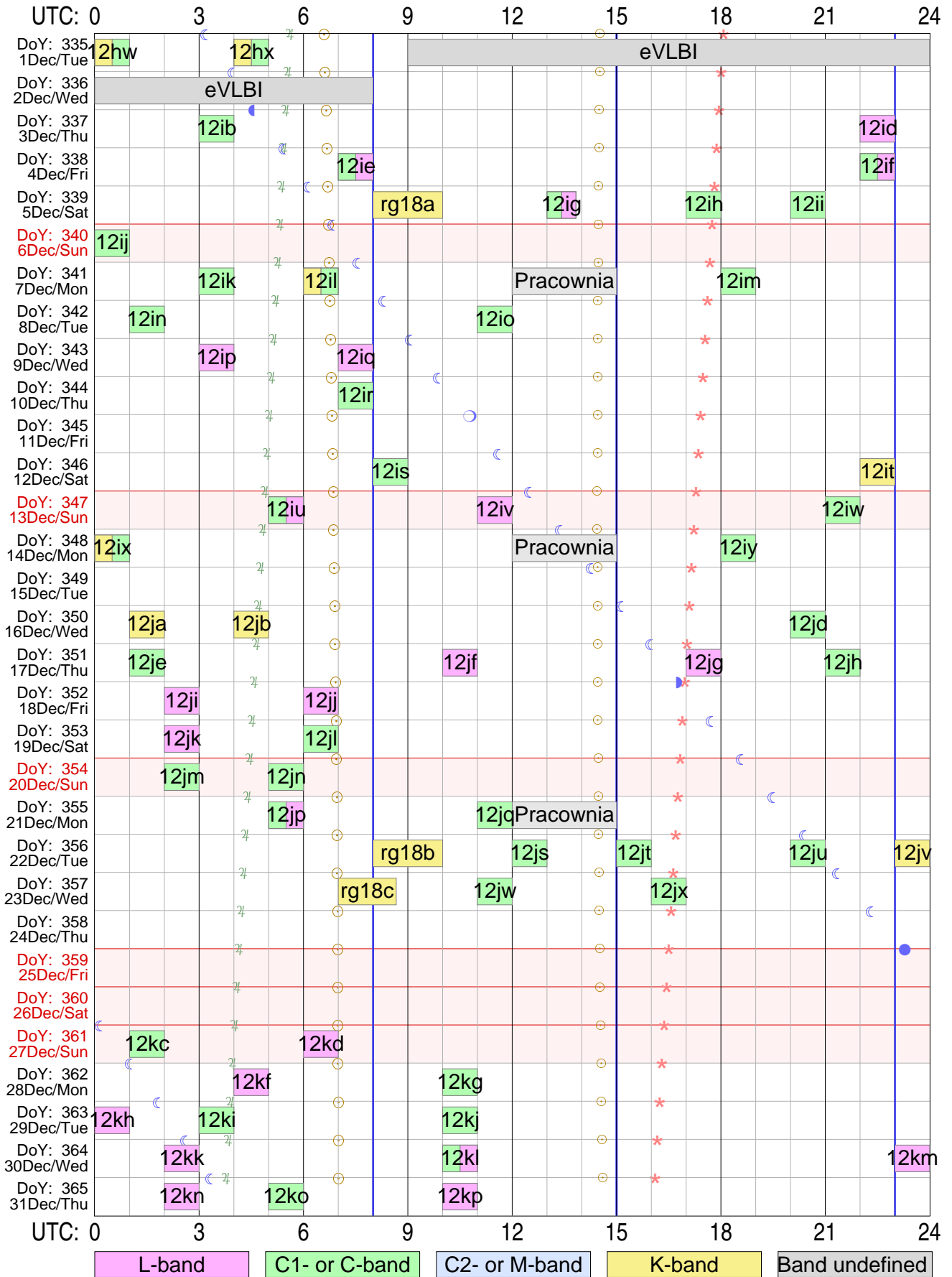


# Tr VLBI plan for Dec 2015



Version: 2015.11.27

Sky events at Tr:    ☉ Sunrise & sunset    ☾☽☽☽☽☽ Transit of Moon    ♃ Transit of Jupiter    ★ Transit of Aries (0h ST)

Vertical lines in blue mark operator shift times at Tr

Total observing time: 87.5 hours in 63 experiments scheduled

Initial characters 'rk' are omitted from RA experiment names!

Strona zostawiona celowo pusta

# RadioAstron & EVN Experiments

## Dec 2015

Uytownik ftp dla logw i schedulw RA: grt

ftp://webinet.asc.rssi.ru

Przykad dla log files: cd GRT\_log\_files/2014\_09/2014\_09\_01\_raks08ak

Przykad dla sched files: cd schedule/grtsched/RAKS/rk08ak

Year	Date	UTstart	UTstop	Exper.	xxComment
2015	D M DoW	hh mm	hh mm	name	
335	1 12 Wto	4 00	5 00	rk12hx	"K>C "
337	3 12 Czw	3 00	4 00	rk12ib	"C "
337	3 12 Czw	22 00	23 00	rk12id	"L "
338	4 12 Pia	7 00	8 00	rk12ie	"C>L "
338	4 12 Pia	22 00	23 00	rk12if	"C>L "
339	5 12 Sob	8 00	10 00	rg18a	"K "
339	5 12 Sob	13 00	13 50	rk12ig	"C>L "
339	5 12 Sob	17 00	18 00	rk12ih	"C "
339	5 12 Sob	20 00	21 00	rk12ii	"C "
340	6 12 Nie	0 00	1 00	rk12ij	"C "
341	7 12 Pon	3 00	4 00	rk12ik	"C "
341	7 12 Pon	6 00	7 00	rk12il	"K>C "
341	7 12 Pon	18 00	19 00	rk12im	"C "
342	8 12 Wto	1 00	2 00	rk12in	"C "
342	8 12 Wto	11 00	12 00	rk12io	"C "
343	9 12 Sro	3 00	4 00	rk12ip	"L "
343	9 12 Sro	7 00	8 00	rk12iq	"L "
344	10 12 Czw	7 00	8 00	rk12ir	"C "
346	12 12 Sob	8 00	9 00	rk12is	"C "
346	12 12 Sob	22 00	23 00	rk12it	"K "
347	13 12 Nie	5 00	6 00	rk12iu	"C>L "
347	13 12 Nie	11 00	12 00	rk12iv	"L "
347	13 12 Nie	21 00	22 00	rk12iw	"C "
348	14 12 Pon	0 00	1 00	rk12ix	"K>C "
348	14 12 Pon	18 00	19 00	rk12iy	"C "
350	16 12 Sro	1 00	2 00	rk12ja	"K "
350	16 12 Sro	4 00	5 00	rk12jb	"K "
350	16 12 Sro	20 00	21 00	rk12jd	"C "
351	17 12 Czw	1 00	2 00	rk12je	"C "
351	17 12 Czw	10 00	11 00	rk12jf	"L "
351	17 12 Czw	17 00	18 00	rk12jg	"L "
351	17 12 Czw	21 00	22 00	rk12jh	"C "
352	18 12 Pia	2 00	3 00	rk12ji	"L "
352	18 12 Pia	6 00	7 00	rk12jj	"L "
353	19 12 Sob	2 00	3 00	rk12jk	"L "
353	19 12 Sob	6 00	7 00	rk12jl	"C "
354	20 12 Nie	2 00	3 00	rk12jm	"C "
354	20 12 Nie	5 00	6 00	rk12jn	"C "
355	21 12 Pon	5 00	6 00	rk12jp	"C>L "

355	21	12	Pon	11	00	12	00	rk12jq	"C	"
356	22	12	Wto	8	00	10	00	rg18b	"K	"
356	22	12	Wto	12	00	13	00	rk12js	"C	"
356	22	12	Wto	15	00	16	00	rk12jt	"C	"
356	22	12	Wto	20	00	21	00	rk12ju	"C	"
356	22	12	Wto	23	00	24	00	rk12jv	"K	"
357	23	12	Sro	7	00	8	40	rg18c	"K	"
357	23	12	Sro	11	00	12	00	rk12jw	"C	"
357	23	12	Sro	16	00	17	00	rk12jx	"C	"
361	27	12	Nie	1	00	2	00	rk12kc	"C	"
361	27	12	Nie	6	00	7	00	rk12kd	"L	"
362	28	12	Pon	4	00	5	00	rk12kf	"L	"
362	28	12	Pon	10	00	11	00	rk12kg	"C	"
363	29	12	Wto	0	00	1	00	rk12kh	"L	"
363	29	12	Wto	3	00	4	00	rk12ki	"C	"
363	29	12	Wto	10	00	11	00	rk12kj	"C	"
364	30	12	Sro	2	00	3	00	rk12kk	"L	"
364	30	12	Sro	10	00	11	00	rk12kl	"C>L	"
364	30	12	Sro	23	00	24	00	rk12km	"L	"
365	31	12	Czw	2	00	3	00	rk12kn	"L	"
365	31	12	Czw	5	00	6	00	rk12ko	"C	"
365	31	12	Czw	10	00	11	00	rk12kp	"L	"

Plik pdf tego dokumentu jest dost/epny w sieci pod adresem:

<http://paulo.astro.uni.torun.pl/~pw/VLBI/schedules/dec15.pdf>



1st LO=	21500.00	21500.00	21500.00	21500.00
Net SB=	L	L	U	U
IF SB =	U	U	U	U
Pol. =	RCP	LCP	RCP	LCP
BBC =	1	2	1	2
BBC SB=	L	L	U	U
IF =	C	A	C	A

The following frequency sets based on these setups were used.

Frequency Set:	2	Setup file default.	Used with PCAL = 1MHz
LO sum=	22236.00	22236.00	22236.00
BBC fr=	736.00	736.00	736.00
Bandwd=	16.00	16.00	16.00
Matching frequency sets:	2		

Track assignments are:  
 track1= 2, 18, 3, 19  
 barrel=roll\_off

==== Setup file: ra6cm2.set

Setup group:	1	Station: TORUN	Total bit rate:	256
Format:	MKIV1:4	Bits per sample:	2	Sample rate: 32.000
Number of channels:	4	DBE type:		Speedup factor: 1.00

Disk used to record data.

```

1st LO=  4100.00  4100.00  4100.00  4100.00
Net SB=           L           L           U           U
IF SB =           U           U           U           U
Pol.  =          RCP          LCP          RCP          LCP
BBC   =           1           2           1           2
BBC SB=           L           L           U           U
IF    =           C           A           C           A

```

The following frequency sets based on these setups were used.

```

Frequency Set:  4  Setup file default.  Used with PCAL = 1MHz
LO sum=  4836.00  4836.00  4836.00  4836.00
BBC fr=   736.00   736.00   736.00   736.00
Bandwd=   16.00   16.00   16.00   16.00
Matching frequency sets:  4

```

Track assignments are:

```

track1=  2, 18,  3, 19
barrel=roll_off

```

#### POSITIONS OF SOURCES USED IN RECORDING SCANS

Source	Source position (RA/Dec) (B1950)	(J2000)	(Date)	Error (mas)
* FAKERA	11 57 21.769299	* 12 00 00.000000	12 00 35.941259	0.00
	85 16 41.77889	* 85 00 00.000000	84 54 22.72739	0.00
	fake circumpolar target for a TS to look at			
* 0235+164	02 35 52.630215	* 02 38 38.930107	02 39 33.202274	0.00
J0238+1636	16 24 04.01610	* 16 36 59.27452	16 41 03.51030	0.00
	./rk12hw_sources.radioastron			
	AGN, IDV, rfc_2013d Petrov, 2013, unpublished 65224 observations, RA-A03-04, RA-			

#### EFFECT OF SOLAR CORONA

The solar corona can cause unstable phases for sources too close to the Sun. SCHED provides warnings at individual scans for distances less than 10 degrees. The distance from the Sun to each source in this schedule is:

Source	Sun distance (deg)
0235+164	154.2

Barry Clark estimates from predictions by Ketan Desai of IPM scattering sizes that the Sun will cause amplitude reductions on the longest VLBA baselines at a solar distance of  $60 \text{ deg } F^{-0.6}$  where  $F$  is in GHz.

