)

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AR-207	Reichert, G. Neff, S.	CSC NASA/Goddard	LINERS with and without broad H-alpha components.	20	4	7.5
AS-333	Sramek, R. Weiler, K. van der Hulst, J. Panagia, N.	Australia Telescope NRL Westerbork STScI	Statistical properties of radio supernovae.	2,6 and 20	5,26	2.5
AS-355	Sumi, D. Burns, J. Zhao, J.	New Mexico New Mexico New Mexico	Radio halo of 3C317, the central galaxy in the cooling flow cluster Abell 2052.	6,20 and 90	29	10.5
AS-362	Su, B. Mutel, R.	Iowa Iowa	Interacting galaxy pair Arp 90.	3.6 and 6	25	8
AS-370	Spoelstra, T. Hermsen, W. Braun, R.	NFRA NFRA NRAO/VLA	Search for radio counterpart of Geminga.	2,3.5,6 and 20	5	4.5
AS-371	Skinner, S. Brown, A.	Colorado Colorado	Radio emission from Herbig Ae/Be Stars.	3.5,6 and 20	7	14.5 w/Move/Op
AT-95	Terzian, V. Bignell, R. van Gorkom, J. Phillips, T.	Cornell NRAO/VLA NRAO-VLA/Columbia Cornell	Angular expansion of planetary nebulae/ Epoch II.	6	26	12
AT-100	Tereby, S. Vogel, S. Myers, P.	Caltech Rensselaer Harvard	Probing the circumstellar environment of young low mass stars.	1.3 and 6 cm line	24	12
AU-36	Ulvestad, J. Antonucci, R.	JPL Calif, Santa Barbara	Compact radio sources in NGC 253.	2 and 6	10	8
AU-37	Umana, G. Hjellming, R. Catalano, s. Rodono, M. Shore, S.	Catania NRAO/VLA Catania Catania Obs. NMIMT	Radio emission from Algol type binary systems.	2,3.5,6 and 20	5	7
AV-161	Velusamy, T.	TIFR	Jet, filaments and outer structure of the Crab nebulae at 327 MHz.	90	20	4
AW-173	Wilking, B. Mundy, L. Howe, J.	Missouri Caltech Texas	A multi-frequency survey of Cold IRAS sources.	2 and 6	1,10	2.0
AW-222	Wood, D. Churchwell, E.	CFA Wisconsin	The dynamics and physical properties of ultracompact HII regions.	2 cm line	20,21	12
AW-230	Wrobel, J. Unger, S.	NMIMT RGO	International monitoring of Seyfert NGC 5548.	3.5	1,8 24	3
AW-233	White, R. Becker, R. Ford, H. Helfand, D.	STScI Calif, Davis STScI Columbia	A search for planetary nebulae in the galactic halo.	6	23,27	10.6
AY-24	Yusef-Zadeh, F. Palmer, P.	Northwestern Chicago	Mosaic the Orion nebula.	2 and 6	26	10
AZ-42	Zhao, J. Ekers, R. Goss, W. Lo, K. Narayan, R.	New Mexico Australia Telescope NRAO/VLA Illinois Steward Obs.	Long-term flux-variations of Sgr A.	6	6	1
VW-52	Wehrle, A. Unwin, S. Cohen, M.	Caltech Caltech Caltech	Monitoring motion of 3C345.	1.3 three Antenna VLB	31	5.5 w/AB534
		JPL Staff	Voyager Mission Readiness/JPL Test		9,16	13.9
		NRAO Staff	Baselines/Startup/Pointing			49.6
			Electronics, etc.			59.0
			Move/Operations			15.7
			Software			41.3
			Standard Field Observation			12.0
			General Tests			47.9

The average downtime for the month of March 1989 was approximately 2.8 percent.

$$\text{Average downtime of operational antennas} = \frac{\text{Total number of antenna-hours of operational antennas lost due to hardware and software failures during scheduled observing}}{\text{Total number of antenna-hours of operational antennas scheduled}} \times 100$$

Where "antenna hours" definition is: An array consisting of N antennas operating for Y hours is defined to have YN antenna hours operation.

The array was scheduled 100.0 percent (746.1 hours) of the time: 70.8 percent (528.4 hours) to astronomical programs, 15.7 percent (117.3 hours) to scheduled test/calibration, and the remaining 13.5 percent (100.4 hours) went to scheduled maintenance.

