

# An Introduction For Using the Gator Nation Earth Station to Make OSCAR Satellite Contacts at W4DFU



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# GNES - The Gator Nation Earth Station



Ground Control Station for SwampSat,  
our upcoming CubeSat,  
[www.ufsmallsat.com](http://www.ufsmallsat.com)

# Location – Room D11-27

## Dental Building – Shands Hospital Complex



The left tower contains our satellite antenna array and is visible from the 11<sup>th</sup> floor window

# SatPC32, Our Control Software for our Radio and Antennas

SatPC32-1c [Standard E:AO-07] [Registered Version]

File Tracking Satellites CAT Rotor Mode Setup Programs Obs. ?

QTH: -82.1 / 29.6 **Sat in Sun** Downlink 0 Corr.(+/-) 0 Uplink 20 100 500 1K 5K D-Corr: Upl/Dwnl

145951.558 432138.905 25.01.2008 12:15:00 U

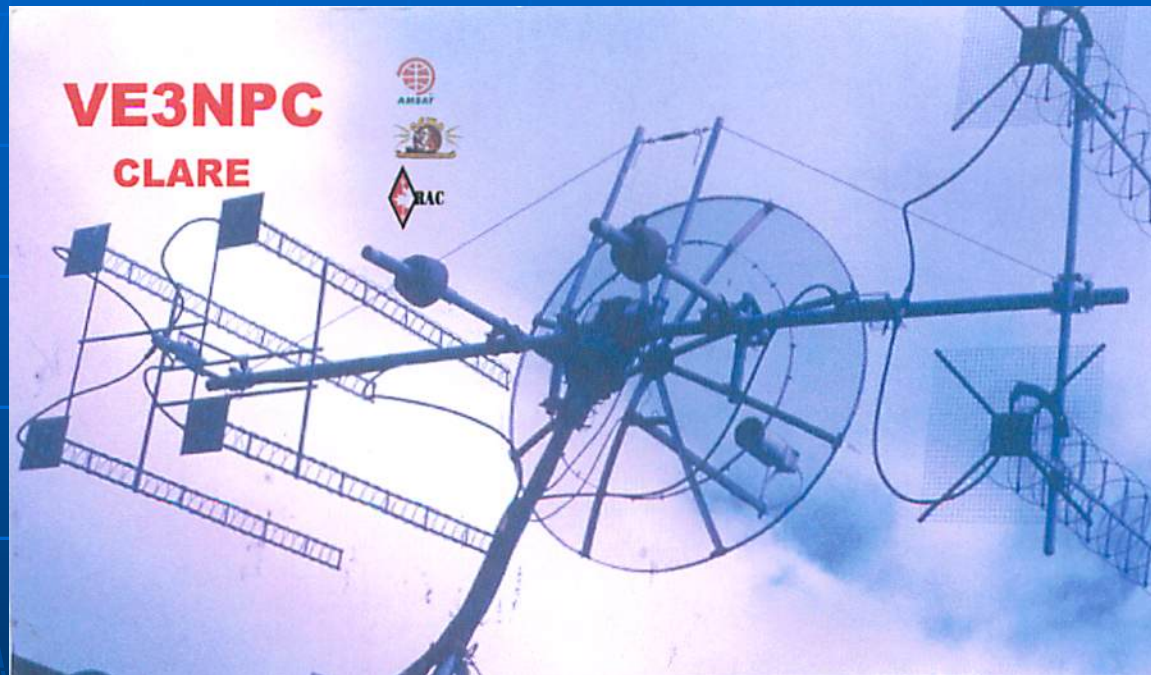
2.314 -6.851

A world map showing satellite coverage footprints. A yellow line represents the satellite's path. Several circular footprints are highlighted with white circles and arrows, each labeled with a satellite call sign and its current Azimuth (A) and Elevation (E) angles. The satellites shown are B:50-50 (A:14:44), C:AO-27 (A:18:14), D:GO-32 (A:13:37), G:VO-52 (A:15:11), and F:ISS (A:00:51). A yellow 'S' is visible on the map.

Azimuth	Elevation	MA	Height	Range	L	SSP	B	Orbit	Squint	Aos	Los
37.2	4.1	215.7	1453	4123	309	52	51896	--	*****	12:33	

A B C D E F  
G H I J K L

Large Arrays with Very High Gain are suggested for Applications such as EME, Earth-Moon-Earth



Fortunately We do not these for OSCAR SATS!

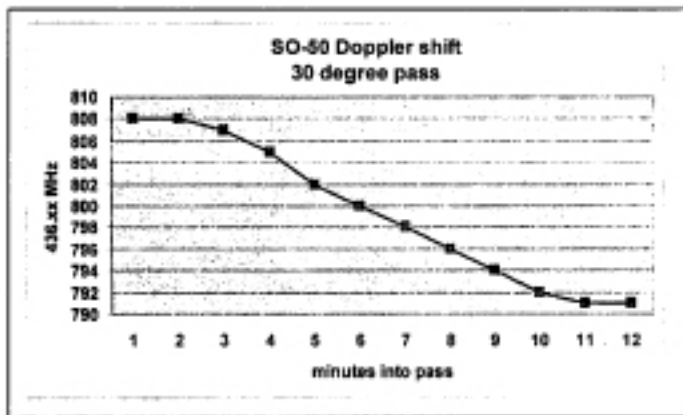
# Handheld Operations

## Low ERP – Minimal Needs

### Doppler shift for SO-50

SO-50 is another FM Mode V/U (Mode J) satellite. So the downlink will experience quite a bit of Doppler shift, about 20 kHz. The uplink Doppler shift is generally not enough to worry about, keep the transmit frequency set on 145.850 MHz + 67 Hz PL tone.

Figure 3. SO-50 Doppler shift on the 436 MHz downlink

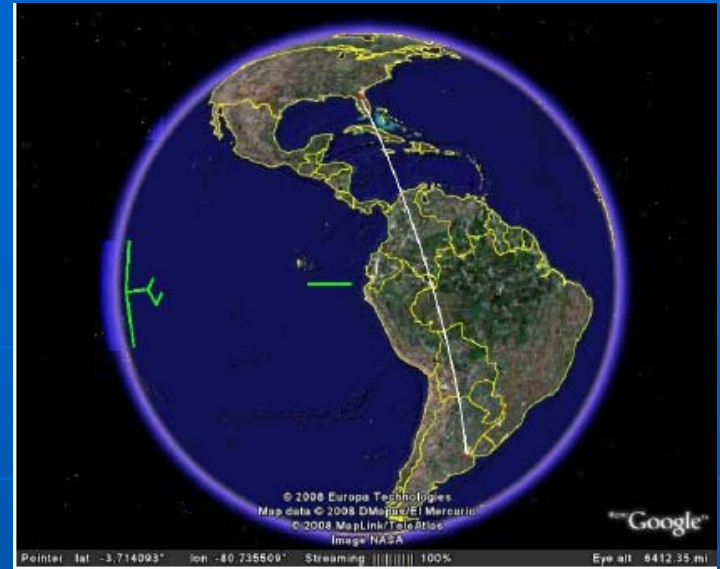


	<u>Downlink</u>	<u>Uplink</u>
Beginning of pass	436.810 MHz	145.850 MHz + 67 Hz PL tone
4 minutes into pass	436.805 MHz	145.850 MHz + 67 Hz PL tone
Mid pass	436.800 MHz	145.850 MHz + 67 Hz PL tone
9 minutes into pass	435.795 MHz	145.850 MHz + 67 Hz PL tone
11 minutes into pass	435.790 MHz	145.850 MHz + 67 Hz PL tone



WØWTN, O.P. KKØSD, SEPT 30 2006  
SPECIAL EVENT. 73, Val, WFLPG PHOTO

# THE NETHERLANDS



Some OSCAR footprints extend outside NA



ZONE 13 - GPOsgl SOUTH AMERICA  
 REPUBLICA ARGENTINA  
**LU2DPW**

Amateur Radio AA4FL Confirming Our CW QSO of Feb. 5, 2008  
 at 00:29 GMT. via AO-07 Mode B  
 MUF: Your Signals 559. Tx FRUITLAND, Orange TX, TX  
 QSL INX/JL Mm. INX JAY for my first V1 contact and  
 JUAN CARLOS AMADO my best DX  
 CALLE No. 417 - 6600 - MERCEDES Provincia de Buenos Aires  
 VIA SATELLITE AO-07 Mode B orb: 52039 - 733 JUAN

**World Record Contact on  
 American Satellite AO7  
 Launched in 1974  
 4699 Miles - 7524 Km**

Thanks dear Jay, for my best DX  
 and first USA station on AO-07  
 Mode B.  
 73's de JUAN, LU2DPW  
 05/02/08

# We Use 2m and 70cm for Most of our Satellite Contacts

## US Amateur Radio Bands

### US AMATEUR POWER LIMITS

At all times, transmitter power should be kept down to that necessary to carry out the desired communications. Power is noted in watts PEP output. Except where noted, the maximum power output is 1500 Watts.

Effective Date  
February 23, 2007

Published by:  
**ARRL** The national association for  
**AMATEUR RADIO**  
www.arrl.org  
225 Main Street, Newington, CT USA 06111-1494



**KEY**

Note:  
CW operation is permitted throughout all amateur bands except 60 meters.  
MCW is authorized above 50.1 MHz, except for 219-220 MHz.  
Test transmissions are authorized above 51 MHz, except for 219-220 MHz.

- = RTTY and data
- = phone and image
- ▨ = CW only
- = SSB phone
- = USB phone only
- = Fixed digital message forwarding systems only

E = Amateur Extra  
A = Advanced  
G = General  
T = Technician  
N = Novice

See ARRL Web at [www.arrl.org](http://www.arrl.org) for more detailed band plans.

**ARRL**  
**We're At Your Service**

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Getting Started in Amateur Radio:  
Toll-Free 1-800-329-3942 (909-594-0355)  
email: [convharr@arrl.org](mailto:convharr@arrl.org)

<sup>†</sup> Phone and image modes are permitted between 7075 and 7100 kHz for FCC licensed stations in ITU Regions 1 and 3 and by FCC licensed stations in ITU Region 2 West of 130 degrees West longitude or South of 20 degrees North latitude. See Sections 97.305(c) and 97.307(f)(11). Novice and Technician licensees outside ITU Region 2 may use CW only between 7025 and 7075 kHz. See Section 97.301(e). These exemptions do not apply to stations in the continental US.

All licensees except Novices are authorized all modes on the following frequencies:  
2300-2310 MHz 10.0-10.5 GHz 122.25-129.0 GHz  
2390-2450 MHz 24.0-24.25 GHz 134-141 GHz  
3300-3500 MHz 47.0-47.2 GHz 241-250 GHz  
5650-5925 MHz 76.0-81.0 GHz All above 275 GHz



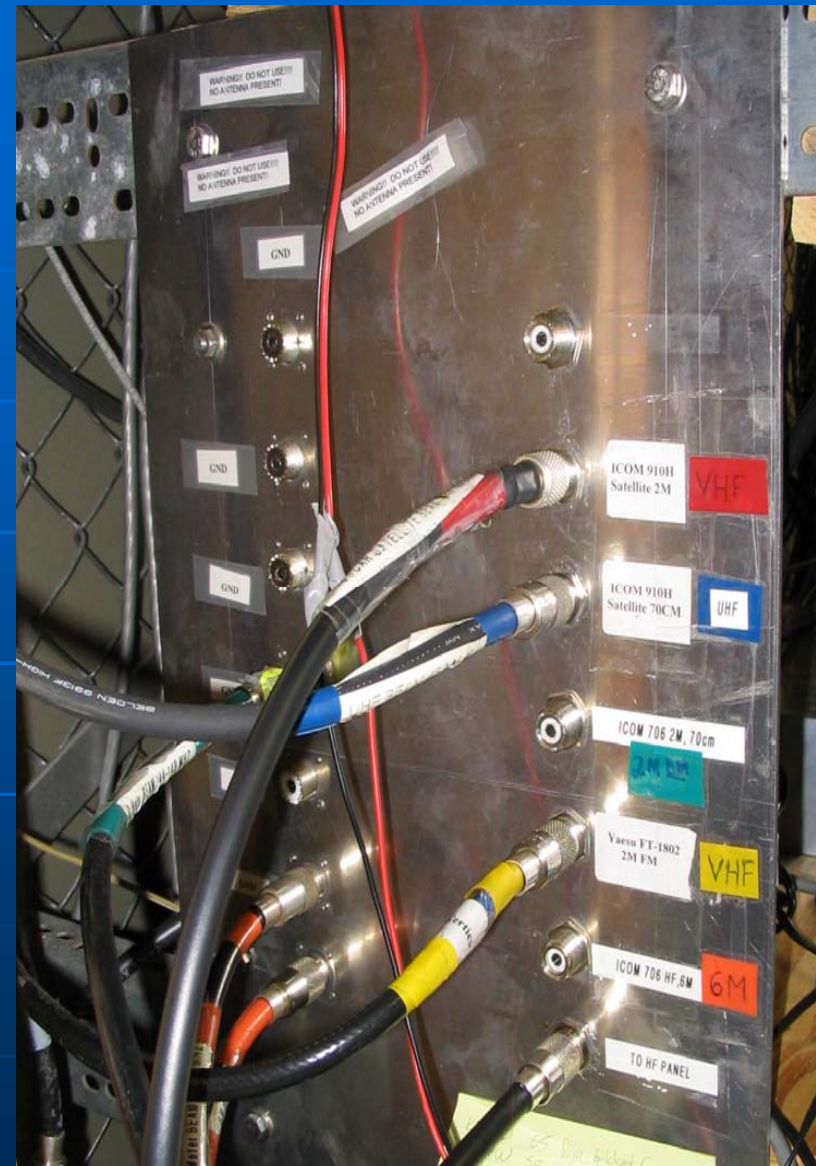
Before you turn on any radio hook up the appropriate antenna. Make sure there are no thunderstorms in the area!

