

A CATALOGUE OF RADIO SOURCES OBSERVED IN VLBI  
I: 1985-1987

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## 1. INTRODUCTION

a. The need for a catalogue of VLBI observations was first raised in a EVN-Programme Committee Meeting a couple of years ago. It was soon clear to all the members of the PC that such a catalogue could have been a great source of information to settle the observing policy and to assist the members themselves in their reading of the submitted proposals. When in the VLBI Community it was rumoured that we were making a list of VLBI observations, the demand grew very quickly and we were "forced" to complete our commitment.

b. The present edition of the catalogue of VLBI observations contains the list of all the observations carried out in VLBI with the EVN and global arrays of radiotelescopes in the years 1985, 1986, 1987.

Entries for the period before 1985 will be completed soon and consequently will include all the observations starting from the very beginning of VLBI activity. The catalogue will be updated each year.

The sources of information for this catalogue were the Observing Schedules distributed by the EVN-Chairman for each session, and the log-files kept at the Medicina Station. As a result, the catalogue does not include currently observations made with the U.S.Network only. We cannot

swear to the completeness of our compilation. We suggest that it is considered as a work in progress only. "Perfection" may be achieved with the help of the Principal Investigators and their comments will be really appreciated.

c. We are constructing also an additional file containing all the publications related to the VLBI observations of each source. This will be inserted into the DATABASE structure and will be available in few months. An updated version of this manual containing details on the publication list and how to handle it will be distributed then.

Gathering all the pieces of information contained in the present catalogue is a difficult job and it sometimes leads to incompleteness, despite our efforts. Any help from those users who can fill the gaps still present in it will therefore be very welcome.

\* \* \*

HELP!

To create this additional file we would like to have the author collaboration. Please send us, possibly via E-mail, the following information:

I.A.U. Source Name, Other Name, References

The catalogue will be organized in such a way that "source name" is the key used to obtain the list of publication.

E-mail address: SPAN/HEPNET  
BITNET

node: 38956::  
node: ASTBO1.INFNET  
user: TIZIANA  
: FRANCO

## 2. DESCRIPTION

The catalogue (Tab. 1) is ordered according to the IAU name of the source, i.e. right ascension and declination. The information given for each source can be divided into three parts: the first concerns generalities on the source itself, the second lists the Principal Investigator and the experiment number and the third gives details of the observations themselves.

The catalogue consists of 15 columns, each of which contains a variable (equivalent to a "key" in the DATABASE language). There follows is a list of all the variables in the catalogue with a brief explanation of their meaning.

Column 1 - Variable name: NAME

It is the IAU name of the source.

Column 2 - Variable name: ON (Other Names)

It contains other names under which the source is known, such as the 3C, 4C, OQ, OJ names and so on. If the source doesn't belong to any of the mentioned catalogues and is associated with an optical object, then the name of this object is given.

Column 3 - Variable name: ID (optical identification)

It gives the morphological class of the optical associated object (if any).

Columns 4,5 - Variable names: RA, DEC

Right ascension and declination of the source  
(epoch 1950). These are the pointing position  
- coordinates, as given by each investigator.

Column 6 - Variable name: PI (Principal Investigator)

Name of the Principal Investigator.

Column 7 - Variable name: AFFL (affiliation)

The institute to which the P.I. is affiliated.  
investigator.

Column 8 - Variable name: EVNPN

EVN project number.

Column 9 - Variable name: USPN

US project number.

Column 10 - Variable name: WL (wavelength)

Wavelength (in cm) at which the observation was  
carried out.

Column 11 - Variable name: GOAL

Purpose of the observation,  
defined by a list of codes.

Column 12 - Variable name: ACTEL (active telescopes)

A list of the antennas which took  
part in the observation. The antenna codes  
follow the official list (see US VLBI Handbook).

Column 13 - Variable name: MODE

Recording system mode (MKII or MKIII)

Column 14 - Variable name: H (hours)

The duration of the observation in  
hours and fractional hours.

Column 15 - Variable name: DATE

The date of the observations where the first 2 digits refer to the year and the last 3 give the day number.