The array was in the AB configuration March 1 through March 8.
B configuration March 9 through March 31.

The total number of programs run for the month of March, 1989 was 60.

The following independent proposals shared simultaneous observing time (15.7 hours total simultaneous observing):

AB534/VW52	5.5
AF172/Move/Op	8.5
AS371/Move/Op	1.7

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VLA UTILIZATION FEBRUARY 1989

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AA-57	Anantharamiah, K. Shaver, P. van Gorkom, J. de Bruyn, A.	NRAO/VLA ESO Columbia/NRAO-VLA Dwingeloo	Search for redshifted recombination lines towards the quasar 3C286.	90 cm line	24	5
AA-100	Andre, P. Montmerle, T. Feigelson, E. Klein, L.	IRAM Saclay Penn State Univ. Meudon	Young magnetic B star S1 in the Ophiuchi cloud.	2,3.5, 6 and 20	24	8
AB-414	Becker, R. White, R.	Calif, Davis STScI	Monitoring the radio flux of the radio stars HD193793 and P Cygni.	2 and 6	17	1.5
AB-456	Burke, B. Hewitt, J. Roberts, D.	MIT Haystack Obs. Brandeis	Time variation of 0957+561.	6	23	2
AB-457	Brown, A. Bookbinder, J.	Colorado Colorado	Distance to the Taurus-Auriga star formation region.	6	5	6.5
AB-471	Bagchi, J. Kapahi, V. Joshi, M.	TIFR JPL TIFR	Distant Abell clusters of BMI classifications.	20 and 90	16	11
AB-509	Baldwin, J. Dingley, S.	Cambridge Cambridge	The evolution of giant radio sources at z=1.	20	2	4
AB-517	Biretta, J. Owen, F.	CFA NRAO/VLA	Proper motion of the M87 jet.	2	4	12
AB-520	Backer, D. Sramek, R.	Calif, Berkeley Australia Telescope	Proper motion of Sgr A.	3.5 and 6	2,4	14
AB-522	Browne, I. Akujor, C.	NRAL Nigeria	An investigation of moderately compact steep spectrum sources.	6 and 18	1	5.9
AB-525	Braun, R. van Gorkom, J. Walterbos, R. Kennicutt, R. Norman, C.	NRAO/VLA Columbia/NRAO-VLA Calif, Berkeley Steward Obs. STScI	The interstellar media of nearby galaxies: HI emission.	20 cm line	24	13.5
AB-527	Bagri, D. Cornwell, T. Kapahi, V. Uson, J.	NRAO/VLA NRAO/VLA JPL NRAO/VLA	Objects in the field of a deep 327 MHz VLA survey.	20	12,14, 27	17.5
AC-243	Condon, J.	NRAO/CV	Compact components in nearby galaxies.	20	6	18
AC-250	Condon, J. Hazzard, C.	NRAO/CV Pittsburgh	Gravitational lens quasar H1413+117.	3.5	4	3
AD-188	Drake, S. Simon, T. Florkowski, D. Stencel, R. Bookbinder, J. Linsky, J.	SASC Hawaii USNO Colorado Colorado Colorado	Variability of the radio emission in M Supergiant Alpha Ori.	2 and 6	12	3
AD-207	Dent, W.	UKIRT	OH maser structure of late type stars with high polarization.	18 cm line	17	3
AD-229	de Jong, T. van Driel, W. van den Broek, A.	Amsterdam Amsterdam Amsterdam	Extreme IRAS galaxies.	6	20,21	11
AD-230	Dickey, J. Brinks, E.	Minnesota RGO	The phases of the interstellar medium in nearby galaxies: HI absorption.	20 cm line	9,10, 11,14	61.5 w/move/op
AD-232	Drake, S. Johnson, H. Brown, A. Judge, P.	NASA/Goddard Indiana Colorado Colorado	A radio survey of binary and single S stars.	3.5	4,13, 25	9.5
AF-160	Freudling, W. Haynes, M. Huchtmeier, W. van Gorkom, J.	Cornell Cornell MPIR, Bonn Columbia/NRAO-VLA	The spin temperature of the Magellanic stream.	20 cm line	17	6.5
AF-168	Fruchter, A. Stinebring, D. Taylor, J. Goss, W.	Princeton Princeton Princeton NRAO/VLA	Eclipsing millisecond pulsar.	20 and 90	3,5, 13,26	10
AF-169	Fomalont, E. Goss, W. Lyne, A. Manchester, R.	NRAO/CV NRAO/VLA NRAL CSIRO	Pulsar positions and proper motions.	20 cm line	27	2
AF-171	Frail, D. McKenna, J. Lyne, A.	Toronto Manchester Manchester	Positions of pulsars close to the galactic center.	20	17	3

VLA UTILIZATION FEBRUARY 1989 (Cont.)

