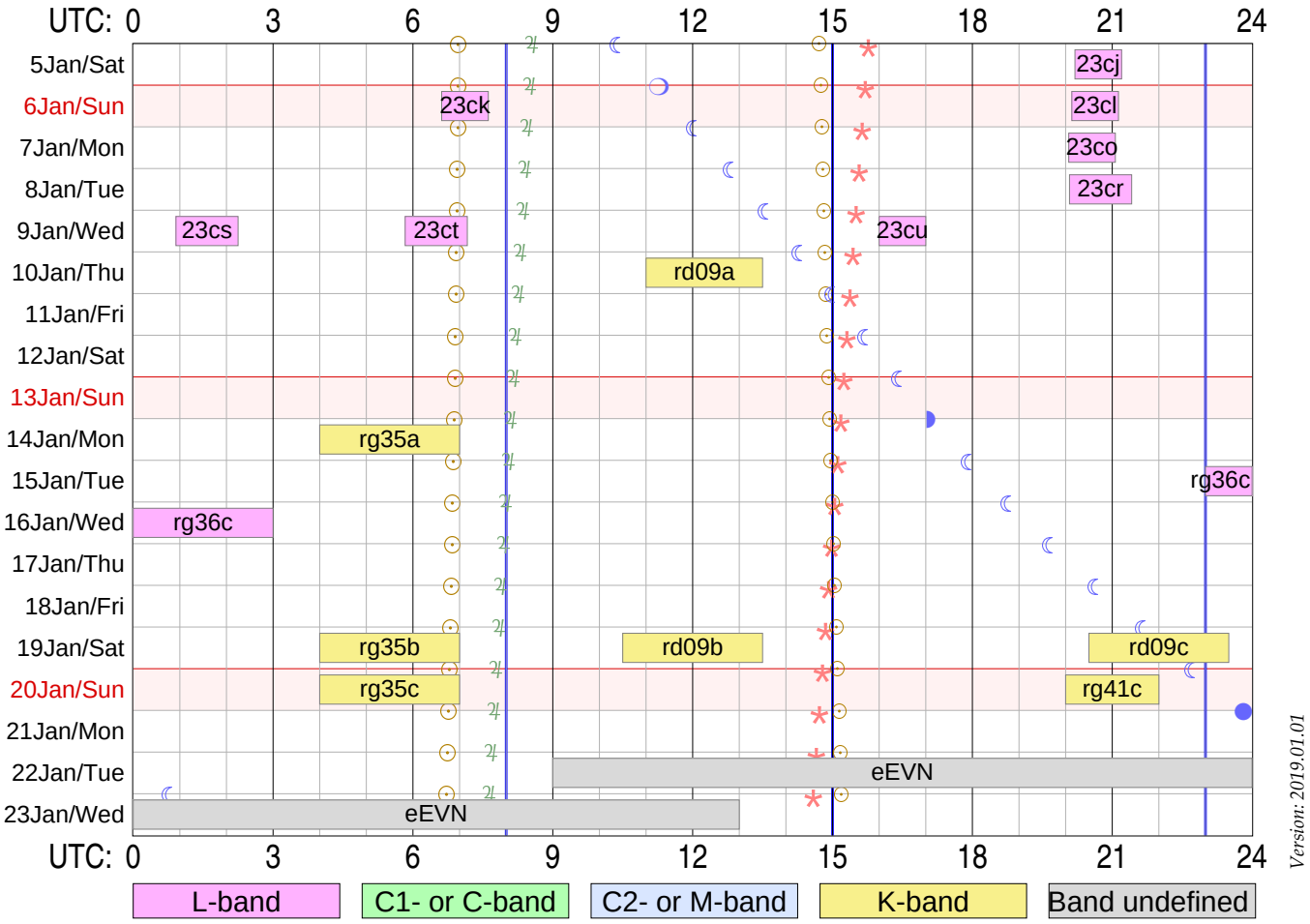
Tr VLBI plan for Jan 2019



Version: 2019.01.01

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: 60.5 hours in 17 experiments scheduled

