



# Using GIBC to Create Coordination Contours around Earth Stations

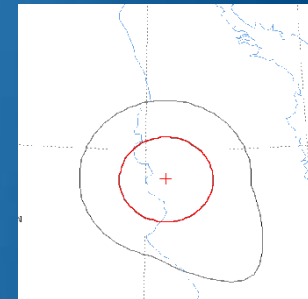
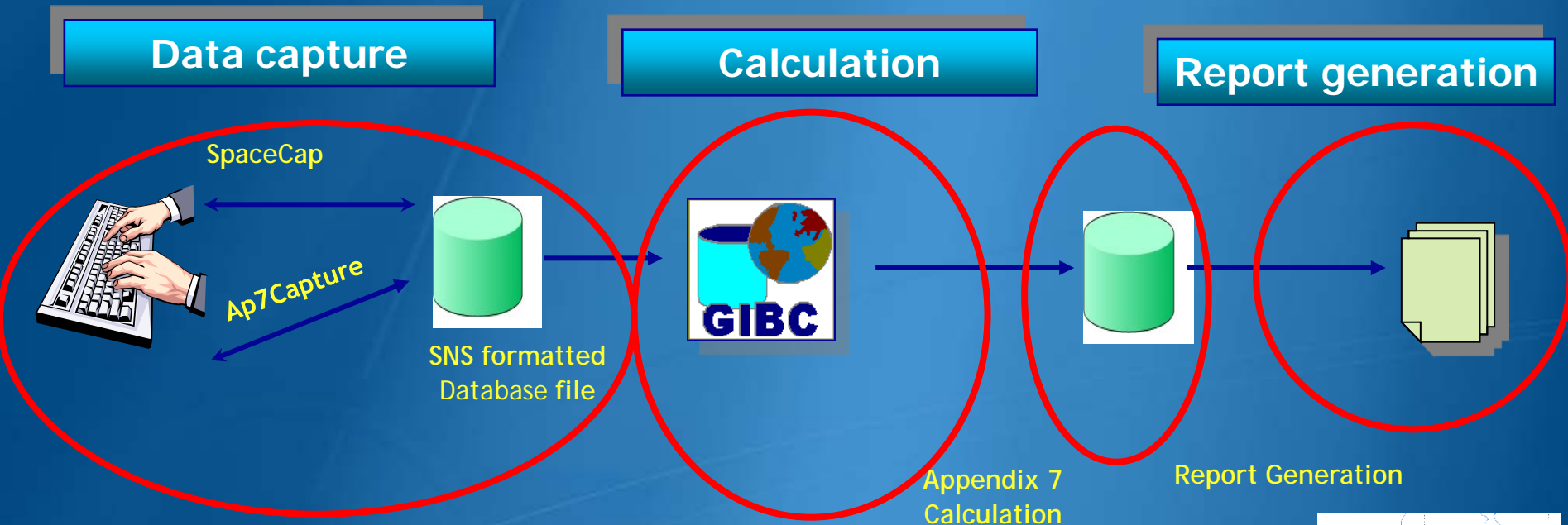
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Space Services Department  
Radiocommunication Bureau

# Earth Station Coordination

- Determination of the Coordination Area Around an Earth Station based on AP7
- 2 Tools :
  - Appendix 7 Capture
  - GIBC Appendix 7 Calculation

# AP7 data capture/calculation



Data capture and storage in the SNS formatted database  
Extract all required information from the database  
Perform Appendix 7 calculation  
Save the results in an ESCC formatted database file  
Produce report document in RTF format

# In this workshop....



## Appendix 7 Capture tool

- **Software Installation**
- **Select or create a database**
- **Browse an existing database**
- **Create a copy of an ES**
- **Modify parameters**
- **Create new ES**
- **Save into existing database**
- **Save into a new database**

## GIBC Appendix 7 Calculation

- **Software Installation**
- **Select input database**
- **Appendix 7 calculation**
- **Generate report document**
- **Report re-generation**
- **Include Auxiliary Contours**
- **Change Printing Options**

## Proposed Exercises:

- To generate Coordination Contours for
  - FSS Transmitting and Receiving Earth Station in the 6/4 GHz band
  - FSS Transmitting Earth Station in the 8 GHz band
- To repeat the calculations to see the effect of the horizon elevation angles on the coordination contours

# Installation

*GIBC* and *Ap7Capture* software can be installed from the ITU-R website  
( ITU-R/software)

As of January 2012, the Space Radiocommunications Stations (SRS) on DVD-ROM is replaced by the BR International Frequency Information Circular (BR IFIC) - Space Service.

Each edition of the BR IFIC Space Services will contain the SRS database.



Install GIBC & Open  
the application

Install Ap7Cap & Open  
the application

# AP7 Capture Tool



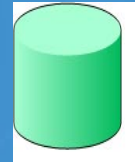
- Enter AP7 data for a new earth station
- Modify parameters of an existing earth station
- Create a copy of an existing earth station entry



Ap7Capture



SNS formatted  
Database file



In addition, Ap7 Capture tool provides:

- oSearch for an earth station by Notice ID
- oBasic validation of AP7 input parameters
- oDeletion of earth stations from AP7 input database
- oUser friendly interface!



Open Ap7capture  
tool

Select the database



# AP7 Capture Tool

AP7 Input Capture

File Edit Help

Open Database

New AP7 Input

Please type in a Notice ID or Station name and press Display:

Notice ID: 104500148

Station name:

Display

Select an Earth Station

ntc_id	stn_name	adm	ntwk_org	cty	long_deg	long_ew	long_min	long_sec	lat_deg
104500148	SOCHI/STELLA-111	RUS		RUS	39	E	54	0	43

Edit Earth Station

Clone Earth Station

New Earth Station

Delete Earth Station

1 earth station found.

# AP7 Capture Tool

**AP7 Input Capture**

File Edit Help

Open Database

New AP7 Input

Please type in a Notice ID or Station name and press Display:

Notice ID:

Station name:

Display

Select an Earth Station

ntc_id	stn_name	adm	ntwk_org	ctry	long deg	long_ew	long_mir
105500430	WPG_KA56	CAN		CAN	97	W	2
105500431	VAN_KA56	CAN		CAN	123	W	5
99500214	GOOSE BAY LEOL...	CAN		CAN	60	W	28
99500210	OTTAWA LEOLUT	CAN		CAN	75	W	53
103500113	GUADALAJARA 23	E		E	3	W	1
106500122	LENINSK/SKYSTAR	RUS		RUS	45	E	11
104500148	SOCHI/STELLA-111	RUS		RUS	39	E	54
104500375	ESRANGE ETX	S		S	21	E	3


8 earth stations found.

Edit Earth Station

Clone Earth Station

Create a New Earth Station

Delete an Earth Station





# AP7 Capture Tool – New Input

AP7 Input Capture

File Edit Help

AP7 CAPTURE

Open Database

New AP7 Input

Please type in a Notice ID or Station name and press Display:

Notice ID:

Station name:

Display

ntc_id	stn_name	adm	ntwk_org	ctry	long deg	long_ew	long_min	long_sec	lat_deg
--------	----------	-----	----------	------	----------	---------	----------	----------	---------

No database currently open. Please use the file menu to open a database.

# AP7 Capture Tool – New Input

## Earth Station Parameters

**AP7 Input Capture**

File Edit Help

Earth Station Parameters

Specific Earth Station Name: 
  
 Typical

Date Rcv:  Adm:  Ctry:  Deg: E/W:  Min:  Sec: 
  
 Long:  Lat:  Deg: N/S:  Min:  Sec:

Satellite Name:  Long nom:  GSO/Non-GSO

Satellite Beam Name	E/R	Gain	Cls of Stn	Min freq in MHz	Max freq in MHz	Noise Temp	Pwr ds max	Antenna pattern
▶ !				0.00000	0.00000			
* *								

Please select an Antenna Pattern from this list.

- 0 :: None
- 50 :: ABCDphi1 ::coefa 19 ::coefb 25 ::coefc 32 ::coefd 2
- 51 :: ABCDphi1 ::coefa 25 ::coefb 29 ::coefc 25 ::coefd 3
- 52 :: ABCDphi1 ::coefa 25 ::coefb 29 ::coefc 32 ::coefd 2
- 53 :: ABCDphi1 ::coefa 29 ::coefb 25 ::coefc 32 ::coefd 2
- 54 :: ABCDphi1 ::coefa 29 ::coefb 25 ::coefc 32 ::coefd 2
- 55 :: A-25\*LOG(FI) ::coefa ::coefb ::coefc ::coefd ::phi
- 56 :: A-25\*LOG(FI) ::coefa 27 ::coefb ::coefc ::coefd ::p

**A7a. Horizon Elevation**

Row No	Azimuth	Elevation Angle	Distance km
▶			
* *			

  
**A7b. Horizon Elevation**

Row No	Azimuth	Elevation Angle
▶		
* *		

1 Horizon Elevation rows

Save Back to List Close

# AP7 Capture Tool – New Input

**AP7 Input Capture** [Window Controls]

File Edit Help

NttRsn: N Earth Station Id: 104500148 Earth Station Parameters:

Specific Earth Station Name: **SOCHI/STELLA-111**  
 Typical

Date Rcv: 06.04.2004 Adm: RUS Ctry: RUS Long: 39 E 54 0 Lat: 43 N 29 0

Satellite Name: **INTELSAT7 66E** Long nom: 66 GSO

Satellite Beam Name	E/R	Gain	Cls of Stn	Min freq in MHz	Max freq in MHz	Noise Temp	Pwr ds max	Antenna pattern	Co
S1R	E	49.20	TC	14,089.00...	14,161.00...		-54.1	REC-580	
*									

A7a. Horizon Elevation

Row No	Azimuth	Elevation Angle	Distance km
1	0.0	0.0	
2	180.0	0.0	
3	360.0	0.0	
*			

3 Horizon Elevation rows

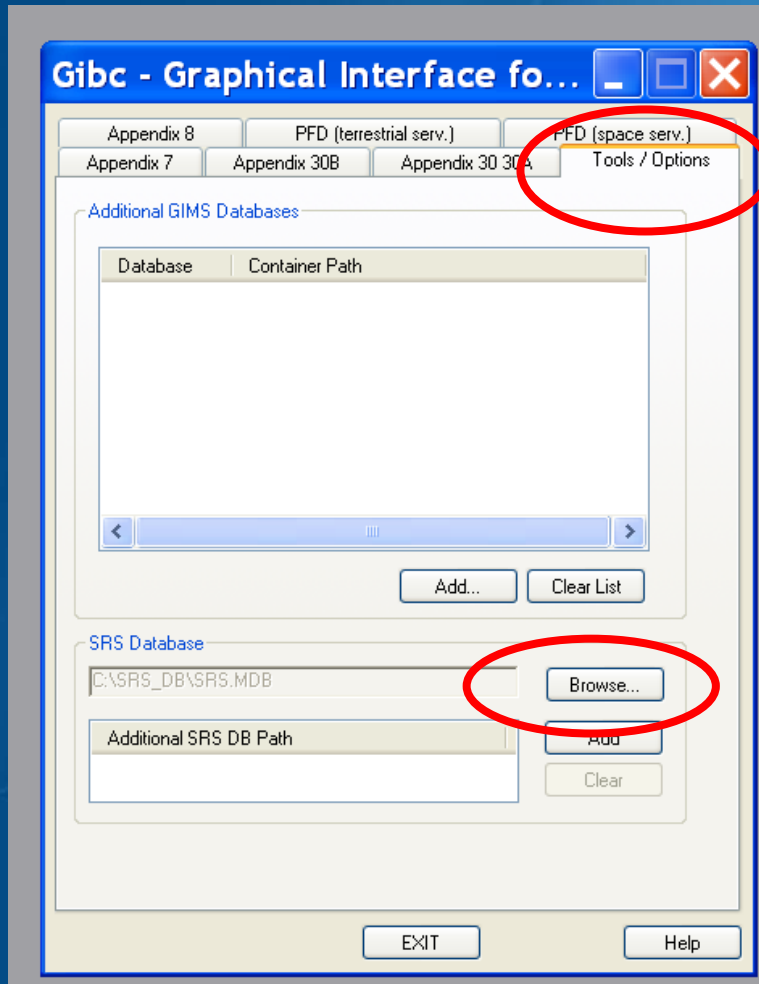
A7e. Min Antenna Elevation

Row No	Azimuth	Elevation Angle
*		

Buttons: Save, Save As, Back to List, Close

# GIBC/ AP 7- Input Database

## Database file location- Tools/ Options page



Use the **browse** button to:

