



The AMOS-3 Satellite Technical Handbook

*In-Orbit Version 3.3
June 2009*

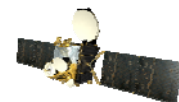


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TABLE OF CONTENTS

1.	<u>GENERAL INFORMATION</u>	3
▪	AMOS SYSTEM INFORMATION	4
▪	GENERAL SATELLITE INFORMATION	5
▪	COMMUNICATION PAYLOAD INFORMATION	6
2.	<u>EIRP AND G/T PERFORMANCE</u>	7
▪	EIRP (EFFECTIVE ISOTROPIC RADIATED POWER) AT BEAM-PEAK PER BEAM	7
▪	G/T AT BEAM PEAK PER EACH BEAM	7
▪	SAMPLE EIRP AND G/T VALUES OVER THE MIDDLE-EAST AND CENTRAL ASIA	8
▪	SAMPLE EIRP AND G/T VALUES OVER THE EUROPE	9
▪	SAMPLE EIRP AND G/T VALUES OVER NORTH AMERICA	9
3.	<u>COMMUNICATION PAYLOAD CHARACTERISTICS (KU BAND)</u>	10
▪	SATURATED FLUX DENSITY.....	10
▪	GAIN VS. FREQUENCY RESPONSE (GAIN FLATNESS).....	10
▪	TRANSPONDER GAIN VARIATION	10
▪	USABLE BANDWIDTH	11
▪	BEAMS CHANNELS ALLOCATION	11
▪	BEAMS POLARIZATION CAPABILITY	11
▪	TELE-COMMAND AND BEACON CHARACTERISTICS	11
	<u>FIGURE 1: MIDDLE-EAST (ME) H-POL EIRP COVERAGE MAP</u>	12
	<u>FIGURE 2: MIDDLE-EAST (ME) V-POL EIRP COVERAGE MAP</u>	13
	<u>FIGURE 3: EUROPE H-POL EIRP COVERAGE MAP</u>	14
	<u>FIGURE 4: EUROPE V-POL EIRP COVERAGE MAP</u>	15
	<u>FIGURE 5: NORTH-AMERICA (NA) H-POL EIRP COVERAGE MAP</u>	16
	<u>FIGURE 6: MIDDLE-EAST H-POL G/T COVERAGE MAP</u>	17
	<u>FIGURE 7: MIDDLE-EAST V-POL G/T COVERAGE MAP</u>	18
	<u>FIGURE 8: EUROPE V-POL G/T COVERAGE MAP</u>	19
	<u>FIGURE 9: EUROPE H-POL G/T COVERAGE MAP</u>	20
	<u>FIGURE 10: NORTH-AMERICA (NA) H-POL G/T COVERAGE MAP</u>	21



1. General Information

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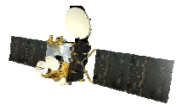
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■ *AMOS System Information*

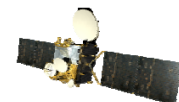
Spacecom is the AMOS satellites operator. In April 2008 **AMOS-3** was launched to the **4°W** orbital position where it joined the Hot-Spot created by **AMOS-1** and **AMOS-2**.

AMOS-3, which replaced AMOS-1 in orbit, enhances **Spacecom's** portfolio with additional capacity, expanded coverage areas, and single-hop cross-Atlantic connectivity to the US East Coast.

Furthermore, **AMOS-3** offers advanced capabilities and new features such as **Ka-band** transponders, and **steerable beams**, in both Ka-band and Ku-band **AMOS-3** fixed beams include three Ku-band beams covering Europe, the Middle East and the US East Coast, and one fixed Ka-band beam with high power coverage over the Middle East.

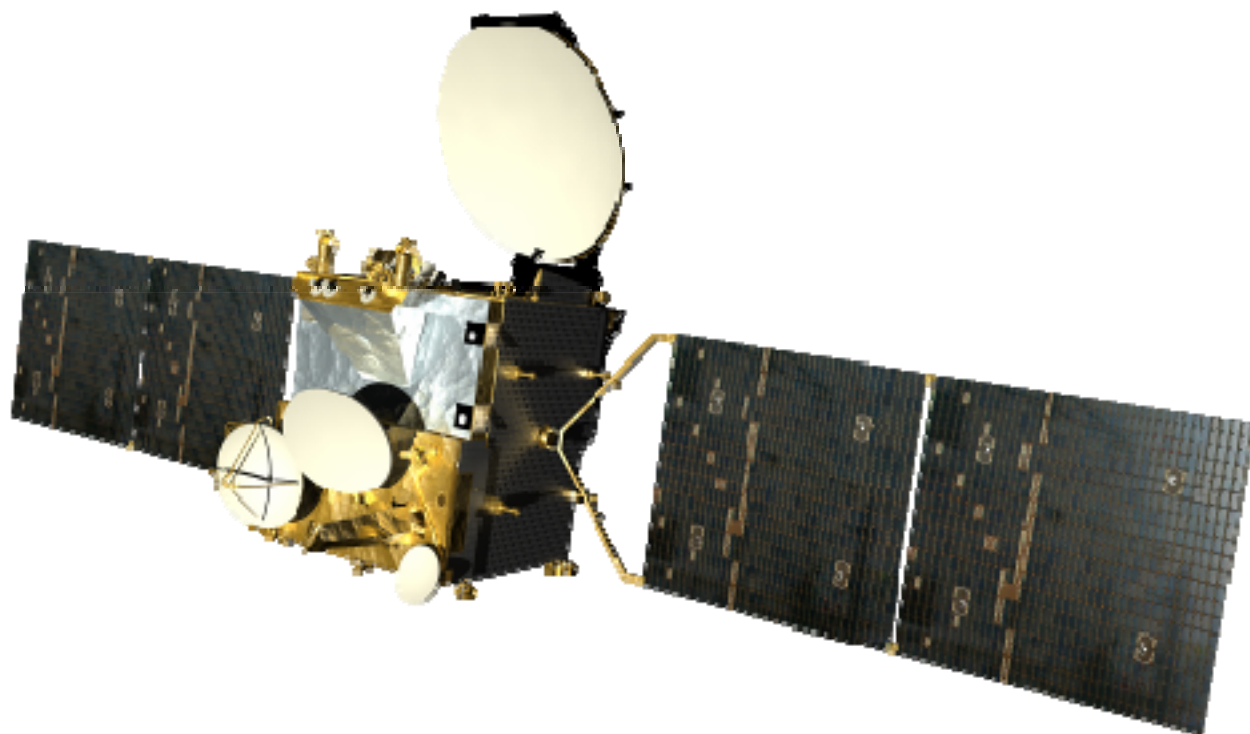
AMOS-3 powerful transponders enhance Spacecom's existing service offering supporting a full range of satcom services, including Direct-To-Home (DTH), video distribution, VSAT communications and broadband Internet.