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

Strona zostawiona celowo pusta

RadioAstron & EVN Experiments

Nov 2018

Uytkownik 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
2019	D	M	DoW	hh	mm	hh	mm	name	
22	22	01	Wto	9	00	113	00	eEVN	" "
5	5	01	Sob	20	12	21	12	rk23cj	"L "
6	6	01	Nie	6	37	7	37	rk23ck	"L "
6	6	01	Nie	20	08	21	08	rk23cl	"L "
7	7	01	Pon	20	04	21	04	rk23co	"L "
8	8	01	Wto	20	05	21	25	rk23cr	"L "
9	9	01	Sro	0	55	2	15	rk23cs	"L "
9	9	01	Sro	5	50	7	10	rk23ct	"L "
9	9	01	Sro	16	00	17	00	rk23cu	"L "
10	10	01	Czw	11	00	13	30	rd09a	"K "
14	14	01	Pon	4	00	7	00	rg35a	"K "
15	15	01	Wto	23	00	24	00	rg36c	"L "
16	16	01	Sro	0	00	3	00	rg36c	"L "
19	19	01	Sob	4	00	7	00	rg35b	"K "
19	19	01	Sob	10	30	13	30	rd09b	"K "
19	19	01	Sob	20	30	23	30	rd09c	"K "
20	20	01	Nie	4	00	7	00	rg35c	"K "
20	20	01	Nie	20	00	22	00	rg41c	"K "

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

`http://paulo.astro.uni.torun.pl/~pw/VLBI/schedules/jan19.pdf`

rk23cjtr

RadioAstron AGN scattering substructure

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Fax: +7-495-3332378 Phone during observation: +7-903-6614865

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

Schedule for TORUN (Code Tr) Page 2

RadioAstron AGN scattering substructure

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 / Stop UT	Source	LST	EL	AZ	HA	UP	ParA	Early Dwell	Disk GBytes	TPStart SYNC
--- Sat 5 Jan 2019 Day 5 ---										
---------- 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					
20 12 00	1015+359	04 26 47	28.8	68.0	-5.9		-43.2	0	0	20 12 00
20 31 30	---	04 46 20	31.5	71.3	-5.5		-44.4	1170	37	20 12 01
20 32 00	1015+359	04 46 51	31.6	71.4	-5.5		-44.4	24	37	20 32 00
20 51 30	---	05 06 24	34.4	74.7	-5.2		-45.4	1170	75	20 32 01
20 52 00	1015+359	05 06 54	34.5	74.8	-5.2		-45.5	24	75	20 52 00
21 12 00	---	05 26 57	37.4	78.3	-4.9		-46.3	1200	113	20 52 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: 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=   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 57.111751	0.00
	85 16 41.77889	* 85 00 00.00000	84 53 24.58097	0.00
	fake circumpolar target for a TS to look at			
* 1015+359	10 15 16.226760	* 10 18 10.988103	10 19 17.094153	0.00
J1018+3542	35 57 41.35603	* 35 42 39.44084	35 36 47.14629	0.00
	./rk23cj_sources.radioastron			
	AGN, rfc_2013d, RA-AO6-07			

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)
  1015+359           136.3

 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 60deg 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
```

rk23cktr

RadioAstron AGN scattering substructure

PI: *Mikhail Lisakov*

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

Schedule for TORUN (Code Tr) Page 2

RadioAstron AGN scattering substructure

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 / Stop UT	Source	LST	EL	AZ	HA	UP	ParA	Early Dwell	Disk GBytes	TPStart SYNC
--- Sun 6 Jan 2019 Day 6 ---										
---------- 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					
06 37 00	1015+359	14 53 30	40.1	278.4	4.6		46.9	0	0	06 37 00
06 56 30	---	15 13 03	37.2	281.9	4.9		46.3	1170	37	06 37 01
06 57 00	1015+359	15 13 33	37.1	282.0	4.9		46.3	24	37	06 57 00
07 16 30	---	15 33 06	34.3	285.4	5.2		45.4	1170	75	06 57 01
07 17 00	1015+359	15 33 36	34.2	285.5	5.2		45.4	24	75	07 17 00
07 37 00	---	15 53 40	31.3	288.9	5.6		44.3	1200	113	07 17 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: 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=   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 57.232991	0.00
	85 16 41.77889	* 85 00 00.00000	84 53 24.57520	0.00
	fake circumpolar target for a TS to look at			
* 1015+359	10 15 16.226760	* 10 18 10.988103	10 19 17.110945	0.00
J1018+3542	35 57 41.35603	* 35 42 39.44084	35 36 47.12146	0.00
	./rk23ck_sources.radioastron			
	AGN, rfc_2013d, RA-AO6-07			

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)
1015+359	136.7

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 60deg 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

rk23cltr

RadioAstron AGN scattering substructure

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

Schedule for TORUN (Code Tr) Page 2

RadioAstron AGN scattering substructure

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 / Stop UT	Source	LST	EL	AZ	HA	UP	ParA	Early Dwell	Disk GBytes	TPStart SYNC
--- Sun 6 Jan 2019 Day 6 ---										
---------- 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					
20 08 00	1015+359	04 26 43	28.8	68.0	-5.9		-43.2	0	0	20 08 00
20 27 30	---	04 46 16	31.5	71.3	-5.6		-44.4	1170	37	20 08 01
20 28 00	1015+359	04 46 46	31.6	71.4	-5.5		-44.4	24	37	20 28 00
20 47 30	---	05 06 20	34.4	74.7	-5.2		-45.4	1170	75	20 28 01
20 48 00	1015+359	05 06 50	34.5	74.8	-5.2		-45.5	24	75	20 48 00
21 08 00	---	05 26 53	37.4	78.3	-4.9		-46.3	1200	113	20 48 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: 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=   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 57.392543	0.00
	85 16 41.77889	* 85 00 00.00000	84 53 24.57173	0.00
	fake circumpolar target for a TS to look at			
* 1015+359	10 15 16.226760	* 10 18 10.988103	10 19 17.132422	0.00
J1018+3542	35 57 41.35603	* 35 42 39.44084	35 36 47.09390	0.00
	./rk23cl_sources.radioastron			
	AGN, rfc_2013d, RA-AO6-07			

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)
  1015+359           137.1

 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 60deg 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
```