- select the srs.mdb from the latest BR-IFIC ( in the DVD drive)
- select a different input database file

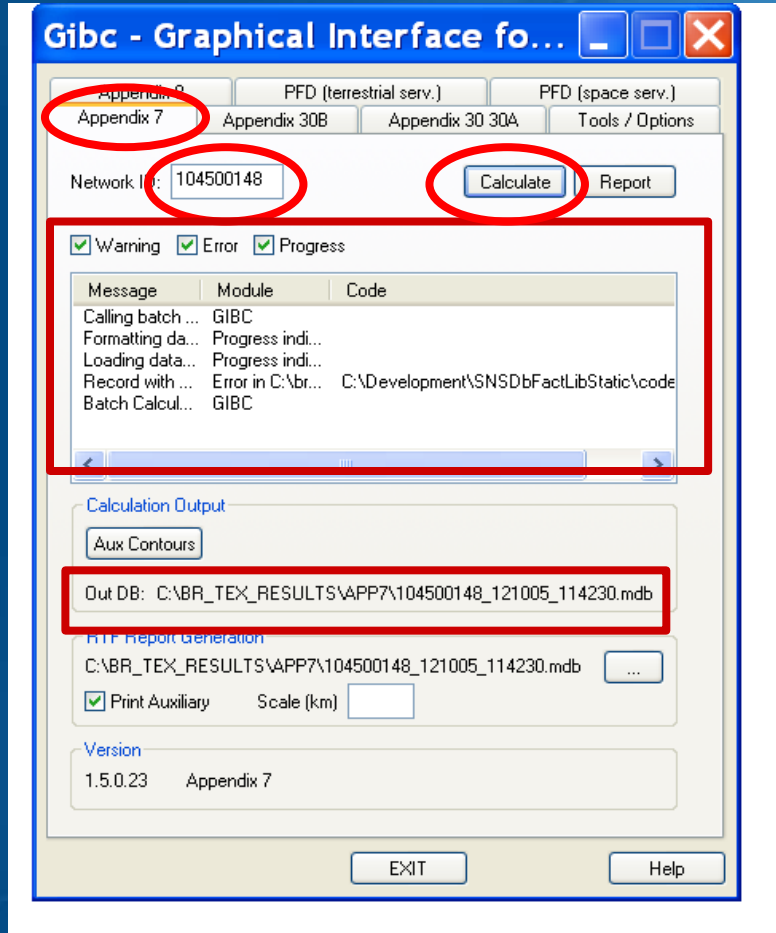


Select the Tools & Options tab

Check the SRS database file location

Select the input WRS12-Workshop\_srs.MDB file

# GIBC/AP 7- Calculation



How to Proceed?

- Select the Appendix 7 tab
- Enter ES Network ID
- Press Calculate

Check Progress of Calculation

Select type of messages :  
Warning\Error\Progress

Results in MS–Access file  
Each calculation in a separate file  
Results Directory:

C:\BR\_TEX\_RESULTS\APP7

Naming convention:

NetworkId\_Date\_Time.mdb



Select the Appendix 7 tab

Enter the Network Id of the earth station (test case 104500375)

Press Calculate

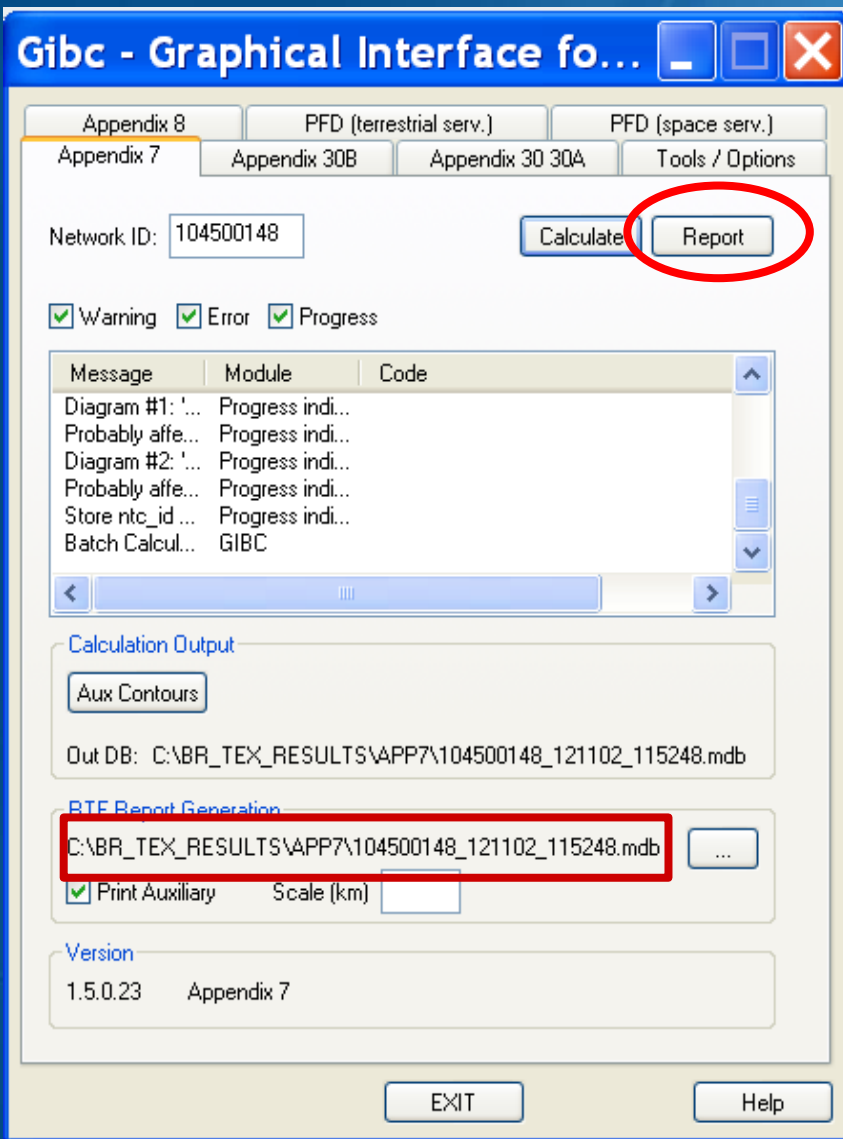


Appendix 7  
Calculation





# GIBC/AP 7- Generate Report

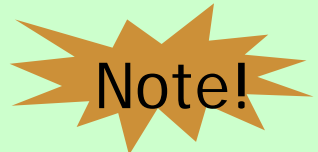


Ap7print.rtf



After an Appendix 7 calculation...

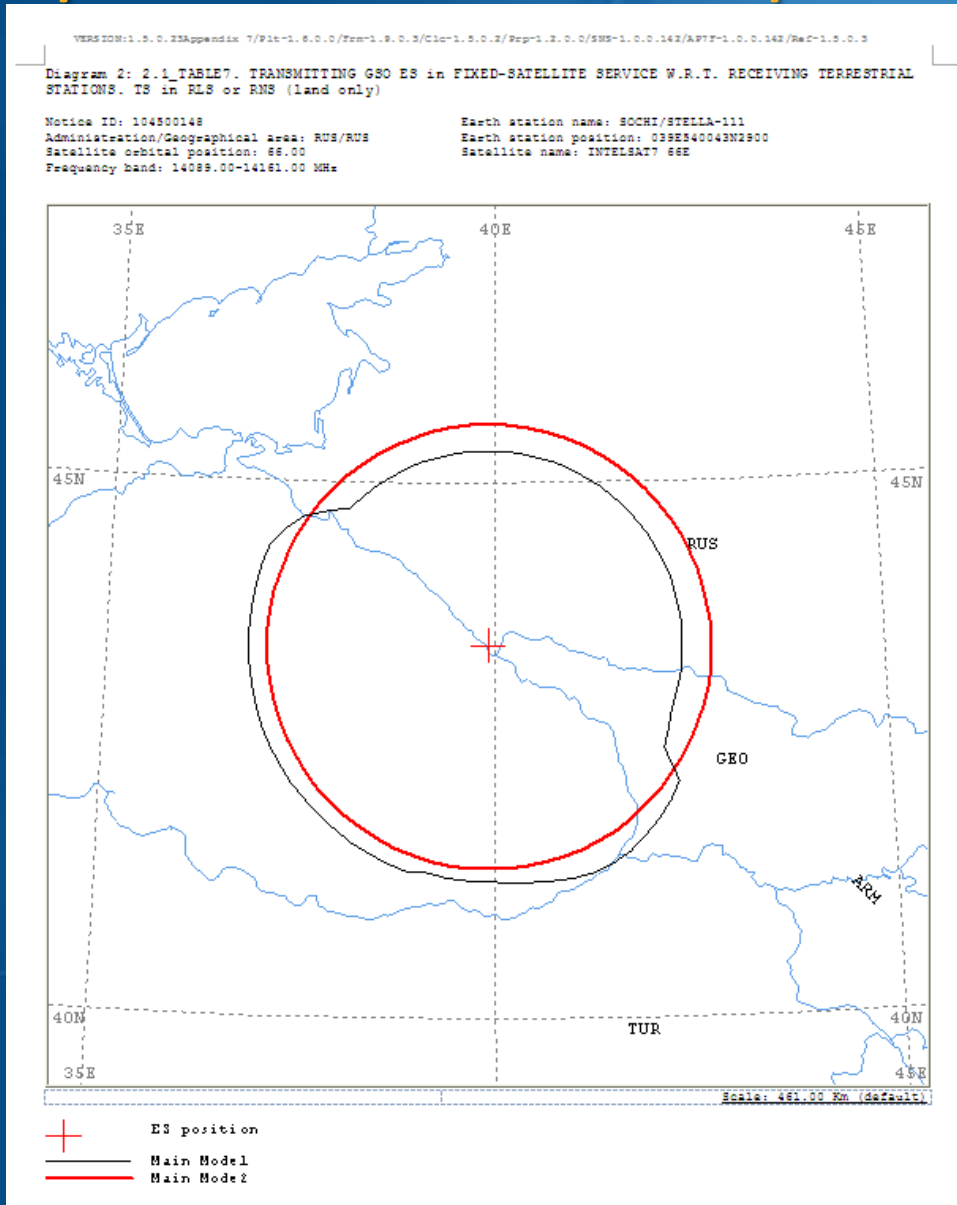
■ **Just Press the Report button**



**Ap7Print.RTF is rewritten each time!!!**  
**If the file is locked you will get an error message.**

Generate report

# Report Document- Graphics



## Ap7Print.RTF Document

### Graphics:

Contains diagrams displaying:

- Title
- Details
- Coordination Contours
  - Main Mode I and II
  - Auxiliary Contours
- Country codes
- Legend



Edits the Ap7Print.RTF file in the C:\br\_tex\_results\ap7 folder

# Report Document- Details

ANALYSIS DATE AND TIME: 2012-11-02 11:52:49  
 VERSION: 1.5.0.23Appendix 7/Plt-1.6.0.0/Frm-1.9.0.3/Clc-1.5.0.2/Prp-1.2.0.0/SNS-1.0.0.142/AP7F-1.0.0.142/Ref-1.5.