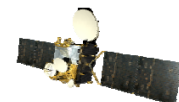
The co-location of the **AMOS** satellites at the **4°W** orbital location means in-orbit satellite redundancy, enabling backup capabilities and the highest service reliability.



■ *General Satellite Information*

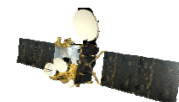
Orbital Location	4°W
Dimensions in stowed configuration	2.4 x 2.3 x 2.7 m
Length in deployed configuration	~ 11 m
Net mass (On ground / “dry”)	837 Kg. (actual)
Mass at launch	1,263 Kg. (actual)
Power (Beginning Of Life)	2,800 W
(End Of Life)	2,450 W
Estimated operational lifetime	17 years (until 2025)
Station Keeping Accuracy	$\pm 0.05^\circ$ N-S / $\pm 0.05^\circ$ E-W
Beam Pointing Accuracy	Better than 0.12°





▪ *Communication Payload Information*

Service areas: Ku-Band	<ul style="list-style-type: none"> • Fixed beams - <ul style="list-style-type: none"> • Europe (EU) • Middle East (ME) • North America (NA) • Steerable Beam (SKu)
Service areas: Ka-Band	<ul style="list-style-type: none"> • Fixed beam - Middle East (ME) • Steerable Beam - (SKa)
Number of active transponders (+redundant)	<ul style="list-style-type: none"> • Ku-Band - 12 (+1) • Ka-Band - 1(+1)
TWT output power	<ul style="list-style-type: none"> • Ku band - 95W • Ka band - 105W
Transponders' usable bandwidth	<ul style="list-style-type: none"> • Ku band - 72 MHz each • Ka Band - 125/250/450 Mhz
Transponder gain modes	<ul style="list-style-type: none"> ▪ ALC (Automatic Level Control) ▪ FGM (Fix Gain Mode)



2. EIRP and G/T Performance

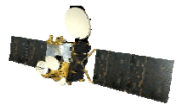
- The EIRP and G/T values below are maximum values based on actual values measured during the AMOS-3 In-Orbit Tests (IOT), including BPE.
- Detailed EIRP and G/T maps are provided at the end of this document.(including BPE)
- Since the Steerable Ku beam (SKU), as well as the entire Ka-band capacity is already committed for through the satellite life-time, the relevant information re this capacity was omitted to avoid confusion.

▪ *EIRP (Effective Isotropic Radiated Power) at beam-peak per beam*

Beam	ME-H	ME-V	EU-H	EU-V	NA-H
EIRP [dBW]	59.5	59.5	59	58.5	52

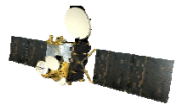
▪ *G/T at beam peak per Each Beam*

Beam	ME-H	ME-V	EU-H	EU-V	NA-H
G/T [dB/K]	15	14	15	16	11



■ *Sample EIRP and G/T values over the Middle-East and Central Asia*

Pol. →	V		H	
Location	G/T [dB/K]	EIRP[dBW]	G/T [dB/K]	EIRP[dBW]
Abu-Dhabi	-0.8	44.8	-1.6	43.6
Afghanistan / Kandahar	3.8	52.0	5.8	50.9
Azerbaijan / Baku	6.1	52.3	8.0	51.4
Cyprus / Nicosia	11.2	56.8	10.5	55.3
Egypt / Cairo	10.1	56.7	10.1	54.5
Greece / Athens	2.8	47.1	2.0	45.9
Georgia / Tbilisi	5.7	50.0	5.9	50.9
Iran / Teheran	10.1	56.2	12.0	57.3
Iraq / Baghdad	13.2	58.8	14.5	59.4
Israel / Tel-Aviv	13.3	58.9	13.2	57.3
Jordan / Amman	11.5	57.5	12.3	56.7
Kuwait / Kuwait	11.4	56.0	14.2	57.4
Lebanon / Beirut	13.1	58.8	13.1	57.2
Pakistan / Islamabad	3.6	51.5	5.7	50.8
Qatar / Doha	3.7	51.2	5.2	50.1
Saudi / Riyadh	4.6	51.2	6.7	51.3
Syria / Halab	11.9	57.5	12.2	56.3
Turkey / Istanbul	2.7	48.1	1.8	46.2
Turkmenistan / Ashkhabad	6.3	52.9	8.8	54.4
U.A.E / Dubai	0.9	49.0	2.1	47.0

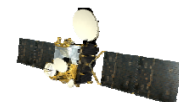


■ *Sample EIRP and G/T values over the Europe*

Location	Pol. →	V		H	
		G/T [dB/K]	EIRP[dBW]	G/T [dB/K]	EIRP[dBW]
Albania / Tirane		11.3	54.1	5.5	52.2
Austria / Vienna		16.0	58.4	9.4	55.5
Belarus / Minsk		12.1	55.1	12.3	56.0
Bosnia / Sarajevo		14.2	57.1	8.5	54.3
Bulgaria / Sofia		13.5	55.5	9.9	55.9
Croatia / Zagreb		15.5	58.3	8.5	54.6
Czech Rep. / Prague		14.9	57.4	6.6	53.8
France / Paris		6.3	48.1	-5.1	41.5
Germany / Berlin		13.0	55.3	4.0	51.5
Germany / Stuttgart		12.3	55.1	-1.3	46.7
Greece / Athens		7.3	51.2	2.6	50.2
Hungary / Budapest		15.9	58.4	11.2	56.5
Italy / Rome		11.1	55.4	0.9	48.1
Latvia / Riga		10.6	53.7	9.8	54.3
Lithuania / Vilnius		12.2	55.1	11.7	55.6
Netherlands / Amsterdam		8.1	50.0	-1.1	44.7
Poland / Krakow		14.4	57.0	11.5	56.3
Poland / Warsaw		15.5	58.0	11.7	56.7
Romania / Bucharest		14.2	56.1	12.7	57.9
Russia / Moscow		6.8	50.7	11.6	55.0
Serbia / Belgrade		12.3	54.8	14.0	58.2
Turkey / Istanbul		5.5	47.2	-5.9	40.4
UK / London		14.8	57.2	10.4	56.0
Ukraine / Kiev		10.8	54.8	11.2	56.1
Ukraine / Lugansk		7.7	52.0	14.6	57.2
Ukraine / Mariupol		9.2	53.0	14.8	57.8
Ukraine / Sevastopol		10.8	54.7	14.2	57.9