rk23cotr

RadioAstron AGN scattering substructure

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

Schedule for TORUN (Code Tr) Page 2

RadioAstron AGN scattering substructure

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 / Stop UT	Source	LST	EL	AZ	HA	UP	ParA	Early Dwell	Disk GBytes	TPStart SYNC
--- Mon 7 Jan 2019 Day 7 ---										
---------- 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					
20 04 00	1015+359	04 26 39	28.8	68.0	-5.9		-43.2	0	0	20 04 00
20 23 30	---	04 46 12	31.5	71.3	-5.6		-44.4	1170	37	20 04 01
20 24 00	1015+359	04 46 42	31.6	71.4	-5.5		-44.4	24	37	20 24 00
20 43 30	---	05 06 16	34.4	74.7	-5.2		-45.4	1170	75	20 24 01
20 44 00	1015+359	05 06 46	34.5	74.8	-5.2		-45.5	24	75	20 44 00
21 04 00	---	05 26 49	37.4	78.3	-4.9		-46.3	1200	113	20 44 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: 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=   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 57.679349	0.00
	85 16 41.77889	* 85 00 00.00000	84 53 24.57891	0.00
	fake circumpolar target for a TS to look at			
* 1015+359	10 15 16.226760	* 10 18 10.988103	10 19 17.169118	0.00
J1018+3542	35 57 41.35603	* 35 42 39.44084	35 36 47.05910	0.00
	./rk23co_sources.radioastron			
	AGN, rfc_2013d, RA-AO6-07			

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)
  1015+359           137.9

 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 60deg 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
```

rk23crtr

RadioAstron AGN scattering substructure

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Fax: +7-495-3332378 Phone during observation: +7-903-6614865

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

Schedule for TORUN (Code Tr) Page 2

RadioAstron AGN scattering substructure

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 / Stop UT	Source	LST	EL	AZ	HA	UP	ParA	Early Dwell	Disk GBytes	TPStart SYNC
--- Tue 8 Jan 2019 Day 8 ---										
---------- 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					
20 05 00	1015+359	04 31 36	29.5	68.8	-5.8		-43.5	0	0	20 05 00
20 24 30	---	04 51 09	32.2	72.1	-5.5		-44.7	1170	37	20 05 01
20 25 00	1015+359	04 51 39	32.3	72.2	-5.5		-44.7	24	37	20 25 00
20 44 30	---	05 11 12	35.1	75.6	-5.1		-45.7	1170	75	20 25 01
20 45 00	1015+359	05 11 42	35.2	75.7	-5.1		-45.7	24	75	20 45 00
21 04 30	---	05 31 16	38.1	79.1	-4.8		-46.5	1170	112	20 45 01
21 05 00	1015+359	05 31 46	38.1	79.2	-4.8		-46.5	24	112	21 05 00
21 25 00	---	05 51 49	41.1	82.8	-4.5		-47.1	1200	151	21 05 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:   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 57.969081	0.00
	85 16 41.77889	* 85 00 00.00000	84 53 24.60559	0.00
	fake circumpolar target for a TS to look at			
* 1015+359	10 15 16.226760	* 10 18 10.988103	10 19 17.203615	0.00
J1018+3542	35 57 41.35603	* 35 42 39.44084	35 36 47.04259	0.00
	./rk23cr_sources.radioastron			
	AGN, rfc_2013d, RA-AO6-07			

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)
  1015+359           138.8

 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 60deg 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
```