It often happens that more observations of the same source belong to the same experiment. In such cases an \* indicates those variables which do not vary from one observation to the other. Let's give an example (only some of the variables are reported):

NAME	PI	EVNPN	WL	GOAL	ACTEL	MODE	H	DATE
0645+609	Pedlar	84-56	18	sts	SBWJ	B	2	85103
0645+609	*	*	6	*	*	A	2	85137

Here the \* indicates that PI, EVNPN, GOAL and ACTEL are the same, but the two observations were carried out at different frequencies, with a different recording system and in different days.

A documentary file (.DOC) accompanies the catalogue. In this file the user will find the list of the variables, their format (A for a character, I for an integer, and so on) and a very brief explanation of their meaning. In this .DOC file one can find also the codes for each telescope (according to the VLBI antenna designations), the codes describing the purpose of the observations. Also included

are the codes for the optical identifications.

In order to help the user a copy of the documentary file is given in Tab: 2.



## 3. COMPUTER ACCESS

The "Catalogue of Radio Sources Observed in VLBI", can be accessed via computer using both Packet Switching (X25)PTT and SPAN/HEPNET.

Node:

Packet Switching (X25)PTT: 02222511079

SPAN/HEPNET: 38956::

User:

ASTRONET

Password:

NO Password

At this point the VMS prompt "\$", will appear. Typing

\$DATABASE

will gain the user entry to DIRA (Distributed Information Retrieval from Astronomical files). This is a software structure, superimposed on the VAX/VMS system, that allows you simple and direct management of astronomical data bases, especially catalogues (D.I.R.A., ASTRONET, Data Base Group, Italy).

A short explanation of the command can be obtained by

means of the VMS-like help of DIRA by typing HELPDB. Answering with "?" to any questions from DIRA will invoke the on-line help facility.

Further information is contained in the DIRA manual and this will be sent on request. Please address your request directly to Mauro Nanni (38956::NANNI).

In our case, you will be able to access the VLBI catalogue using two commands to start with: DB\_SELECT and DB\_WINDCO.

Both commands will ask you the name of the Catalogue that you would like to access (see example). The name we have assigned to "A Catalogue of Radio Sources Observed in VLBI" is VLBINET.

DB\_SELECT

COMMAND NAME : DB\_SELECT

COMMAND TYPE : SELECTION

PURPOSE:

To select from a catalogue the objects which satisfy up to 10 constraints imposed on the variables and to produce an output file that can be picked up in the Personal Data Base. It is more efficient to use DB\_WINDCO or DB\_PLACO commands when constraints on the coordinates are involved in selection.

DESCRIPTION:

With this command you can extract a sub-set of a catalogue selecting only the records which satisfy the imposed constraints. A maximum of 5 constraints on numerical variables and 5 on character variables present in the catalogue can be imposed simultaneously and can be linked by a logical operator ( OR-AND ) at a time.

For instance it is possible to write:

Rel\_1 AND Rel\_2 AND Rel\_3 AND Rel\_4

but not:

( Rel\_1 OR Rel\_2 OR Rel\_3 ) AND Rel\_4

To do the latter search you can use DB\_SELECT with homogenous type of constraints ( Rel\_1 OR Rel\_2 OR Rel\_3 ) to obtain a PDB sub-catalogue; on this you can continue the work with DB\_SELECT routine to impose, logically, the last relation (Rel\_4). There are six types of constraints that you can impose on a single variable:

Cons. Code	Description
0	Match of a substring in the field
1	Equal
2	Less than
3	Greater than
4	Inside the interval (boundaries included)
5	Outside the interval (boundaries excluded)
6	Not Equal

Note: more than one constraint can be imposed on the same variable.