■ *Sample EIRP and G/T values over North America*

Location	EIRP[dBW]	G/T [dB/K]
USA / Boston	51.9	10.8
USA / New-York	51.8	10.9
USA / Washington	51.1	10.5
CANADA / Halifax	49.9	8.2



3. Communication Payload Characteristics (Ku band)

■ *Saturated Flux Density*

<i>Beam</i>	<i>SFD @ Min. Gain Setting</i> [dBW/m ²]	<i>SFD @ Max. Gain Setting</i> [dBW/m ²]
ME-H	-72-G/T	-96-G/T
ME-V	-72-G/T	-96-G/T
EU-V	-72-G/T	-96-G/T
NA-H	-72-G/T	-96-G/T

Gain Setting Step < 1dB

Range = 25 dB

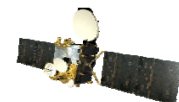
Operational Modes: Fix Gain or Automatic Level Control

■ *Gain vs. Frequency Response (Gain Flatness)*

CF±[MHz]	25.2 (70%)	32.4 (90%)	36.0 (100%)
Gain [dB ptp]	0.9	1.4	2.3
Gain Slope [dB/MHz]	0.1	0.24	0.6

■ *Transponder Gain Variation*

24 Hours	1[dB ptp]	(Max.)
Year	1.6[dB ptp]	(Max.)
Life	2.2[dB ptp]	(Max.)



■ *Usable bandwidth*

72 MHz, per transponder

■ *Beams channels Allocation*

- Europe - up to 7 x 72 MHz transponders
- Middle East - up to 11 x 72 MHz transponders
- North America - up to 3 x 72 MHz transponders

■ *Beams Polarization Capability*

- Europe -
 - i. Uplink polarization - Vertical or Horizontal
 - ii. Downlink polarization - Vertical or Horizontal
- Middle East -
 - i. Uplink polarization- Vertical or Horizontal
 - ii. Downlink polarization - Vertical or Horizontal
- North America -
 - i. Uplink polarization - Horizontal
 - ii. Downlink polarization - Horizontal

■ *Tele-Command and Beacon Characteristics*

	F1	F2	Polarization
Telecommand	13830.75 MHz	13832.75 MHz	V or H
Telemetry and Beacon	11449.0 MHz	11700.0 MHz	RHCP or LHCP

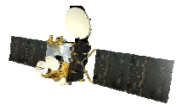
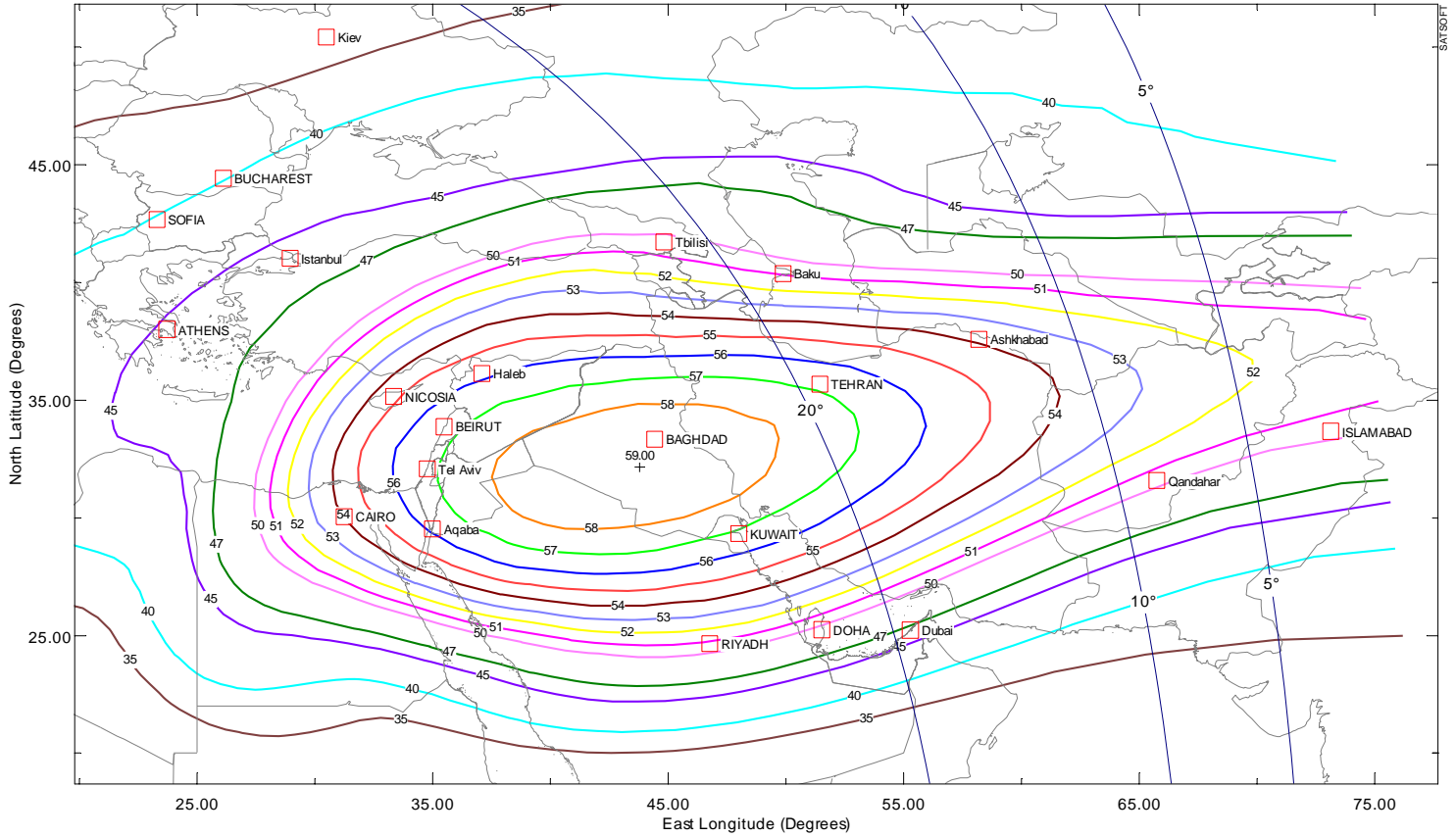