rk23cstr

RadioAstron AGN scattering substructure

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

Schedule for TORUN (Code Tr) Page 2

RadioAstron AGN scattering substructure

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 / Stop UT	Source	LST	EL	AZ	HA	UP	ParA	Early Dwell	Disk GBytes	TPStart SYNC
--- Wed 9 Jan 2019 Day 9 ---										
---------- 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					
00 55 00	1015+359	09 22 23	69.9	144.5	-0.9		-25.4	0	0	00 55 00
01 14 30	---	09 41 57	71.3	155.7	-0.6		-17.7	1170	37	00 55 01
01 15 00	1015+359	09 42 27	71.4	156.0	-0.6		-17.5	23	37	01 15 00
01 34 30	---	10 02 00	72.3	168.4	-0.3		-8.5	1170	75	01 15 01
01 35 00	1015+359	10 02 30	72.3	168.7	-0.3		-8.3	23	75	01 35 00
01 54 30	---	10 22 03	72.5	181.9	0.0		1.4	1170	112	01 35 01
01 55 00	1015+359	10 22 33	72.5	182.2	0.1		1.6	23	112	01 55 00
02 15 00	---	10 42 37	72.0	195.5	0.4		11.4	1200	151	01 55 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: 10 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:   8  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:   8

 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 58.022923	0.00
	85 16 41.77889	* 85 00 00.00000	84 53 24.61284	0.00
	fake circumpolar target for a TS to look at			
* 1015+359	10 15 16.226760	* 10 18 10.988103	10 19 17.209745	0.00
J1018+3542	35 57 41.35603	* 35 42 39.44084	35 36 47.04147	0.00
	./rk23cs_sources.radioastron			
	AGN, rfc_2013d, RA-AO6-07			

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)
  0945+408           143.5
  1015+359           138.9

 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 60deg 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
```

rk23cttr

RadioAstron AGN scattering substructure

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

Schedule for TORUN (Code Tr) Page 2

RadioAstron AGN scattering substructure

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 / Stop UT	Source	LST	EL	AZ	HA	UP	ParA	Early Dwell	Disk GBytes	TPStart SYNC
--- Wed 9 Jan 2019 Day 9 ---										
---------- 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					
05 50 00	1015+359	14 18 12	45.4	271.8	4.0		47.6	0	0	05 50 00
06 09 30	---	14 37 45	42.4	275.5	4.3		47.3	1170	37	05 50 01
06 10 00	1015+359	14 38 15	42.4	275.6	4.3		47.3	24	37	06 10 00
06 29 30	---	14 57 48	39.5	279.2	4.6		46.8	1170	75	06 10 01
06 30 00	1015+359	14 58 18	39.4	279.3	4.7		46.8	24	75	06 30 00
06 49 30	---	15 17 52	36.5	282.8	5.0		46.1	1170	112	06 30 01
06 50 00	1015+359	15 18 22	36.4	282.8	5.0		46.1	24	112	06 50 00
07 10 00	---	15 38 25	33.5	286.3	5.3		45.1	1200	151	06 50 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: 10 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:   8  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:   8

 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 58.082345	0.00
	85 16 41.77889	* 85 00 00.00000	84 53 24.62168	0.00
	fake circumpolar target for a TS to look at			
* 1015+359	10 15 16.226760	* 10 18 10.988103	10 19 17.216411	0.00
J1018+3542	35 57 41.35603	* 35 42 39.44084	35 36 47.04089	0.00
	./rk23ct_sources.radioastron			
	AGN, rfc_2013d, RA-AO6-07			

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)
  1015+359           139.1

 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 60deg 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
```

rk23cutr

RadioAstron AGN scattering substructure

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

Schedule for TORUN (Code Tr) Page 2

RadioAstron AGN scattering substructure

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 / Stop UT	Source	LST	EL	AZ	HA	UP	ParA	Early Dwell	Disk GBytes	TPStart SYNC
--- Wed 9 Jan 2019 Day 9 ---										
---------- 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					
16 00 00	1015+359	00 29 52	3.1	26.1	-9.8		-18.9	0	0	16 00 00
16 19 30	---	00 49 25	4.5	29.8	-9.5		-21.5	1170	37	16 00 01
16 20 00	1015+359	00 49 55	4.5	29.9	-9.5		-21.6	24	37	16 20 00
16 39 30	---	01 09 29	6.1	33.6	-9.2		-24.1	1170	75	16 20 01
16 40 00	1015+359	01 09 59	6.1	33.7	-9.2		-24.2	24	75	16 40 00
17 00 00	---	01 30 02	7.9	37.4	-8.8		-26.6	1200	113	16 40 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: 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:   7  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:   7