For common VLBI bands, this is:

1.6 GHz	45. deg
2.3 GHz	36. deg
5.0 GHz	23. deg
8.4 GHz	17. deg
15.0 GHz	12. deg
22.0 GHz	9. deg





1st LO=	21500.00	21500.00	21500.00	21500.00
Net SB=	L	L	U	U
IF SB =	U	U	U	U
Pol. =	RCP	LCP	RCP	LCP
BBC =	1	2	1	2
BBC SB=	L	L	U	U
IF =	C	A	C	A

The following frequency sets based on these setups were used.

Frequency Set:	2	Setup file default.	Used with PCAL = 1MHz
LO sum=	22236.00	22236.00	22236.00
BBC fr=	736.00	736.00	736.00
Bandwd=	16.00	16.00	16.00
Matching frequency sets:	2		

Track assignments are:

track1= 2, 18, 3, 19  
barrel=roll\_off

==== Setup file: ra6cm2.set

Setup group:	2	Station: TORUN	Total bit rate: 256
Format: MKIV1:4		Bits per sample: 2	Sample rate: 32.000
Number of channels:	4	DBE type:	Speedup factor: 1.00

Disk used to record data.

```

1st LO=  4100.00  4100.00  4100.00  4100.00
Net SB=           L           L           U           U
IF SB =           U           U           U           U
Pol.  =          RCP          LCP          RCP          LCP
BBC   =           1           2           1           2
BBC SB=           L           L           U           U
IF    =           C           A           C           A

```

The following frequency sets based on these setups were used.

```

Frequency Set:  5  Setup file default.  Used with PCAL = 1MHz
LO sum=  4836.00  4836.00  4836.00  4836.00
BBC fr=   736.00   736.00   736.00   736.00
Bandwd=   16.00   16.00   16.00   16.00
Matching frequency sets:  5

```

Track assignments are:

```

track1=  2, 18,  3, 19
barrel=roll_off

```

#### POSITIONS OF SOURCES USED IN RECORDING SCANS

Source	Source position (RA/Dec) (B1950)	(J2000)	(Date)	Error (mas)
* FAKERA	11 57 21.769299	* 12 00 00.000000	12 00 35.983913	0.00
	85 16 41.77889	* 85 00 00.000000	84 54 22.69255	0.00
	fake circumpolar target for a TS to look at			
* 0851+202	08 51 57.250618	* 08 54 48.874930	08 55 43.798730	0.00
J0854+2006	20 17 58.41733	* 20 06 30.64078	20 02 39.74111	0.00
OJ287	./rk12hx_sources.radioastron			
	AGN, rfc_2013d Petrov, 2013, unpublished 213710 observations, RA-A03-04, RA-A03-			

#### EFFECT OF SOLAR CORONA

The solar corona can cause unstable phases for sources too close to the Sun. SCHED provides warnings at individual scans for distances less than 10 degrees. The distance from the Sun to each source in this schedule is:

```

Source      Sun distance (deg)
0851+202    117.9

```

Barry Clark estimates from predictions by Ketan Desai of IPM scattering sizes that the Sun will cause amplitude reductions on the longest VLBA baselines at a solar distance of  $60 \text{ deg } F^{-0.6}$  where  $F$  is in GHz.

For common VLBI bands, this is:

```

1.6 GHz      45. deg
2.3 GHz      36. deg
5.0 GHz      23. deg
8.4 GHz      17. deg
15.0 GHz     12. deg
22.0 GHz     9. deg

```

**rk12ibtr**

RADIOASTRON AGN SURVEY

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Observing mode: C/L-band, dual-pol

Schedule for TORUN                      (Code Tr )                                      Page    2

RadioAstron AGN Survey

UP: D => Below limits; H => Below horizon mask; W => still slewing at end; blank => Up.  
 Early: Seconds between end of slew and start.    Dwell: On source seconds.  
 Disk: GBytes recorded to this point.  
 TPStart: Recording start time. Frequencies are LO sum (band edge).  
 SYNC: Time correlator is expected to sync up.

```
-----
Start UT   Source           Start / Stop           Early   Disk   TPStart
Stop UT                LST   EL   AZ   HA   UP   ParA Dwell  GBytes  SYNC
-----
```

--- Thu    3 Dec 2015    Day 337 ---

----- C-band VLBI scans -----

Next scan frequencies: 4836.00 4836.00 4836.00 4836.00  
 Next BBC frequencies:    736.00    736.00    736.00    736.00  
 Next scan bandwidths:    16.00    16.00    16.00    16.00

03 00 00	2022+542	09 00 47	17.9	5.5-11.4	-5.7	0	0	03 00 00
03 14 30	---	09 15 19	18.1	7.7-11.2	-8.0	870	28	03 00 01
03 15 00	2022+542	09 15 49	18.1	7.8-11.1	-8.1	24	28	03 15 00
03 29 30	---	09 30 22	18.5	10.0-10.9	-10.4	870	56	03 15 01
03 30 00	2022+542	09 30 52	18.5	10.1-10.9	-10.4	24	56	03 30 00
03 44 30	---	09 45 24	18.9	12.3-10.6	-12.7	870	84	03 30 01
03 45 00	2022+542	09 45 54	18.9	12.3-10.6	-12.8	24	84	03 45 00
04 00 00	---	10 00 57	19.5	14.6-10.4	-15.1	900	112	03 45 01

SETUP FILE INFORMATION:

NOTE: If DOPPLER, FREQ, or BW were used, see the individual scans for the final BBC settings.

==== Setup file: ra6cm2.set

Setup group:    1	Station: TORUN	Total bit rate:    256
Format: MKIV1:4	Bits per sample: 2	Sample rate: 32.000
Number of channels: 4	DBE type:	Speedup factor:    1.00

Disk used to record data.

```

1st LO=  4100.00  4100.00  4100.00  4100.00
Net SB=           L           L           U           U
IF SB =           U           U           U           U
Pol.  =          RCP          LCP          RCP          LCP
BBC   =           1           2           1           2
BBC SB=           L           L           U           U
IF    =           C           A           C           A

```

The following frequency sets based on these setups were used.

```

Frequency Set:  2  Setup file default.  Used with PCAL = 1MHz
LO sum=  4836.00  4836.00  4836.00  4836.00
BBC fr=   736.00   736.00   736.00   736.00
Bandwd=   16.00   16.00   16.00   16.00
Matching frequency sets:  2

```

Track assignments are:

```

track1=  2, 18,  3, 19
barrel=roll_off

```

#### POSITIONS OF SOURCES USED IN RECORDING SCANS

Source	Source position (RA/Dec) (B1950)	(J2000)	(Date)	Error (mas)
* FAKERA	11 57 21.769299	* 12 00 00.000000	12 00 36.478943	0.00
	85 16 41.77889	* 85 00 00.000000	84 54 22.32249	0.00
	fake circumpolar target for a TS to look at			
* 2022+542	20 22 37.651026	* 20 23 55.844020	20 24 19.769426	0.00
J2023+5427	54 17 49.43890	* 54 27 35.82889	54 31 06.01328	0.00
	./rk12ib_sources.radioastron			
	AGN, rfc_2013d Petrov, 2013, unpublished 140 observations, RA-A03-04, RA-A02-12			

#### EFFECT OF SOLAR CORONA

The solar corona can cause unstable phases for sources too close to the Sun. SCHED provides warnings at individual scans for distances less than 10 degrees. The distance from the Sun to each source in this schedule is:

Source	Sun distance (deg)
2022+542	90.7

Barry Clark estimates from predictions by Ketan Desai of IPM scattering sizes that the Sun will cause amplitude reductions on the longest VLBA baselines at a solar distance of  $60 \text{ deg } F^{-0.6}$  where  $F$  is in GHz.

For common VLBI bands, this is:

1.6 GHz	45. deg
2.3 GHz	36. deg
5.0 GHz	23. deg
8.4 GHz	17. deg
15.0 GHz	12. deg
22.0 GHz	9. deg

**rk12idtr**

RADIOASTRON AGN SURVEY

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Observing mode: C/L-band, dual-pol

Schedule for TORUN                      (Code Tr )    Page    2

RadioAstron AGN Survey

UP: D => Below limits; H => Below horizon mask; W => still slewing at end; blank => Up.

Early: Seconds between end of slew and start.    Dwell: On source seconds.

Disk: GBytes recorded to this point.

TPStart: Recording start time. Frequencies are LO sum (band edge).

SYNC: Time correlator is expected to sync up.

-----  
Start UT    Source                      Start / Stop                      Early    Disk    TPStart  
Stop UT                      LST       EL    AZ    HA    UP    ParA    Dwell    GBytes    SYNC  
-----

--- Thu    3 Dec 2015    Day 337 ---

----- L-band VLBI scans -----

Next scan frequencies: 1668.00 1668.00 1668.00 1668.00  
Next BBC frequencies:    732.00    732.00    732.00    732.00  
Next scan bandwidths:    16.00    16.00    16.00    16.00

22 00 00	2209+236	04 03 54	20.3	-76.7	5.9	39.8	0	0	22 00 00
22 14 30	---	04 18 26	18.2	-74.0	6.1	39.2	870	28	22 00 01
22 15 00	2209+236	04 18 56	18.1	-73.9	6.1	39.2	24	28	22 15 00
22 29 30	---	04 33 29	16.0	-71.2	6.3	38.5	870	56	22 15 01
22 30 00	2209+236	04 33 59	16.0	-71.1	6.4	38.5	24	56	22 30 00
22 44 30	---	04 48 31	13.9	-68.4	6.6	37.7	870	84	22 30 01
22 45 00	2209+236	04 49 01	13.8	-68.3	6.6	37.6	24	84	22 45 00
23 00 00	---	05 04 04	11.8	-65.5	6.9	36.7	900	112	22 45 01

SETUP FILE INFORMATION:

NOTE: If DOPPLER, FREQ, or BW were used, see the individual scans for the final BBC settings.