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AF-173	Fomalont, E. Ekers, R. Ebneter, K. van Breugel, W.	NRAO/CV Australia Telescope Calif, Berkeley Calif, Berkeley	Fornax A.	90	27	7.5
AF-174	Frail, D. Cordes, J. Hankins, T. Seaquist, E. Weisberg, J.	Toronto Cornell NMIMT Toronto Carleton College	HI absorption measurements against pulsars in the inner galaxy.	20 cm line	18,25, 26,27	28.6
AF-175	Fischer, M. Gibson, D. Gonzalez, P.	Silver City High Lincoln Lab/Socorro La Plata Jr. High	176 day cycle of 4U1820-30.	6 and 20	13	2
AG-278	Garcia-Barreto, J.	UAEM	Barred galaxies NGC-1022 and NGC-1326.	2,6 and 20	26	4
AG-287	Gaume, R. Claussen, M. Goss, W.	NRL NRL NRAO/VLA	H and He recombination lines in Sgr B2.	1.3 cm line	23	10
AH-295	Habing, H. Goss, W. Winnberg, A. van Langevelde, H.	Leiden Obs. NRAO/VLA Onsala Leiden Obs.	A direct measurement of the distance to the galactic center.	18 cm line	9	2
AH-301	Hjellming, R. Gehrz, R. Taylor, A. Seaquist, E.	NRAO/VLA Minnesota Calgary Toronto	Systematic observations of two new new radio novae.	1.3,2,3.6, 6 and 20	14	7
AH-336	Hankins, T. Horton, E.	NMIMT/NRAO-VLA Dartmouth	Time resolved pulsar polarimetry.	20	5	12
AH-339	Haschick, A. Ho, P. Rodriguez, L.	Haystack CFA CFA	Position determination for the H_2O maser associated with HH1-2.	1.3 cm line	4	3
AH-345	Hjellming, R. McKinnon, M. Hankins, T. Han, X.	NRAO/VLA NMIMT/NRAO-VLA NMIMT/NRAO-VLA NMIMT/NRAO-VLA	A search for quasi-periodic radio emission components in X-ray binaries.	3.5	12	3
AJ-176	Jorsater, S. Bergvall, N.	ESO Uppsala Astr. Obs.	Blue compact galaxies.	2 and 6	25	10
AK-218	Kazes, I. Dickey, J. Mirabel, I.	Meudon Minnesota Caltech	A peculiar OH megamaser.	2,6 and 18	20,22	12
AK-223	Kapahi, V. D'Silva, S. Subrahmanya, C. van Breugel, W. Dey, A. McCarthy, P.	JPL TIFR TIFR Calif, Berkeley Calif, Berkeley Mt. Wilson	High redshift radio galaxies.	6	19	16
AL-188	Langston, G. Heflin, M. Lehar, J. Burke, B. Lawrence, C.	NRL MIT MIT MIT Caltech	Variation of lens 2016+112.	2 and 6	5	2
AL-189	Lo, K. Killeen, N. Crutcher, R.	Illinois Illinois Illinois	OH Zeeman measurement in Sgr A.	18 cm line	20,21	20
AM-262	Moran, J. Rodriguez, L.	CFA CFA	Mapping of Triple-Line H_2O masers.	1.3 cm line	3	8
AM-264	Machin, G. McHardy, I. Callanan, P.	Oxford Univ. Oxford Univ. Oxford Univ.	Globular cluster x-ray sources.	6	19,20	10
AO-86	Owen, F. Perley, R.	NRAO/VLA NRAO/VLA	B3 classical doubles.	3.6	26	8.5
AP-169	Pooley, G. Giommi, P. Tagliaferri, G.	Mullard Obs. ESA ESA	Serendipitous EXOSAT sources with featureless optical spectra.	2,6	13,24	5.5
AP-171	Penninx, W. van der Klis, M. Lewin, W. Makishima, K. van Paradijs, J.	Amsterdam ESTEC MIT Tokyo Amsterdam	Low mass x-ray binary 4U 1820-30, Ginga observation.	2,6 and 20	10,11 12,13	9.5 w/move/Op
AS-333	Sramek, R. Weiler, K. van der Hulst, J. Panagia, N.	Australia Telescope NRL Westerbork STScI	Statistical properties of radio supernovae.	2,6 and 20	13	2