 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 58.207656	0.00
	85 16 41.77889	* 85 00 00.00000	84 53 24.64329	0.00
	fake circumpolar target for a TS to look at			
* 1015+359	10 15 16.226760	* 10 18 10.988103	10 19 17.230139	0.00
J1018+3542	35 57 41.35603	* 35 42 39.44084	35 36 47.04189	0.00
	./rk23cu_sources.radioastron			
	AGN, rfc_2013d, RA-AO6-07			

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)
  1015+359           139.4

 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 60deg 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
```

rd09atr

RadioAstron Megamaser observations

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Observing mode: K-band dual-pol

Schedule for TORUN (Code Tr) Page 2

RadioAstron Megamaser observations

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 / Stop UT	Source	LST	EL	AZ	HA	UP	ParA	Early Dwell	Disk GBytes	TPStart SYNC
--- Thu 10 Jan 2019 Day 10 ---										
---------- K-band VLBI scans. Ground segment 01 : target source M33-IC133 ----------										
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						
11 00 00	M33-IC13	19 32 59	24.1	69.9	-6.0		-41.1	0	0	11 00 00
11 10 00	---	19 43 01	25.5	71.7	-5.9		-41.7	600	19	11 00 01
11 10 30	M33-IC13	19 43 31	25.6	71.8	-5.8		-41.7	24	19	11 10 30
11 20 00	---	19 53 03	27.0	73.5	-5.7		-42.2	570	37	11 10 31
11 20 30	M33-IC13	19 53 33	27.0	73.6	-5.7		-42.2	24	37	11 20 30
11 30 00	---	20 03 04	28.4	75.3	-5.5		-42.6	570	56	11 20 31
---------- K-band VLBI scans. Ground segment 01 : calibrator NRAO150 ----------										
11 31 00	NRAO150	20 04 04	25.9	37.6	-7.9		-35.6	-30	56	11 31 00
11 40 00	---	20 13 06	26.8	38.9	-7.8		-36.8	510	73	11 31 01
---------- K-band VLBI scans. Ground segment 01 : delay calibrator 0133+476 ----------										
11 41 00	0133+476	20 14 06	41.0	61.3	-5.4		-51.9	-7	73	11 41 00
11 50 00	---	20 23 08	42.2	62.5	-5.3		-52.7	533	90	11 41 01
---------- K-band VLBI scans. Ground segment 01 : target source M33-IC133 ----------										
11 50 30	M33-IC13	20 23 38	31.4	79.0	-5.2		-43.4	-24	90	11 50 30
11 59 00	---	20 32 09	32.7	80.6	-5.0		-43.7	486	107	11 50 31
---------- K-band VLBI scans. Space segment 01: target source M33-IC133 ----------										
12 00 00	M33-IC13	20 33 09	32.8	80.7	-5.0		-43.7	54	107	12 00 00
12 23 20	---	20 56 33	36.3	85.1	-4.6		-44.3	1400	152	12 00 01
12 23 50	M33-IC13	20 57 03	36.4	85.2	-4.6		-44.3	24	152	12 23 50
12 46 40	---	21 19 57	39.8	89.7	-4.2		-44.5	1370	196	12 23 51
12 47 10	M33-IC13	21 20 27	39.9	89.8	-4.2		-44.5	24	196	12 47 10
13 10 00	---	21 43 21	43.3	94.5	-3.8		-44.3	1370	239	12 47 11

```
 ---------- K-band VLBI scans. Ground segment 02 : calibrator 0133+476 ----------

13 11 00  0133+476     21 44 21  53.5  73.8 -3.9     -59.4     4      239   13 11 00
13 20 00  ---          21 53 22  54.8  75.1 -3.7     -60.1   540      257   13 11 01
```

```
Schedule for TORUN     (Code Tr )                                  Page   3
               RadioAstron Megamaser observations
  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  10 Jan 2019   Day  10 ---

 ---------- K-band VLBI scans. Ground segment 02 : calibrator 3C84 ----------

13 20 30  3C84         21 53 52  36.5  67.1 -5.5     -47.7   -52      257   13 20 30
13 30 00  ---          22 03 24  37.8  68.6 -5.3     -48.4   518      275   13 20 31