=====  
Setup file: ra18cm2.set

Setup group:    5	Station: TORUN	Total bit rate:    256
Format: MKIV1:4	Bits per sample: 2	Sample rate: 32.000
Number of channels: 4	DBE type:	Speedup factor:    1.00

Disk used to record data.

```

1st LO= 2400.00 2400.00 2400.00 2400.00
Net SB=      L      L      U      U
IF SB =      L      L      L      L
Pol.  =      RCP     LCP     RCP     LCP
BBC   =      1      2      1      2
BBC SB=      U      U      L      L
IF    =      C      A      C      A

```

The following frequency sets based on these setups were used.

```

Frequency Set: 2 Setup file default. Used with PCAL = 1MHz
LO sum= 1668.00 1668.00 1668.00 1668.00
BBC fr= 732.00 732.00 732.00 732.00
Bandwd= 16.00 16.00 16.00 16.00
Matching frequency sets: 2

```

Track assignments are:

```

track1= 2, 18, 3, 19
barrel=roll_off

```

#### POSITIONS OF SOURCES USED IN RECORDING SCANS

Source	Source position (RA/Dec) (B1950)	(Date)	Error (mas)	
* FAKERA	11 57 21.769299	* 12 00 00.000000	12 00 36.672855	0.00
	85 16 41.77889	* 85 00 00.000000	84 54 22.18994	0.00
	fake circumpolar target for a TS to look at			
* 2209+236	22 09 45.687917	* 22 12 05.966312	22 12 50.546310	0.00
J2212+2355	23 40 49.85180	* 23 55 40.54374	24 00 39.52594	0.00
	./rk12id_sources.radioastron			
	AGN, MASIV, rfc_2013d Petrov, 2013, unpublished 17068 observations, RA-A03-04, R			

#### EFFECT OF SOLAR CORONA

The solar corona can cause unstable phases for sources too close to the Sun. SCHED provides warnings at individual scans for distances less than 10 degrees. The distance from the Sun to each source in this schedule is:

Source	Sun distance (deg)
2209+236	93.1

Barry Clark estimates from predictions by Ketan Desai of IPM scattering sizes that the Sun will cause amplitude reductions on the longest VLBA baselines at a solar distance of  $60 \text{ deg } F^{-0.6}$  where  $F$  is in GHz.

For common VLBI bands, this is:

1.6 GHz	45. deg
2.3 GHz	36. deg
5.0 GHz	23. deg
8.4 GHz	17. deg
15.0 GHz	12. deg
22.0 GHz	9. deg

**rk12ietr**

RADIOASTRON AGN SURVEY

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Observing mode: C/L-band, dual-pol

Schedule for TORUN                      (Code Tr )    Page    2

RadioAstron AGN Survey

UP: D => Below limits; H => Below horizon mask; W => still slewing at end; blank => Up.

Early: Seconds between end of slew and start.    Dwell: On source seconds.

Disk: GBytes recorded to this point.

TPStart: Recording start time.    Frequencies are LO sum (band edge).

SYNC: Time correlator is expected to sync up.

-----  
Start UT    Source                      Start / Stop                      Early    Disk    TPStart  
Stop UT                      LST       EL    AZ    HA    UP    ParA    Dwell    GBytes    SYNC  
-----

--- Fri    4 Dec 2015    Day 338 ---

----- C-band VLBI scans -----

Next scan frequencies: 4836.00 4836.00 4836.00 4836.00  
Next BBC frequencies:    736.00    736.00    736.00    736.00  
Next scan bandwidths:    16.00    16.00    16.00    16.00

07 00 00	0838+133	13 05 23	24.9	258.5	4.4	37.2	0	0	07 00 00
07 14 30	---	13 19 55	22.7	261.6	4.6	37.6	870	28	07 00 01
07 15 00	0838+133	13 20 25	22.6	261.7	4.6	37.6	24	28	07 15 00
07 25 00	---	13 30 27	21.1	263.7	4.8	37.8	600	47	07 15 01

----- L-band VLBI scans -----

Next scan frequencies: 1668.00 1668.00 1668.00 1668.00  
Next BBC frequencies:    732.00    732.00    732.00    732.00

07 30 00	0838+133	13 35 28	20.4	264.8	4.9	37.9	293	47	07 30 00
07 44 30	---	13 50 00	18.2	267.7	5.1	38.0	870	75	07 30 01
07 45 00	0838+133	13 50 30	18.1	267.8	5.1	38.0	24	75	07 45 00
08 00 00	---	14 05 33	15.9	270.9	5.4	38.1	900	104	07 45 01

SETUP FILE INFORMATION:

NOTE: If DOPPLER, FREQ, or BW were used, see the individual scans for the final BBC settings.

=====  
Setup file: ra6cm2.set

Setup group:    2	Station: TORUN	Total bit rate:    256
Format: MKIV1:4	Bits per sample: 2	Sample rate: 32.000
Number of channels: 4	DBE type:	Speedup factor:    1.00

Disk used to record data.

1st LO=	4100.00	4100.00	4100.00	4100.00
Net SB=	L	L	U	U
IF SB =	U	U	U	U
Pol. =	RCP	LCP	RCP	LCP
BBC =	1	2	1	2
BBC SB=	L	L	U	U
IF =	C	A	C	A

The following frequency sets based on these setups were used.

Frequency Set: 2 Setup file default. Used with PCAL = 1MHz  
 LO sum= 4836.00 4836.00 4836.00 4836.00  
 BBC fr= 736.00 736.00 736.00 736.00  
 Bandwd= 16.00 16.00 16.00 16.00  
 Matching frequency sets: 2

Track assignments are:  
 track1= 2, 18, 3, 19  
 barrel=roll\_off

==== Setup file: ra18cm2.set

Setup group: 5	Station: TORUN	Total bit rate: 256
Format: MKIV1:4	Bits per sample: 2	Sample rate: 32.000
Number of channels: 4	DBE type:	Speedup factor: 1.00

Disk used to record data.



```

1st LO=  2400.00  2400.00  2400.00  2400.00
Net SB=      L      L      U      U
IF SB =      L      L      L      L
Pol.  =      RCP     LCP     RCP     LCP
BBC   =      1      2      1      2
BBC SB=      U      U      L      L
IF    =      C      A      C      A

```

The following frequency sets based on these setups were used.

```

Frequency Set:  4  Setup file default.  Used with PCAL = 1MHz
LO sum=  1668.00  1668.00  1668.00  1668.00
BBC fr=   732.00  732.00  732.00  732.00
Bandwd=   16.00  16.00  16.00  16.00
Matching frequency sets:  4

```

Track assignments are:

```

track1=  2, 18,  3, 19
barrel=roll_off

```

#### POSITIONS OF SOURCES USED IN RECORDING SCANS

Source	Source position (RA/Dec) (B1950)	(J2000)	(Date)	Error (mas)
* FAKERA	11 57 21.769299	* 12 00 00.000000	12 00 36.763088	0.00
	85 16 41.77889	* 85 00 00.000000	84 54 22.12962	0.00
	fake circumpolar target for a TS to look at			
* 0838+133	08 38 01.723597	* 08 40 47.588427	08 41 40.909597	0.00
J0840+1312	13 23 05.67979	* 13 12 23.56368	13 08 48.72749	0.00
	./rk12ie_sources.radioastron			
	AGN, rfc_2013d Petrov, 2013, unpublished 196 observations, RA-A03-04			

#### EFFECT OF SOLAR CORONA

The solar corona can cause unstable phases for sources too close to the Sun. SCHED provides warnings at individual scans for distances less than 10 degrees. The distance from the Sun to each source in this schedule is:

Source	Sun distance (deg)
0838+133	122.4

Barry Clark estimates from predictions by Ketan Desai of IPM scattering sizes that the Sun will cause amplitude reductions on the longest VLBA baselines at a solar distance of  $60 \text{ deg } F^{-0.6}$  where  $F$  is in GHz.

For common VLBI bands, this is:

1.6 GHz	45. deg
2.3 GHz	36. deg
5.0 GHz	23. deg
8.4 GHz	17. deg
15.0 GHz	12. deg
22.0 GHz	9. deg

RADIOASTRON AGN SURVEY

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Observing mode: C/L-band, dual-pol

Schedule for TORUN (Code Tr ) Page 2  
RadioAstron AGN Survey

UP: D => Below limits; H => Below horizon mask; W => still slewing at end; blank => Up.  
Early: Seconds between end of slew and start. Dwell: On source seconds.  
Disk: GBytes recorded to this point.  
TPStart: Recording start time. Frequencies are LO sum (band edge).  
SYNC: Time correlator is expected to sync up.

-----  
Start UT Source Start / Stop Early Disk TPStart  
Stop UT LST EL AZ HA UP ParA Dwell GBytes SYNC  
-----

--- Fri 4 Dec 2015 Day 338 ---

----- C-band VLBI scans -----

Next scan frequencies: 4836.00 4836.00 4836.00 4836.00  
Next BBC frequencies: 736.00 736.00 736.00 736.00  
Next scan bandwidths: 16.00 16.00 16.00 16.00

22 00 00	2209+236	04 07 51	19.7 -76.0	5.9	39.6	0	0	22 00 00
22 14 30	---	04 22 23	17.6 -73.2	6.2	39.0	870	28	22 00 01
22 15 00	2209+236	04 22 53	17.5 -73.2	6.2	39.0	24	28	22 15 00
22 25 00	---	04 32 55	16.1 -71.3	6.3	38.5	600	47	22 15 01

----- L-band VLBI scans -----

Next scan frequencies: 1668.00 1668.00 1668.00 1668.00  
Next BBC frequencies: 732.00 732.00 732.00 732.00

22 30 00	2209+236	04 37 55	15.4 -70.4	6.4	38.3	293	47	22 30 00
22 44 30	---	04 52 28	13.4 -67.6	6.7	37.4	870	75	22 30 01
22 45 00	2209+236	04 52 58	13.3 -67.6	6.7	37.4	24	75	22 45 00
23 00 00	---	05 08 00	11.2 -64.7	6.9	36.5	900	104	22 45 01

SETUP FILE INFORMATION:

NOTE: If DOPPLER, FREQ, or BW were used, see the individual scans for the final BBC settings.

===== Setup file: ra6cm2.set

Setup group: 2	Station: TORUN	Total bit rate: 256
Format: MKIV1:4	Bits per sample: 2	Sample rate: 32.000
Number of channels: 4	DBE type:	Speedup factor: 1.00

Disk used to record data.

1st LO=	4100.00	4100.00	4100.00	4100.00
Net SB=	L	L	U	U
IF SB =	U	U	U	U
Pol. =	RCP	LCP	RCP	LCP
BBC =	1	2	1	2
BBC SB=	L	L	U	U
IF =	C	A	C	A

The following frequency sets based on these setups were used.

Frequency Set: 4 Setup file default. Used with PCAL = 1MHz  
 LO sum= 4836.00 4836.00 4836.00 4836.00  
 BBC fr= 736.00 736.00 736.00 736.00  
 Bandwd= 16.00 16.00 16.00 16.00  
 Matching frequency sets: 4

Track assignments are:  
 track1= 2, 18, 3, 19  
 barrel=roll\_off

==== Setup file: ra18cm2.set

Setup group: 7	Station: TORUN	Total bit rate: 256
Format: MKIV1:4	Bits per sample: 2	Sample rate: 32.000
Number of channels: 4	DBE type:	Speedup factor: 1.00

Disk used to record data.

1st LO=	2400.00	2400.00	2400.00	2400.00
Net SB=	L	L	U	U
IF SB =	L	L	L	L
Pol. =	RCP	LCP	RCP	LCP
BBC =	1	2	1	2
BBC SB=	U	U	L	L
IF =	C	A	C	A

The following frequency sets based on these setups were used.