Our GNES panel has a left column of connectors to ground antennas not in use. The right column are connectors for the radios available at GNES and our VHF/UHF station

This photo shows the GNES 2 meter antenna (red coded) and 70cm antenna (blue) hooked up and ready for use. The radio they hook up to is the ICOM IC-910

The yellow connector is for our Yaesu FT-1802 2m FM radio for speaking locally on our repeater.

When finished before leaving make sure to disconnect and ground the antennas.





## Our Station Equipment

**ICOM IC-910 radio**

**Yaesu G5500 Az-EI Rotor**

**Yaesu GS-232B Computer-Rotor Interface**

**KPC9612plus TNC**

**An instructional video for the correct turn on and turn off procedure is on our Website.**

The Manuals for this equipment are also available on the satellite/space page of our Website as pdf file links



# OSCAR Satellites

## Orbiting Satellites Carrying Amateur Radio

- Includes satellites containing VHF repeaters, V/U VHF up, UHF down
- Voice Modes FM, LSB/USB, FM/DSB
- Some Birds have linear inverting transponders
- Digital modes
- Many operate on schedules due to power budgets and experimental modes

Use the [www.amsat.org](http://www.amsat.org) Website's passes page to see the passes available for EL89 (our location); or any other computer satellite tracking program, or smart phone application

The screenshot displays the AMSAT Online Satellite Pass Predictions website. The browser window title is "AMSAT - AMSAT Online Satellite Pass Predictions - Windows Internet Explorer". The address bar shows the URL "http://www.amsat.org/amsat-new/tools/predict/". The page features the AMSAT logo and the text "AMSAT Online Satellite Pass Predictions". A navigation menu includes "Launch Pad", "Navigator", "Sat Status", and "Keps". A dropdown menu is open, listing various satellites, with "POLLUX" selected. Below the menu, there are input fields for "Calculate Latitude and Longitude from Gridsquare", "Enter Decimal Latitude" (with value 29.6042 and "North" selected), "Enter Decimal Longitude" (with value 82.0416 and "West" selected), and "Elevation (Metres)" (with value 0). A "Predict" button is located below these fields. A checkbox labeled "Save my location for later use" is checked. The page also includes contact information: "850 Sligo Ave. Suite 600 Silver Spring, MD 20910 1-888-322-6728". The browser's status bar at the bottom shows "Done" and "Internet".



# Other Considerations

- Must be licensed to operate (easy to obtain)
- The hobby is non-commercial in nature, no profit motive is allowed
- Rules and Regulations must be followed
- Frequencies are coordinated and shared with other satellites that are different orbits
- Low Earth Sun-Synchronous Polar Orbits make for about 4 ten to fifteen minute passes a day at our Latitude
- Ground stations for our purposes need to be computer driven

**Start simple with the FM birds easiest to use. They are repeaters in the sky receiving on one frequency on one band and re-transmitting the transmission one frequency on another band. These birds get busy and weekday during work hours are the best time to use them.**

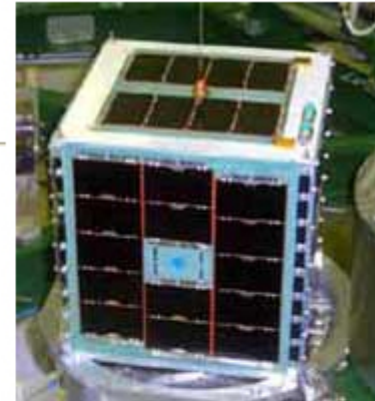
**AO-51: the easiest to use, check the schedule to make sure it is in mode V/U (VHF up/UHF down).**

**AO-27 is also easy to use. It is only turned on for six minutes of the footprint when over the US.**

**SO-50 is a third EasySat but has a little wobble and is this not consistent throughout the pass.**

**These three are three easiest to use as they are active most of the time. Detailed information about these three birds and for SO-67, Hope-1 and ISS follows on the next eight slides.**

## AMSAT-OSCAR 51 (Echo)



### Spacecraft Summary

<b>Oscar Designation:</b> AMSAT-OSCAR 51	<b>Oscar Number:</b> AO-51
<b>International Designator:</b> 2004-025K	<b>Norad Number:</b> 28375
<b>Common Name:</b> Echo	<b>Alternate Name:</b> OSCAR-E
<b>Satellite Type:</b> Microsatellite	<b>Launch Date:</b> 28 June, 2004
<b>Launch Location:</b> Baikonur Cosmodrome	<b>Launch Vehicle:</b> Dnepr
<b>Apogee:</b> 818.00	<b>Perigee:</b> 696.00
<b>Inclination:</b> 99.97	<b>Period:</b> 99.97
<b>Dimensions:</b> 25 x 25 x 25 cube	<b>Weight:</b> 11.140 Kg
<b>Organization:</b> <a href="#">AMSAT-NA</a>	

### Frequency Information

#### Mode V/U (J) FM Voice Repeater (QRP): **Operational**

Uplink: 145.8800 MHz FM

Downlink 435.1500 MHz FM

#### Mode V/U (J) FM Voice Repeater: **Operational**

Uplink: 145.9200 MHz FM, PL 67.0 Hz.

Downlink 435.3000 MHz FM

### Callsign(s)

**Broadcast:** PECHO-11

**BBS:** PECHO-12

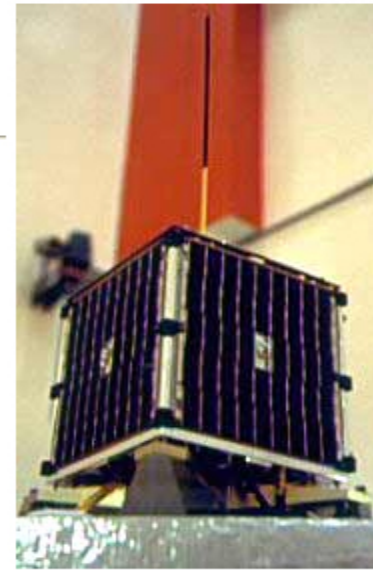


AO-27 is easy to use. It is only turned on for six minutes of the footprint when over the US so do not be surprised when you do not acquire signal at AOS (turned on over mid-US).

## AMRAD-OSCAR 27 (EYESAT-1)

### Spacecraft Summary

<b>Oscar Designation:</b> AMRAD-OSCAR 27	<b>Oscar Number:</b> AO-27
<b>International Designator:</b> 1993-061C	<b>Norad Number:</b> 22825
<b>Common Name:</b> EYESAT-1	<b>Satellite Type:</b> Microsatellite
<b>Launch Date:</b> 26 September, 1993	<b>Launch Location:</b> Kourou, French Guiana
<b>Launch Vehicle:</b> Ariane 4	<b>Apogee:</b> 800.00
<b>Perigee:</b> 789.00	<b>Inclination:</b> 98.27
<b>Period:</b> 100.76	<b>Dimensions:</b> 150 x 150 x 150 cube
<b>Weight:</b> 11.800 Kg	
<b>Organization:</b> <a href="#">AMRAD/Interferometrics</a>	



### Frequency Information

**Mode V/U (J) FM Voice Repeater:** **Operational**

Uplink: 145.8500 MHz FM

Downlink 436.7950 MHz FM

## Saudi-OSCAR 50 (Saudisat-1C)

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### Spacecraft Summary

<b>OSCAR Designation:</b> Saudi-OSCAR 50	<b>Oscar Number:</b> SO-50
<b>International Designator:</b> 2002-058C	<b>Norad Number:</b> 27607
<b>Common Name:</b> Saudisat-1C	<b>Satellite Type:</b> Microsatellite
<b>Launch Date:</b> 20 December, 2002	<b>Launch Location:</b> Baikonur Cosmodrome
<b>Launch Vehicle:</b> Dnepr	<b>Apogee:</b> 713.00
<b>Perigee:</b> 603.00	<b>Inclination:</b> 64.56
<b>Period:</b> 97.89	<b>Weight:</b> 10.000 Kg
<b>Organization:</b> King Abdulaziz University for Science & Technology	



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### Frequency Information

**Mode V/U (J) FM Voice Repeater:** **Operational**

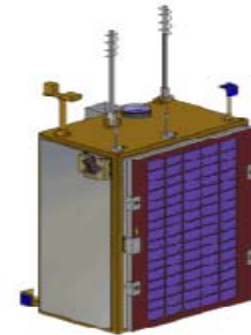
Uplink: 145.8500 MHz FM, PL 67.0 Hz.

Downlink 436.7950 MHz FM

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SO-67, Sumbandilla, is also easy to use but is a secondary usage, when the primary transponder is not needed. You must check the schedule. Use narrow FM for this bird.

### Sumbandila Oscar 67 (SumbandilaSat)



#### Spacecraft Summary

**OSCAR Designation:** Sumbandila Oscar 67  
**Norad Number:** 35870  
**Alternate Name:** SO-67  
**Launch Date:** 17 September, 2009  
**Launch Vehicle:** Soyuz-2-B/Fregat  
**Perigee:** 498.00  
**Period:** 95.00  
**Organization:** [AMSAT-SA](#)

**Oscar Number:** SO-67  
**Common Name:** SumbandilaSat  
**Satellite Type:** Microsatellite  
**Launch Location:** Baikonur  
**Apogee:** 520.00  
**Inclination:** 97.30  
**Weight:** 81.000 Kg

#### Frequency Information

**Mode V/U (J) FM Voice Repeater (Use Narrow FM on the uplink):** Unknown  
Uplink: 145.8750 MHz FM, PL 233.6 Hz.  
Downlink 435.3450 MHz FM

#### Callsign(s)

Beacon: ZS0SUM

#### Current Keplerian Elements

SO-67

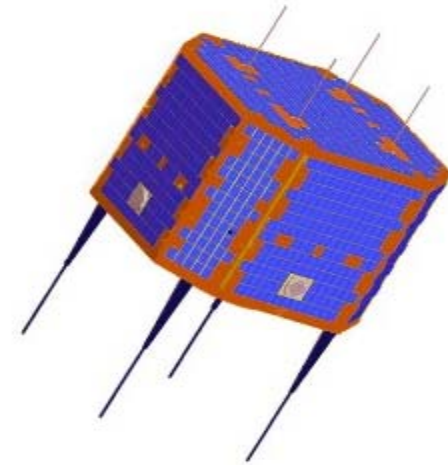
```
1 35870U 09049F 10049.10571325 .00001461 00000-0 65187-4 0 4553  
2 35870 97.3492 101.1220 0012727 111.7662 329.4810 15.22889765 23341
```

Hope-1, is also easy to use in FM mode but is on a schedule that turns it on at different times, and in different modes. See the following slide for mode info. The transponder pairs are entered into SatPC32 and the current pair needs to be selected under the satellite tab. Check online for scheduling.

## Hope Oscar 68 (XW-1) (XW-1)

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### Spacecraft Summary



**OSCAR Designation:** Hope Oscar 68 (XW-1)  
**International Designator:** 2009-072?  
**Alternate Name:** CAS-1  
**Launch Date:** 15 December, 2009

**Launch Vehicle:** CZ-4C(LM-4C) Rocket  
**Perigee:** 1200.00  
**Period:** 109.00

**Weight:** 60.000 Kg  
**Organization:** [CAMSAT](#)

**Oscar Number:** HO-68  
**Common Name:** XW-1  
**Satellite Type:** Microsatellite  
**Launch Location:** Taiyuan Satellite Launch Center of China  
**Apogee:** 1200.00  
**Inclination:** 100.50  
**Dimensions:** 680mm\*480mm (Envelope dimension), not include antennas

## Frequency Information

**Mode V/U (J) FM Voice Repeater (30 dbm (1 w) Currently Scheduled Operation): Operational**

Uplink: 145.8250 MHz FM, PL 67.0 Hz.  
Downlink 435.6750 MHz FM

**Mode V/U (J) Linear Transponder (Inverting) (30 dbm (1 w) Currently Scheduled Operation): Operational**

Uplink: 145.9250 - 145.9750 MHz SSB/CW  
Downlink 435.7650 - 435.7150 MHz SSB/CW

**Mode V/U (J) PacSat BBS (30 dbm (1 w) Currently Scheduled Operation): Operational**

Uplink: 145.8250 MHz AFSK 1200 BPS  
Downlink 435.6750 MHz AFSK 1200 BPS

**Mode Beacon (23 dbm (200mw)): Operational**

Downlink 435.7900 MHz CW

## Callsign(s)

Broadcast: BJ1SA  
-11

BBS: BJ1SA  
-12



The ISS has an easy to use 2m FM transponder. You need to start the desktop icon for "SatPC32ISS" and make sure to update your keys as the orbit changes with frequent burns. Check the online schedule at [www.issfanclub.com](http://www.issfanclub.com). The next slide explains more.