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AS-360	Schwartz, P. Johnston, K. deVegt, C.	NRL NRL Hamburger Sternwarte	Precise radio positions and flux densities of T Tau N and S.	2,6 and 20	3	9
AS-371	Skinner, S. Brown, A.	Colorado Colorado	Emission from Herbig Ae/Be stars.	3.5,6 and 20	2,14	6.5 w/Move/Op
AT-94	Taylor, A. Seaquist, E. Kenyon, S.	Calgary Toronto CFA	Monitoring of the symbiotic stars stars Z and CH Cyg.	1.3,2 6 and 20	9	6
AU-37	Umana, G. Hjellming, R. Catalano, S. Rodono', M. Shore, S.	Catania NRAO/VLA Catania Catania Obs. NMIMT	Emission from Algol type binary systems.	2,3.5, 6 and 20	18	16
AW-220	Willson, R. Lang, K.	Tufts Univ. Tufts Univ.	Bursts from active stars.	20 and 90 cm line	28	6.5
AW-230	Wrobel, J. Unger, S.	NMIMT/NRAO-VLA RGO	Monitoring of Seyfert NGC 5548.	3.5	15	1
AW-232	Wood, D. Churchwell, E. Van Buren, D. Mac Low, M.	CFA Wisconsin STScI Colorado	Dynamic ultracompact HII region G5.89-0.39.	3.5	28	8
AY-22	Yun, M. Ho, P. Lo, K.	Harvard Harvard Illinois	HI synthesis mapping of M82.	21 cm line	1	5
AZ-42	Zhao, J. Ekers, R. Goss, W. Lo, K. Narayan, R.	New Mexico Australia Telescope NRAO/VLA Illinois Steward Obs.	Long-term flux variations of Sgr A.	6	13	1
		JPL Staff	Tests		9	4
			Voyager Mission Readiness		16	10
		NRAO Staff	Electronics etc.			52.3
			Baseline/Startup/Pointing			45.9
			Move/Operations			23.9
			Software			36.4
			General Tests			47.7

The average downtime for the month of February 1989 was approximately 9.04 percent.

$$\text{Average downtime of operational antennas} = \frac{\text{Total number of antenna-hours of operational antennas lost due to hardware and software failures during scheduled observing}}{\text{Total number of antenna-hours of operational antennas scheduled}} \times 100$$

Where "antenna hours" definition is: An array consisting of N antennas operating for Y hours is defined to have YN antenna hours operation.

The array was scheduled 100.0 percent (673.9 hours) of the time: 69.2 percent (446.6 hours) to astronomical programs, 16.9 percent (118.6 hours) to scheduled test/calibration, and the remaining 13.2 percent (88.6 hours) went to scheduled maintenance.

The array was in the A configuration February 1 through February 7.
AB configuration February 8 through Febuary 28.

The total number of programs run for the month of February, 1989 was 53.

The following independent proposals shared simultaneous observing time (8.5 hours total simultaneous observing):

AD230/Move/Op	2.0
AP171/Move/Op	2.0
AS371/Move/Op	4.5

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VLA UTILIZATION JANUARY 1989