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


 ======== Setup file: ra1cm2.set

   Setup group:    6         Station: TORUN            Total bit rate:   256
   Format: MARK5B            Bits per sample: 2        Sample rate: 32.000
   Number of channels:  4    DBE type: DBBC_DDC        Speedup factor:   1.00

   Disk used to record data.
```

```
 1st LO=  21500.00  21500.00  21500.00  21500.00
 Net SB=         U         U         L         L
 IF SB =         U         U         U         U
 Pol.  =       RCP       LCP       RCP       LCP
 BBC   =         1         5         1         5
 BBC SB=         U         U         L         L
 IF    =        A1        B1        A1        B1

 The following frequency sets based on these setups were used.

 Frequency Set:   7  Setup file default.  Used with PCAL = off
 LO sum=   22236.00  22236.00  22236.00  22236.00
 BBC fr=     736.00    736.00    736.00    736.00
 Bandwd=      16.00     16.00     16.00     16.00
  Matching frequency sets:   7

 Track assignments are:
  track1=   2,  4,  6,  8
  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 58.429621	0.00
	85 16 41.77889	* 85 00 00.00000	84 53 24.69149	0.00
	fake circumpolar target for a TS to look at			
* M33-IC13	01 30 27.274604	* 01 33 16.545000	01 34 20.443221	0.00
M33-IC133	30 37 27.44838	* 30 52 50.00000	30 58 40.85791	0.00
	./rd09a_sources.radioastron			
	RA-AO4-05			
0316+413	03 16 29.567283	* 03 19 48.160114	03 21 03.940767	0.00
J0319+4130	41 19 51.91847	* 41 30 42.10559	41 34 48.98364	0.00
* 3C84	./rd09a_sources.radioastron			
	AGN, rfc_2013d Petrov, 2013, unpublished 15448 observations, RA-AO4-04, RA-AO3-0			
* 0133+476	01 33 55.103060	* 01 36 58.594805	01 38 08.180354	0.00
J0136+4751	47 36 12.85365	* 47 51 29.10004	47 57 22.59019	0.00
	./rd09a_sources.radioastron			
	AGN, MASIV, rfc_2013d Petrov, 2013, unpublished 178454 observations, RA-AO3-04,			
0355+508	03 55 45.261370	* 03 59 29.747271	04 00 55.786910	0.00
J0359+5057	50 49 20.28584	* 50 57 50.16179	51 01 03.87091	0.00
* NRAO150	./rd09a_sources.radioastron			
	AGN, rfc_2013d Petrov, 2013, unpublished 19270 observations, RA-AO3-04, RA-AO2-1			

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)
 M33-IC13           102.7
 3C84               125.5
```

```
 0133+476           108.0
 NRAO150            130.9
 3C48               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 60deg 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
```

rg35atr

RadioAstron Megamaser observations
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Observing mode: K-band dual-pol

Schedule for TORUN (Code Tr) Page 2
RadioAstron Megamaser observations
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 / Stop UT	Source	Start / Stop LST	EL	AZ	HA	UP	ParA	Early Dwell	Disk GBytes	TPStart SYNC
--- Mon 14 Jan 2019 Day 14 ---										
---------- Space-ground segment 01: K-band VLBI scans ----------										
Next scan frequencies:		22132.00	22132.00	22132.00	22132.00	22196.00	22196.00	22196.00	22196.0	
Next BBC frequencies:		632.00	632.00	632.00	632.00	696.00	696.00	696.00	696.0	
Next scan bandwidths:		16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.0	
04 00 00	NGC4258	12 47 37	82.6	219.7	0.5		34.4	0	0	04 00 00
04 37 00	---	13 24 43	78.1	246.8	1.1		54.3	2220	142	04 00 01
04 37 30	NGC4258	13 25 13	78.0	247.1	1.1		54.5	23	142	04 37 30
05 13 30	---	14 01 19	72.8	260.2	1.7		60.5	2160	281	04 37 31
05 14 00	NGC4258	14 01 49	72.7	260.3	1.7		60.6	24	281	05 14 00
05 50 00	---	14 37 55	67.4	268.9	2.3		62.1	2160	419	05 14 01
---------- Ground-only segment 01: K-band VLBI scans ----------										
05 51 00	1150+497	14 38 55	64.4	278.5	2.7		65.9	26	419	05 51 00
06 00 00	---	14 47 56	63.0	279.9	2.9		65.4	540	454	05 51 01
06 00 30	0923+392	14 48 26	35.7	289.4	5.3		46.7	-87	454	06 00 30
06 10 00	---	14 57 58	34.3	291.0	5.5		46.1	483	490	06 00 31
06 10 30	NGC4258	14 58 28	64.3	272.9	2.6		62.0	-95	490	06 10 30
06 20 00	---	15 08 00	62.8	274.6	2.8		61.7	475	527	06 10 31
06 20 30	NGC4258	15 08 30	62.8	274.7	2.8		61.7	24	527	06 20 30
06 30 00	---	15 18 01	61.3	276.4	3.0		61.4	570	563	06 20 31
06 30 30	NGC4258	15 18 31	61.3	276.5	3.0		61.4	24	563	06 30 30
06 40 00	---	15 28 03	59.9	278.0	3.1		61.0	570	600	06 30 31
06 40 30	1150+497	15 28 33	57.1	285.7	3.6		62.7	0	600	06 40 30