EXAMPLE:

\$ DB\_SELECT

[ In the first input block you must enter the logical name of the catalogue that you need to use and if it is public (MASTER) or private (PERSONAL) one. ]

Input from Personal Data Base [Y/N] ? >> N

Catalogue Name ? >> VLBINET

N.Cat = 1 file DEV\_DB\_DATA:VLBINET.DAT opened

[ After the file related with the catalogue has been opened the user can define the physical variables to be read using the mnemonic CODE of the variable. Other than CODES at this step you can use some special string to answer

/ Produce a complete list of the variables

/ALL Use all the variables present on the catalogue (If you are working on a PDB catalogue)

%NAME Reads from 'NAME' file the code  
(Codes of the catalogue parameters can be written as a free list by editor) ]

Variables to be read ? >> RA DEC MAG

[ Now define the constraints on the variables; for each constraint the program asks for the variables code, the constraint code and the value(s) (numerical or character). If you have need of more than one constraint, you have to define the relationship among them.]

```
-----Constraints N.      1 -----
--On Variable ? <CR> = exit    >> MAG
--Constraint Code ?           >> 2
--Comparison value            >> 15

-----Constraints N.      2 -----
--On Variable ? <CR> = exit    >> ACOD1
--Constraint Code ?           >> 0
--Comparison value            >> sA

-----Constraints N.      3 -----
--On Variable ? <CR> = exit    >> <CR>
```

Relationship (0 = .OR. 1 = .AND.)? >> 1

```
-----
Var = MAG      Const = 2      Val = 15
```

Var = ACOD1    Const = 0    Val = sA

---

Are the constraints O.K. [Y/N]                    >> Y

[ The output of this task is written to a file that you can put directly into Personal Data Base (PDB) for a future application (see DIRA manual). If you want to update PDB inserting a new catalogue you will produce a new CATALOGUE NAME; When this NAME matches with a NAME already present the old catalogue is updated with new parameters and the new data file name have the same name of the old catalogue. It is possible to use the same name of the input catalogue (if you are working on a PDB catalogue) in this way you can perform sequential filtering operations on data set. ]

Do you want to update Personal Data Base ? [Y/N]    >> Y

New Catalogue Name    ?                    >> VLBMINE

Output File Name    ?                    >> VLBOU

----- n. 4567 Objects founded -----

Cpu Time.....36.9400 seconds

[ You can continue to make selections in the same catalogue to obtain more output files with different variables and constraints.]

Do you want to continue on same catalogue ? [Y/N] >> N



DB\_WINDCO

COMMAND NAME : DB\_WINDCO

COMMAND TYPE : SELECTION

PURPOSE:

To select from a catalogue the objects located inside a coordinates window defined in Right Ascension and Declination and that satisfy up to 10 constraints imposed on the variables. It produces an output file that can be picked up in the Personal Data Base.

DESCRIPTION:

With this command you can extract a sub set of a catalogue selecting only the records inside a sky region defined by Right Ascension and Declination.

All the options of the command DB\_SELECT are available in this task.

When the original catalogue is sorted coordinate, the routine uses a dichotomic search strategy and the time for the retrieval of information is related only to the number of objects in the defined region and not to the number of

records in the catalogue or to the physical position of the region into the catalogue.

If you search objects in a region around 0 hours in Right Ascension (ie. from 23.30 to 0.30 ) you can specify the RA as either from 23.30 to 0.30 or from 23.30 to 24.30. When the first R.A. coordinate is greater than the second one the program uses a window containing the 0 hour RA.

EXAMPLE:

```
$ DB_WINDCO
```

```
[ In the first input block you must enter the logical name of the catalogue that you need to use and if it is public (MASTER) or private (PERSONAL) one. ]
```

```
Input from Personal Data Base [Y/N] ? >> N
```

```
Catalogue Name ? >> VLBINET
```

```
N.Cat = 1 file DEV_DB_DATA:VLBINET.DAT opened
```

```
[ After the file related with the catalogue has been opened the user can define the physical variables to be
```

read using the mnemonic CODE of the variable.  
The coordinates are always returned in the output file  
and you do not need to give here the coordinates CODE.  
Other than CODES at this step you can use some special  
string to answer. ]

/ Produce a complete list of the variables

/ALL Use all the variables present on the  
catalogue (If you are working on a PDB  
catalogue)