Figure 1: Middle-East (ME) H-pol EIRP Coverage Map



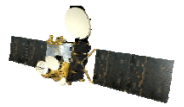
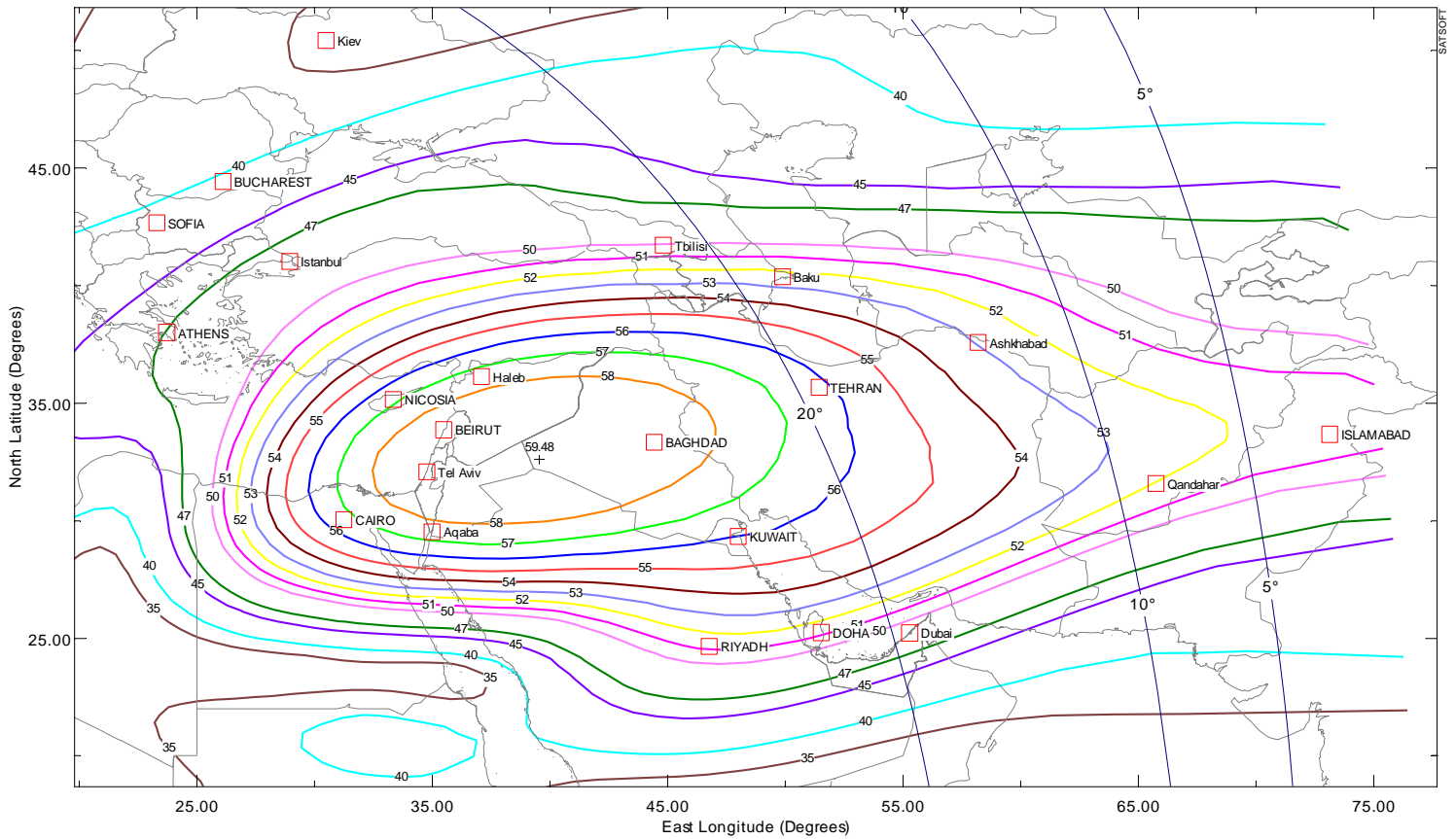