```
06 50 00  ---          15 38 04  55.7 287.0  3.7      62.0   570      637   06 40 31

06 50 30  0923+392     15 38 35  28.8 297.6  6.2      43.2   -85      637   06 50 30
07 00 00  ---          15 48 06  27.5 299.1  6.3      42.4   485      673   06 50 31



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


 ======== Setup file: ra1cm2.set

   Setup group:    5         Station: TORUN            Total bit rate:   512
   Format: MARK5B            Bits per sample: 2        Sample rate: 32.000
   Number of channels:  8    DBE type: DBBC_DDC        Speedup factor:   1.00

   Disk used to record data.
```

1st LO=	21500.00	21500.00	21500.00	21500.00	21500.00	21500.00	21500.00	21500.00
Net SB=	U	U	L	L	U	U	L	L
IF SB =	U	U	U	U	U	U	U	U
Pol. =	RCP	LCP	RCP	LCP	RCP	LCP	RCP	LCP
BBC =	1	5	1	5	2	6	2	6
BBC SB=	U	U	L	L	U	U	L	L
IF =	A1	B1	A1	B1	A1	B1	A1	B1

The following frequency sets based on these setups were used.

Frequency Set: 5 Setup file default. Used with PCAL = off

LO sum=	22132.00	22132.00	22132.00	22132.00	22196.00	22196.00	22196.00	22196.00
BBC fr=	632.00	632.00	632.00	632.00	696.00	696.00	696.00	696.00
Bandwd=	16.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00

Matching frequency sets: 5

Track assignments are:
track1= 2, 6, 10, 14, 4, 8, 12, 16
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 59.385507	0.00
	85 16 41.77889	* 85 00 00.00000	84 53 25.03041	0.00
	fake circumpolar target for a TS to look at			
* NGC4258	12 16 29.364915	* 12 18 57.504600	12 19 53.108104	0.00
NGC4258_H2O	47 34 53.16919	* 47 18 14.30300	47 11 43.70676	0.00
	./rg35a_sources.radioastron			
	H2O maser; positions from Herrnstein et al. 2005, RA-AO3-10, RA-AO2-13			
* 0923+392	09 23 55.319218	* 09 27 03.013939	09 28 14.489192	0.00
J0927+3902	39 15 23.56637	* 39 02 20.85177	38 57 13.39516	0.00
4C39.25	./rg35a_sources.radioastron			
	AGN, rfc_2013d Petrov, 2013, unpublished 245863 observations, RA-AO3-04, RA-AO3-			
* 1150+497	11 50 47.999856	* 11 53 24.466639	11 54 23.362364	0.00
J1153+4931	49 47 50.09409	* 49 31 08.83012	49 24 36.70881	0.00
	./rg35a_sources.radioastron			
	AGN, rfc_2013d Petrov, 2013, unpublished 1816 observations, RA-AO3-04, RA-AO2-12			

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)
NGC4258	119.4
0923+392	151.3
1150+497	123.5

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 60deg 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
```