%NAME Reads from 'NAME' file the code  
(Codes of the catalogue parameters can be  
written as a free list by editor) ]

Variables to be read (besides RA and DEC ) ? >> MAG,POSANG

[ You must enter now the window in R.A. and Dec.  
coordinates in the format hours, minutes, seconds and  
degrees, arcmins, arcsecs. The questions layout can  
help you to put in a right format the values. ]

-----

Enter the limits in R.A. [minimum maximum]:  
HHMMss.s HHMMss.s  
1230 123525.5

Enter the limits in Dec. [minimum maximum]:  
\_DDMMss.s \_DDMMss.s  
-051200.0 0315

Minimum R.A. = 12 30 00.0 Maximum R.A. = 12 35 25.5  
Minimum Dec. = -05 12 00.0 Maximum Dec. = 03 15 00.0

-----

Coordinates O.K. [Y/N] ? >> Y

Do you want to impose constraints on the variables [Y/N] ? >>N

[ You can put constraints on each variable present in the catalogue inside the defined window by answering Yes at this step. (See DB\_SELECT for more information) ]

[ The output of this task is written to a file that you can put directly into Personal Data Base (PDB) for

future applications. If you want to update PDB inserting a new catalogue you will produce a new CATALOGUE NAME; When this NAME matches with a NAME already present the old catalogue is updated with the new parameters and the new data file name have the same name of the old catalogue. It is possible to use the same name of the input catalogue (if you are working on a PDB catalogue). In this way you can perform sequential filtering operations on data set.]

Do you want to update the Personal Data Base ? [Y/N] >> Y

New Catalogue Name ? >> VLBMINE

Output File Name ? >> VLB.DAT

R.A. Range : 12 30 0.0 <---> 12 35 25.0

Dec. Range :-05 12 0.0 <---> 3 15 0.0

----- n. 11 Objects founded -----

Cpu Time -----> 0.62 Seconds

Do you want to continue on the same catalogue ? [Y/N] >> N

draft:

CATALOGUE OF RADIO SOURCES OBSERVED IN VLBI

catalogue name: VLBI-OBS

keywords: RADIO, SOURCES, VLBI, OBSERVATIONS

The catalogue contains the list of all the radio sources observed in VLBI from the beginning of 1985 to the end of 1987 and it will be progressively updated.

:RECORDS 633:

CODE	FORMAT	PHYSICAL VARIABLES
NAME	A	IAU radio source name
ON	A	Source names from other catalogues (3C,4C...)
ID	A	Optical identification
RA	I	Right ascension (Epoch 1950.0)
DEC	I	Declination (Epoch 1950.0)
PI	A	Project Investigator
AFFL	A	Affiliation of the project investigator
EVNPN	A	EVN project number
USPN	A	US project number
WL	A	Wavelength in cm at which the observation was made
ACTEL	A	Telescopes involved in the observation. Symbols are given according to the following VLBIN antenna designations: A - Arecibo, 300m B - Bonn, 100m at Effelsberg C - Canada, 46m at Algonquin Park Dx- Deep Space Net: Dm=DSS14 Mars Goldstone 64m, Dv=DSS13 Venus Goldstone 26m, Ds=DSS43 Madrid 64m, Dt=DSS43 Tidbinbilla 64m E - Hartebeesthoek, South Africa, 26m F - Fort Davis, GRAS, 26m G - Green Bank, 43m Hx- Hat Creek: Hc=26m; Hw,p,x=6m's I - Iowa, 18m Jx- Jodrell Bank: J1=76m Mark Ia; J2=25m MarkII Kx- Haystack: Kc=36m; Ki=46m; Kw=Westford 18m L - Italy: Lm=32m at Medicina; Ln=32m at Noto, Sicily M - Nobeyama, 45m N - NRL, 26m at Maryland Point Ox- Owens Valley: Oc=40m; Ox,y,z=10m P - Penticton, 26m Q - Quabbin, 16m R - Simeiz, Crimea, 22m Sx- Onsala: Sc=26m, Sm=20m T - Tucson, 12m U - Chilboton, 26m V - Metsahovi (Finland), 14m Wn- Westerbork, n=1-14 x 25m X - Brazil, 14m Yn- VLA, n=1-27 x 25m Z - Torun (Poland), 15m Mr- MERLIN
GOAL	A	Reason why the source has been observed
MODE	A	Recording system: 2=MarkII; A,B,C,D,E=MarkIII PL=polarisation; SL=spectral line
H	A	Duration of the observation in hours
DATE	A	Date of the observation

An \* following the index name of the source indicates that the information on

the present record continues from the previous one.