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AA-96	Anantharamiah, K. Cornwell, T. Narayan, R.	NRAO/VLA NRAO/VLA Steward Obs	Synthesis imaging of sources scatter-broadened through the solar wind.	2,3.5, 6 and 20	6	4
AB-414	Becker, R. White, R.	Calif, Davis STScI	Monitoring the radio flux of HD193793 and P Cygni.	2 and 6	7	1.5
AB-456	Burke, B. Hewitt, J. Roberts, D.	MIT Haystack Obs Brandeis	Time variation of 0957+561.	6	24	2.5 w/Move/Op
AB-509	Baldwin, J. Dingley, S.	Cambridge Cambridge	The evolution of giant radio sources at z=1.	20	31	3
AB-513	Becker, R. White, R. Helfand, D. Zoonematkermani, S.	Calif, Davis STScI Columbia Columbia	Search for undiscovered stellar wind sources and ultracompact HII regions.	6 and 20	19	9 w/AB515
AB-515	Becker, R. Helfand, D. Zoonematkermani, S. White, R.	Calif, Davis Columbia Columbia STScI	Imaging of weak extended galactic sources.	6 and 20	19	9 w/AB513
AB-517	Biretta, J. Owen, F.	CFA NRAO/VLA	Proper motion of the M87 jet.	2	14	11.5
AB-520	Backer, D. Sramek, R.	Calif, Berkeley NRAO/CSIRO	Proper motion of Sgr A.	3.5 and 6	28	7
AB-522	Browne, I. Akujor, C.	NRAL Nigeria	Moderately compact steep spectrum sources.	6 and 18	31	6.6
AC-146	Churchwell, E. Felli, M. Massi, M.	Wisconsin/MPIR Arcetri Obs Arcetri Obs	High dynamic range mapping of Orion A.	20	28	4
AC-231	Claussen, M. Gaume, R. Johnston, K. Wilson, T.	NRL NRL NRL MPIR, Bonn	W3 star forming region.	1.3,2,6, and 18 cm line	20,22	24.5 w/Move/Op
AC-235	Conner, S. Lehar, J. Burke, B.	MIT MIT MIT	Search for gravitationally lensed QSOs with small image seperations.	2 and 3.6	6	12
AC-237	Cordova, F. Hjellming, B.	LANL NRAO/VLA	Radio astrometry of PSR 0656+14.	20	24	5
AC-244	Carilli, C. Perley, R. Dreher, J. Bridle, A. Cotton, W.	NRAO/VLA NRAO/VLA MIT NRAO/CV NRAO/CV	Cygnus A.	3.5	6	12
AC-249	Conner, S. Burke, B.	MIT MIT	AO 0235+164.	1.3	28	2.1
AD-188	Drake, S. Simon, T. Florkowski, D. Stencel, R. Bookbinder, J. Linsky, J.	SASC Hawaii USNO Colorado Colorado Colorado	Variability of emission in M Supergiant Alpha Ori.	2 and 6	16	3
AD-205	de Pater, I.	Calif, Berkeley	Jupiter at 327 MHz.	90	12	7
AD-207	Dent, W.	UKIRT	OH maser structure of late type stars with high polarisation.	18 cm line	24	10
AD-225	Diamond, P. Goss, W.	NRAO/CV NRAO/VLA	Magnetic field structure in the envelopes of Supergiant stars.	18 cm line	5	4
AE-055	Ekers, R. Cowan, J. Sramek, R. Goss, W. Roberts, D.	Australia Telescope Oklahoma CSIRO NRAO/VLA Oklahoma	Young SNR G25.52+0.22.	2,6,20 and 90	5,7	3
AF-166	Foster, R. Backer, D. Wloszczan, A.	Calif, Berkeley Calif, Berkeley Arecibo	Pulsar PSR 1951+32 in the radio nebula CTB 80.	20	13	7
AF-168	Fruchter, A. Stinebring, D. Taylor, J. Goss, W.	Princeton Princeton Princeton NRAO/VLA	The eclipsing millisecond pulsar.	20 and 90	14,15	5
AF-169	Fomalont, E. Goss, W. Lyne, A. Manchester, R.	NRAO/CV NRAO/VLA NRAL CSIRO	Pulsar positions and proper motions.	20	27	24