Frequency Set: 6 Setup file default. Used with PCAL = 1MHz  
 LO sum= 1668.00 1668.00 1668.00 1668.00  
 BBC fr= 732.00 732.00 732.00 732.00  
 Bandwd= 16.00 16.00 16.00 16.00  
 Matching frequency sets: 6

Track assignments are:

track1= 2, 18, 3, 19  
 barrel=roll\_off

#### POSITIONS OF SOURCES USED IN RECORDING SCANS

Source	Source position (RA/Dec) (B1950)	(J2000)	(Date)	Error (mas)
* FAKERA	11 57 21.769299	* 12 00 00.000000	12 00 36.911102	0.00
	85 16 41.77889	* 85 00 00.000000	84 54 22.03171	0.00
	fake circumpolar target for a TS to look at			
* 2209+236	22 09 45.687917	* 22 12 05.966312	22 12 50.526455	0.00
J2212+2355	23 40 49.85180	* 23 55 40.54374	24 00 39.41445	0.00
	./rk12if_sources.radioastron			
	AGN, MASIV, rfc_2013d Petrov, 2013, unpublished 17068 observations, RA-A03-04, R			

#### EFFECT OF SOLAR CORONA

The solar corona can cause unstable phases for sources too close to the Sun. SCHED provides warnings at individual scans for distances less than 10 degrees. The distance from the Sun to each source in this schedule is:

Source	Sun distance (deg)
2209+236	92.3

Barry Clark estimates from predictions by Ketan Desai of IPM scattering sizes that the Sun will cause amplitude reductions on the longest VLBA baselines at a solar distance of  $60 \text{ deg } F^{-0.6}$  where  $F$  is in GHz.

For common VLBI bands, this is:

1.6 GHz	45. deg
2.3 GHz	36. deg
5.0 GHz	23. deg
8.4 GHz	17. deg
15.0 GHz	12. deg
22.0 GHz	9. deg

**rk12igtr**

RADIOASTRON AGN SURVEY

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Observing mode: C/L-band, dual-pol

Schedule for TORUN (Code Tr ) Page 2  
 RadioAstron AGN Survey

UP: D => Below limits; H => Below horizon mask; W => still slewing at end; blank => Up.  
 Early: Seconds between end of slew and start. Dwell: On source seconds.  
 Disk: GBytes recorded to this point.  
 TPStart: Recording start time. Frequencies are LO sum (band edge).  
 SYNC: Time correlator is expected to sync up.

Start UT	Source	Start / Stop					Early	Disk	TPStart	
Stop UT		LST	EL	AZ	HA	UP	ParA	Dwell	GBytes	SYNC

--- Sat 5 Dec 2015 Day 339 ---

----- C-band VLBI scans -----

Next scan frequencies:	4836.00	4836.00	4836.00	4836.00
Next BBC frequencies:	736.00	736.00	736.00	736.00
Next scan bandwidths:	16.00	16.00	16.00	16.00

13 00 00	2209+236	19 10 18	45.1	112.2	-3.0	-37.5	0	0	13 00 00
13 12 00	---	19 22 20	46.8	115.4	-2.8	-36.4	720	23	13 00 01
13 12 30	2209+236	19 22 50	46.9	115.5	-2.8	-36.4	24	23	13 12 30
13 20 00	---	19 30 22	47.9	117.5	-2.7	-35.7	450	37	13 12 31

----- L-band VLBI scans -----

Next scan frequencies:	1668.00	1668.00	1668.00	1668.00
Next BBC frequencies:	732.00	732.00	732.00	732.00

13 25 00	2209+236	19 35 22	48.5	118.9	-2.6	-35.1	293	37	13 25 00
13 37 00	---	19 47 24	50.1	122.4	-2.4	-33.7	720	60	13 25 01
13 37 30	2209+236	19 47 55	50.2	122.6	-2.4	-33.6	24	60	13 37 30
13 50 00	---	20 00 27	51.7	126.4	-2.2	-32.0	750	84	13 37 31

SETUP FILE INFORMATION:

NOTE: If DOPPLER, FREQ, or BW were used, see the individual scans for the final BBC settings.

=====  
Setup file: ra6cm2.set

Setup group:	2	Station: TORUN	Total bit rate:	256
Format:	MKIV1:4	Bits per sample:	2	Sample rate: 32.000
Number of channels:	4	DBE type:		Speedup factor: 1.00

Disk used to record data.

1st LO=	4100.00	4100.00	4100.00	4100.00
Net SB=	L	L	U	U
IF SB =	U	U	U	U
Pol. =	RCP	LCP	RCP	LCP
BBC =	1	2	1	2
BBC SB=	L	L	U	U
IF =	C	A	C	A

The following frequency sets based on these setups were used.

Frequency Set: 4 Setup file default. Used with PCAL = 1MHz  
 LO sum= 4836.00 4836.00 4836.00 4836.00  
 BBC fr= 736.00 736.00 736.00 736.00  
 Bandwd= 16.00 16.00 16.00 16.00  
 Matching frequency sets: 4

Track assignments are:  
 track1= 2, 18, 3, 19  
 barrel=roll\_off

==== Setup file: ra18cm2.set

Setup group: 7	Station: TORUN	Total bit rate: 256
Format: MKIV1:4	Bits per sample: 2	Sample rate: 32.000
Number of channels: 4	DBE type:	Speedup factor: 1.00

Disk used to record data.

1st LO=	2400.00	2400.00	2400.00	2400.00
Net SB=	L	L	U	U
IF SB =	L	L	L	L
Pol. =	RCP	LCP	RCP	LCP
BBC =	1	2	1	2
BBC SB=	U	U	L	L
IF =	C	A	C	A

The following frequency sets based on these setups were used.

Frequency Set: 6 Setup file default. Used with PCAL = 1MHz  
 LO sum= 1668.00 1668.00 1668.00 1668.00  
 BBC fr= 732.00 732.00 732.00 732.00  
 Bandwd= 16.00 16.00 16.00 16.00  
 Matching frequency sets: 6

Track assignments are:

track1= 2, 18, 3, 19  
 barrel=roll\_off

#### POSITIONS OF SOURCES USED IN RECORDING SCANS

Source	Source position (RA/Dec) (B1950)	(J2000)	(Date)	Error (mas)
* FAKERA	11 57 21.769299	* 12 00 00.000000	12 00 37.055852	0.00
	85 16 41.77889	* 85 00 00.000000	84 54 21.93631	0.00
	fake circumpolar target for a TS to look at			
* 2209+236	22 09 45.687917	* 22 12 05.966312	22 12 50.514243	0.00
J2212+2355	23 40 49.85180	* 23 55 40.54374	24 00 39.34580	0.00
	./rk12ig_sources.radioastron AGN, MASIV, rfc_2013d Petrov, 2013, unpublished 17068 observations, RA-A03-04, R			

#### EFFECT OF SOLAR CORONA

The solar corona can cause unstable phases for sources too close to the Sun. SCHED provides warnings at individual scans for distances less than 10 degrees. The distance from the Sun to each source in this schedule is:

Source	Sun distance (deg)
2209+236	91.8

Barry Clark estimates from predictions by Ketan Desai of IPM scattering sizes that the Sun will cause amplitude reductions on the longest VLBA baselines at a solar distance of  $60 \text{ deg } F^{-0.6}$  where  $F$  is in GHz.

For common VLBI bands, this is:

1.6 GHz	45. deg
2.3 GHz	36. deg
5.0 GHz	23. deg
8.4 GHz	17. deg
15.0 GHz	12. deg
22.0 GHz	9. deg

**rk12ihtr**

RADIOASTRON AGN SURVEY  
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Observing mode: C/K-band, dual-pol

Schedule for TORUN (Code Tr ) Page 2  
RadioAstron AGN Survey

UP: D => Below limits; H => Below horizon mask; W => still slewing at end; blank => Up.  
Early: Seconds between end of slew and start. Dwell: On source seconds.  
Disk: GBytes recorded to this point.  
TPStart: Recording start time. Frequencies are LO sum (band edge).  
SYNC: Time correlator is expected to sync up.

-----  
Start UT Source Start / Stop Early Disk TPStart  
Stop UT LST EL AZ HA UP ParA Dwell GBytes SYNC  
-----

--- Sat 5 Dec 2015 Day 339 ---

----- C-band VLBI scans -----

Start UT	Source	LST	EL	AZ	HA	UP	ParA	Early Dwell	Disk GBytes	TPStart SYNC
17 00 00	2251+158	23 10 58	53.0	186.5	0.3		4.0	0	0	17 00 00
17 14 30	---	23 25 30	52.6	192.2	0.5		7.6	870	28	17 00 01
17 15 00	2251+158	23 26 00	52.6	192.4	0.5		7.7	24	28	17 15 00
17 29 30	---	23 40 33	52.1	198.1	0.8		11.2	870	56	17 15 01
17 30 00	2251+158	23 41 03	52.0	198.2	0.8		11.3	24	56	17 30 00
17 44 30	---	23 55 35	51.3	203.7	1.0		14.6	870	84	17 30 01
17 45 00	2251+158	23 56 05	51.2	203.9	1.0		14.7	24	84	17 45 00
18 00 00	---	00 11 08	50.2	209.4	1.3		17.9	900	112	17 45 01

SETUP FILE INFORMATION:

NOTE: If DOPPLER, FREQ, or BW were used, see the individual scans for the final BBC settings.

===== Setup file: ra6cm2.set

Setup group: 3 Station: TORUN Total bit rate: 256  
Format: MKIV1:4 Bits per sample: 2 Sample rate: 32.000  
Number of channels: 4 DBE type: Speedup factor: 1.00

Disk used to record data.



```

1st LO=  4100.00  4100.00  4100.00  4100.00
Net SB=           L           L           U           U
IF SB =           U           U           U           U
Pol.  =          RCP          LCP          RCP          LCP
BBC   =           1           2           1           2
BBC SB=           L           L           U           U
IF    =           C           A           C           A

```

The following frequency sets based on these setups were used.

```

Frequency Set:  1  Setup file default.  Used with PCAL = 1MHz
LO sum=  4836.00  4836.00  4836.00  4836.00
BBC fr=   736.00   736.00   736.00   736.00
Bandwd=   16.00   16.00   16.00   16.00
Matching frequency sets:  1

```

Track assignments are:

```

track1=  2, 18,  3, 19
barrel=roll_off

```

#### POSITIONS OF SOURCES USED IN RECORDING SCANS

Source	Source position (RA/Dec) (B1950)	(J2000)	(Date)	Error (mas)
* FAKERA	11 57 21.769299	* 12 00 00.000000	12 00 37.094507	0.00
	85 16 41.77889	* 85 00 00.000000	84 54 21.91076	0.00
	fake circumpolar target for a TS to look at			
* 2251+158	22 51 29.519741	* 22 53 57.747940	22 54 45.017286	0.00
J2253+1608	15 52 54.34791	* 16 08 53.56074	16 14 09.78662	0.00
3C454.3	./rk12ih_sources.radioastron			
	AGN, rfc_2013d Petrov, 2013, unpublished 40570 observations, RA-A03-04, RA-A02-1			

#### EFFECT OF SOLAR CORONA

The solar corona can cause unstable phases for sources too close to the Sun. SCHED provides warnings at individual scans for distances less than 10 degrees. The distance from the Sun to each source in this schedule is:

```

Source      Sun distance (deg)
2251+158    97.8

```

Barry Clark estimates from predictions by Ketan Desai of IPM scattering sizes that the Sun will cause amplitude reductions on the longest VLBA baselines at a solar distance of  $60 \text{ deg } F^{-0.6}$  where  $F$  is in GHz.