Diagram 2: 2.1\_TABLE7. TRANSMITTING GSO ES in FIXED-SATELLITE SERVICE W.R.T. RECEIVING

NOTICE ID: 104500148 EARTH STATION NAME: SOCHI/STELLA-111 EARTH STATION PO  
 ADM/GEO\_AREA: RUS/RUS RAIN CLIMATICAL\_ZONE: K  
 SATELLITE NAME: INTELSAT7 66E SATELLITE ORBITAL POSITION: 66.00 DEG  
 ANTENNA AZIMUTH: 144.55 DEG ANTENNA ELEVATION: 33.42 DEG  
 FREQUENCY BAND: 14089.00-14161.00 MHZ ASSIGNED FREQUENCY: 14125.00 MHZ  
 MAXIMUM ANTENNA GAIN: 49.2 DBI MAXIMUM POWER DENSITY: -54.1 DBW/HZ  
 ANTENNA PATTERN: APEREC004V01  
 2.1\_TABLE7 Model: PLM\_DUCTING

TRANSMISSION LOSS MODE 1: 182.9 DB (DOES NOT INCLUDE HOR. CORR. AND ANT. GAIN)  
 TRANSMISSION LOSS MODE 2: 146.9 DB

AZIMUTH	0	5	10	15	20	25	30	35	40	45	50	55	60	65
OFF-AXIS	132.8	129.4	125.8	122.1	118.3	114.3	110.3	106.2	102.1	98.0	93.8	89.6	85.5	81.3
HOR. ELEV.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOR. CORR.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANT. GAIN	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
COORDINATION DISTANCE (KM)														
MODE 1														
0.0 DB	202	202	202	202	202	202	202	202	202	202	202	202	202	202
MODE 2														
0.0 DEG	229	229	229	229	230	230	230	230	230	230	230	231	231	231

AZIMUTH	120	125	130	135	140	145	150	155	160	165	170	175	180	185
OFF-AXIS	40.6	38.1	36.1	34.6	33.7	33.4	33.8	34.8	36.4	38.5	41.1	44.0	47.2	50.6
HOR. ELEV.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOR. CORR.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANT. GAIN	-8.2	-7.5	-6.9	-6.5	-6.2	-6.1	-6.2	-6.5	-7.0	-7.7	-8.3	-9.1	-9.8	-10.0
COORDINATION DISTANCE (KM)														
MODE 1														
0.0 DB	211	243	248	252	256	260	261	260	257	253	250	248	244	245
MODE 2														
0.0 DEG	232	232	233	233	233	233	233	233	233	232	232	232	232	232

AZIMUTH	240	245	250	255	260	265	270	275	280	285	290	295	300	305
OFF-AXIS	94.5	98.7	102.8	107.0	111.0	115.0	119.0	122.8	126.5	130.1	133.4	136.6	139.4	141.9
HOR. ELEV.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HOR. CORR.	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANT. GAIN	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
COORDINATION DISTANCE (KM)														
MODE 1														
0.0 DB	249	249	249	249	249	249	249	249	249	249	249	249	243	234
MODE 2														
0.0 DEG	230	230	230	230	230	230	230	229	229	229	229	229	229	229

PROBABLY AFFECTED COUNTRIES: GEO TUR

- Coordination distances at 72 azimuths
- (0-355degrees at 5 deg steps)
- Details of the calculation
- Intermediate data
- List of affected countries

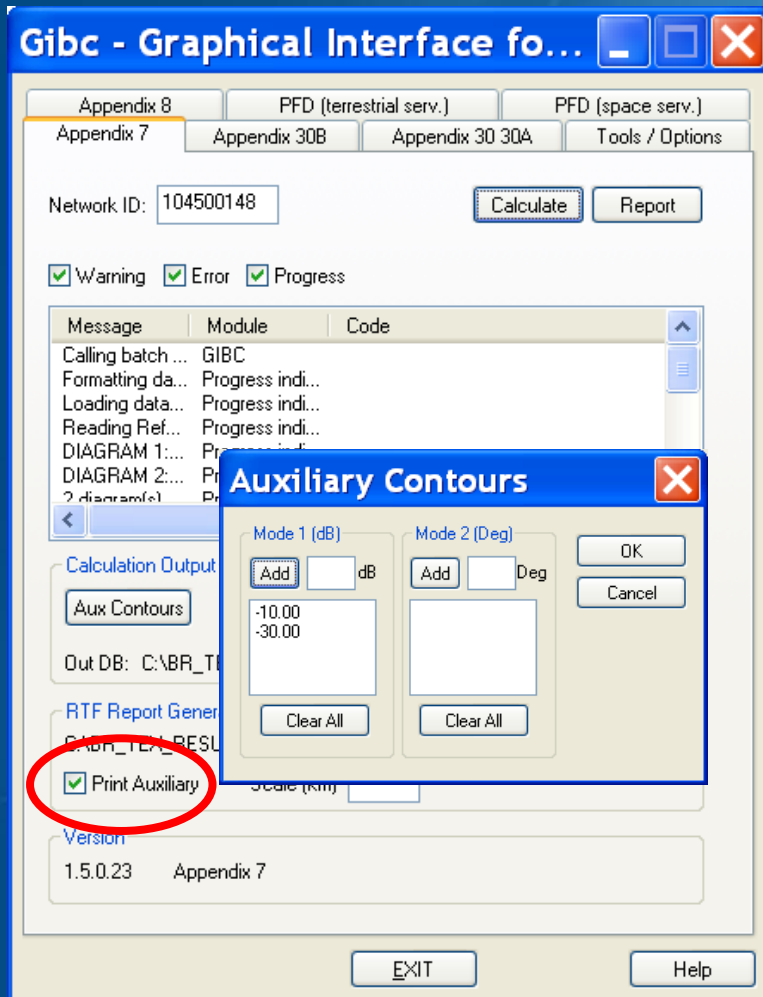


Print the Report Document

# Auxiliary Contours

Auxiliary Mode 1 : Reduced required loss expressed in dB

Auxiliary Mode 2 : Angular offset between beams expressed in degrees



How to produce auxiliary contours?

- Press **Auxiliary Contours** button
- Enter the values in the list
  - Mode 1 (dB) (negative values)
  - Mode 2 (deg)
- Perform the Calculation



To add Mode 1 aux contours press the **Auxiliary Contours** button.

Add Mode 1 Contours (-10dB, -30dB)

Perform Calculation

Perform Report Generation

# Printing Options

## Print Auxiliary

Check **Print Auxiliary** (if auxiliary contours information exists).

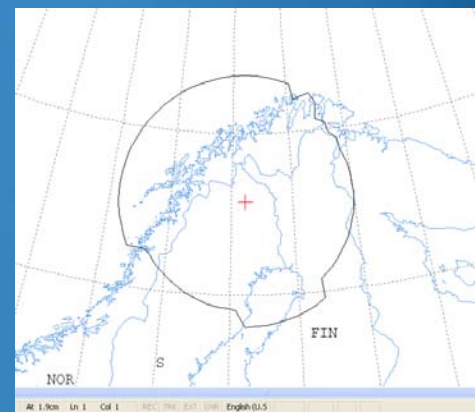
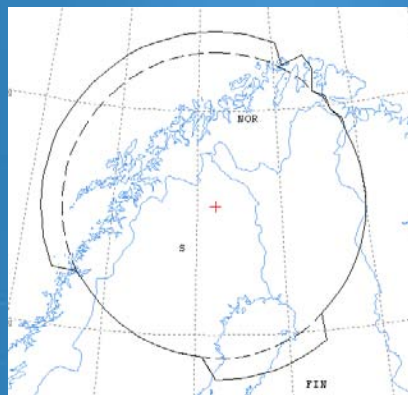
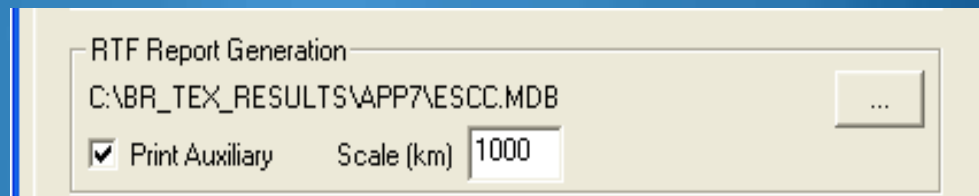
This option is without effect if there is not any auxiliary contours information in the database.

## Distance\Scale

Size of the window of the map (expressed in Km).

By default automatic value is selected that accommodates the diagram.

Useful in comparing results from two different earth stations.



Uncheck the **Print Auxiliary Contours** option

Specify 1000Km

Perform Report Generation

Check the report file



# Proposed Exercises

## Generation of coordination contours:

### ➤ 1<sup>st</sup> exercise: FSS Transmitting and Receiving ES in the 6/4 GHz band

-Input example database (SNS format):

[Tx&RxEarthStation@6&4GHz.mdb](#)

-ES name: HELSINKI TEHTAANKATU

-ES Notice ID: Ex.1.1 112505404(with non-zero deg. horizon elevation angles)

Ex.1.2 112505405(with zero deg. horizon elevation angles)

### ➤ 2<sup>nd</sup> exercise: FSS Transmitting ES in the 8 GHz band

-Input example database (SNS format):

[TxEarthStation@8GHz.mdb](#)

-ES name: VERONA

-ES Notice ID: Ex. 2.1 107500164(with non-zero deg. horizon elevation angles)

Ex. 2.2 107500165(with zero deg. horizon elevation angles)



# Exercise 1

## FSS Transmitting and Receiving ES in the 6/4 GHz band

Input database (SNS format):

**Tx&RxEarthStation@6&4GHz.mdb**

ES name: **HELSINKI TEHTAANKATU**

Ex. 1.1 ES notice id: **112505404** (non-zero deg. horizon elevation angles)

- Ex. 1.2 ES notice id: **112505405** (zero deg. horizon elevation angles)



Folder contents:  
Solution\_Ex\_1.1  
Solution\_Ex\_1.2  
Tx&RxEarthStation@6&4GHz.mdb

# Exercise 1- AP7 Capture/View

**AP7 Input Capture**

File Edit Help

Open Database

New AP7 Input

Please type in a Notice ID or Station name and press Display:

Notice ID:

Station name:

Display

Select an Earth Station

ntc_id	stn_name	adm	ntwk_org	cty	long deg	long_ew	long_min	long_sec	lat deg
112505404	HELSINKI TEHTA...	FIN		FIN	24	E	57	13	60
112505405	HELSINKI TEHTA...	FIN		FIN	24	E	57	13	60

Edit Earth Station

Clone Earth Station

Select an earth station from the list

View/Edit 1<sup>st</sup> Earth Station

2 earth stations found.