Figure 2: Middle-East (ME) V-pol EIRP Coverage Map



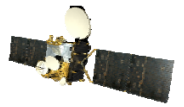
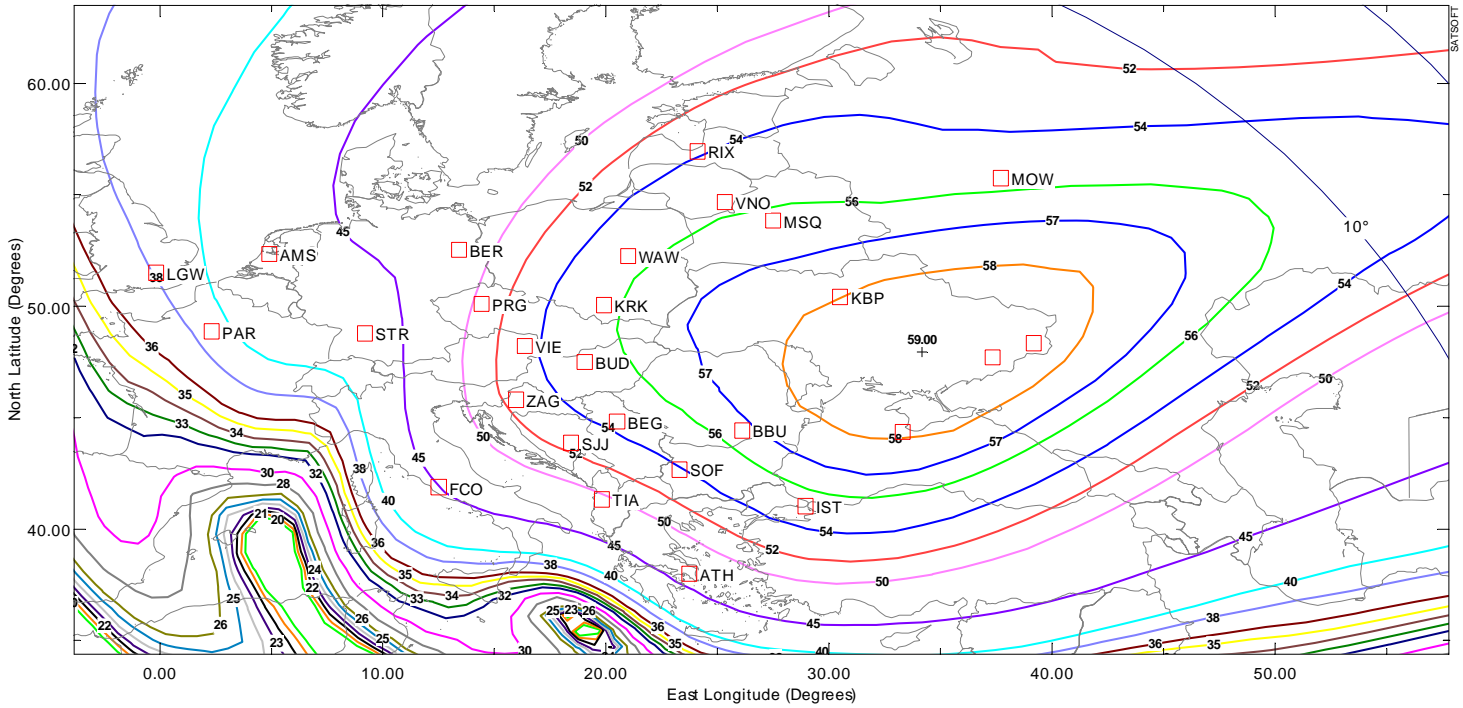


Figure 3: Europe H-pol EIRP Coverage Map



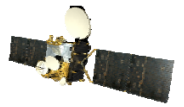
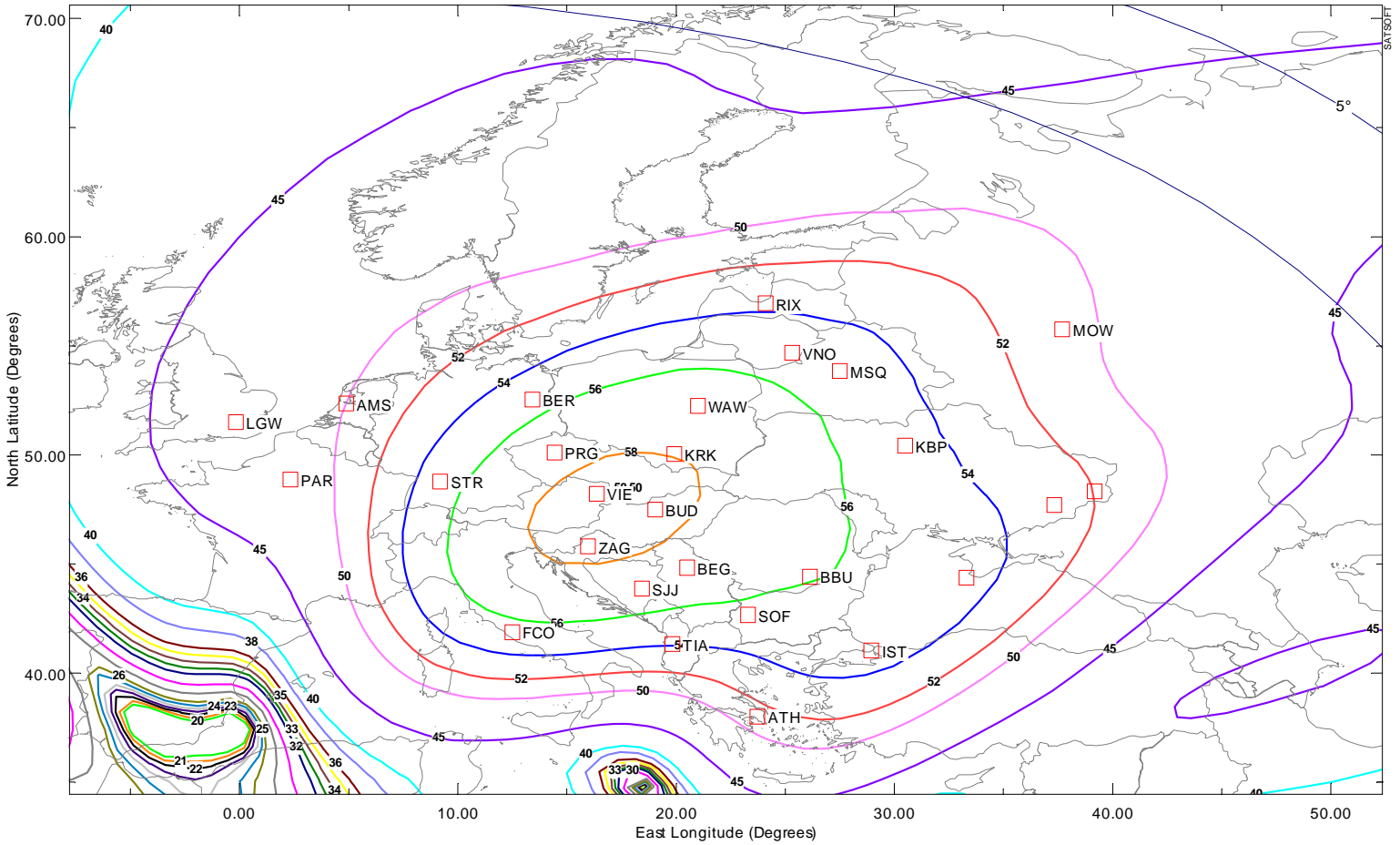