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AF-170	Florkowski, D. Johnston, K. DeVegt, C.	USNO NRL Hamburg	Radio and optical reference frames.	6	2	24
AG-274	Gaume, R. Johnston, K.	NRL NRL	Mapping the W49 N magnetic field.	18 cm line	29	12
AH-330	Hughes, V.	Queen's Univ	Variability of HII regions in Cepheus A.	2,6, and 20	28	6
AH-331	Hummel, E. van der Hulst, J. Keel, W. Kennicutt, R.	NRAL Westerbork Alabama Steward Obs	Compact core radio sources in spiral galaxies.	6	14	6
AH-332	Hofstadter, M. Muhleman, D. Berge, G.	Caltech Caltech Caltech	Mapping Uranus.	6	17	8
AH-333	Hutchings, J. Neff, S.	DAO NASA/Goddard	Radio evolution of infrared selected galaxies.	3.5 and 6	9	24
AH-335	Hewitt, J. Burke, B. Turner, E.	Haystack Obs MIT Princeton	Variability in MG1131+0456.	2,3.5, and 6	26	5
AH-336	Hankins, T. Horton, E.	NRAO/NMIMT Dartmouth	Time resolved pulsar polarimetry.	20	29	12
AH-338	Hogg, D.	NRAO/CV	Temperature structure in WR envelopes.	1.3,3,6 and 20	11,16, 18,21	10
AI-35	Inoue, M. Perley, R. Carilli, C. Kato, T. Tabara, H. Aizu, K.	Nobeyama NRAO/VLA NRAO/VLA Utsunomiya Univ Utsunomiya Univ Rikkyo Univ	Large Faraday rotation source Hyd A.	2 and 6	10	8
AJ-171	Johnston, K. Stolovy, S. Florkowski, D. Wade, C. de Vegt, C.	NRL NRL USNO NRAO/VLA Hamburge Sternwarte	Parallax of UX Ari.	6	29,30	12
AK-203	Kudritzki, R. Mendez, R. Gomez, Y. Rodriguez, L. Moran, J.	Sternwarte Sternwarte CFA CFA CFA	Stellar wind of the central star of NGC2392.	2	5	6
AK-221	Kundu, M. Uchida, Y. White, S. Nitta, N.	Maryland Tokyo Maryland Maryland	The radio spectrum of RS CVn systems from .3 GHz to 80 GHz.	2,3.5,6 20 and 90	25	12.9
AL-186	Langston, G. Weiler, K.	NRL NRL	Ring source at high galactic latitude.	2 and 6	7	3
AL-187	Langston, G. Burke, B. Heflin, M. Hewitt, J. Lehar, J. Conners, S.	NRL MIT MIT Princeton MIT MIT	Faint source lens search.	6	15,22	24
AM-252	Mollenhoff, C. Bender, R. Hummel, E.	Heidelberg Heidelberg NRAL	Dust-Lane ellipticals.	20	1,2	6.1
AM-262	Moran, J. Rodriguez, L.	CFA CFA	Mapping of triple-line H_2O masers.	1.3 cm line	30	2
AM-263	McHardy, I. Marscher, A. Gear, W. Abraham, R.	Oxford Boston Royal Obs Oxford	Deep polarisation imaging of 1156+295.	2 and 6	5	8
AO-84	O'Dea, C. Baum, S.	NFRA NFRA	Radio properties of giant galaxies in cooling flows.	90	18	3.5
AO-85	O'Dea, C. de Bruyn, A.	NFRA NFRA	Multi-frequency polarization of quasars and BL Lac objects.	1.3,2,2.8, 6,18,20	17	7
AP-158	Pooley, G. Riley, J. Liu, R.	MRAO MRAO MRAO	Spectral ages of luminous radio sources.	2,6 and 21	21	8
AR-167	Roeser, H. Perley, R. Hiltner, P. Meisenheimer, K.	MPIA, Heidelberg NRAO/VLA MPIA, Heidelberg MPIA, Heidelberg	Optically identified hotspots in classical double radio sources.	2,6 and 20	23	12 w/Move/Op

VLA UTILIZATION JANUARY 1989 (Cont.)