C:\BR\_SOFT\Data\TxRxEarthStation@64GHz.mdb

# Exercise 1- AP7 Capture/View

**AP7 Input Capture**

File Edit Help

IntRsn: D Earth Station Id: 112505404 Earth Station Parameters:

Specific Earth Station Name: **HELSINKI TEHTAANKATU**

Typical

Date Rcv: 12.11.12 Adm: FIN Ctry: FIN Deg: 24 E Min: 57 Sec: 13 Lat: 60 N Min: 9 Sec: 31

Satellite Name: EXPRESS-3 Long nom: -11 GSO

Satellite Beam Name	E/R	Gain	dgso	Cls of Stn	Min freq in MHz	Max freq in MHz	Noise Temp	Pwr ds max	Antenna pattern
OGE	E	38.00		TC	6'241.44000	6'242.44000		-51.0	A-25*LOC
ZER	R	34.30		TC	3'941.26000	3'942.26000	400		A-25*LOC
*									

Save Save As Back to List Close

**A7a. Horizon Elevation**

Row No	Azimuth	Elevation Angle	Distance km
1	0.0	5.0	
2	5.0	5.0	
3	10.0	2.0	

**A7e. Min Antenna Elevation**

Row No	Azimuth	Elevation Angle
*		

**Back to the List**

**Horizon Elevation Angles (non-zero deg.)**

C:\BR\_SOFT\Data\TxRxEarthSta

# Exercise 1- AP7 Capture/View

**AP7 Input Capture**

File Edit Help

Open Database

New AP7 Input

Please type in a Notice ID or Station name and press Display:

Notice ID:

Station name:

Display

Select an Earth Station

ntc_id	stn_name	adm	ntwk_org	ctry	long deg	long_ew	long_min	long_sec	lat_deg
112505404	HELSINKI TEHTA...	FIN		FIN	24	E	57	13	60
112505405	HELSINKI TEHTA...	FIN		FIN	24	E	57	13	60

Edit Earth Station

Clone Earth Station

2 earth stations found.

C:\BR\_SOFT\Data\TxRxEarthStation@64GHz.mdb

**View/Edit 2<sup>nd</sup> Earth Station**



# Exercise 1 - AP7 Capture/View

## AP7 Input Capture

File Edit Help

ntfRsn: D Earth Station Id: 112505405 Earth Station Parameters:

Specific Earth Station Name: **HELSINKI TEHTAANKATU**  
 Typical

Date Rcv: 12.11.12 Adm: FIN Ctry: FIN Deg: 24 E Min: 57 Sec: 13 Lat: 60 N 9 31  
Long: 24 E 57 13

Satellite Name: EXPRESS-3 Long nom: -11 GSO

	Satellite Beam Name	E/R	Gain	dgso	Cls of Stn	Min freq in MHz	Max freq in MHz	Noise Temp	Pwr ds max	Antenna pattern
▶	OGE	E	38.00		TC	6'241.44000	6'242.44000		-51.0	A-25*LOC
	ZER	R	34.30		TC	3'941.26000	3'942.26000	400		A-25*LOC
*										

Save Save As Back to List **Close**

A7a. Horizon Elevation

Row No	Azimuth	Elevation Angle	Distance km
▶ 1	0.0	0.0	
2	5.0	0.0	
3	10.0	0.0	

A7e. Min Antenna Elevation

Row No	Azimuth	Elevation Angle
▶		
*		

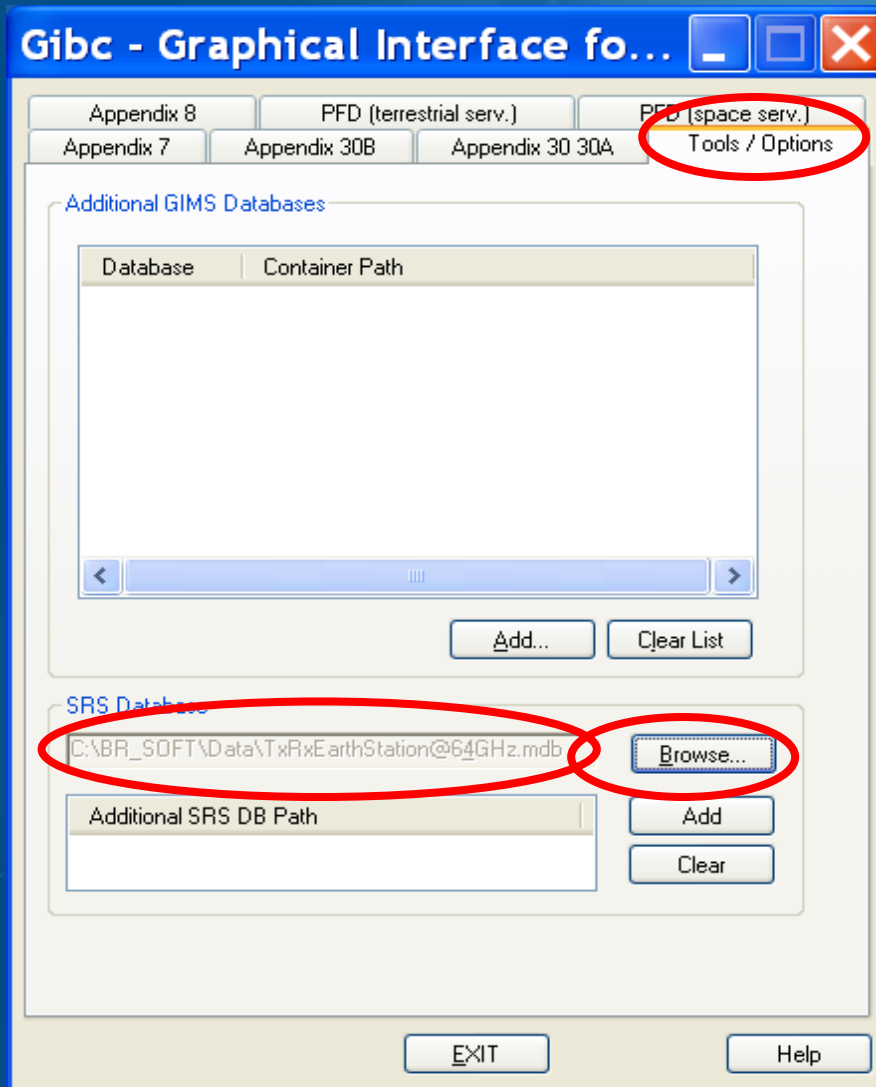
14 Horizon Elevation

**Close AP7 Capture**

**Zero degree Horizon Elevation Angles**

C:\BR\_SOFT\Data\TxRxEarthStator...

# Exercise 1 - GIBC – Open input Database

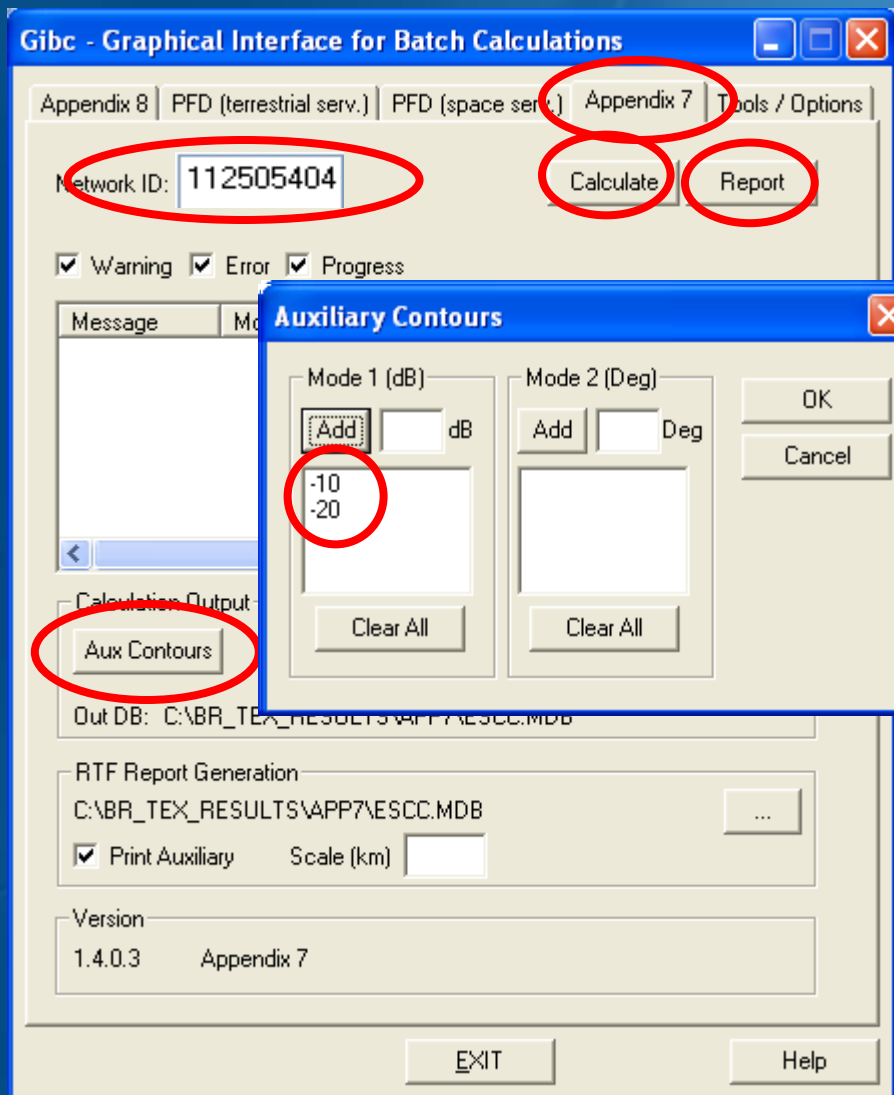


- Run GIBC
- Select the Tools & Options tab
- Change the SRS database reference input file:

⇒ Browse and Select the following file from the Workshop directory

Tx&RxEarthStation@6&4GHz .mdb

# Exercise 1 - GIBC – Calculate



- Select the Appendix 7 tab
- Enter the 1<sup>st</sup> Earth Station notice Id. (Ex. 1.1 Non-Zero deg horizon elevation angle):

112505404

- Select the values for generating Auxiliary Contours :
  - 10 dB and -20 dB for mode 1
- Calculate
- Create and Open the Report

# GIBC –Results –Exercise 1.1(Tx)

Diagram 1: 2.1\_TABLE7. TRANSMITTING GSO ES in FIXED-SATELLITE SERVICE W.R.T. RECEIVING TERRESTRIAL STATIONS. TS in FS or MS