Figure 4: Europe V-pol EIRP Coverage Map



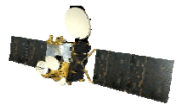
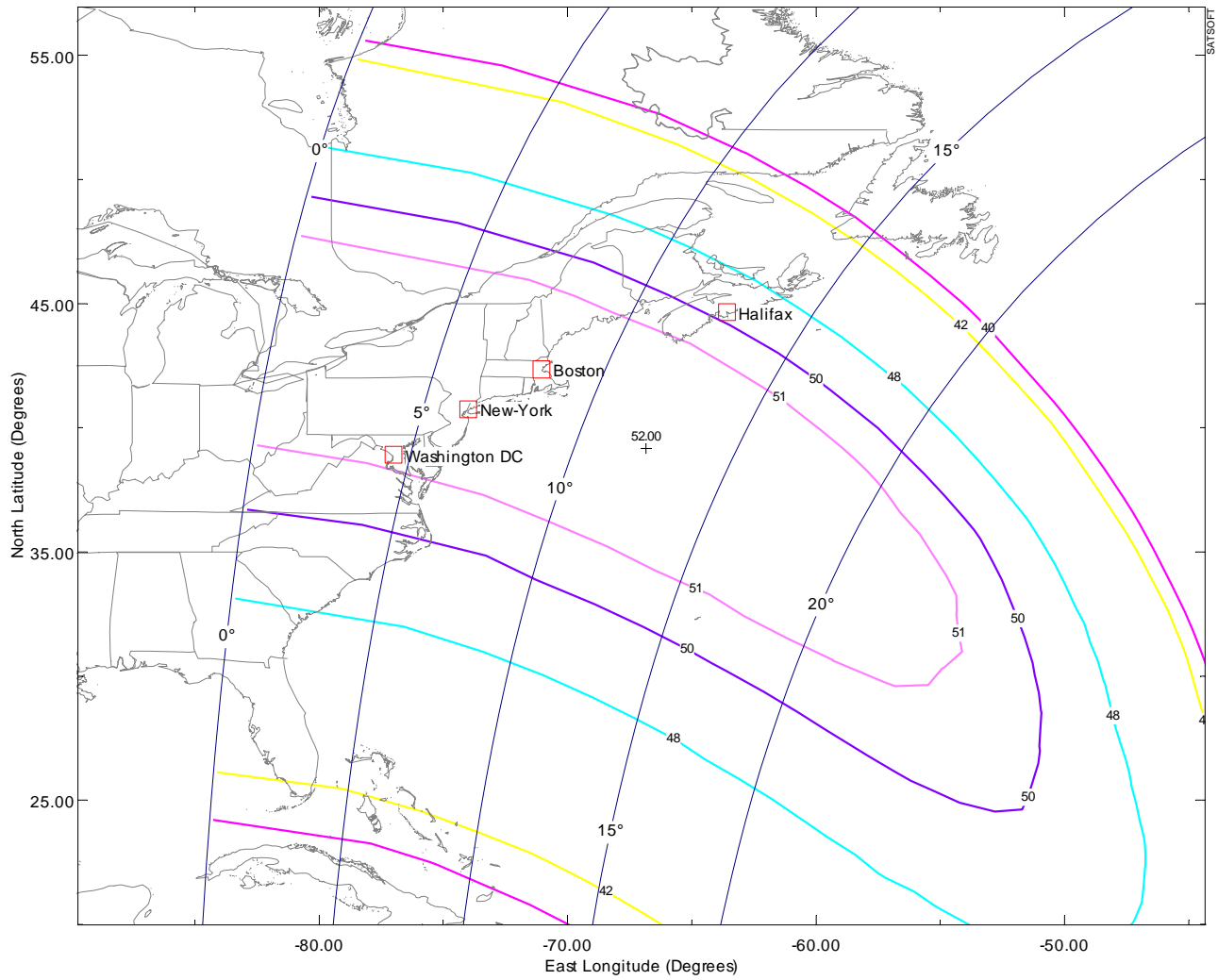


Figure 5: North-America (NA) H-pol EIRP Coverage Map



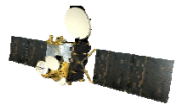
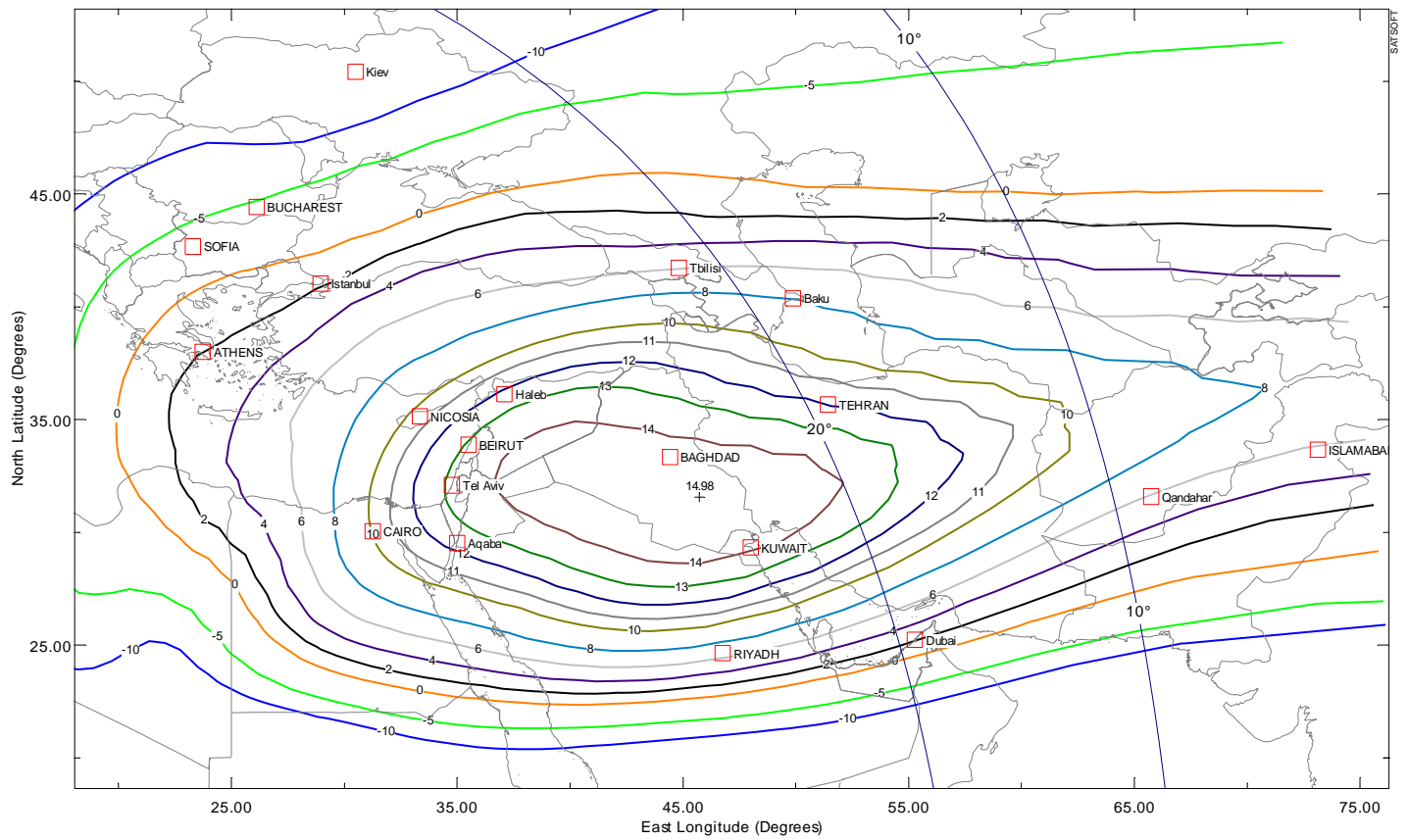