For common VLBI bands, this is:

```

1.6 GHz      45. deg
2.3 GHz      36. deg
5.0 GHz      23. deg
8.4 GHz      17. deg
15.0 GHz     12. deg
22.0 GHz     9. deg

```

**rk12iitr**

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Observing mode: C/K-band, dual-pol

Schedule for TORUN                      (Code Tr )    Page    2

RadioAstron AGN Survey

UP: D => Below limits; H => Below horizon mask; W => still slewing at end; blank => Up.  
Early: Seconds between end of slew and start.    Dwell: On source seconds.  
Disk: GBytes recorded to this point.  
TPStart: Recording start time. Frequencies are LO sum (band edge).  
SYNC: Time correlator is expected to sync up.

-----  
Start UT    Source                      Start / Stop                      Early    Disk    TPStart  
Stop UT                      LST       EL    AZ    HA    UP    ParA    Dwell    GBytes    SYNC  
-----

--- Sat    5 Dec 2015    Day 339 ---

----- C-band VLBI scans -----

Next scan frequencies: 4836.00 4836.00 4836.00 4836.00  
Next BBC frequencies:    736.00    736.00    736.00    736.00  
Next scan bandwidths:    16.00    16.00    16.00    16.00

20 00 00	2007+777	02 11 27	51.1	-19.4	6.1	73.0	0	0	20 00 00
20 14 30	---	02 26 00	50.4	-19.1	6.4	69.7	870	28	20 00 01
20 15 00	2007+777	02 26 30	50.4	-19.0	6.4	69.6	25	28	20 15 00
20 29 30	---	02 41 02	49.7	-18.6	6.6	66.4	870	56	20 15 01
20 30 00	2007+777	02 41 32	49.6	-18.6	6.6	66.3	25	56	20 30 00
20 44 30	---	02 56 05	49.0	-18.1	6.9	63.1	870	84	20 30 01
20 45 00	2007+777	02 56 35	48.9	-18.1	6.9	63.0	25	84	20 45 00
21 00 00	---	03 11 37	48.2	-17.5	7.1	59.7	900	112	20 45 01

SETUP FILE INFORMATION:

NOTE: If DOPPLER, FREQ, or BW were used, see the individual scans for the final BBC settings.

=====  
Setup file: ra6cm2.set

Setup group:    2                      Station: TORUN                      Total bit rate:    256  
Format: MKIV1:4                      Bits per sample: 2                      Sample rate: 32.000  
Number of channels: 4                      DBE type:                      Speedup factor:    1.00

Disk used to record data.

```

1st LO=  4100.00  4100.00  4100.00  4100.00
Net SB=           L           L           U           U
IF SB =           U           U           U           U
Pol.  =          RCP          LCP          RCP          LCP
BBC   =           1           2           1           2
BBC SB=           L           L           U           U
IF    =           C           A           C           A

```

The following frequency sets based on these setups were used.

```

Frequency Set:  1  Setup file default.  Used with PCAL = 1MHz
LO sum=  4836.00  4836.00  4836.00  4836.00
BBC fr=   736.00  736.00  736.00  736.00
Bandwd=   16.00  16.00  16.00  16.00
Matching frequency sets:  1

```

Track assignments are:

```

track1=  2, 18,  3, 19
barrel=roll_off

```

#### POSITIONS OF SOURCES USED IN RECORDING SCANS

Source	Source position (RA/Dec) (B1950)	(J2000)	(Date)	Error (mas)
* FAKERA	11 57 21.769299	* 12 00 00.000000	12 00 37.123083	0.00
	85 16 41.77889	* 85 00 00.000000	84 54 21.89184	0.00
	fake circumpolar target for a TS to look at			
* 2007+777	20 07 20.430168	* 20 05 30.998496	20 04 52.237375	0.00
J2005+7752	77 43 58.12300	* 77 52 43.24753	77 55 52.08675	0.00
	./rk12ii_sources.radioastron			
	AGN, rfc_2013d Petrov, 2013, unpublished 16338 observations, RA-A03-04, RA-A02-1			

#### EFFECT OF SOLAR CORONA

The solar corona can cause unstable phases for sources too close to the Sun. SCHED provides warnings at individual scans for distances less than 10 degrees. The distance from the Sun to each source in this schedule is:

Source	Sun distance (deg)
2007+777	104.3

Barry Clark estimates from predictions by Ketan Desai of IPM scattering sizes that the Sun will cause amplitude reductions on the longest VLBA baselines at a solar distance of  $60 \text{ deg } F^{-0.6}$  where  $F$  is in GHz.

For common VLBI bands, this is:

1.6 GHz	45. deg
2.3 GHz	36. deg
5.0 GHz	23. deg
8.4 GHz	17. deg
15.0 GHz	12. deg
22.0 GHz	9. deg

rk12ijtr

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Observing mode: C/K-band, dual-pol

Schedule for TORUN (Code Tr ) Page 2
RadioAstron AGN Survey

UP: D => Below limits; H => Below horizon mask; W => still slewing at end; blank => Up.
Early: Seconds between end of slew and start. Dwell: On source seconds.
Disk: GBytes recorded to this point.
TPStart: Recording start time. Frequencies are LO sum (band edge).
SYNC: Time correlator is expected to sync up.

Start UT Source Start / Stop Early Disk TPStart
Stop UT LST EL AZ HA UP ParA Dwell GBytes SYNC

--- Sun 6 Dec 2015 Day 340 ---

----- C-band VLBI scans -----

Next scan frequencies: 4836.00 4836.00 4836.00 4836.00
Next BBC frequencies: 736.00 736.00 736.00 736.00
Next scan bandwidths: 16.00 16.00 16.00 16.00

Table with columns: Start UT, Stop UT, Source, LST, EL, AZ, HA, UP, ParA, Dwell, GBytes, TPStart, SYNC. It lists observation times and parameters for scans on 0716+714.

SETUP FILE INFORMATION:

NOTE: If DOPPLER, FREQ, or BW were used, see the individual scans for the final BBC settings.

==== Setup file: ra6cm2.set

Setup group: 2 Station: TORUN Total bit rate: 256
Format: MKIV1:4 Bits per sample: 2 Sample rate: 32.000
Number of channels: 4 DBE type: Speedup factor: 1.00

Disk used to record data.

```

1st LO=  4100.00  4100.00  4100.00  4100.00
Net SB=           L           L           U           U
IF SB =           U           U           U           U
Pol.  =          RCP          LCP          RCP          LCP
BBC   =           1           2           1           2
BBC SB=           L           L           U           U
IF    =           C           A           C           A

```

The following frequency sets based on these setups were used.

```

Frequency Set:  1  Setup file default.  Used with PCAL = 1MHz
LO sum=  4836.00  4836.00  4836.00  4836.00
BBC fr=   736.00   736.00   736.00   736.00
Bandwd=   16.00   16.00   16.00   16.00
Matching frequency sets:  1

```

Track assignments are:

```

track1=  2, 18,  3, 19
barrel=roll_off

```

#### POSITIONS OF SOURCES USED IN RECORDING SCANS

Source	Source position (RA/Dec) (B1950)	(J2000)	(Date)	Error (mas)
* FAKERA	11 57 21.769299	* 12 00 00.000000	12 00 37.161035	0.00
	85 16 41.77889	* 85 00 00.000000	84 54 21.86664	0.00
	fake circumpolar target for a TS to look at			
* 0716+714	07 16 13.029739	* 07 21 53.448474	07 23 43.891745	0.00
J0721+7120	71 26 15.17406	* 71 20 36.36340	71 18 24.03567	0.00
	./rk12ij_sources.radioastron			
	AGN, rfc_2013d Petrov, 2013, unpublished 42370 observations, RA-A03-04, RA-A02-1			

#### EFFECT OF SOLAR CORONA

The solar corona can cause unstable phases for sources too close to the Sun. SCHED provides warnings at individual scans for distances less than 10 degrees. The distance from the Sun to each source in this schedule is:

```

Source      Sun distance (deg)
0716+714    126.3

```

Barry Clark estimates from predictions by Ketan Desai of IPM scattering sizes that the Sun will cause amplitude reductions on the longest VLBA baselines at a solar distance of  $60 \text{ deg } F^{-0.6}$  where  $F$  is in GHz.

For common VLBI bands, this is:

```

1.6 GHz      45. deg
2.3 GHz      36. deg
5.0 GHz      23. deg
8.4 GHz      17. deg
15.0 GHz     12. deg
22.0 GHz     9. deg

```

**rk12iktr**

RADIOASTRON AGN SURVEY

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Observing mode: C/K-band, dual-pol

Schedule for TORUN                      (Code Tr )    Page    2

RadioAstron AGN Survey

UP: D => Below limits; H => Below horizon mask; W => still slewing at end; blank => Up.

Early: Seconds between end of slew and start.    Dwell: On source seconds.

Disk: GBytes recorded to this point.

TPStart: Recording start time. Frequencies are LO sum (band edge).

SYNC: Time correlator is expected to sync up.

-----  
Start UT    Source                      Start / Stop                      Early    Disk    TPStart  
Stop UT                      LST            EL    AZ    HA    UP    ParA    Dwell    GBytes    SYNC  
-----

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----- C-band VLBI scans -----

Next scan frequencies: 4836.00 4836.00 4836.00 4836.00  
Next BBC frequencies:    736.00    736.00    736.00    736.00  
Next scan bandwidths:    16.00    16.00    16.00    16.00

03 00 00	0224+671	09 16 33	43.8	-31.4	6.8		54.6	0	0	03 00 00
03 14 30	---	09 31 05	42.7	-30.3	7.0		52.0	870	28	03 00 01
03 15 00	0224+671	09 31 35	42.6	-30.2	7.0		51.9	24	28	03 15 00
03 29 30	---	09 46 08	41.6	-29.0	7.3		49.4	870	56	03 15 01
03 30 00	0224+671	09 46 38	41.5	-29.0	7.3		49.3	24	56	03 30 00
03 44 30	---	10 01 10	40.5	-27.7	7.5		46.7	870	84	03 30 01
03 45 00	0224+671	10 01 40	40.5	-27.7	7.5		46.6	24	84	03 45 00
04 00 00	---	10 16 43	39.4	-26.4	7.8		44.0	900	112	03 45 01

SETUP FILE INFORMATION:

NOTE: If DOPPLER, FREQ, or BW were used, see the individual scans for the final BBC settings.