## ARISS

### Spacecraft Summary

OSCAR Designation: ARISS

Norad Number: 25544

Alternate Name: Zarya

Launch Date: 20 November, 1998

Launch Vehicle: Various

Perigee: 341.00

Period: 91.48

Organization: [ARISS/AMSAT/ARRL](http://www.issfanclub.com)

International Designator: 1998-067A

Common Name: ARISS

Satellite Type: Other

Launch Location: Various

Apogee: 353.00

Inclination: 51.64

Weight: 0.000 Kg



### Frequency Information

**Mode V/V Crew Contact (Regions 2 & 3): Operational**

Uplink: 144.4900 MHz FM

Downlink 145.8000 MHz FM

**Mode V/V Crew Contact (Region 1): Operational**

Uplink: 145.2000 MHz FM

Downlink 145.8000 MHz FM

**Mode V/V Packet (Worldwide): Operational**

Uplink: 145.9900 MHz AFSK 1200 BPS

Downlink 145.8000 MHz AFSK 1200 BPS

## Amateur Radio on the ISS

The International Space Station is operational and permanently manned by teams of astronauts and cosmonauts, most of whom have amateur licenses. Amateurs from the ISS partner countries, in the USA, Russia, Japan, Europe and Canada, have set up the ARISS program, a program whose mission is to foster amateur radio communications between the astronauts and cosmonauts who reside on the station. These include scheduling and assisting with school contacts, promoting field day and arranging other special events. Additionally the ARISS team works to help astronauts and cosmonauts who do not have amateur licenses become licensed before launch.

The first amateur radio equipment was carried to the ISS on Space Shuttle Atlantis in September 2000 and installed by the Expedition 1 crew. The first amateur contacts were made by Commander William Shepherd in mid November 2000, and the first school contact took place in December 2000.

ISS Information on the AMSAT website includes:

- [Amateur Radio Equipment and Frequencies](#)
- [School Contact Application Information](#)
- [The Latest News from the ARISS Team](#)
- [ISS Facts and Figures](#)
- [SuitSat Information](#)

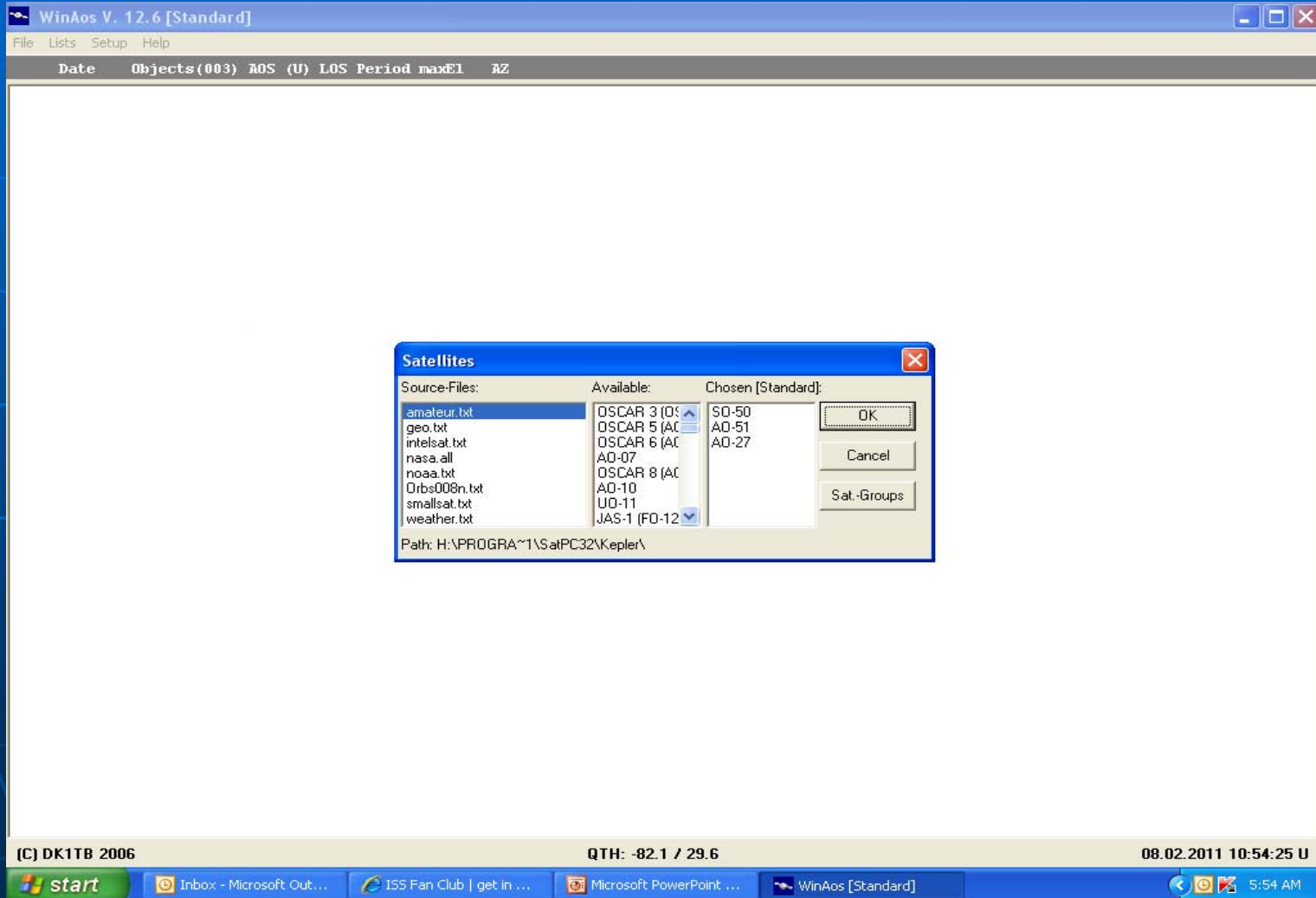


Astronaut Susan Helms KC7NHZ having a QSO

## The SuitSat Re-Entry Contest

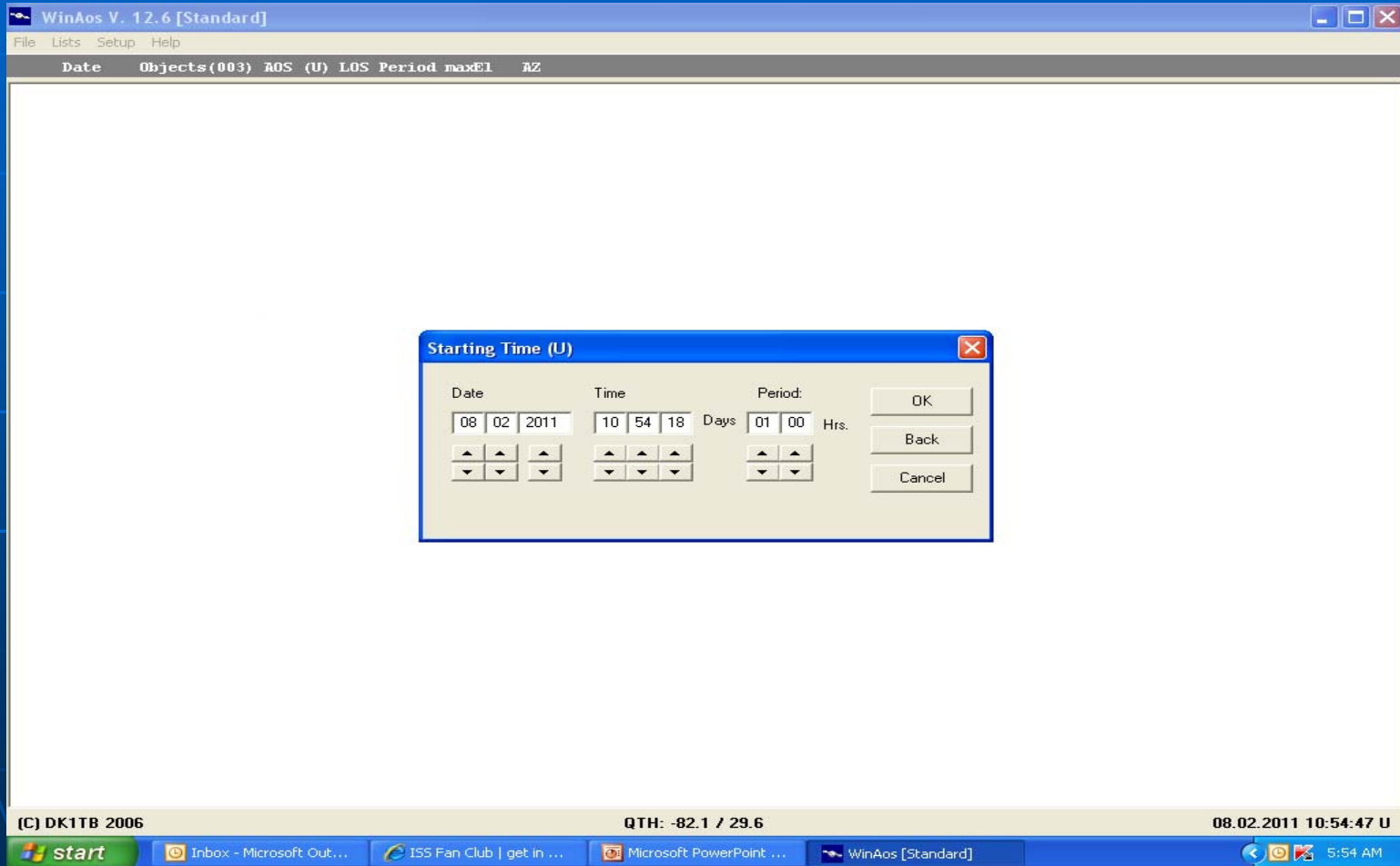
SuitSat-1 was launched on February 3, 2006 at 23:03 UTC, and as planned, it immediately began falling slowly towards the Earth every day. Over time, SuitSat-1 picked up more drag from the Earth's upper atmosphere and heated up, until it eventually burned up and vaporized. Since SuitSat-1 didn't contain any heat shields, it is unlikely that any part of it ever reached the Earth's surface. Just for fun, we held an impromptu contest to see who could most closely predict the re-entry date and time.

Use the desktop icon for program WinAOS to make to display information for satellites you are interested in working. Open the software and select amateur source files as shown below, click on those available that you desire to list and the once chose hit OK.





Select the time range that you are interested in getting a report for. You can select what day/time to start the report so you can plan for the best time to come in the station or go on a portable operation.



Select one satellite and all passes for that bird are highlighted for easier use. Each pass displays AOS (acquisition), LOS (loss), max elevation, range of AZ. We can usually work satellites reliably at elevations above 5 degrees, and often below.