CODES FOR OPTICAL IDENTIFICATIONS			CODES FOR THE GOAL OF THE OBSERVATIONS	
AN	active gal. nuclei	sm	source mapping	
BS	binary system	gl	gravitational lenses	
EF	empty field	hsm	hot spot morphology	
G	galaxy	eo	epoch observation	
Q	quasar	pm	proper motion	
PR	pulsar	cc	compact component	
S	star	slm	superluminal motion	
SR	supernova remnant	fm	flux measurement	
		cm	core mapping	
		jd	jet dynamics	
		ab	angular broadening	
		pfs	peak flux sample	
		spv	structure and polar variability	
		ss	strong survey	
		sc	structure changes	
		mon	monitoring	
		mo	maser observation	
		pt	polarisation test	
		sur	survey	
		snr	supernova remnant	
		no	nucleus observations	
		sws	stellar wind structure	
		mbo	multiband observations	
		vp	variable polarisation	
		cs	compact structure	
		ps	polarised structure	
		rn	radio nuclei	
		po	polarisation observations	
		css	compact steep spectrum sources	
		mfs	magnetic field structure	
		fs	flare star	
		xb	x-ray binary system	
		ast	astrometry	
		mss	milliarcsecond structure	
		aho	ad hoc observations	
		se	stellar envelopes	
		hdo	high dynamic range observations	
		fo	flare observations	
		sts	short track seyfert gal. obs.	
		pr	phase reference	