==== Setup file: ra6cm2.set

Setup group:    2	Station: TORUN	Total bit rate:    256
Format: MKIV1:4	Bits per sample: 2	Sample rate: 32.000
Number of channels: 4	DBE type:	Speedup factor:    1.00

Disk used to record data.

```

1st LO=  4100.00  4100.00  4100.00  4100.00
Net SB=           L           L           U           U
IF SB =           U           U           U           U
Pol.  =      RCP      LCP      RCP      LCP
BBC   =           1           2           1           2
BBC SB=           L           L           U           U
IF    =           C           A           C           A

```

The following frequency sets based on these setups were used.

```

Frequency Set:  1  Setup file default.  Used with PCAL = 1MHz
LO sum=  4836.00  4836.00  4836.00  4836.00
BBC fr=   736.00  736.00  736.00  736.00
Bandwd=   16.00  16.00  16.00  16.00
Matching frequency sets:  1

```

Track assignments are:

```

track1=  2, 18,  3, 19
barrel=roll_off

```

#### POSITIONS OF SOURCES USED IN RECORDING SCANS

Source	Source position (RA/Dec) (B1950)	(J2000)	(Date)	Error (mas)
* FAKERA	11 57 21.769299	* 12 00 00.000000	12 00 37.413564	0.00
	85 16 41.77889	* 85 00 00.000000	84 54 21.69606	0.00
	fake circumpolar target for a TS to look at			
* 0224+671	02 24 41.169053	* 02 28 50.051490	02 30 13.908411	0.00
J0228+6721	67 07 39.70870	* 67 21 03.02933	67 25 22.97646	0.00
	./rk12ik_sources.radioastron			
	AGN, rfc_2013d Petrov, 2013, unpublished 3946 observations, RA-A03-04			

#### EFFECT OF SOLAR CORONA

The solar corona can cause unstable phases for sources too close to the Sun. SCHED provides warnings at individual scans for distances less than 10 degrees. The distance from the Sun to each source in this schedule is:

```

Source      Sun distance (deg)
0224+671    129.9

```

Barry Clark estimates from predictions by Ketan Desai of IPM scattering sizes that the Sun will cause amplitude reductions on the longest VLBA baselines at a solar distance of  $60 \text{ deg } F^{-0.6}$  where  $F$  is in GHz.

For common VLBI bands, this is:

```

1.6 GHz      45. deg
2.3 GHz      36. deg
5.0 GHz      23. deg
8.4 GHz      17. deg
15.0 GHz     12. deg
22.0 GHz     9. deg

```

**rk12iltr**

RADIOASTRON AGN SURVEY

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Observing mode: C/K-band, dual-pol

Schedule for TORUN                      (Code Tr )    Page    2

RadioAstron AGN Survey

UP: D => Below limits; H => Below horizon mask; W => still slewing at end; blank => Up.  
Early: Seconds between end of slew and start.    Dwell: On source seconds.  
Disk: GBytes recorded to this point.  
TPStart: Recording start time. Frequencies are LO sum (band edge).  
SYNC: Time correlator is expected to sync up.

-----  
Start UT    Source                      Start / Stop                      Early    Disk    TPStart  
Stop UT                      LST       EL    AZ    HA    UP    ParA    Dwell    GBytes    SYNC  
-----

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----- K-band VLBI scans -----

Next scan frequencies: 22236.00 22236.00 22236.00 22236.00  
Next BBC frequencies:    736.00    736.00    736.00    736.00  
Next scan bandwidths:    16.00    16.00    16.00    16.00

06 00 00	0316+413	12 17 02	12.6 -33.4	8.9		26.3	0	0	06 00 00
06 14 30	---	12 31 35	11.4 -30.9	9.2		24.4	870	28	06 00 01
06 15 00	0316+413	12 32 05	11.4 -30.8	9.2		24.3	24	28	06 15 00
06 25 00	---	12 42 07	10.7 -29.1	9.4		23.0	600	47	06 15 01

----- C-band VLBI scans -----

Next scan frequencies: 4836.00 4836.00 4836.00 4836.00  
Next BBC frequencies:    736.00    736.00    736.00    736.00

06 30 00	0316+413	12 47 07	10.3 -28.2	9.4		22.3	294	47	06 30 00
06 44 30	---	13 01 40	9.3 -25.6	9.7		20.3	870	75	06 30 01
06 45 00	0316+413	13 02 10	9.3 -25.6	9.7		20.3	24	75	06 45 00
07 00 00	---	13 17 12	8.3 -22.9	9.9		18.2	900	104	06 45 01

SETUP FILE INFORMATION:

NOTE: If DOPPLER, FREQ, or BW were used, see the individual scans for the final BBC settings.

=====  
Setup file: ra1cm2.set

Matching groups in ./rk12il\_freq.dat:  
tr1cm

Setup group:    4	Station: TORUN	Total bit rate:    256
Format: MKIV1:4	Bits per sample: 2	Sample rate: 32.000
Number of channels: 4	DBE type:	Speedup factor:    1.00

Disk used to record data.



1st LO=	21500.00	21500.00	21500.00	21500.00
Net SB=	L	L	U	U
IF SB =	U	U	U	U
Pol. =	RCP	LCP	RCP	LCP
BBC =	1	2	1	2
BBC SB=	L	L	U	U
IF =	C	A	C	A

The following frequency sets based on these setups were used.

Frequency Set:	2	Setup file default.	Used with PCAL = 1MHz
LO sum=	22236.00	22236.00	22236.00
BBC fr=	736.00	736.00	736.00
Bandwd=	16.00	16.00	16.00
Matching frequency sets:	2		

Track assignments are:  
 track1= 2, 18, 3, 19  
 barrel=roll\_off

==== Setup file: ra6cm2.set

Setup group:	2	Station: TORUN	Total bit rate:	256
Format:	MKIV1:4	Bits per sample: 2	Sample rate:	32.000
Number of channels:	4	DBE type:	Speedup factor:	1.00

Disk used to record data.

1st LO=	4100.00	4100.00	4100.00	4100.00
Net SB=	L	L	U	U
IF SB =	U	U	U	U
Pol. =	RCP	LCP	RCP	LCP
BBC =	1	2	1	2
BBC SB=	L	L	U	U
IF =	C	A	C	A

The following frequency sets based on these setups were used.

Frequency Set: 4 Setup file default. Used with PCAL = 1MHz  
 LO sum= 4836.00 4836.00 4836.00 4836.00  
 BBC fr= 736.00 736.00 736.00 736.00  
 Bandwd= 16.00 16.00 16.00 16.00  
 Matching frequency sets: 4

Track assignments are:

track1= 2, 18, 3, 19  
 barrel=roll\_off

#### POSITIONS OF SOURCES USED IN RECORDING SCANS

Source	Source position (RA/Dec) (B1950)	(Date)	Error (mas)
* FAKERA	11 57 21.769299 * 12 00 00.000000	12 00 37.441328	0.00
	85 16 41.77889 * 85 00 00.000000	84 54 21.67691	0.00
	fake circumpolar target for a TS to look at		
* 0316+413	03 16 29.567283 * 03 19 48.160114	03 20 53.484038	0.00
J0319+4130	41 19 51.91847 * 41 30 42.10559	41 34 06.63585	0.00
3C84	./rk12il_sources.radioastron AGN, rfc_2013d Petrov, 2013, unpublished 15448 observations, RA-A03-04, RA-A02-1		

#### EFFECT OF SOLAR CORONA

The solar corona can cause unstable phases for sources too close to the Sun. SCHED provides warnings at individual scans for distances less than 10 degrees. The distance from the Sun to each source in this schedule is:

Source	Sun distance (deg)
0316+413	152.8

Barry Clark estimates from predictions by Ketan Desai of IPM scattering sizes that the Sun will cause amplitude reductions on the longest VLBA baselines at a solar distance of  $60 \text{deg } F^{-0.6}$  where  $F$  is in GHz.

For common VLBI bands, this is:

1.6 GHz	45. deg
2.3 GHz	36. deg
5.0 GHz	23. deg
8.4 GHz	17. deg
15.0 GHz	12. deg
22.0 GHz	9. deg

**rk12imtr**

RADIOASTRON AGN SURVEY

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Observing mode: C/L-band, dual-pol

Schedule for TORUN (Code Tr ) Page 2

RadioAstron AGN Survey

UP: D => Below limits; H => Below horizon mask; W => still slewing at end; blank => Up.  
Early: Seconds between end of slew and start. Dwell: On source seconds.  
Disk: GBytes recorded to this point.  
TPStart: Recording start time. Frequencies are LO sum (band edge).  
SYNC: Time correlator is expected to sync up.

```
-----
Start UT  Source          Start / Stop          Early   Disk   TPStart
Stop UT          LST    EL    AZ    HA  UP    ParA Dwell  GBytes  SYNC
-----
```

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----- C-band VLBI scans -----

Start UT	Source	LST	EL	AZ	HA	UP	ParA	Early Dwell	Disk GBytes	TPStart SYNC
Next scan frequencies:		4836.00	4836.00	4836.00	4836.00					
Next BBC frequencies:		736.00	736.00	736.00	736.00					
Next scan bandwidths:		16.00	16.00	16.00	16.00					
18 00 00	2251+158	00 19 01	49.6	212.2	1.4		19.5	0	0	18 00 00
18 14 30	---	00 33 33	48.4	217.1	1.6		22.2	870	28	18 00 01
18 15 00	2251+158	00 34 03	48.3	217.3	1.7		22.3	24	28	18 15 00
18 29 30	---	00 48 36	46.9	222.1	1.9		24.8	870	56	18 15 01
18 30 00	2251+158	00 49 06	46.9	222.2	1.9		24.9	24	56	18 30 00
18 44 30	---	01 03 38	45.3	226.7	2.1		27.1	870	84	18 30 01
18 45 00	2251+158	01 04 08	45.3	226.9	2.2		27.2	24	84	18 45 00
19 00 00	---	01 19 11	43.6	231.4	2.4		29.2	900	112	18 45 01

SETUP FILE INFORMATION:

NOTE: If DOPPLER, FREQ, or BW were used, see the individual scans for the final BBC settings.

==== Setup file: ra6cm2.set

Setup group: 2 Station: TORUN Total bit rate: 256  
Format: MKIV1:4 Bits per sample: 2 Sample rate: 32.000  
Number of channels: 4 DBE type: Speedup factor: 1.00

Disk used to record data.

```

1st LO=  4100.00  4100.00  4100.00  4100.00
Net SB=           L           L           U           U
IF SB =           U           U           U           U
Pol.  =          RCP          LCP          RCP          LCP
BBC   =           1           2           1           2
BBC SB=           L           L           U           U
IF    =           C           A           C           A

```

The following frequency sets based on these setups were used.

```

Frequency Set:  1  Setup file default.  Used with PCAL = 1MHz
LO sum=  4836.00  4836.00  4836.00  4836.00
BBC fr=   736.00   736.00   736.00   736.00
Bandwd=   16.00   16.00   16.00   16.00
Matching frequency sets:  1

```

Track assignments are:

```

track1=  2, 18,  3, 19
barrel=roll_off

```

#### POSITIONS OF SOURCES USED IN RECORDING SCANS

Source	Source position (RA/Dec) (B1950)	(J2000)	(Date)	Error (mas)
* FAKERA	11 57 21.769299	* 12 00 00.000000	12 00 37.552084	0.00
	85 16 41.77889	* 85 00 00.000000	84 54 21.59956	0.00
	fake circumpolar target for a TS to look at			
* 2251+158	22 51 29.519741	* 22 53 57.747940	22 54 44.982714	0.00
J2253+1608	15 52 54.34791	* 16 08 53.56074	16 14 09.61232	0.00
3C454.3	./rk12im_sources.radioastron			
	AGN, rfc_2013d Petrov, 2013, unpublished 40570 observations, RA-A03-04, RA-A02-1			

#### EFFECT OF SOLAR CORONA

The solar corona can cause unstable phases for sources too close to the Sun. SCHED provides warnings at individual scans for distances less than 10 degrees. The distance from the Sun to each source in this schedule is:

Source	Sun distance (deg)
2251+158	95.8

Barry Clark estimates from predictions by Ketan Desai of IPM scattering sizes that the Sun will cause amplitude reductions on the longest VLBA baselines at a solar distance of  $60 \text{ deg } F^{-0.6}$  where  $F$  is in GHz.