WinAos V. 12.6 [Standard]

File Lists Setup Help

Date	Objects(003)	AOS (U)	LOS	Period	maxEl	AZ
08.02.2011	AO-51	10:53	10:58	05	16	239 - 214
08.02.2011	AO-27	16:58	17:04	06	02	080 - 032
08.02.2011	AO-27	18:32	18:46	14	49	152 - 355
08.02.2011	AO-27	20:13	20:25	12	14	212 - 325
08.02.2011	AO-51	20:15	20:26	11	12	118 - 015
08.02.2011	SO-50	20:20	20:33	13	40	189 - 035
08.02.2011	AO-51	21:52	22:06	14	50	179 - 343
08.02.2011	SO-50	22:02	22:13	11	16	248 - 010
09.02.2011	SO-50	04:59	05:10	11	09	003 - 101
09.02.2011	SO-50	06:39	06:52	13	86	332 - 155
09.02.2011	AO-27	06:52	07:06	14	30	027 - 172
09.02.2011	SO-50	08:21	08:30	09	05	291 - 214
09.02.2011	AO-51	08:29	08:37	08	04	059 - 126
09.02.2011	AO-27	08:31	08:45	14	24	355 - 222
09.02.2011	AO-51	10:05	10:19	14	83	012 - 192

[C] DK1TB 2006 QTH: -82.1 / 29.6 08.02.2011 10:55:06 U

start | InBox - Microsoft Out... | ISS Fan Club | get in ... | Microsoft PowerPoint ... | WinAos [Standard] | 5:55 AM

WinListen software lets you select the coordinates for two stations, and the satellite desired. It then computes the common footprint where both stations can make contact

This is very helpful for working stations on the fringes of a footprint, and for making schedules between two stations

WinListen32 V.12.4 [AO-07]

File Lists Setup Help

Day	Time (U)	Az1	El1	Az2	El2	MR	Height	Lon/Lat	Orbit
26.01.2008	00:57:00	169	0	329	4	122.1	1462	285 -6	51903
26.01.2008	00:57:15	169	1	329	3	122.7	1462	284 -5	51903
26.01.2008	00:57:30	169	1	329	2	123.2	1462	284 -5	51903
26.01.2008	00:57:45	169	2	330	1	123.8	1462	284 -4	51903
26.01.2008	00:58:00	169	3	330	1	124.3	1462	284 -3	51903
26.01.2008	00:58:15	170	4	330	0	124.9	1462	283 -2	51903
26.01.2008	23:57:45	144	0	356	2	127.2	1462	298 -1	51915
26.01.2008	23:58:00	143	1	356	1	127.8	1461	298 0	51915
26.01.2008	23:58:15	143	1	355	1	128.3	1461	298 1	51915
27.01.2008	12:25:00	154	3	344	0	0.5	1443	291 0	51922
27.01.2008	12:25:15	155	3	343	1	1.1	1443	291 -1	51922
27.01.2008	12:25:30	156	2	342	2	1.6	1443	291 -2	51922
27.01.2008	12:25:45	157	1	342	2	2.2	1443	291 -3	51922
27.01.2008	12:26:00	158	1	341	3	2.7	1443	290 -3	51922
27.01.2008	12:26:15	159	0	340	4	3.3	1444	290 -4	51922
28.01.2008	00:50:15	166	0	332	4	125.3	1462	286 -5	51928
28.01.2008	00:50:30	166	1	332	3	125.9	1462	286 -5	51928
28.01.2008	00:50:45	166	2	332	2	126.5	1462	286 -4	51928
28.01.2008	00:51:00	166	3	332	1	127.0	1462	285 -3	51928
28.01.2008	00:51:15	166	3	333	1	127.6	1462	285 -2	51928
28.01.2008	00:51:30	166	4	333	0	128.1	1462	285 -2	51928
28.01.2008	23:51:15	140	1	358	1	131.0	1461	300 1	51940
28.01.2008	23:51:30	140	1	358	0	131.6	1461	299 1	51940
29.01.2008	12:17:45	150	3	347	0	2.6	1443	293 1	51947
29.01.2008	12:18:00	151	3	347	1	3.2	1443	293 0	51947
29.01.2008	12:18:15	152	2	346	1	3.8	1443	293 -1	51947
29.01.2008	12:18:30	153	2	345	2	4.3	1443	293 -2	51947
29.01.2008	12:18:45	154	1	345	3	4.9	1443	292 -2	51947
29.01.2008	12:19:00	155	0	344	3	5.4	1443	292 -3	51947

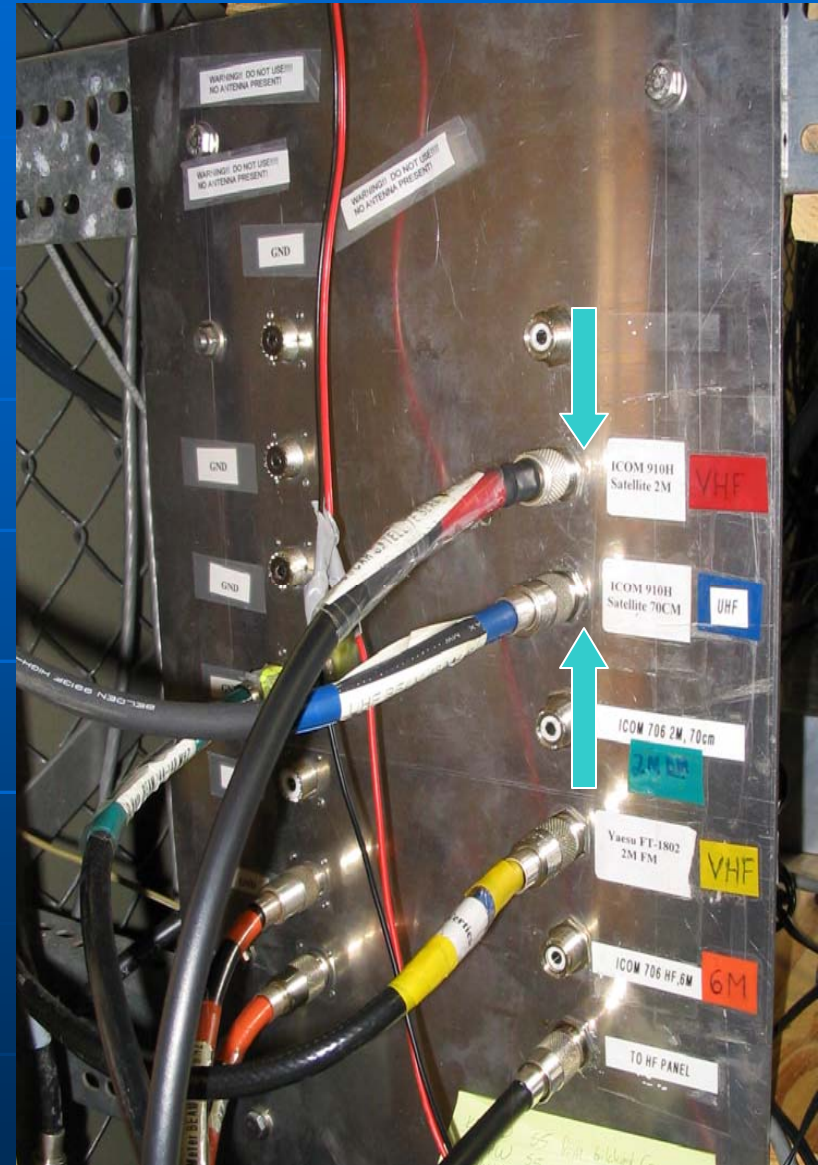
(C) DK1TB 2005 QTH1: -82.1 / 29.6 QTH2: -59.5 / -34.6 25.01.2008 15:55:58 U

**Before you turn on any radio or control software hook up the appropriate antenna. Make sure there are no thunderstorms in the area!**

Our GNES panel has a left column of connectors to ground antennas not in use. The right column are connectors for the radios available at GNES and our VHF/UHF station

This photo shows the GNES 2 meter antenna (red coded) and 70cm antenna (blue) hooked up and ready for use. The radio they hook up to is the ICOM IC-910

**When finished before leaving make sure to disconnect and ground the antennas.**



SatPC32 is the software we use for CAT (computer assisted tuning) and computer antenna tracking control. Before starting the software make sure to turn on all equipment in the correct order (see website video).

SatPC32-1c [Standard A:A0-07] [Registered Version]

File Tracking Satellites CAT Rotor Mode Setup Programs Accy ?

QTH: -82.0 / 29.6 **Sat in Sun** Downlink 0 Corr.(+/-) 0 Uplink 20 100 500 1K 5K D-Corr: Upl/Dwnl

**R+ C+ A- U+ T1 U CW- AL** **145947.705 432151.795** **08.02.2011**

**1G- S+ D+ W3 2D BM** -2.295 6.795 **11:11:56 U**

B:50-50 Aos:20:14 maxE:26

C:A0-51 Aos:20:12 maxE:13

Azimuth	Elevation	MA	Height	Range	L	SSP	B	Orbit	Squint	Aos	Los	MaxE
158.4	14.8	253.8	1442	3183	286	8	65805	--	*****	11:16	16	

A B C D E F  
G H I J K L

In this image Satellite AO7 is selected as the active satellite for CAT/rotor control, by hitting tab A on the lower right. If the footprint is over our location (QTH), the tabs highlight.

SatPC32-1c [Standard A:AO-07] [Registered Version]

File Tracking Satellites CAT Rotor Mode Setup Programs Accy ?

QTH: -82.0 / 29.6 Sat in Sun      Downlink 0    Corr.(+/-) 0    Uplink 20 100 500 1K 5K      D-Corr: Upl/Dwnl

R+ C+ A- U+ T1 U CW-AL      145947.705    432151.795      08.02.2011

M+ Z1 G- S+ D+ W3 2D BM      -2.295      6.795      11:11:56 U

B:SO-50 Aos:20:14 maxE:26

C:AO-51 Aos:20:12 maxE:13

Azimuth	Elevation	MA	Height	Range	L	SSP	B	Orbit	Squint	Aos	Los	MaxE
158.4	14.8	253.8	1442	3183	286	8	65805	--	*****	11:16	16	

Note that other satellites are also appear on the screen and have the tab letter preceding the name

SatPC32-1c [Standard A:AO-07] [Registered Version]

File Tracking Satellites CAT Rotor Mode Setup Programs Accy ?

QTH: -82.0 / 29.6 **Sat in Sun** Downlink 0 Corr.(+/-) 0 Uplink 20 100 500 1K 5K D-Corr: Upl/Dwnl

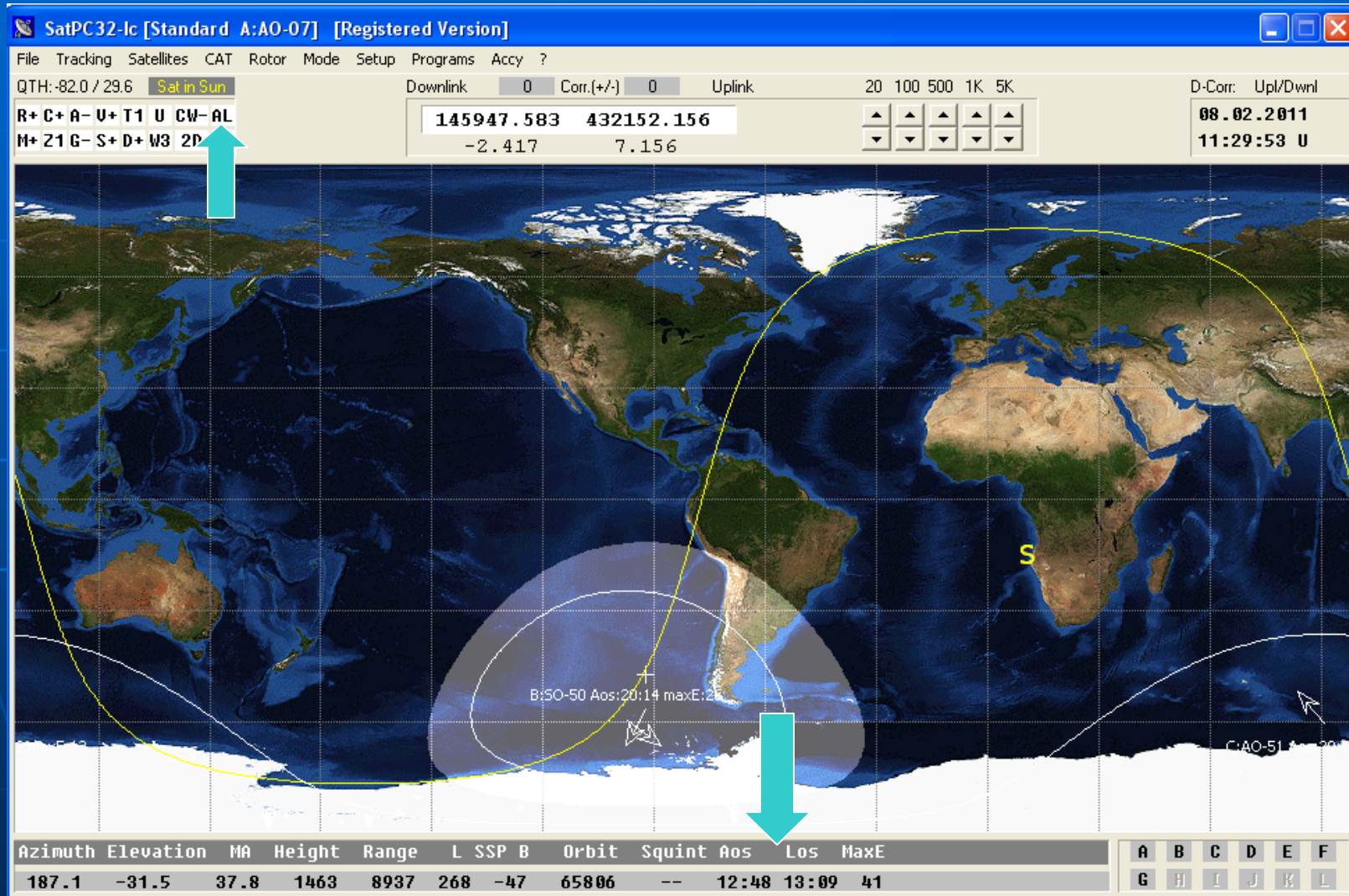
R+ C+ A- U+ T1 U CW-AL 145947.705 432151.795 08.02.2011  
M+ Z1 G- S+ D+ W3 2D BM -2.295 6.795 11:11:56 U

Azimuth Elevation MA Height Range L SSP B Orbit Squint Aos Los MaxE

158.4	14.8	253.8	1442	3183	286	8	65805	--	*****	11:16	16
-------	------	-------	------	------	-----	---	-------	----	-------	-------	----

A B C D E F  
G H I J K L

By using the AL/Ct button on top in the AL mode the bottom of the screen shows the AL (AOS/LOS) times of the selected satellite.