Program	Observer	Affiliation	Program title	Bands (cm)	Obsv date	Sched hrs
AR-196	Roberts, D.	Brandeis	High dynamic range multi-frequency	2,3.5,	8	10
	Brown, L.	Brandeis	structure of the quasar 3C345.	and 6		
	Kollgaard, R.	Brandeis				
	Wardle, J.	Brandeis				
	Perley, R.	NRAO/VLA				
AR-197	Roberts, D.	Brandeis	Muli-frequency structure of the quasar	3.5,6	7	10
	Kollgaard, R.	Brandeis	0106+013.	and 18		
	Wardle, J.	Brandeis				
	Cohen, M.	Caltech				
	Wehrle, A.	Caltech				
AR-202	Rudolph, A.	Calif, Berkeley	HH 7-11.	2,3.6,	13	8
	Rodriguez, L.	CFA		and 6		
	Palmer, P.	Chicago				
AS-350	Seaquist, E.	Toronto	Supergiant star HR 8752.	1.3,2,3.7,	14	9
	Smolinski, J.	Copernicus		6 and 20		
AS-356	Surdej, J.	Liege	High luminosity quasars as	3.6	10,11,	13.5
	Kellerman, K.	NRAO/CV	gravitationally lensed objects.		13,14	w/AS357
	Borgeest, U.	Hamburg Obs				
	Kayser, R.	Hamburg Obs				
	Magain, P.	ESO				
	Refsdal, S.	Hamburg Obs				
	Swings, J.	Liege				
AS-357	Surdej, J.	Liege	New and likely gravitational lens	2,3.6,	10,11,	13.5
	Kellerman, K.	NRAO/CV	systems.	and 6	13,14	w/AS356
	Borgeest, U.	Hamburg Obs				
	Kayser, R.	Hamburg Obs				
	Magain, P.	ESO				
	Refsdal, S.	Hamburg Obs				
	Swings, J.	Liege				
AS-358	Saikia, D.	NRAL	Depolarization and viewing angles of	6,18	28	5
	Garrington, S.	NRAL	one-sided radio sources.	and 20		
AS-359	Saikia, D.	NRAL	Merlin study of interstellar scattering	6	31	8
	Pedlar, A.	NRAL	in the inner galaxy.			
AS-362	Su, B.	Iowa	Interacting galaxy pair Arp 90.	3.6 and 6	9	8
	Mutel, R.	Iowa				
AT-99	Tamura, S.	Tohoku	Search for OH in IC4997.	18 cm	8	2
	Kazes, I.	Meudon		line		
AU-36	Ulvestad, J.	JPL	Compact radio sources in NGC253.	2 and 6	15,16	12
	Antonucci, R.	STScI				
AW-221	Wilson, A.	Maryland	Deep radio images of three classical	2,6	19,21	36
	Haniff, C.	Cambridge	Seyfert galaxies.	and 20		w/Move/Op
	Ward, M.	Washington				
AW-225	Wooten, A.	NRAO/CV	Binary protostar 16293-2422.	1.3,3.5	20	5.5
				and 20 cm line		
AW-230	Wrobel, J.	NRAO/NMIMT	Monitoring Seyfert NGC5548.	3.5	13,28	2
	Unger, S.	RGO				
AY-24	Yusef-Zadeh, F.	NASA/Goddard	Mosaic of the Orion nebula.	2 and 6	8	10.5
	Palmer, P.	Chicago				
		JPL Staff	Voyager/Mission Readiness		12,26	19.4
		NRAO Staff	Electronics/Software/Pointing			49.9
			Baseline/Startup			50.1
			Software			39.8
			Holiday			16.0
			General Tests			63.5
			Move/Op			25.2

The average downtime for the month of January 1989 was approximately 5.8 percent.

$$\text{Average downtime of operational antennas} = \frac{\text{Total number of antenna-hours of operational antennas lost due to hardware and software failures during scheduled observing}}{\text{Total number of antenna-hours of operational antennas scheduled}} \times 100$$

Where "antenna hours" definition is: An array consisting of N antennas operating for Y hours is defined to have YN antenna hours operation.

The array was scheduled 97.8 percent (730.0 hours) of the time: 68.9 percent (514.1 hours) to astronomical programs, 16.9 percent (126.2 hours) to scheduled test/calibration, and the remaining 12.0 percent (89.7 hours) went to scheduled maintenance.

The array was in the A configuration the entire month of January.

The total number of programs run for the month of January, 1989 was 60.

The following independent proposals shared simultaneous observing time (47.7 hours total simultaneous observing):

AB456/Move/Op	2.3
AB513/AB515	9.0
AC231/Move/Op	2.3
AH335/Move/Op	5.0
AR167/Move/Op	9.9
AS356/AS357	2.5
AS356/AS357	2.5
AS356/AS357	3.5
AS356/AS357	3.5
AS356/AS357	1.5
AW221/Move/Op	5.7

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