Notice ID: 112505404

Administration/Geographical area: FIN/FIN

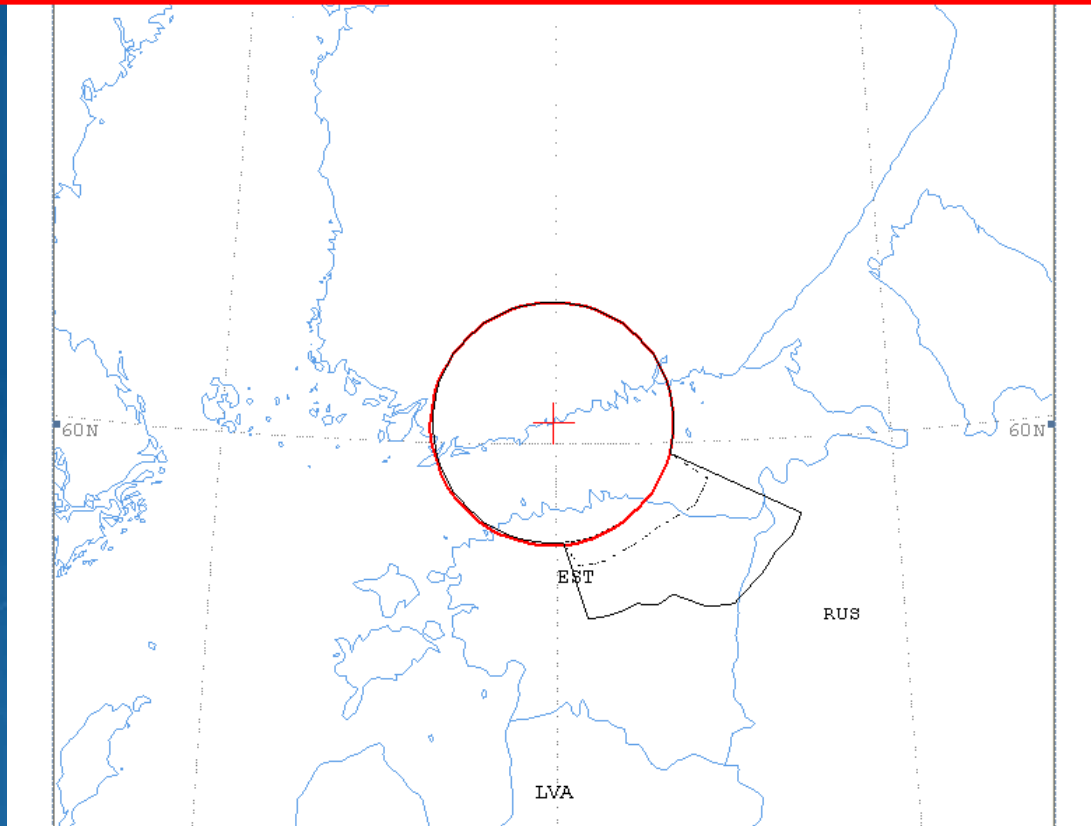
Satellite orbital position: -11.00

Frequency band: 6241.44-6242.44 MHz

Earth station name: HELSINKI TEHTAANKATU

Earth station position: 024E571360N0931

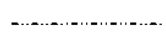
Satellite name: EXPRESS-3



Scale: 419.00 Km (default)



ES position



Aux. Model -10.0dB



Aux. Model -20.0dB



Main Model1



Main Mode2

# GIBC –Results –Exercise 1.1 (Tx)

Diagram 1: 2.1\_TABLE7. TRANSMITTING GSO ES in FIXED-SATELLITE SERVICE W.R.T. RECEIVING TERRESTRIAL STA

NOTICE ID: 112505404 EARTH STATION NAME: HELSINKI TEHTAANKATU EARTH STATION POSITION: 024E571360  
 ADM/GEO\_AREA: FIN/FIN RAIN CLIMATICAL\_ZONE: E  
 SATELLITE\_NAME: EXPRESS-3 SATELLITE\_ORBITAL\_POSITION: -11.00 DEG  
 ANTENNA\_AZIMUTH: 219.90 DEG ANTENNA\_ELEVATION: 15.38 DEG  
 FREQUENCY\_BAND: 6241.44-6242.44 MHZ ASSIGNED\_FREQUENCY: 6241.94 MHZ PERCENTAGE\_OF\_TIME: 100  
 MAXIMUM\_ANTENNA\_GAIN: 38.0 DBI MAXIMUM\_POWER\_DENSITY: -51.0 DBW/HZ NOISE\_TEMPERATURE: 293.15 K  
 ANTENNA\_PATTERN: APENST806V01  
 2.1\_TABLE7 Model: PLM\_DUCTING

TRANSMISSION\_LOSS\_MODE\_1: 162.0 DB (DOES NOT INCLUDE HOR. CORR. AND ANT. GAIN)  
 TRANSMISSION\_LOSS\_MODE\_2: 116.0 DB

AZIMUTH	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	
OFF-AXIS	135.5	139.9	145.7	149.9	153.7	157.2	160.1	162.0	162.6	161.9	160.0	157.1	153.6	149.7	145.5	141.2	136.7	132.0	
HOR.ELEV.	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
HOR.CORR.	35.0	35.0	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	
ANT.GAIN	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	
COORDINATION DISTANCE (KM)																			
MODE 1																			
0.0 DB	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
-10.0 DB	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
-20.0 DB	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
MODE 2																			
0.0 DEG	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
AZIMUTH	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	
OFF-AXIS	99.5	94.7	89.9	85.1	80.3	75.5	70.7	65.9	61.1	56.3	51.6	46.6	41.9	37.3	31.9	27.5	23.2	19.0	
HOR.ELEV.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	3.0	3.0	3.0	3.0	
HOR.CORR.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.6	23.6	23.6	33.0	33.0	33.0	33.0	
ANT.GAIN	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-8.6	-7.0	-5.1	-3.0	
COORDINATION DISTANCE (KM)																			
MODE 1																			
0.0 DB	213	213	212	213	199	174	174	165	166	166	166	100	100	100	100	100	100	100	
-10.0 DB	136	131	127	123	122	121	121	121	122	122	121	100	100	100	100	100	100	100	
-20.0 DB	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
MODE 2																			

PROBABLY AFFECTED COUNTRIES: EST RUS

# GIBC – Results – Exercise 1.1 (Rx)

Diagram 2: 2.1\_TABLE8. RECEIVING GSO ES in FIXED-SATELLITE SERVICE W.R.T. TRANSMITTING TERRESTRIAL STATIONS. TS in FS or MS

Notice ID: 112505404

Administration/Geographical area: FIN/FIN

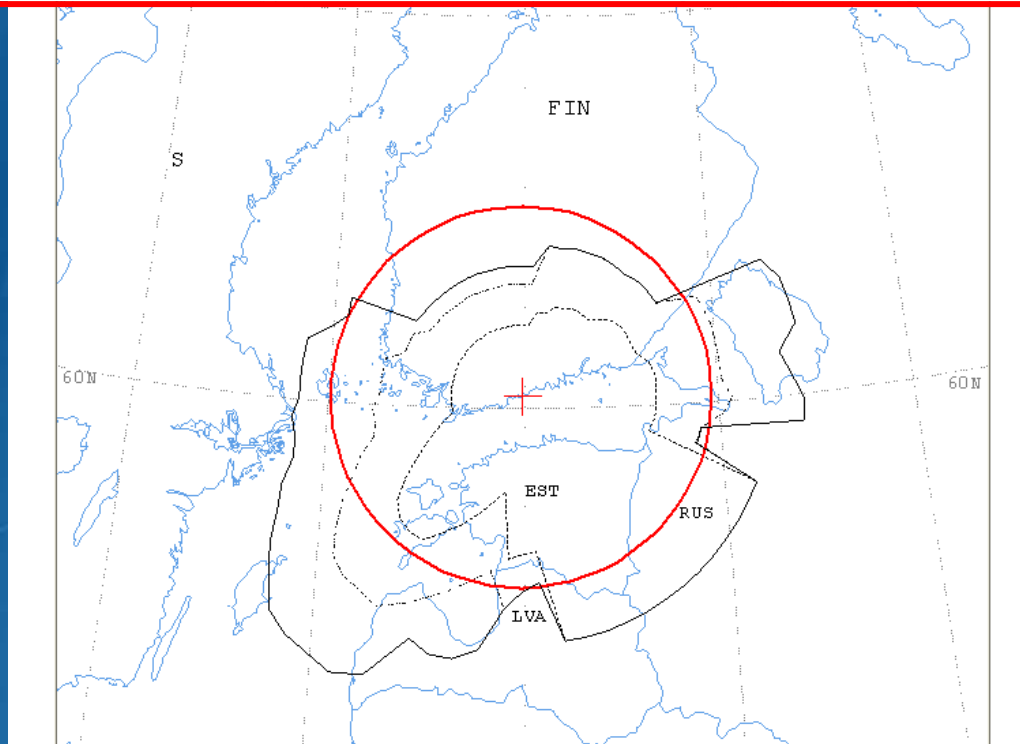
Satellite orbital position: -11.00

Frequency band: 3941.26-3942.26 MHz

Earth station name: HELSINKI TEHTAANKATU

Earth station position: 024E571360N0931

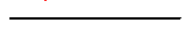
Satellite name: EXPRESS-3



Scale: 679.00 Km (default)



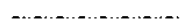
ES position



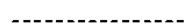
Main Model1



Main Model2



Aux. Model -10.0dB



Aux. Model -20.0dB



# GIBC – Results – Exercise 1.1 (Rx)

Diagram 2: 2.1\_TABLE8. RECEIVING GSO ES in FIXED-SATELLITE SERVICE W.R.T. TRANSMITTING TERRESTRIAL STATIONS. TS in FS or MS

NOTICE ID: 112505404 EARTH STATION NAME: HELSINKI TEHTAANKATU EARTH STATION POSITION: 024E571360N0931 PHASE: D  
 ADM/GEO AREA: FIN/FIN RAIN CLIMATICAL ZONE: E  
 SATELLITE NAME: EXPRESS-3 SATELLITE ORBITAL POSITION: -11.00 DEG  
 ANTENNA AZIMUTH: 219.90 DEG ANTENNA ELEVATION: 15.38 DEG  
 FREQUENCY BAND: 3941.26-3942.26 MHZ ASSIGNED FREQUENCY: 3941.76 MHZ PERCENTAGE OF TIME: 0.0017 %  
 MAXIMUM ANTENNA GAIN: 34.3 DBI MAXIMUM POWER DENSITY: - DBW/HZ NOISE TEMPERATURE: 400.0 K  
 ANTENNA PATTERN: APENST806V01  
 2.1\_TABLE8 Model: PLM\_DUCTING