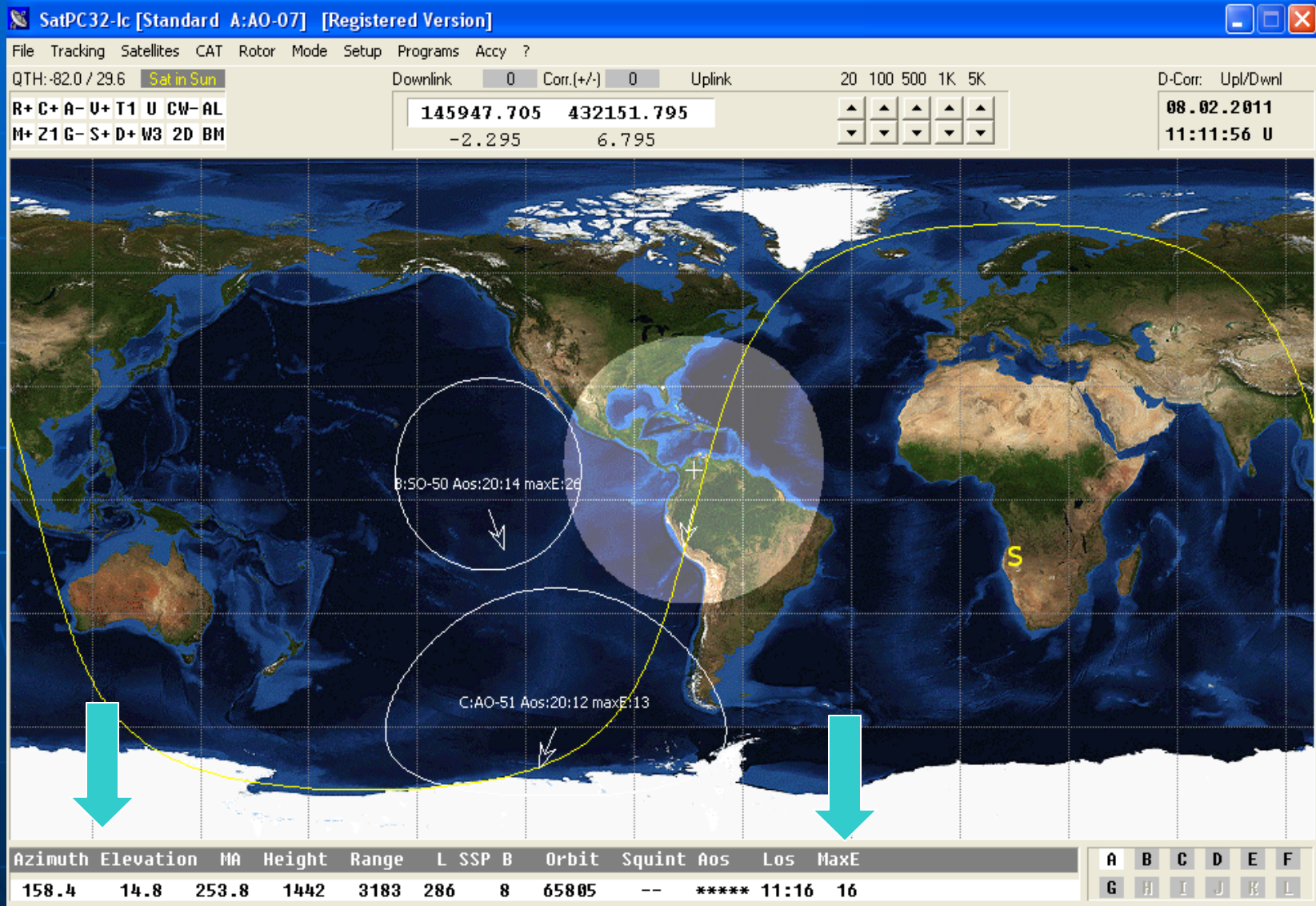


By using the AL/Ct button on top in the Ct mode the bottom of the screen shows the amount of time until the next AOS of the selected satellite. Note the mouseover description.

The screenshot displays the SatPC32-1c software interface. At the top, the title bar reads "SatPC32-1c [Standard A:AO-07] [Registered Version]". Below the title bar is a menu bar with options: File, Tracking, Satellites, CAT, Rotor, Mode, Setup, Programs, Accy, ?. The main interface area is divided into several sections:

- Top Left:** QTH: -82.0 / 29.6, Sat in Sun, and a mode selector showing "R+C+A-U+T1 U CW-Ct" and "M+Z1G-S+D+W3 2D". A red arrow points to the "Ct" button.
- Top Center:** Downlink: 0, Corr.(+/-): 0, Uplink: 20 100 500 1K 5K. Below this are numerical fields for "145947.626" and "432152.029" with up/down arrows.
- Top Right:** D-Corr: Upl/Dwnl, "08.02.2011", and "11:30:46 U".
- Center:** A world map showing satellite orbits. A red arrow points to the "Ct" button, and another red arrow points to the "AOS/LOS time (AL) or Countdown (Ct) with World Map" text.
- Bottom:** A data table with columns: Azimuth, Elevation, MA, Height, Range, L, SSP, B, Orbit, Squint, Aos, Los, MaxE. The values are: 187.6, -33.2, 39.8, 1464, 9198, 266, -50, 65806, --, 01:17, 41. A red arrow points to the "Aos" column.
- Bottom Right:** A grid of buttons labeled A through L.

Note the maximum elevation of the pass of the selected satellite is displayed as well as the current Az and El



The screen map displays can be changed in 2D size and whether 3D globe view is desired. Use mouseover for details.

The screenshot shows the SatPC32-1c software interface. At the top, the title bar reads "SatPC32-1c [Standard A:AO-07] [Registered Version]". Below the title bar is a menu bar with "File Tracking Satellites CAT Rotor Mode Setup Programs Accy ?". The main interface is divided into several sections:

- Top Left:** QTH: -82.0 / 29.6, **Sat in Sun** (highlighted), and a "Show AOS/LOS time (AL) or Countdown (Ct) with World Map" checkbox.
- Top Center:** Downlink 0, Corr.(+/-) 0, Uplink 20 100 500 1K 5K. Below these are two input fields: "145947.626" and "432152.029", each with up/down arrow buttons.
- Top Right:** D-Corr: Upl/Dwnl, "08.02.2011", and "11:30:46 U".
- Left Side:** A vertical stack of mode letters: "R+ C+ A- U+ T1 U CW- Ct", "M+ Z1 G- S+ D+ W3 2D B^M". A red arrow points to the "2D" mode.
- Main Map:** A world map showing satellite tracks. A yellow arc represents the satellite's path. A semi-transparent grey circle is centered on the map with the text "B:50-50 Aos:08:43 maxE:26". Other labels include "maxE:13" and "C:AO-51 Aos:08:41".
- Bottom:** A data table with columns: Azimuth, Elevation, MA, Height, Range, L, SSP, B, Orbit, Squint, Aos, Los, MaxE. Below the table is a keyboard layout with letters A-F and G-L.

Azimuth	Elevation	MA	Height	Range	L	SSP	B	Orbit	Squint	Aos	Los	MaxE
187.6	-33.2	39.8	1464	9198	266	-50	65806	--	01:17			41

This view shows the 3D globe view.

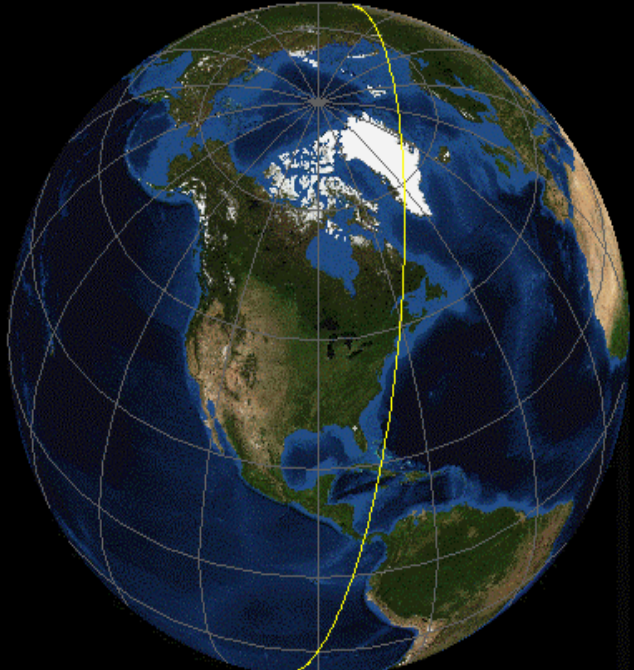
SatPC32-1c [Standard A:A0-07] [Registered Version]

File Tracking Satellites CAT Rotor Mode Setup Programs Accy ?

QTH: -82.0 / 29.6 **Sat in Sun** Downlink 0 Corr.(+/-) 0 Uplink 20 100 500 1K 5K D-Corr: Upl/Dwnl

R+ C+ A- U+ T1 U CW-AL 145948.741 432148.728 08.02.2011  
M+ Z1 G- S+ D+ W3 3D1BM -1.259 3.728 11:47:34 U

3D map on/off



Azimuth Elevation MA Height Range L SSP B Orbit Squint Aos Los MaxE

194.6	-64.1	77.2	1479	13044	135	-72	65806	--	12:48	13:09	41	A	B	C	D	E	F	G	H	I	J	K	L
-------	-------	------	------	-------	-----	-----	-------	----	-------	-------	----	---	---	---	---	---	---	---	---	---	---	---	---

# Mouseover to see what the other buttons do to the satellite display.

The screenshot shows the SatPC32-1c software interface. The main window displays a world map with a satellite's path and coverage area. A cyan arrow points to the 'Sat in Sun' button in the top control panel. The interface includes various data fields and control buttons.

**Top Panel:**

- File Tracking Satellites CAT Rotor Mode Setup Programs Accy ?
- QTH: -82.0 / 29.6 **Sat in Sun** Downlink 0 Corr.(+/-) 0 Uplink 20 100 500 1K 5K D-Corr: Upl/Dwnl
- R+ C+ A- U+ T1 U CW- Ct 145947.626 432152.029
- M+ Z1 G- S+ D+ W3 2D B<sup>M</sup> 0.029
- Show AOS/LOS time (AL) or Countdown (Ct) with World Map
- 08.02.2011 11:30:46 U

**Map Data:**

- maxE:13
- B:SO-50 Aos:08:43 maxE:26
- C:AO-51 Aos:08:41

**Bottom Panel:**

Azimuth	Elevation	MA	Height	Range	L	SSP	B	Orbit	Squint	Aos	Los	MaxE
187.6	-33.2	39.8	1464	9198	266	-50	65806	--	01:17		41	

**Bottom Right Panel:**

A	B	C	D	E	F
G	H	I	J	K	L

When you are in footprint and ready to transmit use the boom microphone/headset (Heil) and activate transmit by foot pedal. Listen for your downlink and make sure you hear it or avoid making frequent calls

SatPC32-1c [Standard A:AO-07] [Registered Version]

File Tracking Satellites CAT Rotor Mode Setup Programs Accy ?