NAME	ON	ID	RA (1950)	DEC (1950)	P.I.	APPL.	EVNPN	USPN	WL	GOAL	ACTEL	MODE	H	DATE
0016+731		Q	001654200	731051500	Witzel	MPifr	84-46G	W39G	1.3	sm	BSKGOY	B	1	85275
0016+731		Q	001654100	731052000	Schalinsky	MPifr	87-15G	S71G	6	slm	BWJSLZ	2	10	87152
0023+171		*	001654100	731052000	*	*			*	*	KNGFOHY	*	10	87152
0055+300	NGC315	G	005505700	300455000	Hewitt	MIT	86-29	H26G	2.1	gl	BWJ-Y	A	3	86347
0104+321	3C31 4C32.05	G	010439200	320844000	Giovannini	IRA	84-52	rn	6	rn	LSBWJ	B	2	85289
0106+013	4C01.02	Q	010604523	011901060	Giovannini	IRA	84-52	rn	6	rn	LSBWJ	B	2	85289
0106+013	4C01.02	Q	010604523	011901060	Cohen	CIT	86-21G	C43G	6	v	LSBWJ	B	2	86164
0108+388		EF	010847252	011901060	Campbell	GeoIns	86-74	*	6	*	EKNGFOHYA	2	2	86164
0127+233	3C43 4C23.06	Q	012715200	385032800	Barthel	CIT	86-58G	B74G	6	sur	LSBWJ-KGIFYOH	E	1	87276
0133+476		Q	013355110	473612500	Fanti	IRA	85-65	18	css	LSBWJ	2	2	86327	
0133+476		Q	013355110	473612500	Greybe	MPifr	85-58G	G49G	2.8	vp	LB-KGO	C/PL	10	86272
0133+476		Q	013355110	473612790	Barthel	CIT	86-58G	B74G	6	sur	LSBWJ-KGIFYOH	2	2	86147
0138+136	3C49 4C13.10	G	013828510	133819950	Fanti	IRA	85-12	6	css	LSBWJ	2	4	85280	
0138+136		*	013828510	133819950	*	*			*	*	LSBWJ	2	4	85280
0153+744		*	013828510	133819950	*	*			*	*	LSBWJ	2	4	85280
0212+735		Q	015304348	742805650	Witzel	MPifr	84-53G	W38G	6	sur	LSBWJ-KNGYO	2	4	86162
0212+735		BL	021249940	733540150	Witzel	MPifr	84-53G	W38	6	hdo	LSBWJ-KNGYO	2	4	86162
0219+421	SNR1986J	BL	021249900	733540100	Witzel	MPifr	84-46G	W39G	1.3	sm	BSKGOY	B	1	85141
0219+421	SNR1986J	SN	021922600	420618900	Bartel	CFA	86-75G	B76G	2.8	sm	BL-KGFO	A	9	87054
0219+580	S Per	SN	021922600	420619000	Strom	NFRA	86-73G	S72G	6	snr	BWSL-GO	B	5	87146
0220+427	3C66B 4C42.07	S	021915090	582133500	Diamond	MPifr	84-45G	D9G	1.3	mo	BSKNGOY	2	11	85275
0222+369		G	022001700	424555000	Giovannini	IRA	84-52	6	rn	LSBWJ	B	5	85289	
0223+616	W3(OH)	G	022223900	365657000	Giovannini	IRA	84-52	6	rn	LSBWJ	B	5	85289	
0223+616	W3(OH)	M	022316500	613856400	Baudry	Bdeaux	85-38	6	mo	LSBWJ	2/SL	14	85290	
0223+616	W3(OH)	M	022316450	613857510	Bloemhof	Bdeaux	85-22H	B64G	18	mo	BJ-KGFOHCY27	2/SL	14	86071
0224+671		M	022316450	613857510	Baudry	Bdeaux	86-44	6	mo	LSBWJ-G	2/SL	3	86330	
0224+671		Q	02241170	670739700	Mantovani	IRA	aho	aho	2.8	mo	L-KGFOH	2	3	85341
0229+131		Q	02241170	670739700	*	*			*	*		2	3	85341
0229+341	3C66.1 4C34.08	Q	022902500	130940400	Lawrence	CIT	86-79G	L45G	1.3	ss	BL-KGOY1	2	4	85342
0229+341		Q	022927000	341102000	Fanti	IRA	S4	18	aho	SBWJ	2	2	87048	
0234+285	4C28.07	Q	022927000	341102000	*	*			*	*		2	1	85098
0235+164	A00235	Q	023455570	283512100	Coley	NEROC	85-54G	C41G	1.3	sc	BS-KNGOY1	2	10	86058
0235+164	A00235	G	023552600	162404000	Hooimeyer	Leiden	85-08G	H17	6	cs	LSBGOY27	A	5	85147
0235+164	A00235	Q	023552600	162403800	Coley	NEROC	85-54G	C41G	1.3	sc	BS-KNGOY1	2	10	86058
0235+164		Q	023552600	162403800	Greybe	MPifr	85-58G	G49G	2.8	vp	BL-KGO	C/PL	12	86060
0235+164	A00235	Q	023552600	162403800	*	*			*	*		6	6	86147
0236+610	LSI+61303	SS	023552700	162403300	Roberts	MA	87-12G	R41G	6	spv	BWLKGFHOY27	C/PL	1	87151
0236+610		G	023640600	610053900	Taylor	NRAL	87-20	6	xb	BLSWJ	B	12	87269	
0240-002	NGC1068	*	023640600	610053900	*	*			*	*		12	87269	
0240-002	NGC1068	G	024007060	-001331440	Pedlar	NRAL	84-56	6	sts	LSBWJ	A	2	85137	
0240-002	NGC1068	G	024007100	-001331000	Pedlar	NRAL	87-46	6	no	BLWJ	A	6	87271	
0258+350	4C34.09 NGC1167	G	025835400	350032000	Giovannini	IRA	84-52	6	rn	LSBWJ	B	5	85289	

