TRANSMISSION LOSS MODE 1: 198.9 DB (DOES NOT INCLUDE HOR. CORR. AND ANT. GAIN)  
 TRANSMISSION LOSS MODE 2: 156.9 DB

AZIMUTH	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115
OFF-AXIS	135.5	139.9	145.7	149.9	153.7	157.2	160.1	162.0	162.6	161.9	160.0	157.1	153.6	149.7	145.5	141.2	136.7	132.1	127.5	122.8	118.1	113.4	109.2	104.4
HOR. ELEV.	5.0	5.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	0.0
HOR. CORR.	35.0	35.0	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	0.0	0.0
ANT. GAIN	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
COORDINATION DISTANCE (KM)																								
MODE 1																								
0.0 DB	184	184	216	216	222	223	226	226	226	231	231	231	389	402	402	402	371	383	401	401	259	257	354	354
-10.0 DB	159	159	216	216	222	223	226	226	226	231	231	231	285	286	286	286	283	285	298	286	258	256	354	354
-20.0 DB	101	101	122	122	134	137	142	143	143	155	165	171	172	171	173	187	190	190	190	190	190	187	354	354
MODE 2																								
0.0 DEG	269	269	269	269	269	268	268	268	268	268	268	268	269	269	269	269	269	269	269	269	270	270	270	270
AZIMUTH	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215	220	225	230	235
OFF-AXIS	99.5	94.7	89.9	85.1	80.3	75.5	70.7	65.9	61.1	56.3	51.6	46.6	41.9	37.3	31.9	27.5	23.2	19.2	15.8	13.3	12.4	13.4	15.9	19.3
HOR. ELEV.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
HOR. CORR.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.5	21.5	21.5	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
ANT. GAIN	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-8.6	-7.0	-5.1	-3.1	-0.9	0.9	1.7	0.9	-1.0	-3.2
COORDINATION DISTANCE (KM)																								
MODE 1																								
0.0 DB	354	354	354	354	354	354	354	354	354	354	354	265	280	303	367	386	391	380	457	479	476	479	471	439
-10.0 DB	354	354	354	354	354	354	354	354	354	354	354	265	280	303	252	271	292	315	340	363	360	361	351	323
-20.0 DB	354	354	354	354	354	354	354	354	354	354	354	222	226	232	138	156	177	201	225	249	252	244	231	202
MODE 2																								
0.0 DEG	270	271	271	271	271	271	272	272	272	272	272	272	273	273	273	273	273	273	273	273	273	273	273	273
AZIMUTH	240	245	250	255	260	265	270	275	280	285	290	295	300	305	310	315	320	325	330	335	340	345	350	355
OFF-AXIS	23.3	27.6	32.1	36.7	41.4	46.1	50.5	55.3	60.1	64.9	69.5	74.3	79.1	84.0	88.8	93.6	98.4	103.1	107.9	112.6	117.3	121.9	126.6	131.1
HOR. ELEV.	3.0	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
HOR. CORR.	33.0	33.0	33.0	33.0	33.0	33.0	34.0	34.0	34.0	34.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
ANT. GAIN	-5.2	-7.0	-8.7	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
COORDINATION DISTANCE (KM)																								
MODE 1																								
0.0 DB	413	383	364	336	328	328	316	316	316	289	272	280	185	184	184	184	184	184	184	184	184	184	184	184
-10.0 DB	293	264	245	219	213	213	202	202	202	179	178	178	161	159	159	159	159	159	159	159	159	159	159	159
-20.0 DB	172	145	126	104	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101

PROBABLY AFFECTED COUNTRIES: EST LVA RUS S |

# GIBC –Results - Exercise 1.1

Ap7Print [Read-Only] [Compatibility Mode] - Microsoft Word

VERSION: Test Pack  
SPACEAPT\2.0.0.0/Fls-2.0.0.0/Fm-2.0.0.0/Clc-2.0.0.0/Exp-1.2.0.0/SNS-2.0.0.0/APTF-2.0.0.0/Ref-2.0.0.0

1 TABLE7. TRANSMITTING GSO ES in FIXED-SATELLITE SERVICE W.R.T. RECEIVING TERRESTRIAL in FS or MS

OS404  
Geographical area: FIM/FIN  
Earth station name: HELSINKI TEMTAAHATU  
Earth station position: 024E571060W0931  
Satellite name: EXPRESS-3  
al position: -11.00  
6241.44-6242.44 MHz

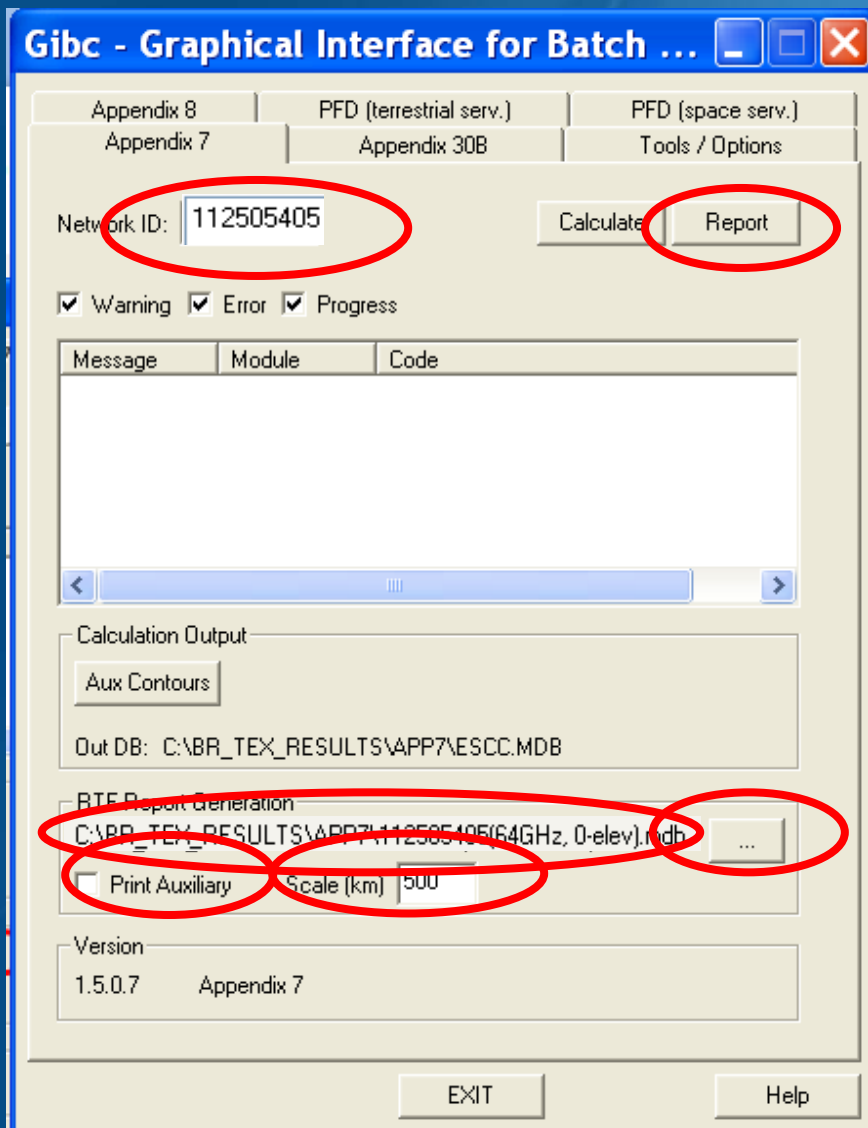
LVA

Scale: 419.00 Km (default)

- Remember to save this file with a Specific Name
- Otherwise it will be rewritten at next run!
- We did it for you, in the solutions folder, with the following file name:

**112505404(6&4GHz, Non-0-elev).rtf**

# GIBC – Report re-generation – Exercise 1.2



- Run GIBC
- Select the Appendix 7 page
- Enter the 2<sup>nd</sup> Earth Station notice Id. (Ex.1.2 Zero deg horizon elevation angle):

112505405

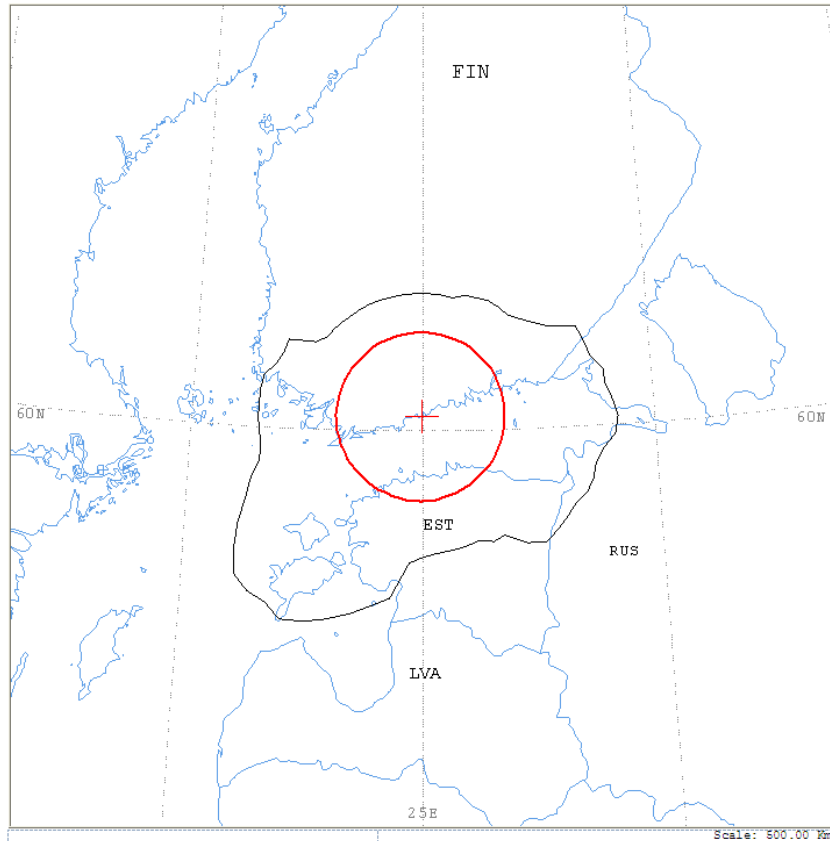
- Select resulting database  
112505405(6&4GHz, 0-elev).mdb
- Disable print of auxiliary contours
- Enter a value for the scale
- Re-create the output Report

# GIBC –Results - Exercise 1.2

Diagram 1: 2.1\_TABLE7. TRANSMITTING GSO ES in FIXED-SATELLITE SERVICE W.R.T. RECEIVING TERRESTRIAL STATIONS. TS in FS or MS

Notice ID: 112505405  
Administration/Geographical area: FIN/FIN  
Satellite orbital position: -11.00  
Frequency band: 6241.44-6242.44 MHz

Earth station name: HELSINKI TEHTAANKATU  
Earth station position: 024E571360N0931  
Satellite name: EXPRESS-3



+ ES position  
— Main Model  
— Main Mode2

Diagram 2: 2.1\_TABLE8. RECEIVING GSO ES in FIXED-SATELLITE SERVICE W.R.T. TRANSMITTING TERRESTRIAL STATIONS. TS in FS or MS