QTH: -82.0 / 29.6 **Sat in Sun** Downlink 0 Corr.(+/-) 0 Uplink 20 100 500 1K 5K D-Corr: Upl/Dwnl

**145947.705 432151.795**

-2.295 6.795

08.02.2011 11:11:56 U

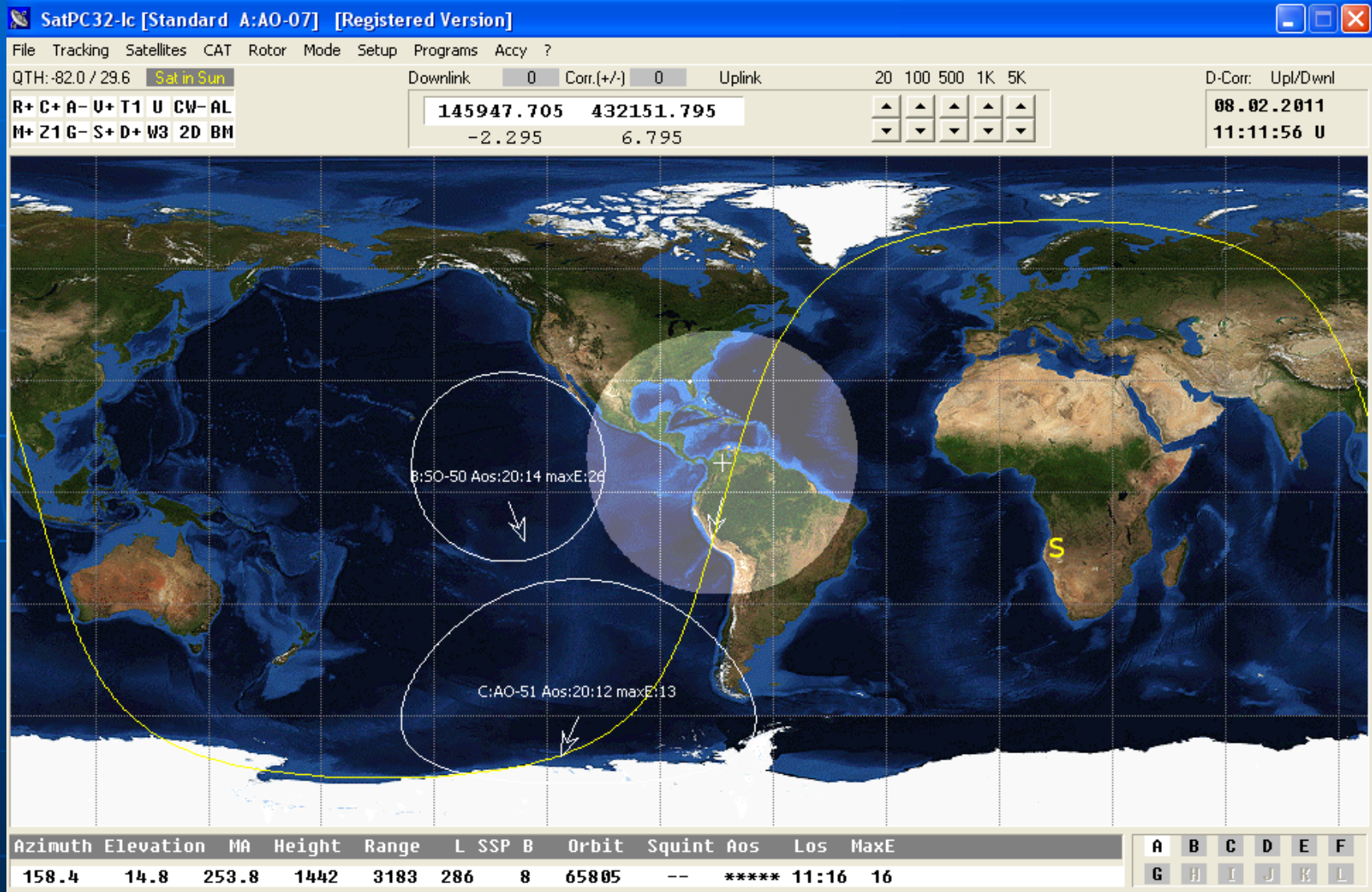
B:50-50 Aos:20:14 maxE:26

C:AO-51 Aos:20:12 maxE:13

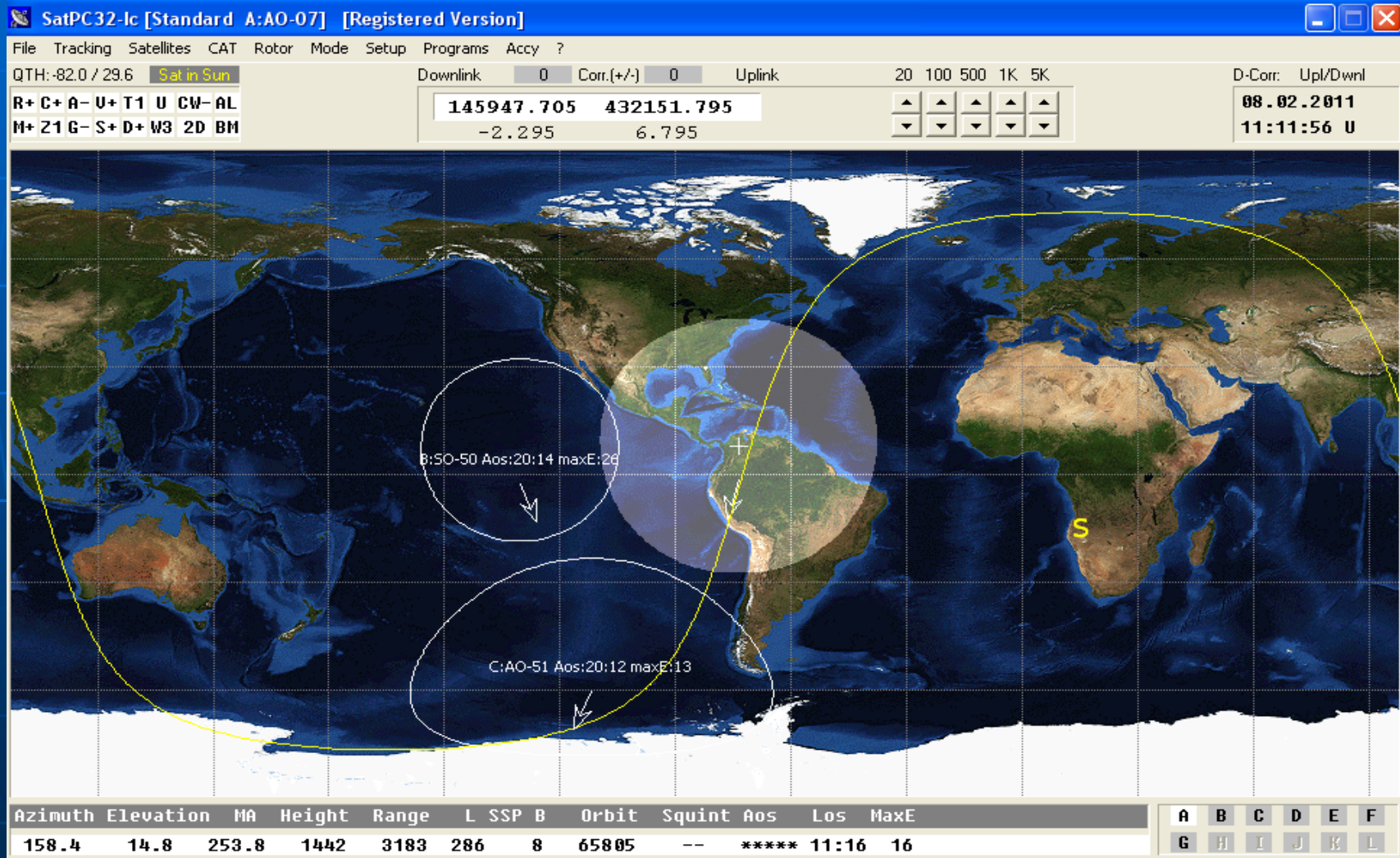
Azimuth	Elevation	MA	Height	Range	L	SSP	B	Orbit	Squint	Aos	Los	MaxE
158.4	14.8	253.8	1442	3183	286	8	65805	--	*****	11:16	16	

A B C D E F  
G H I J K L

If you do not hear your downlink you may still be getting into the bird but not receiving it and be causing interference to others (tumbling bird with antennas orientation changing).



The FM birds are one frequency crossband repeaters. You may have many stations on at once trying to transmit, use etiquette. Say their callsign from W4DFU, your first name, "Univ. FL" Club Station Gainesville in EL89 (grid square).





The other station may say QSL to confirm the contact, and you the same after a successful two way exchange. You may get more calls from others, or make more yourself. If the SAT is crowded do not hog the bird, 2-3 contacts if others are on is good etiquette

SatPC32-1c [Standard A:A0-07] [Registered Version]

File Tracking Satellites CAT Rotor Mode Setup Programs Accy ?

QTH: -82.0 / 29.6 **Sat in Sun** Downlink 0 Corr.(+/-) 0 Uplink 20 100 500 1K 5K D-Corr: Upl/Dwnl

**145947.705 432151.795** **08.02.2011**  
 -2.295 6.795 **11:11:56 U**

R+ C+ A- U+ T1 U CW- AL  
 M+ Z1 G- S+ D+ W3 2D BM

Azimuth	Elevation	MA	Height	Range	L	SSP	B	Orbit	Squint	Aos	Los	MaxE
158.4	14.8	253.8	1442	3183	286	8	65805	--	*****	11:16	16	

A B C D E F  
G H I J K L

Make sure to enter the contact in the paper log at the SAT station. List the date in UTC (see clock), time UTC, mode used, callsign of the station contacted, frequency up/down, their grid square, sign your name and callsign. Not logging contacts is a club violation and can result in losing station rights.

SatPC32-1c [Standard A:AO-07] [Registered Version]

File Tracking Satellites CAT Rotor Mode Setup Programs Accy ?

QTH: -82.0 / 29.6 Sat in Sun      Downlink 0    Corr.(+/-) 0    Uplink      20 100 500 1K 5K      D-Corr: Upl/Dwrl

R+ C+ A- U+ T1 U CW- AL      145947.705    432151.795      08.02.2011  
M+ Z1 G- S+ D+ W3 2D BM      -2.295      6.795      11:11:56 U

The software interface displays a world map with satellite footprints. Two footprints are highlighted with white circles and arrows:

- B:SO-50 Aos:20:14 maxE:26
- C:AO-51 Aos:20:12 maxE:13

A yellow arc represents the satellite's orbit. A yellow 'S' is visible on the map over South America.

Azimuth	Elevation	MA	Height	Range	L	SSP	B	Orbit	Squint	Aos	Los	MaxE
158.4	14.8	253.8	1442	3183	286	8	65805	--	*****	11:16	16	

Buttons: A B C D E F  
G H I J K L

# OSCAR Satellites

## Orbiting Satellites Carrying Amateur Radio

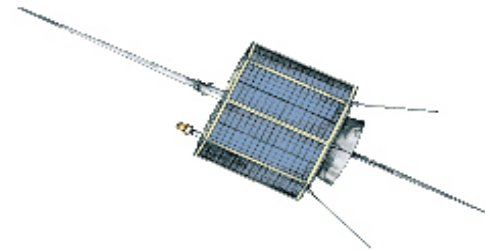
Some more information follows about satellites for advanced users. Look for a primer in the near future for using these birds and ask Dr. Garlitz if you would like more information about making contact with them, at [jgarlitz@ufl.edu](mailto:jgarlitz@ufl.edu).

Many of the following birds use linear transponders, transmitting LSB, USB (or CW) up on one side of the center of the bandwidth and the opposite side down (50 KHz bandwidth on most).

This allows multiple users to make contacts on the satellite simultaneously.

## AMSAT-OSCAR 7 (OSCAR 7)

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### Spacecraft Summary

OSCAR Designation: AMSAT-OSCAR 7	Oscar Number: AO-7
International Designator: 1974-089B	Norad Number: 7530
Common Name: OSCAR 7	Alternate Name: Phase-II B
Satellite Type: Satellite	Launch Date: 15 November, 1974
Launch Location: Vandenberg, AFB	Launch Vehicle: Delta 2310
Apogee: 1459.00	Perigee: 1440.00
Inclination: 101.59	Period: 114.87
Dimensions: 36.0cm x 42.4cm octahedron	Weight: 28.800 Kg
Organization: AMSAT-NA	

### Frequency Information

#### **Mode V/A (A) Linear Transponder (Non-Inverting): Semi-Operational**

Uplink: 145.8500 - 145.9500 MHz SSB/CW

Downlink 29.4000 - 29.5000 MHz SSB/CW

#### **Mode V/A (A) TLM Beacon: Semi-Operational**

Downlink 29.5020 MHz CW

#### **Mode U/V (B) Linear Transponder (Inverting): Semi-Operational**

Uplink: 432.1250 - 432.1750 MHz SSB/CW

Downlink 145.9750 - 145.9250 MHz SSB/CW

**OSCAR Designation:** AMSAT OSCAR 16      **Oscar Number:** AO-16  
**International Designator:** 1990-005D      **Norad Number:** 20439  
**Common Name:** PacSAT      **Satellite Type:** Microsatellite  
**Launch Date:** 22 January, 1990      **Launch Location:** French Guiana  
**Launch Vehicle:** Ariane 4      **Apogee:** 794.00  
**Perigee:** 778.00      **Inclination:** 98.19  
**Period:** 100.58      **Dimensions:** 22.6 x 22.6 x 22.3 cm  
cube  
**Weight:** 13.340 Kg  
**Organization:** AMSAT-NA