rg36ctr

RadioAstron Pulsar observations

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

Schedule for TORUN (Code Tr) Page 2

RadioAstron Pulsar observations

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 / Stop UT	Source	LST	EL	AZ	HA	UP	ParA	Early Dwell	Disk GBytes	TPStart SYNC
--- Tue 15 Jan 2019 Day 15 ---										
---------- This is a 1min calibration scan with auto-level (AGC) ON ----------										
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 58 00	CRAB	07 52 40	49.5	233.4	2.3		31.3	0	0	Stopped
22 59 00	---	07 53 40	49.3	233.7	2.3		31.5	60	0	
---------- Please make sure Pcal, noise diode (Tsys) and auto-level (AGC) are OFF now ----------										
23 00 00	CRAB	07 54 40	49.2	234.0	2.3		31.6	54	0	23 00 00
23 19 30	---	08 14 14	46.8	239.7	2.6		34.0	1170	37	23 00 01
23 20 00	CRAB	08 14 44	46.7	239.8	2.7		34.1	24	37	23 20 00
23 39 30	---	08 34 17	44.1	245.1	3.0		36.0	1170	75	23 20 01
23 40 00	CRAB	08 34 47	44.0	245.2	3.0		36.0	24	75	23 40 00
23 59 30	---	08 54 20	41.3	250.2	3.3		37.5	1170	112	23 40 01
--- Wed 16 Jan 2019 Day 16 ---										
00 00 00	CRAB	08 54 50	41.2	250.3	3.3		37.6	24	112	00 00 00
00 19 30	---	09 14 23	38.4	254.9	3.6		38.7	1170	150	00 00 01
00 20 00	CRAB	09 14 54	38.4	255.1	3.7		38.7	24	150	00 20 00
00 39 30	---	09 34 27	35.5	259.5	4.0		39.6	1170	187	00 20 01
00 40 00	CRAB	09 34 57	35.4	259.6	4.0		39.6	24	187	00 40 00
00 59 30	---	09 54 30	32.5	263.8	4.3		40.1	1170	225	00 40 01
---------- This is a 1min calibration scan with auto-level (AGC) ON ----------										
01 00 00	CRAB	09 55 00	32.5	263.9	4.3		40.1	24	225	Stopped
01 01 00	---	09 56 00	32.3	264.1	4.3		40.1	60	225	
---------- Please make sure Pcal, noise diode (Tsys) and auto-level (AGC) are OFF now ----------										
01 02 00	CRAB	09 57 00	32.2	264.3	4.4		40.1	54	225	01 02 00

```
01 18 30  ---          10 13 33  29.7 267.7  4.6      40.3   990      256   01 02 01

01 19 00  CRAB         10 14 03  29.6 267.8  4.6      40.3    24      256   01 19 00
01 35 30  ---          10 30 36  27.1 271.1  4.9      40.4   990      288   01 19 01

01 36 00  CRAB         10 31 06  27.0 271.2  4.9      40.4    24      288   01 36 00
01 52 30  ---          10 47 39  24.6 274.5  5.2      40.2   990      320   01 36 01
```

Schedule for TORUN (Code Tr) Page 3

RadioAstron Pulsar observations

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 / Stop UT	Source	Start / Stop LST	EL	AZ	HA	UP	ParA	Early Dwell	Disk GBytes	TPStart SYNC
--- Wed 16 Jan 2019 Day 16 ---										
01 53 00	CRAB	10 48 09	24.5	274.6	5.2		40.2	24	320	01 53 00
02 09 30	---	11 04 42	22.0	277.8	5.5		39.9	990	351	01 53 01
02 10 00	CRAB	11 05 12	21.9	277.9	5.5		39.9	24	351	02 10 00
02 26 20	---	11 21 34	19.5	281.0	5.8		39.5	980	383	02 10 01
02 26 50	CRAB	11 22 04	19.4	281.1	5.8		39.5	24	383	02 26 50
02 43 10	---	11 38 27	17.0	284.2	6.0		38.9	980	414	02 26 51
02 43 40	CRAB	11 38 57	17.0	284.3	6.1		38.9	24	414	02 43 40
03 00 00	---	11 55 20	14.6	287.4	6.3		38.2	980	445	02 43 41

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

======== Setup file: ra18cm2_autolevel.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:

Disk used to record data.

```
  Setup not used for recording 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 = off
  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


======== Setup file: ra18cm2.set

  Setup group:   11         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:  14  Setup file default.  Used with PCAL = off
 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:  14

 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 59.791992	0.00
	85 16 41.77889	* 85 00 00.00000	84 53 25.20191	0.00
	fake circumpolar target for a TS to look at			
* CRAB	05 31 31.427725	* 05 34 31.973000	05 35 40.984166	0.00
J0534+2200	21 58 54.40670	* 22 00 52.06000	22 01 28.88596	0.00
B0531+21	./rg36c_sources.radioastron			
	PSR GP DM=56.791, RA-AO2-05, RA-AO6-03			

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)
  CRAB               148.7

 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 60deg 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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