For common VLBI bands, this is:

1.6 GHz	45. deg
2.3 GHz	36. deg
5.0 GHz	23. deg
8.4 GHz	17. deg
15.0 GHz	12. deg
22.0 GHz	9. deg

**rk12intr**

RADIOASTRON AGN SURVEY

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Observing mode: C/L-band, dual-pol

Schedule for TORUN                      (Code Tr )    Page    2

RadioAstron AGN Survey

UP: D => Below limits; H => Below horizon mask; W => still slewing at end; blank => Up.

Early: Seconds between end of slew and start.    Dwell: On source seconds.

Disk: GBytes recorded to this point.

TPStart: Recording start time.    Frequencies are LO sum (band edge).

SYNC: Time correlator is expected to sync up.

-----  
Start UT    Source                      Start / Stop                      Early    Disk    TPStart  
Stop UT                      LST            EL    AZ    HA    UP    ParA    Dwell    GBytes    SYNC  
-----

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----- C-band VLBI scans -----

Start UT	Stop UT	Source	LST	EL	AZ	HA	UP	ParA	Dwell	GBytes	TPStart
01 00 00	01 14 30	0110+318	07 20 10	24.3	-68.1	6.1		41.2	0	0	01 00 00
		---	07 34 42	22.3	-65.6	6.3		40.3	870	28	01 00 01
01 15 00	01 29 30	0110+318	07 35 12	22.3	-65.5	6.4		40.2	24	28	01 15 00
		---	07 49 45	20.3	-63.0	6.6		39.2	870	56	01 15 01
01 30 00	01 44 30	0110+318	07 50 15	20.2	-62.9	6.6		39.2	24	56	01 30 00
		---	08 04 47	18.3	-60.4	6.9		38.1	870	84	01 30 01
01 45 00	02 00 00	0110+318	08 05 17	18.2	-60.3	6.9		38.1	24	84	01 45 00
		---	08 20 20	16.3	-57.6	7.1		36.8	900	112	01 45 01

SETUP FILE INFORMATION:

NOTE: If DOPPLER, FREQ, or BW were used, see the individual scans for the final BBC settings.

=====  
Setup file: ra6cm2.set

Setup group:    1	Station: TORUN	Total bit rate:    256
Format: MKIV1:4	Bits per sample: 2	Sample rate: 32.000
Number of channels: 4	DBE type:	Speedup factor:    1.00

Disk used to record data.

```

1st LO=  4100.00  4100.00  4100.00  4100.00
Net SB=           L           L           U           U
IF SB =           U           U           U           U
Pol.  =          RCP          LCP          RCP          LCP
BBC   =           1           2           1           2
BBC SB=           L           L           U           U
IF    =           C           A           C           A

```

The following frequency sets based on these setups were used.

```

Frequency Set:  1  Setup file default.  Used with PCAL = 1MHz
LO sum=  4836.00  4836.00  4836.00  4836.00
BBC fr=   736.00   736.00   736.00   736.00
Bandwd=   16.00   16.00   16.00   16.00
Matching frequency sets:  1

```

Track assignments are:

```

track1=  2, 18,  3, 19
barrel=roll_off

```

#### POSITIONS OF SOURCES USED IN RECORDING SCANS

Source	Source position (RA/Dec) (B1950)	(Date)	Error (mas)	
* FAKERA	11 57 21.769299	* 12 00 00.000000	12 00 37.616594	0.00
	85 16 41.77889	* 85 00 00.000000	84 54 21.55379	0.00
	fake circumpolar target for a TS to look at			
* 0110+318	01 10 03.762608	* 01 12 50.333038	01 13 44.648101	0.00
J0112+3208	31 52 23.76437	* 32 08 17.43261	32 13 27.87962	0.00
	./rk12in_sources.radioastron			
	AGN, rfc_2013d Petrov, 2013, unpublished 72 observations, RA-A03-04			

#### EFFECT OF SOLAR CORONA

The solar corona can cause unstable phases for sources too close to the Sun. SCHED provides warnings at individual scans for distances less than 10 degrees. The distance from the Sun to each source in this schedule is:

Source	Sun distance (deg)
0110+318	130.0

Barry Clark estimates from predictions by Ketan Desai of IPM scattering sizes that the Sun will cause amplitude reductions on the longest VLBA baselines at a solar distance of  $60 \text{ deg } F^{-0.6}$  where  $F$  is in GHz.

For common VLBI bands, this is:

1.6 GHz	45. deg
2.3 GHz	36. deg
5.0 GHz	23. deg
8.4 GHz	17. deg
15.0 GHz	12. deg
22.0 GHz	9. deg

**rk12iotr**

RADIOASTRON AGN SURVEY

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Observing mode: C/L-band, dual-pol

Schedule for TORUN (Code Tr ) Page 2

RadioAstron AGN Survey

UP: D => Below limits; H => Below horizon mask; W => still slewing at end; blank => Up.

Early: Seconds between end of slew and start. Dwell: On source seconds.

Disk: GBytes recorded to this point.

TPStart: Recording start time. Frequencies are LO sum (band edge).

SYNC: Time correlator is expected to sync up.

```
-----  
Start UT  Source             Start / Stop      Early   Disk   TPStart  
Stop UT           LST   EL   AZ   HA  UP   ParA Dwell  GBytes  SYNC  
-----
```

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----- C-band VLBI scans -----

Next scan frequencies:	4836.00	4836.00	4836.00	4836.00							
Next BBC frequencies:	736.00	736.00	736.00	736.00							
Next scan bandwidths:	16.00	16.00	16.00	16.00							

11 00 00	2251+158	17 21 48	16.9	85.4	-5.5	-38.6	0	0	11 00 00
11 14 30	---	17 36 21	19.1	88.2	-5.3	-38.7	870	28	11 00 01

11 15 00	2251+158	17 36 51	19.2	88.3	-5.3	-38.7	24	28	11 15 00
11 29 30	---	17 51 23	21.4	91.2	-5.1	-38.7	870	56	11 15 01

11 30 00	2251+158	17 51 53	21.5	91.3	-5.0	-38.7	24	56	11 30 00
11 44 30	---	18 06 26	23.6	94.3	-4.8	-38.6	870	84	11 30 01

11 45 00	2251+158	18 06 56	23.7	94.4	-4.8	-38.6	24	84	11 45 00
12 00 00	---	18 21 58	26.0	97.5	-4.5	-38.3	900	112	11 45 01

SETUP FILE INFORMATION:

NOTE: If DOPPLER, FREQ, or BW were used, see the individual scans for the final BBC settings.

==== Setup file: ra6cm2.set

Setup group: 3	Station: TORUN	Total bit rate: 256
Format: MKIV1:4	Bits per sample: 2	Sample rate: 32.000
Number of channels: 4	DBE type:	Speedup factor: 1.00

Disk used to record data.

```

1st LO=  4100.00  4100.00  4100.00  4100.00
Net SB=           L           L           U           U
IF SB =           U           U           U           U
Pol.  =          RCP          LCP          RCP          LCP
BBC   =           1           2           1           2
BBC SB=           L           L           U           U
IF    =           C           A           C           A

```

The following frequency sets based on these setups were used.

```

Frequency Set:  3  Setup file default.  Used with PCAL = 1MHz
LO sum=  4836.00  4836.00  4836.00  4836.00
BBC fr=   736.00   736.00   736.00   736.00
Bandwd=   16.00   16.00   16.00   16.00
Matching frequency sets:  3

```

Track assignments are:

```

track1=  2, 18,  3, 19
barrel=roll_off

```

#### POSITIONS OF SOURCES USED IN RECORDING SCANS

Source	Source position (RA/Dec) (B1950)	(J2000)	(Date)	Error (mas)
* FAKERA	11 57 21.769299	* 12 00 00.000000	12 00 37.708854	0.00
	85 16 41.77889	* 85 00 00.000000	84 54 21.48745	0.00
	fake circumpolar target for a TS to look at			
* 2251+158	22 51 29.519741	* 22 53 57.747940	22 54 44.972356	0.00
J2253+1608	15 52 54.34791	* 16 08 53.56074	16 14 09.56098	0.00
3C454.3	./rk12io_sources.radioastron			
	AGN, rfc_2013d Petrov, 2013, unpublished 40570 observations, RA-A03-04, RA-A02-1			

#### EFFECT OF SOLAR CORONA

The solar corona can cause unstable phases for sources too close to the Sun. SCHED provides warnings at individual scans for distances less than 10 degrees. The distance from the Sun to each source in this schedule is:

Source	Sun distance (deg)
2251+158	95.2

Barry Clark estimates from predictions by Ketan Desai of IPM scattering sizes that the Sun will cause amplitude reductions on the longest VLBA baselines at a solar distance of  $60 \text{ deg } F^{-0.6}$  where  $F$  is in GHz.

For common VLBI bands, this is:

1.6 GHz	45. deg
2.3 GHz	36. deg
5.0 GHz	23. deg
8.4 GHz	17. deg
15.0 GHz	12. deg
22.0 GHz	9. deg



rk12iptr

RADIOASTRON AGN SURVEY

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Observing mode: C/L-band, dual-pol

Schedule for TORUN (Code Tr ) Page 2  
 RadioAstron AGN Survey

UP: D => Below limits; H => Below horizon mask; W => still slewing at end; blank => Up.  
 Early: Seconds between end of slew and start. Dwell: On source seconds.  
 Disk: GBytes recorded to this point.  
 TPStart: Recording start time. Frequencies are L0 sum (band edge).  
 SYNC: Time correlator is expected to sync up.

Start UT	Source	Start / Stop					Early	Disk	TPStart	
Stop UT		LST	EL	AZ	HA	UP	ParA	Dwell	GBytes	SYNC

--- Wed 9 Dec 2015 Day 343 ---

----- L-band VLBI scans -----

Next scan frequencies:	1668.00	1668.00	1668.00	1668.00
Next BBC frequencies:	732.00	732.00	732.00	732.00
Next scan bandwidths:	16.00	16.00	16.00	16.00

03 00 00	0322+222	09 24 26	18.1	-76.5	6.0	39.2	0	0	03 00 00
03 14 30	---	09 38 58	16.0	-73.7	6.2	38.6	870	28	03 00 01
03 15 00	0322+222	09 39 28	15.9	-73.6	6.2	38.6	24	28	03 15 00
03 29 30	---	09 54 01	13.8	-70.9	6.5	37.9	870	56	03 15 01
03 30 00	0322+222	09 54 31	13.8	-70.8	6.5	37.9	24	56	03 30 00
03 44 30	---	10 09 03	11.7	-68.1	6.7	37.1	870	84	03 30 01
03 45 00	0322+222	10 09 33	11.7	-68.0	6.7	37.0	24	84	03 45 00
04 00 00	---	10 24 36	9.6	-65.1	7.0	36.1	900	112	03 45 01

SETUP FILE INFORMATION:

NOTE: If DOPPLER, FREQ, or BW were used, see the individual scans for the final BBC settings.