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### Frequency Information

#### Mode V/U (J) PacSat BBS: **Non-Operational**

Downlink 437.0260 MHz BPSK 1200 BPS  
Downlink 437.0510 MHz BPSK 1200 BPS  
Uplink: 145.9000 MHz MFSK 1200 BPS  
Uplink: 145.9200 MHz MFSK 1200 BPS  
Uplink: 145.9400 MHz MFSK 1200 BPS  
Uplink: 145.9600 MHz MFSK 1200 BPS

#### Mode S Packet: **Non-Operational**

Downlink 2401.1428 MHz BPSK 1200 BPS

#### Mode FM Voice Repeater (Downlink is double sideband.): **Operational**

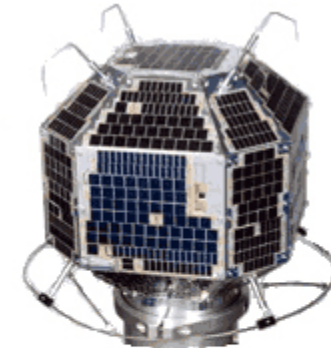
Simplex: 145.9200 MHz FM  
Downlink 437.0260 MHz SSB/CW

### Callsign(s)

**Broadcast:** PACSAT-11  
**BBS:** PACSAT-12

## Fuji-OSCAR 29 (JAS 2)

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### Spacecraft Summary

<b>OSCAR Designation:</b> Fuji-OSCAR 29	<b>Oscar Number:</b> FO-29
<b>International Designator:</b> 1996-046B	<b>Norad Number:</b> 24278
<b>Common Name:</b> JAS 2	<b>Satellite Type:</b> Satellite
<b>Launch Date:</b> 17 August, 1996	<b>Launch Location:</b> Tanegashima Space Center
<b>Launch Vehicle:</b> H-II No. 4	<b>Apogee:</b> 1323.00
<b>Perigee:</b> 800.00	<b>Inclination:</b> 98.54
<b>Period:</b> 106.44	<b>Dimensions:</b> 44 x 47 polyhedron
<b>Weight:</b> 50.000 Kg	
<b>Organization:</b> <a href="#">Japan Amateur Radio League</a>	

---

### Frequency Information

### Callsign(s)

BBS: 8J1JCS

#### Mode V/U (J) Linear Transponder (Inverting): **Semi-Operational**

Uplink: 145.9000 - 146.0000 MHz SSB/CW

Downlink 435.8000 - 435.9000 MHz SSB/CW

#### Mode V/U (J) PacSat BBS: **Non-Operational**

Uplink: 145.8000 MHz BPSK 1200 BPS

Uplink: 145.8700 MHz BPSK 1200 BPS

Uplink: 145.9100 MHz BPSK 1200 BPS

Downlink 435.9100 MHz FSK 9600 BPS

#### Mode U Beacon: **Semi-Operational**

## Gurwin OSCAR-32 (TechSat1b)



### Spacecraft Summary

<b>OSCAR Designation:</b> Gurwin OSCAR-32	<b>Oscar Number:</b> GO-32
<b>International Designator:</b> 1998-043D	<b>Norad Number:</b> 25397
<b>Common Name:</b> TechSat1b	<b>Alternate Name:</b> Gurwin II
<b>Satellite Type:</b> Microsatellite	<b>Launch Date:</b> 10 July, 1998
<b>Launch Location:</b> Baikonur Cosmodrome	<b>Launch Vehicle:</b> Zenith
<b>Apogee:</b> 816.00	<b>Perigee:</b> 814.00
<b>Inclination:</b> 98.48	<b>Period:</b> 101.19
<b>Dimensions:</b> 44.5 x 44.5 x 44.5 cm cube	<b>Weight:</b> 60.000 Kg
<b>Organization:</b> <a href="#">Technion Institute of Technology</a>	

### Frequency Information

**Mode V/U (J) APRS (Set Path to be via 4XTECH):** **Non-Operational**

Uplink: 145.9300 MHz FM 9600 BPS

Downlink 435.2250 MHz FM 9600 BPS

**Mode V/U (J) PacSat BBS:** **Non-Operational**

Uplink: 145.8500 MHz FSK 9600 BPS

**Mode V/U (J) PacSat BBS (PBBS has been off, in bootloader mode):** **Semi-Operational**

Uplink: 145.8900 MHz FSK 9600 BPS

### Callsign(s)

**BBS:** 4XTECH  
-12

**Beacon:** 4XTECH  
-11

# OSCAR Digital Satellites

## GO-32 - Technion U Haifa Israel

The screenshot shows the SatPC32 software interface. The main window displays tracking information for GO-32, including QTH: 02.1 / 29.6, Sat in Sun, and various tracking parameters. A 'Groundstation Control' dialog box is open, showing a table of satellite passes and two gauges for Azimuth (Az) and Elevation (El).

Satellite	P	El	Start Time	Finish Time
GO-32	1	88	03-01-08 01:10:27	03-01-08 01:25:47
GO-32	1	6	03-01-08 02:53:42	03-01-08 03:03:30
GO-32	1	2	03-01-08 11:56:53	03-01-08 12:03:19
GO-32	1	62	03-01-08 13:33:09	03-01-08 13:48:23
GO-32	1	12	03-01-08 15:14:16	03-01-08 15:26:07
GO-32	1	2	03-01-08 23:13:44	03-01-08 23:20:16
GO-32	1	52	03-02-08 00:48:19	03-02-08 01:03:23
GO-32	1	13	03-02-08 02:29:51	03-02-08 02:42:17

Groundstation Control dialog box also shows:

- 01:15:54 UTC
- 1 Mar 2008
- GO-32
- 00:09:53 LOS
- Az 166
- El 37

At the bottom of the dialog box, there is a table with columns: Satellite, Azm, El, Range, Doplr, MA, CountDwn, Mode.

Satellite	Azm	El	Range	Doplr	MA	CountDwn	Mode
	166.2	37.0	166.9	818	1244	280	22
				50081	--	*****	01:26



# Store and Forward BBS

MSPE [GO-32]

File Setup Directory Fill Satellite Send Msg Help

File #	Hol	%	Offset	Length
7702	1	55	0	542

Upload complete and accepted by satellite. [115 CPS]  
Upload file number 773B  
Auto: Request fill of file 76F8, 4 holes  
OK AA4FL  
Upload complete and accepted by satellite. [85 CPS]  
File 76F8 heard  
Upload file number 773C  
File 76F8 downloaded  
Auto: Request fill of file 76FA, 2 holes  
OK AA4FL  
File 76FA heard  
File 76FA downloaded  
Auto: Request fill of file 7702, 1 holes

OK AA4FL  
>B:69783777  
>B:69784961  
OK AA4FL  
>B:69786182

>B:69780342  
>Sat Mar 01 01:15:35 2008 :UTC! Gurwin Techsat1B <U9.87>  
BBS<U9.87 beta> 2Users/8BCasts.  
Up1:145.89,145.93,1269.8,1269.9  
:BLN1 G032:cu APRS!!Use pth via 4XTECH  
:BLN2 G032:APRS msgs and clients use 145.85 Up1  
:BLN3 G032:D7&D700 posits use 145.93  
>B:69780784  
OK AA4FL  
>B:69780999  
>B:69782743  
>B:69782924  
>Sat Mar 01 01:15:55 2008 :UTC! Gurwin Techsat1B <U9.87>  
BBS<U9.87 beta> 2Users/8BCasts.  
Up1:145.89,145.93,1269.8,1269.9  
:BLN1 G032:cu APRS!!Use pth via 4XTECH  
:BLN2 G032:APRS msgs and clients use 145.85 Up1  
:BLN3 G032:D7&D700 posits use 145.93  
OK AA4FL  
>B:69783777  
>B:69784961  
OK AA4FL  
>B:69786182

PB: Empty.

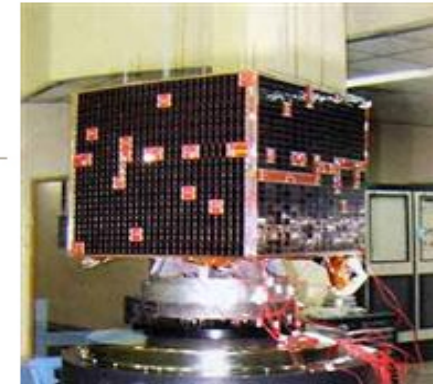
Open:A 1C23:

DIR 4 holes    AUTO 7702    83%    T: 6159    D: 0    F: 3634

Upload Status

Uploading File	773B.PUL	Disc
File size	428	
File number	773C	
Bytes Uploaded	464	
Bytes to Upload	0	
Average CPS	51	
Approx. time remaining	00:00:00	Help

## VUSat OSCAR-52 (HAMSAT)



### Spacecraft Summary

<b>OSCAR Designation:</b> VUSat OSCAR-52	<b>Oscar Number:</b> VO-52
<b>International Designator:</b> 2005-017B	<b>Norad Number:</b> 28650
<b>Common Name:</b> HAMSAT	<b>Alternate Name:</b> VUSat
<b>Satellite Type:</b> Microsatellite	<b>Launch Date:</b> 5 May, 2005
<b>Launch Location:</b> Sirharkota	<b>Launch Vehicle:</b> PSLV
<b>Apogee:</b> 646.00	<b>Perigee:</b> 607.00
<b>Inclination:</b> 97.24	<b>Period:</b> 97.24
<b>Dimensions:</b> 63 x 63 x 55 cuboid	<b>Weight:</b> 42.500 Kg
<b>Organization:</b> <a href="http://AMSAT-India.org">AMSAT-India</a>	

### Frequency Information

#### **Mode V Beacon (Indian Beacon): Operational**

Downlink 145.9360 MHz Carrier

#### **Mode V Beacon (Dutch Beacon): Operational**

Simplex: 145.8600 MHz CW

#### **Mode U/V (B) Linear Transponder (Inverting) (Indian Transponder): Operational**

Uplink: 435.2200 - 435.2800 MHz SSB/CW

Downlink 145.9300 - 145.8700 MHz SSB/CW

#### **Mode U/V (B) Linear Transponder (Inverting) (Dutch Transponder): Operational**

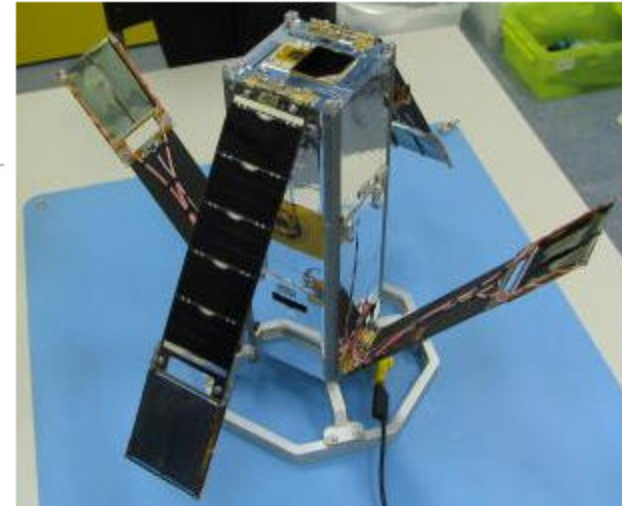
Uplink: 435.2250 - 435.2750 MHz SSB/CW

Downlink 145.9250 - 145.8750 MHz SSB/CW

# 3U CubeSat Form Factor

## Delfi OSCAR-64 (Delfi-C3)

### Spacecraft Summary



**OSCAR Designation:** Delfi OSCAR-64

**Norad Number:** 32789

**Satellite Type:** Nanosatellite

**Launch Location:** Satish Dawan Space  
Center, India

**Apogee:** 642.10

**Inclination:** 98.00

**Dimensions:** 10cm x 10cm x 34cm

**Organization:** [Delft University of Technology](#)

**Oscar Number:** DO-64

**Common Name:** Delfi-C3

**Launch Date:** 28 April, 2008

**Launch Vehicle:** PSLV

**Perigee:** 621.60

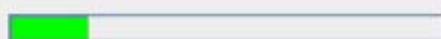
**Period:** 97.20

**Weight:** 2.200 Kg



File Options

Audio level



Primary Sound Capture Driver

Frequency



Satellite

Packet counter	2	packets
Bootcounter attempt	265	boots
Bootcounter succes	254	boots
Operational mode	science	
Last Rx Cmd RAP	RAP 1	

OBC

OBC temperature	-5.679	deg. C
System bus voltage	12.152	V
OBC current	0.0	mA

ComBo

CEP mode	OBC
AWP mode	OBC
ComBo Current	0.0 mA

EPS

EMP op. mode	OBC
GaAs Z+ X+ current	0.0 mA
GaAs Z+ X- current	97.65 mA
GaAs Z- Y+ current	115.22 mA
GaAs Z- Y- current	0.0 mA