Figure 6: Middle-East H-pol G/T Coverage Map



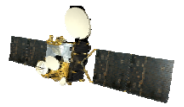
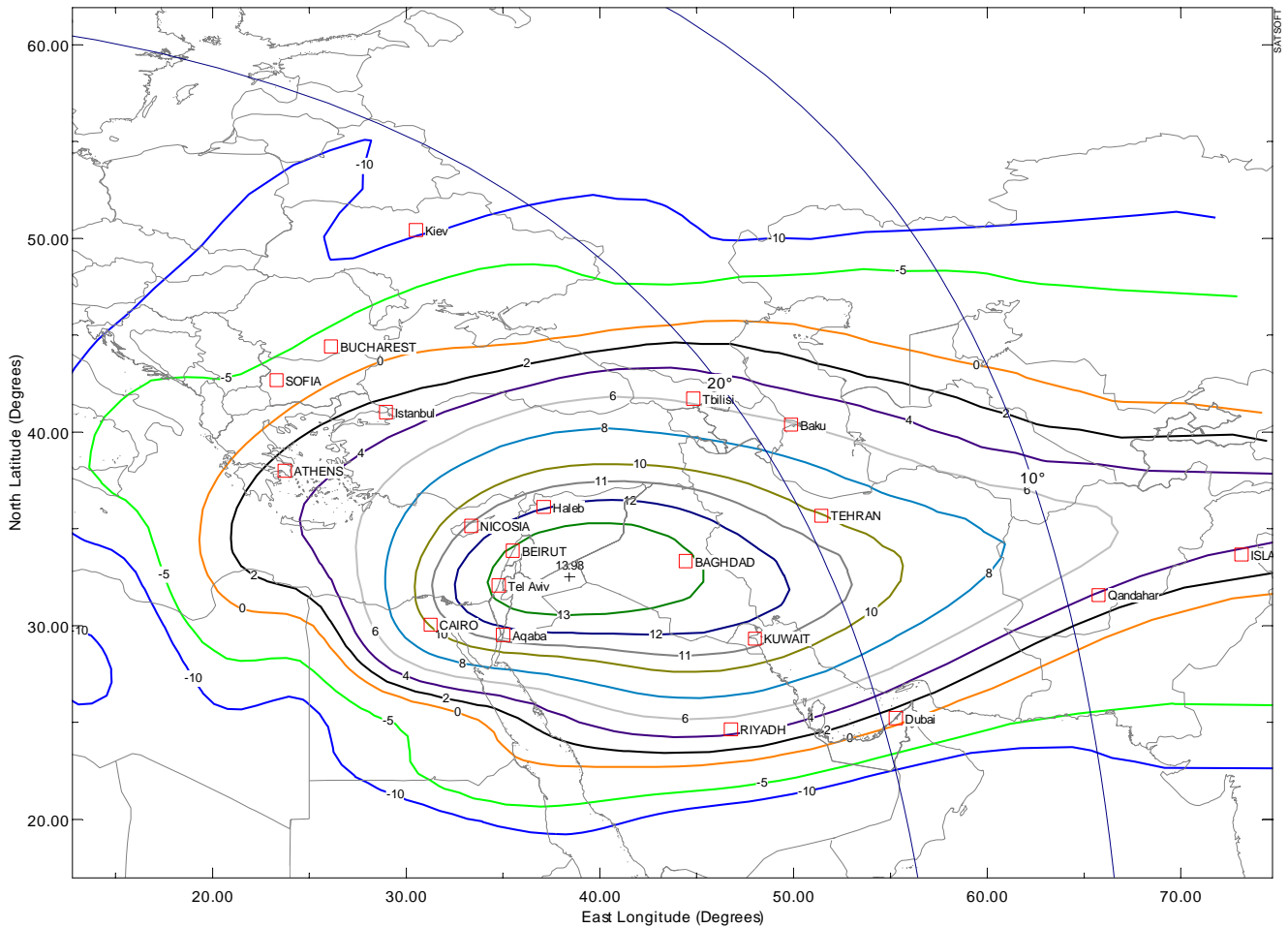