===== Setup file: ra18cm2.set

Setup group: 6	Station: TORUN	Total bit rate: 256
Format: MKIV1:4	Bits per sample: 2	Sample rate: 32.000
Number of channels: 4	DBE type:	Speedup factor: 1.00

Disk used to record data.

1st LO=	2400.00	2400.00	2400.00	2400.00
Net SB=	L	L	U	U
IF SB =	L	L	L	L
Pol. =	RCP	LCP	RCP	LCP
BBC =	1	2	1	2
BBC SB=	U	U	L	L
IF =	C	A	C	A

The following frequency sets based on these setups were used.

Frequency Set: 2 Setup file default. Used with PCAL = 1MHz  
 LO sum= 1668.00 1668.00 1668.00 1668.00  
 BBC fr= 732.00 732.00 732.00 732.00  
 Bandwd= 16.00 16.00 16.00 16.00  
 Matching frequency sets: 2

Track assignments are:

track1= 2, 18, 3, 19  
 barrel=roll\_off

#### POSITIONS OF SOURCES USED IN RECORDING SCANS

Source	Source position (RA/Dec) (B1950)	(J2000)	(Date)	Error (mas)
* FAKERA	11 57 21.769299	* 12 00 00.000000	12 00 37.857398	0.00
	85 16 41.77889	* 85 00 00.000000	84 54 21.37867	0.00
	fake circumpolar target for a TS to look at			
* 0322+222	03 22 41.745721	* 03 25 36.814357	03 26 34.070179	0.00
J0325+2224	22 13 30.30088	* 22 24 00.36553	22 27 16.16324	0.00
	./rk12ip_sources.radioastron			
	AGN, rfc_2013d Petrov, 2013, unpublished 12934 observations, RA-A03-04, RA-A02-1			

#### EFFECT OF SOLAR CORONA

The solar corona can cause unstable phases for sources too close to the Sun. SCHED provides warnings at individual scans for distances less than 10 degrees. The distance from the Sun to each source in this schedule is:

Source	Sun distance (deg)
0322+222	157.9

Barry Clark estimates from predictions by Ketan Desai of IPM scattering sizes that the Sun will cause amplitude reductions on the longest VLBA baselines at a solar distance of  $60 \text{ deg } F^{-0.6}$  where  $F$  is in GHz.

For common VLBI bands, this is:

1.6 GHz	45. deg
2.3 GHz	36. deg
5.0 GHz	23. deg
8.4 GHz	17. deg
15.0 GHz	12. deg
22.0 GHz	9. deg

RADIOASTRON AGN SURVEY

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Observing mode: C/L-band, dual-pol

Schedule for TORUN (Code Tr ) Page 2

RadioAstron AGN Survey

UP: D => Below limits; H => Below horizon mask; W => still slewing at end; blank => Up.  
 Early: Seconds between end of slew and start. Dwell: On source seconds.

Disk: GBytes recorded to this point.

TPStart: Recording start time. Frequencies are L0 sum (band edge).

SYNC: Time correlator is expected to sync up.

Start UT	Source	Start / Stop					Early	Disk	TPStart	
Stop UT		LST	EL	AZ	HA	UP	ParA	Dwell	GBytes	SYNC

--- Wed 9 Dec 2015 Day 343 ---

----- L-band VLBI scans -----

```

Next scan frequencies: 1668.00 1668.00 1668.00 1668.00
Next BBC frequencies: 732.00 732.00 732.00 732.00
Next scan bandwidths: 16.00 16.00 16.00 16.00

07 00 00 0829+046 13 25 05 13.6 259.0 4.9 36.2 0 0 07 00 00
07 14 30 --- 13 39 38 11.5 262.0 5.1 36.6 870 28 07 00 01

07 15 00 0829+046 13 40 08 11.4 262.1 5.1 36.6 24 28 07 15 00
07 29 30 --- 13 54 40 9.2 265.1 5.4 36.9 870 56 07 15 01

07 30 00 0829+046 13 55 10 9.2 265.2 5.4 36.9 24 56 07 30 00
07 44 30 --- 14 09 43 7.0 268.1 5.6 37.0 870 84 07 30 01

07 45 00 0829+046 14 10 13 6.9 268.2 5.6 37.0 24 84 07 45 00
08 00 00 --- 14 25 15 4.7 271.2 5.9 37.0 900 112 07 45 01
    
```

SETUP FILE INFORMATION:

NOTE: If DOPPLER, FREQ, or BW were used, see the individual scans for the final BBC settings.

===== Setup file: ra18cm2.set

Setup group: 5	Station: TORUN	Total bit rate: 256
Format: MKIV1:4	Bits per sample: 2	Sample rate: 32.000
Number of channels: 4	DBE type:	Speedup factor: 1.00

Disk used to record data.

```

1st LO=  2400.00  2400.00  2400.00  2400.00
Net SB=      L      L      U      U
IF SB =      L      L      L      L
Pol.  =      RCP     LCP     RCP     LCP
BBC   =      1      2      1      2
BBC SB=      U      U      L      L
IF    =      C      A      C      A

```

The following frequency sets based on these setups were used.

```

Frequency Set:  2  Setup file default.  Used with PCAL = 1MHz
LO sum=  1668.00  1668.00  1668.00  1668.00
BBC fr=   732.00  732.00  732.00  732.00
Bandwd=   16.00  16.00  16.00  16.00
Matching frequency sets:  2

```

Track assignments are:

```

track1=  2, 18,  3, 19
barrel=roll_off

```

#### POSITIONS OF SOURCES USED IN RECORDING SCANS

Source	Source position (RA/Dec) (B1950)	(J2000)	(Date)	Error (mas)
* FAKERA	11 57 21.769299	* 12 00 00.000000	12 00 37.894834	0.00
	85 16 41.77889	* 85 00 00.000000	84 54 21.35094	0.00
	fake circumpolar target for a TS to look at			
* 0829+046	08 29 10.894139	* 08 31 48.876958	08 32 39.933537	0.00
J0831+0429	04 39 50.82946	* 04 29 39.08580	04 26 15.51882	0.00
	./rk12iq_sources.radioastron			
	AGN, rfc_2013d Petrov, 2013, unpublished 1604 observations, RA-A03-04			

#### EFFECT OF SOLAR CORONA

The solar corona can cause unstable phases for sources too close to the Sun. SCHED provides warnings at individual scans for distances less than 10 degrees. The distance from the Sun to each source in this schedule is:

```

Source      Sun distance (deg)
0829+046    126.2

```

Barry Clark estimates from predictions by Ketan Desai of IPM scattering sizes that the Sun will cause amplitude reductions on the longest VLBA baselines at a solar distance of  $60 \text{ deg } F^{-0.6}$  where  $F$  is in GHz.

For common VLBI bands, this is:

```

1.6 GHz      45. deg
2.3 GHz      36. deg
5.0 GHz      23. deg
8.4 GHz      17. deg
15.0 GHz     12. deg
22.0 GHz     9. deg

```

**rk12irtr**

RADIOASTRON AGN SURVEY

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Observing mode: C/L-band, dual-pol

Schedule for TORUN              (Code Tr )                      Page 2  
   RadioAstron AGN Survey

UP: D => Below limits; H => Below horizon mask; W => still slewing at end; blank => Up.  
Early: Seconds between end of slew and start. Dwell: On source seconds.  
Disk: GBytes recorded to this point.  
TPStart: Recording start time. Frequencies are L0 sum (band edge).  
SYNC: Time correlator is expected to sync up.

-----

Start UT	Source	Start / Stop	Early	Disk	TPStart
Stop UT		LST    EL    AZ    HA    UP    ParA	Dwell	GBytes	SYNC
-----					
--- Thu 10 Dec 2015 Day 344 ---					
----- C-band VLBI scans -----					
Next scan frequencies: 4836.00 4836.00 4836.00 4836.00					
Next BBC frequencies: 736.00 736.00 736.00 736.00					
Next scan bandwidths: 16.00 16.00 16.00 16.00					
07 00 00	0838+133	13 29 02    21.4 263.5 4.8	37.8	0	07 00 00
07 14 30	---	13 43 34    19.2 266.4 5.0	38.0	870	07 00 01
07 15 00	0838+133	13 44 04    19.1 266.5 5.0	38.0	24	07 15 00
07 29 30	---	13 58 37    16.9 269.5 5.3	38.1	870	07 15 01
07 30 00	0838+133	13 59 07    16.8 269.6 5.3	38.1	24	07 30 00
07 44 30	---	14 13 39    14.7 272.5 5.5	38.0	870	07 30 01
07 45 00	0838+133	14 14 09    14.6 272.6 5.5	38.0	24	07 45 00
08 00 00	---	14 29 12    12.3 275.5 5.8	37.9	900	07 45 01

-----

SETUP FILE INFORMATION:

NOTE: If DOPPLER, FREQ, or BW were used, see the individual scans for the final BBC settings.

==== Setup file: ra6cm2.set

Setup group: 2                      Station: TORUN                      Total bit rate: 256  
Format: MKIV1:4                      Bits per sample: 2                      Sample rate: 32.000  
Number of channels: 4                      DBE type:                      Speedup factor: 1.00

Disk used to record data.

```

1st LO=  4100.00  4100.00  4100.00  4100.00
Net SB=           L           L           U           U
IF SB =           U           U           U           U
Pol.  =          RCP          LCP          RCP          LCP
BBC   =           1           2           1           2
BBC SB=           L           L           U           U
IF    =           C           A           C           A

```

The following frequency sets based on these setups were used.

```

Frequency Set:  2  Setup file default.  Used with PCAL = 1MHz
LO sum=  4836.00  4836.00  4836.00  4836.00
BBC fr=   736.00   736.00   736.00   736.00
Bandwd=   16.00   16.00   16.00   16.00
Matching frequency sets:  2

```

Track assignments are:

```

track1=  2, 18,  3, 19
barrel=roll_off

```

#### POSITIONS OF SOURCES USED IN RECORDING SCANS

Source	Source position (RA/Dec) (B1950)	(J2000)	(Date)	Error (mas)
* FAKERA	11 57 21.769299	* 12 00 00.000000	12 00 38.123482	0.00
	85 16 41.77889	* 85 00 00.000000	84 54 21.18028	0.00
	fake circumpolar target for a TS to look at			
* 0838+133	08 38 01.723597	* 08 40 47.588427	08 41 41.072358	0.00
J0840+1312	13 23 05.67979	* 13 12 23.56368	13 08 47.83385	0.00
	./rk12ir_sources.radioastron			
	AGN, rfc_2013d Petrov, 2013, unpublished 196 observations, RA-A03-04			

#### EFFECT OF SOLAR CORONA

The solar corona can cause unstable phases for sources too close to the Sun. SCHED provides warnings at individual scans for distances less than 10 degrees. The distance from the Sun to each source in this schedule is:

```

Source      Sun distance (deg)
0838+133    128.4

```

Barry Clark estimates from predictions by Ketan Desai of IPM scattering sizes that the Sun will cause amplitude reductions on the longest VLBA baselines at a solar distance of  $60 \text{ deg } F^{-0.6}$  where  $F$  is in GHz.

For common VLBI bands, this is:

```

1.6 GHz      45. deg
2.3 GHz      36. deg
5.0 GHz      23. deg
8.4 GHz      17. deg
15.0 GHz     12. deg
22.0 GHz      9. deg

```

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