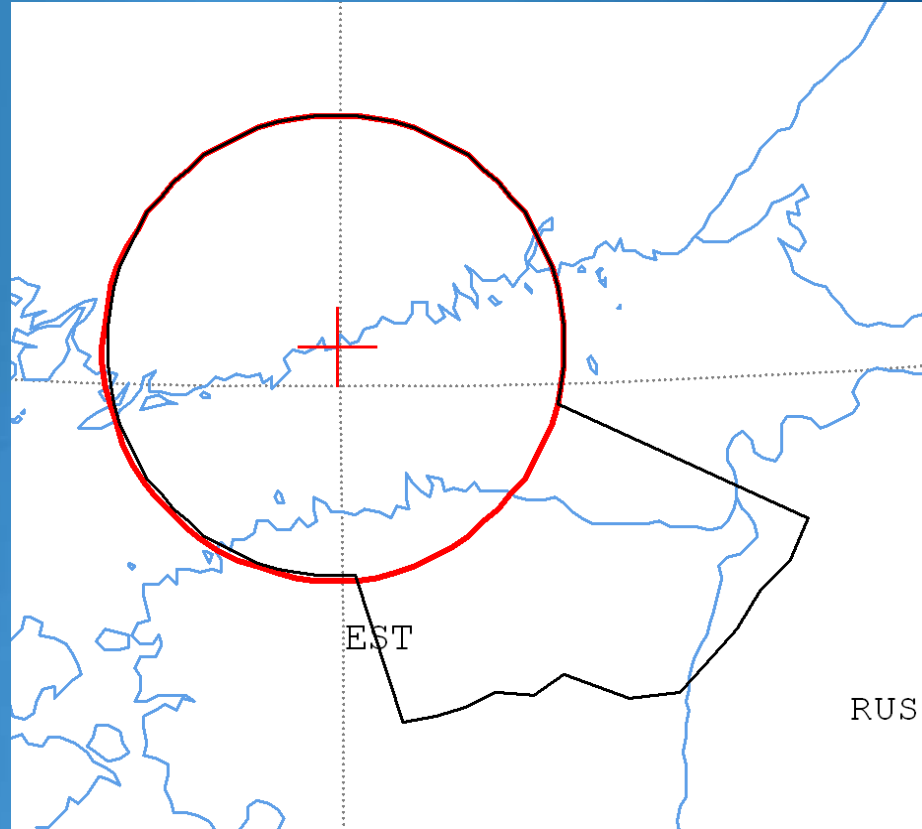
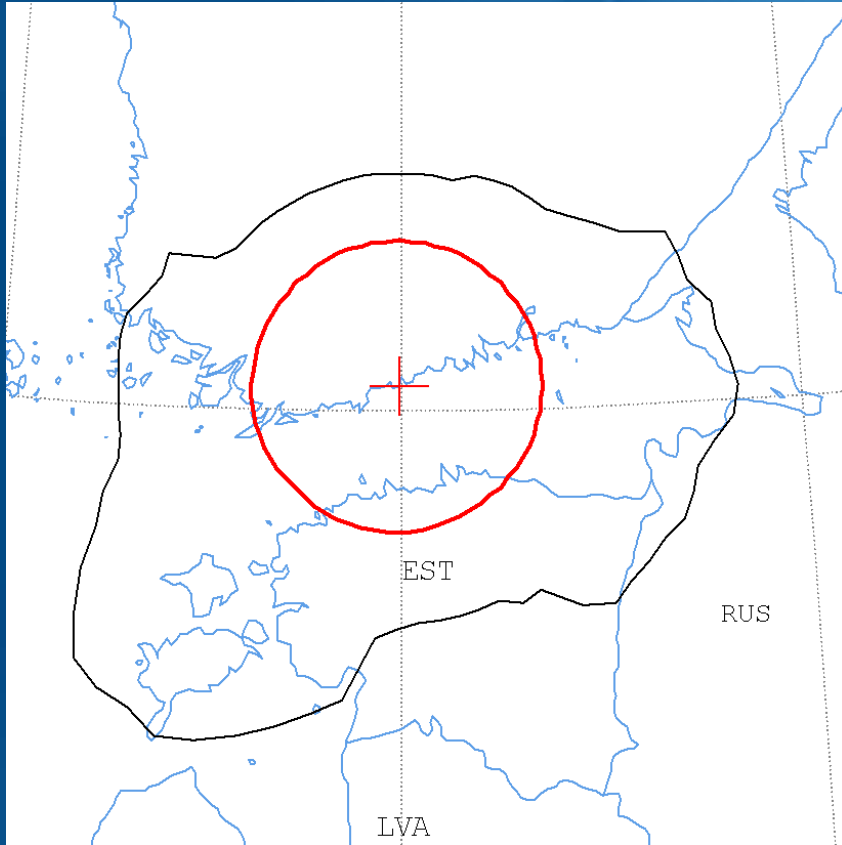
Notice ID: 112505405  
Administration/Geographical area: FIN/FIN  
Satellite orbital position: -11.00  
Frequency band: 3941.26-3942.26 MHz

Earth station name: HELSINKI TEHTAANKATU  
Earth station position: 024E571360N0931  
Satellite name: EXPRESS-3



Scale: 1049.00 Km (default)

# Exercise 1 – GIBC – Compare Results (Tx)



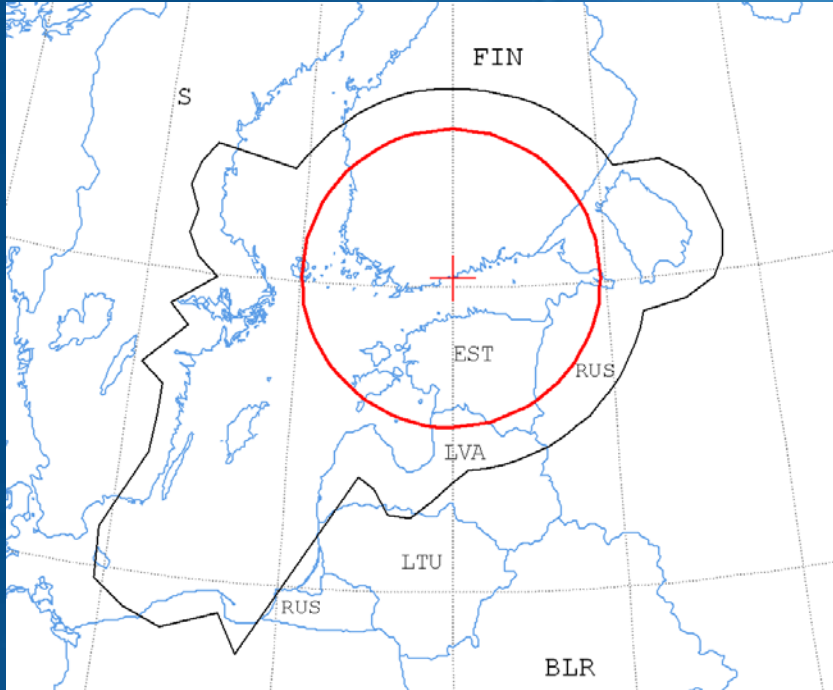
Zero-degree horizon elevation angles

Non-zero-degree horizon elevation angles

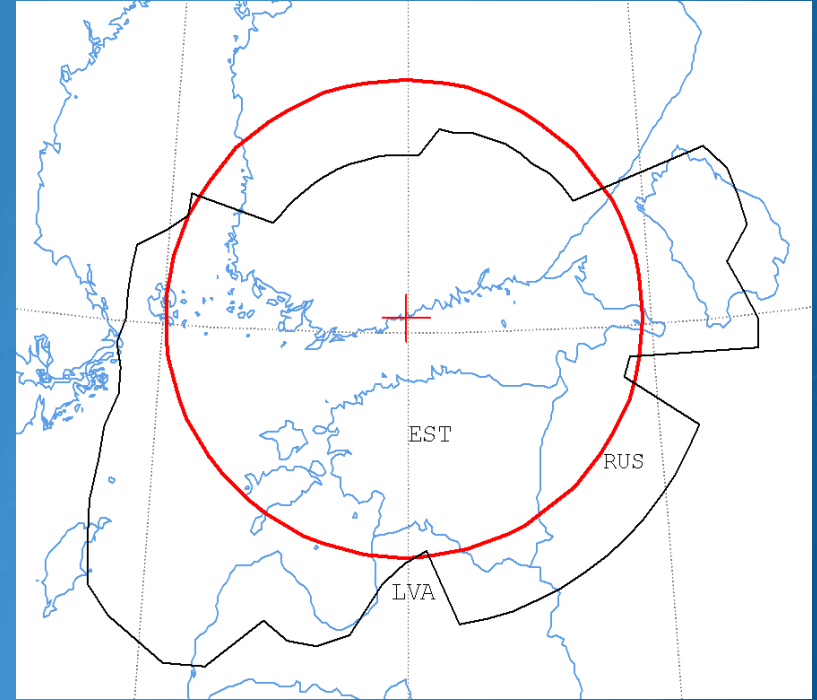
PROBABLY AFFECTED COUNTRIES:  
EST RUS

PROBABLY AFFECTED COUNTRIES:  
EST RUS

# Exercise 1 – GIBC – Compare Results (Rx)



Zero-degree horizon elevation angles



Non-zero-degree horizon elevation angles

**PROBABLY AFFECTED COUNTRIES:**  
DNK EST LTU LVA POL RUS S

**PROBABLY AFFECTED COUNTRIES:**  
EST LVA RUS S



# Exercise 2

## FSS Transmitting ES in the 8 GHz band

Input example database (SNS format):

**TxEarthStation@8GHz.mdb**

ES name: **VERONA**

- Ex. 2.1 ES Notice Id: **107500164** (non-zero deg. horizon elevation angles)
- Ex. 2.2 ES Notice Id: **107500165** (zero deg. horizon elevation angles)



Solution\_Ex\_2.1  
Solution\_Ex\_2.2  
TxEarthstation@8ghz.mdb

# Exercise 2 – GIBC – Results



- FSS Transmitting Earth Station in 8 GHz band
- Input database file:

`TxEarthStation@8GHz.mdb`

- Results in following files:

- For Ex. 2.1 with non-zero-degree horizon elevation angle:

`107500164(Tx8GHz, Non-0-elev).rtf`

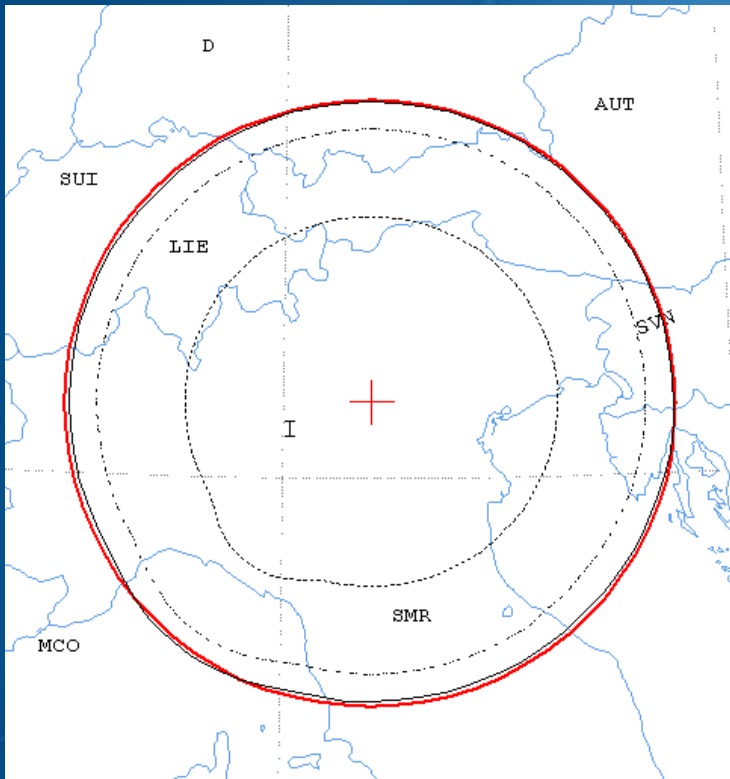
- For Ex. 2.2 with zero-degree horizon elevation angle:

`107500165(Tx8GHz, 0-elev).rtf`

# Exercise 2 – GIBC – Results

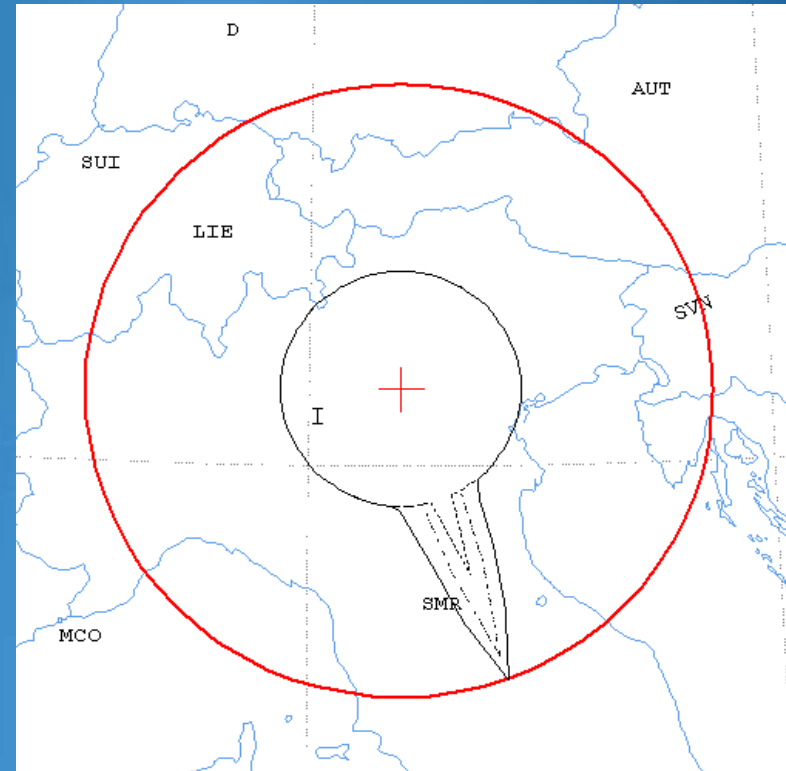
Diagram 1: 2.1\_TABLE7.