Figure 7: Middle-East V-pol G/T Coverage Map



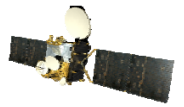
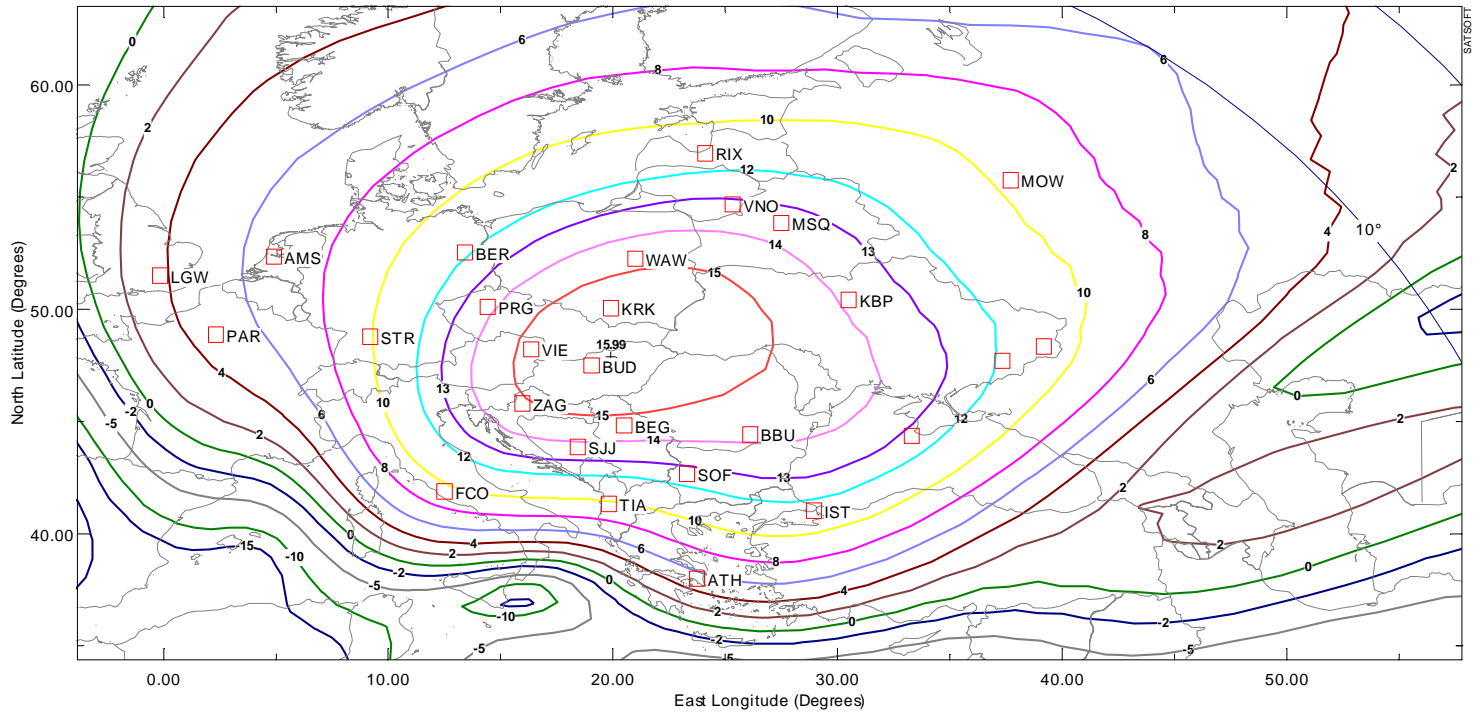


Figure 8: Europe V-pol G/T Coverage Map



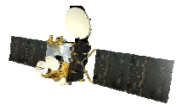
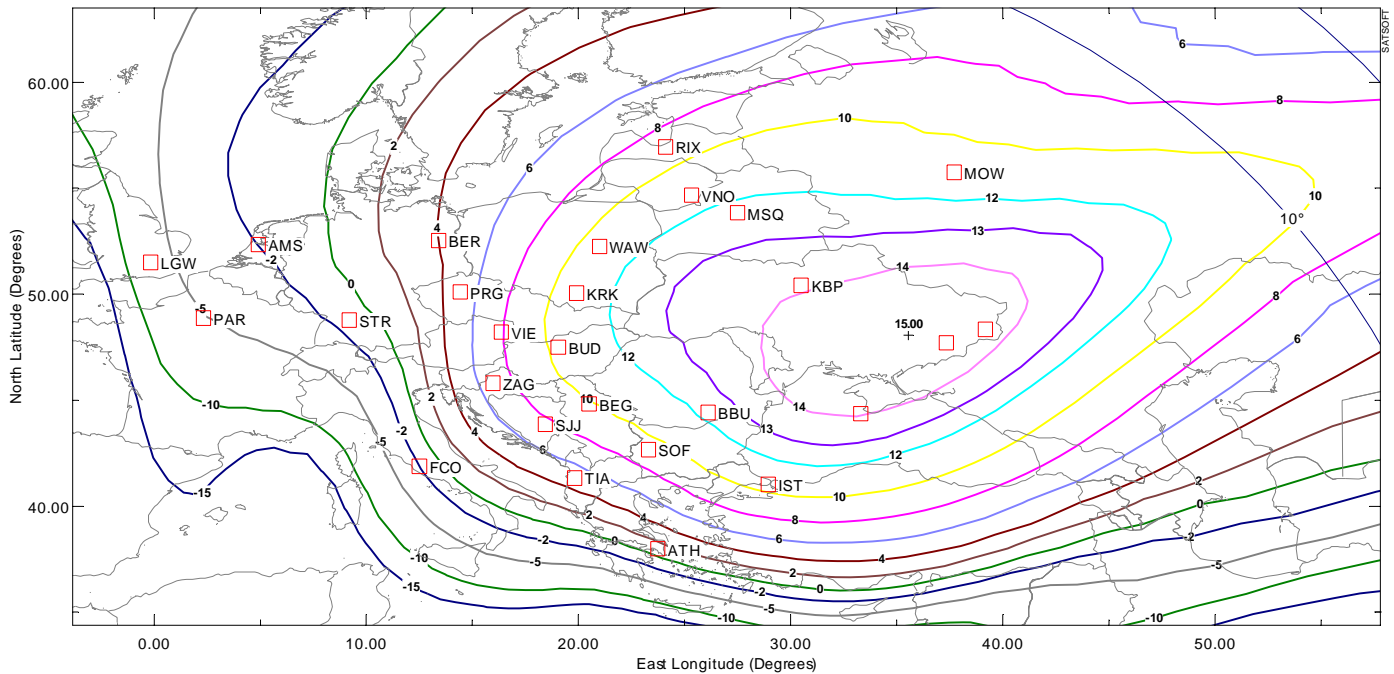


Figure 9: Europe H-pol G/T Coverage Map



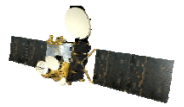


Figure 10: North-America (NA) H-pol G/T Coverage Map