TRANSMITTING GSO ES in FIXED-SATELLITE SERVICE W.R.T.  
RECEIVING TERRESTRIAL STATIONS. TS in FS or MS



With zero-degree  
horizon elevation angles

PROBABLY AFFECTED COUNTRIES:  
AUT D HRV LIE SMR SUI SVN



With non-zero-degree  
horizon elevation angles

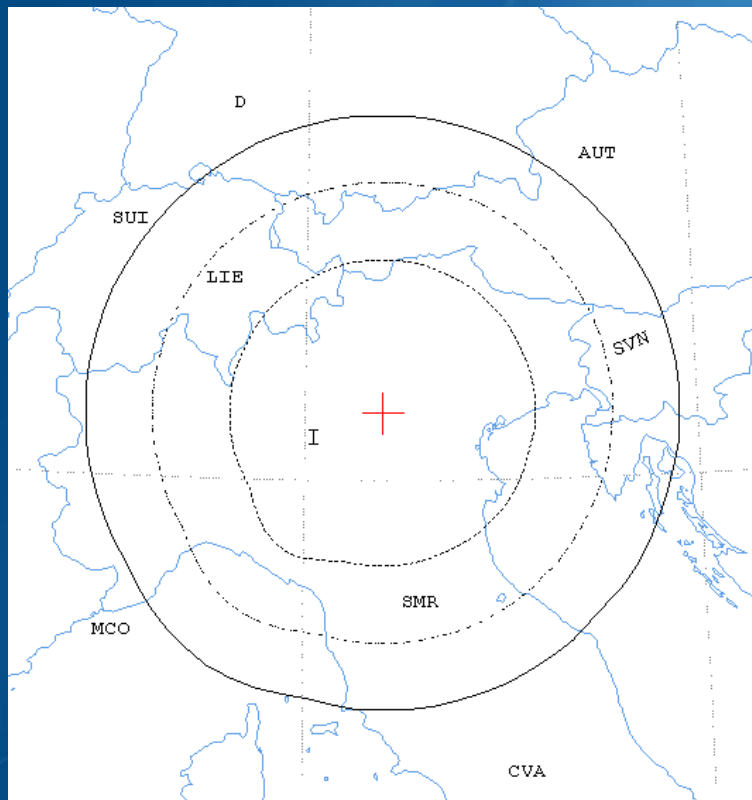
PROBABLY AFFECTED COUNTRIES:  
AUT D HRV LIE SMR SUI SVN

# Exercise 2 – GIBC – Results

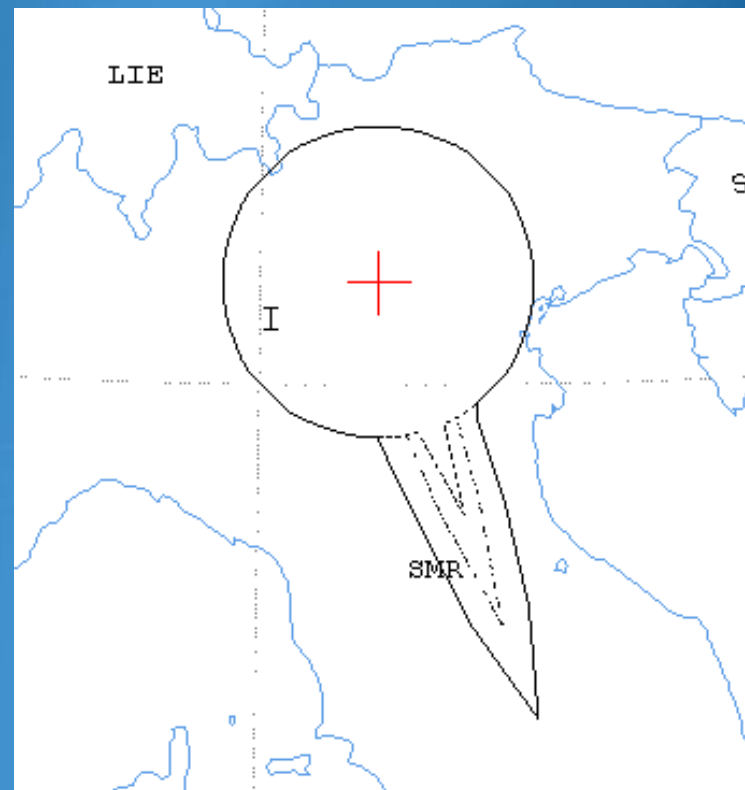
Diagram 2: 3.2.1\_TABLE9.

TRANSMITTING GSO ES in FIXED-SATELLITE SERVICE W.R.T.

RECEIVING NGSO ES in EARTH EXPLORATION SATELLITE SERVICE



With zero-degree  
horizon elevation angles



With non-zero-degree  
horizon elevation angles

PROBABLY AFFECTED COUNTRIES:

AUT D HRV LIE SMR SUI SVN

PROBABLY AFFECTED COUNTRIES:

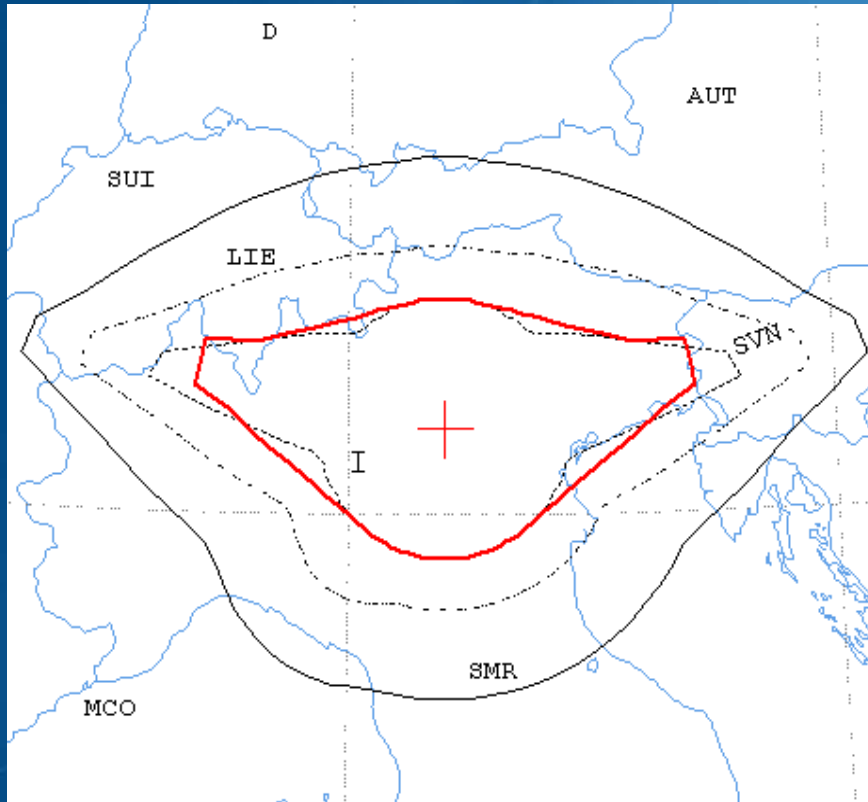
SUI

# Exercise 2 – GIBC – Results

Diagram 3: 3.1\_TABLE9.

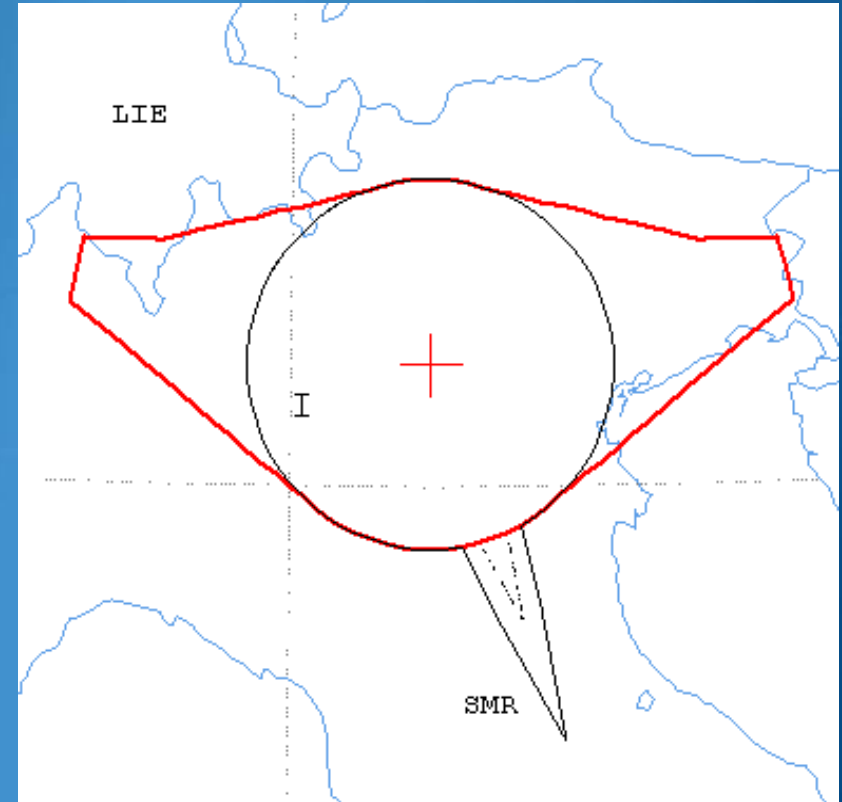
TRANSMITTING GSO ES in FIXED-SATELLITE SERVICE W.R.T.

RECEIVING GSO ES in EARTH EXPLORATION SATELLITE SERVICE



With zero-degree  
horizon elevation angles

PROBABLY AFFECTED COUNTRIES:  
AUT D F HRV LIE SUI SVN



With non-zero-degree  
horizon elevation angles

PROBABLY AFFECTED COUNTRIES:  
SUI SVN