MeBo Z+

MEP Z+ op. mode	OBC
MDP Z+ op. mode	OBC
MeBo Z+ current	3.555 mA

MeBo Z-

MEP Z- op. mode	OBC
MDP Z- op. mode	OBC
MeBo Z- current	2.765 mA

RAP 1

REP1 op. mode	OBC
RCP1 op. mode	OEM
RBP1 op. mode	OEM
RAP 1 temperature	-68.1 deg. C
RAP 1 Rx current	23.305 mA
RAP 1 Tx current	0.0 mA
RAP 1 fwd. power	0.0 mW
RAP 1 refl. power	0.0 mW

RAP 2

REP2 op. mode	OBC
RCP2 op. mode	OBC
RBP2 op. mode	OBC
RAP 2 temperature	10.497 deg. C
RAP 2 Rx current	21.725 mA
RAP 2 Tx current	118.89 mA
RAP 2 fwd. power	256.82 mW
RAP 2 refl. power	2.6175 mW

ICB Z+

ADP 1 op. mode	OBC
ADP 2 op. mode	OBC
Solar Panel Z+ X+	deployed
Solar Panel Z+ X-	deployed
Antenna Z+ X+	deployed
Antenna Z+ X-	deployed
Antenna Z+ Y+	deployed
Antenna Z+ Y-	deployed

ICB Z-

ADP3 op. mode	OBC
ADP4 op. mode	OBC
Solar Panel Z- Y+	deployed
Solar Panel Z- Y-	deployed
Antenna Z- X+	deployed
Antenna Z- X-	deployed
Antenna Z- Y+	deployed
Antenna Z- Y-	deployed

Terminal

```

from: DLFIC3 to: TLM a8 98 9b 40 40 40 00 88 98 8c 92 86 66 01 03 f0 08 0
from: DLFIC3 to: TLM a8 98 9b 40 40 40 00 88 98 8c 92 86 66 01 03 f0 08 0
from: DLFIC3 to: TLM a8 98 9b 40 40 40 00 88 98 8c 92 86 66 01 03 f0 08 0
from: DLFIC3 to: TLM a8 98 9b 40 40 40 00 88 98 8c 92 86 66 01 03 f0 08 0
from: DLFIC3 to: TLM a8 98 9b 40 40 40 00 88 98 8c 92 86 66 01 03 f0 08 0
from: DLFIC3 to: TLM a8 98 9b 40 40 40 00 88 98 8c 92 86 66 01 03 f0 08 0
from: DLFIC3 to: TLM a8 98 9b 40 40 40 00 88 98 8c 92 86 66 01 03 f0 08 0
from: DLFIC3 to: TLM a8 98 9b 40 40 40 00 88 98 8c 92 86 66 01 03 f0 08 0
from: DLFIC3 to: TLM a8 98 9b 40 40 40 00 88 98 8c 92 86 66 01 03 f0 08 0
from: DLFIC3 to: TLM a8 98 9b 40 40 40 00 88 98 8c 92 86 66 01 03 f0 08 0
    
```

Status messages

Packets received: 37 Last packet received: 28/Apr/08 22:09:56

Primary repository		Secondary repository	
Disk:	0	Sent:	38
Disk:	0	Sent:	38

```

[22:08:25] Connected to server 83.136.144.137
[22:08:25] User AA4TL logged in
[22:08:25] User AA4TL logged in
[22:10:57] Saving secondary repository data to disk
[22:10:57] Saving primary repository data to disk
[22:14:55] Terminal data copied to clipboard
    
```

**Delfi-C3 RASCAL**

File Options

Audio level: Creative SB Live! Series

Frequency: 1632 Hz

**Delfi-C<sup>3</sup>**

<b>Satellite</b>	Packet counter: 97 packets	<b>OBC</b>	OBC temperature: -4.309 deg. C	<b>EPS</b>	EMP op. mode: OBC	<b>MeBo Z+</b>	MEP Z+ op. mode: OBC
Bootcounter attempt: 2273 boots	Bootcounter succes: 311 boots	System bus voltage: 12.25 V	OBC current: 3.16 mA	GaAs Z+ X+ current: 205.06 mA	GaAs Z+ X- current: 25.389 mA	MDP Z+ op. mode: OBC	MDP Z+ current: 3.555 mA
Operational mode: science	Last Rx Cmd RAP: RAP 1	ComBo	CEP mode: OBC	GaAs Z- Y+ current: 0.0 mA	GaAs Z- Y- current: 0.0 mA	MeBo Z-	MEP Z- op. mode: OBC
		AWP mode: OBC	ComBo Current: 0.0 mA			MDP Z- op. mode: OBC	MDP Z- current: 3.16 mA

<b>RAP 1</b>	REP1 op. mode: OBC	<b>RAP 2</b>	REP2 op. mode: OBC	<b>ICB Z+</b>	ADP 1 op. mode: OBC	<b>ICB Z-</b>	ADP3 op. mode: OBC
RCP1 op. mode: OBM	RBP1 op. mode: OBM	RCP2 op. mode: OBC	RBP2 op. mode: OBC	ADP 2 op. mode: OBC	ADP4 op. mode: OBC	Solar Panel Z- Y+	Solar Panel Z- Y+
RAP 1 temperature: -68.1 deg. C	RAP 1 Rx current: 23.305 mA	RAP 2 temperature: 9.4320 deg. C	RAP 2 Rx current: 21.725 mA	Solar Panel Z+ X+	Solar Panel Z+ X+	Solar Panel Z- Y-	Solar Panel Z- Y-
RAP 1 Tx current: 0.0 mA	RAP 1 fwd. power: 0.0 mW	RAP 2 Tx current: 118.89 mA	RAP 2 fwd. power: 259.63 mW	Antenna Z+ X-	Antenna Z+ X-	Antenna Z- Y+	Antenna Z- Y+
RAP 1 refl. power: 0.0 mW		RAP 2 refl. power: 2.4095 mW		Antenna Z+ Y-	Antenna Z+ Y-	Antenna Z- Y-	Antenna Z- Y-

**Terminal**

```

from: DLFIC3 to: TLM 48 98 9b 40 40 40 00 88 98 8c 92 86 66 01 02 f0 e1 08
from: DLFIC3 to: TLM 48 98 9b 40 40 40 00 88 98 8c 92 86 66 01 02 f0 e1 08
from: DLFIC3 to: TLM 48 98 9b 40 40 40 00 88 98 8c 92 86 66 01 02 f0 e1 08
from: DLFIC3 to: TLM 48 98 9b 40 40 40 00 88 98 8c 92 86 66 01 02 f0 e1 08
from: DLFIC3 to: TLM 48 98 9b 40 40 40 00 88 98 8c 92 86 66 01 02 f0 e1 08
from: DLFIC3 to: TLM 48 98 9b 40 40 40 00 88 98 8c 92 86 66 01 02 f0 e1 08

```

**Status messages**

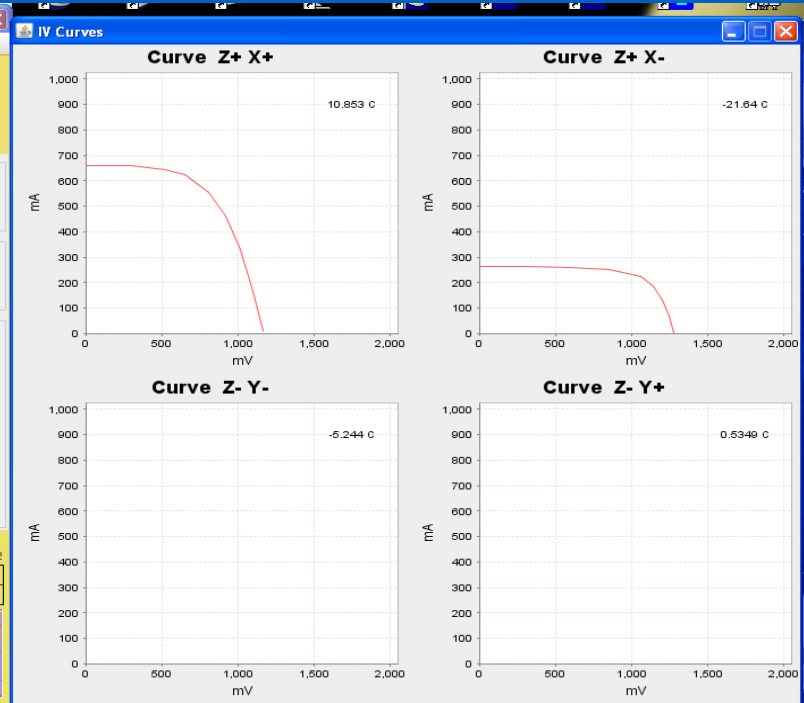
Packets received: 6 Last packet received: 04/May/08 22:24:52

Primary repository	Secondary repository
Disk: 0 Sent: 7	Disk: 0 Sent: 7

```

[22:24:47] Connected to server 89.138.144.157
[22:24:47] Connected to server 131.180.117.51
[22:24:47] User ADMIN logged in
[22:24:47] Saving primary repository data to disk
[22:25:59] Saving primary repository data to disk
[22:26:00] Saving secondary repository data to disk

```



# Experimentation and Communication – DO64

## Frequency Information

**Mode V Beacon (Transponder Mode Beacon): Non-Operational**

Downlink 145.8700 MHz CW

**Mode V Telemetry (Primary, Not Continuous Operation): Operational**

Downlink 145.8700 MHz BPSK 1200 BPS

**Mode V Telemetry (Backup, Not Continuous Operation): Operational**

Downlink 145.9300 MHz BPSK 1200 BPS

**Mode U/V (B) Linear Transponder (Inverting): Non-Operational**

Uplink: 435.5300 - 435.5700 MHz SSB/CW

Downlink 145.8800 - 145.9200 MHz SSB/CW

**Delfi-C3 RASCAL**

File Options

Audio level:

Frequency: 1400 1500 1600 1700 1800  
1512 Hz Sync

Satellite: Creative SB Live! Series

Packet counter	890 packets	OBC	OBC temperature	-0.199 deg. C	EPS	EMF op. mode	OBC	MeBo Z+	MEP Z+ op. mode	OBC
Bootcounter attempt	2273 boots	System bus voltage	12.299 V	GaAs Z+ X- current	212.87 mA	MDP Z+ op. mode	OBC	MeBo Z+	MDP Z+ op. mode	OBC
Bootcounter succes	311 boots	OBC current	3.16 mA	GaAs Z+ Y- current	0.0 mA	MeBo Z- current	0.0 mA	MeBo Z-	MEP Z- op. mode	OBC
Operational mode	science	ComBo		GaAs Z- Y- current	0.0 mA	MeBo Z-	MEP Z- op. mode	OBC	MDP Z- op. mode	OBC
Last Rx Cmd	RAP 1	CEP mode	OBC	Antenna Z- X-	deployed	MeBo Z-	MDP Z- op. mode	OBC	MDP Z- op. mode	OBC
		AWP mode	OBC	Antenna Z- Y-	deployed	MeBo Z-	MDP Z- op. mode	OBC	MeBo Z-	MDP Z- op. mode
		ComBo Current	0.0 mA	Antenna Z- Y-	deployed	MeBo Z-	MDP Z- op. mode	OBC	MeBo Z-	MDP Z- op. mode

RAP 1	REP1 op. mode	OBC	REP2 op. mode	OBC	ICB Z+	ADP 1 op. mode	OBC	ICB Z-	ADP3 op. mode	OBC
	RCP1 op. mode	OBC	RCP2 op. mode	OBC	ADP 2 op. mode	OBC	ADP4 op. mode	OBC	ADP4 op. mode	OBC
	RBP1 op. mode	OBC	RBP2 op. mode	OBC	Solar Panel Z+ X-	deployed	Solar Panel Z- Y-	deployed	Solar Panel Z- Y-	deployed
RAP 1 temperature	-88.1 deg. C	RAP 2 temperature	25.620 deg. C	Antenna Z+ X-	deployed	Antenna Z- X-	deployed	Antenna Z- X-	deployed	Antenna Z- X-
RAP 1 Rx current	23.305 mA	RAP 2 Rx current	22.515 mA	Antenna Z+ Y-	deployed	Antenna Z- Y-	deployed	Antenna Z- Y-	deployed	Antenna Z- Y-
RAP 1 Tx current	0.0 mA	RAP 2 Tx current	119.68 mA	Antenna Z- Y-	deployed	Antenna Z- Y-	deployed	Antenna Z- Y-	deployed	Antenna Z- Y-
RAP 1 fwd. power	0.0 mW	RAP 2 fwd. power	268.87 mW							
RAP 1 refl. power	0.0 mW	RAP 2 refl. power	0.0936 mW							

Terminal

```

from: DLFICQ to: TLM 48 98 9b 40 40 00 88 28 8c 92 86 66 01 09 f0 +1.0
from: DLFICQ to: TLM 48 98 9b 40 40 00 88 28 8c 92 86 66 01 09 f0 +1.0
from: DLFICQ to: TLM 48 98 9b 40 40 00 88 28 8c 92 86 66 01 09 f0 +1.0
from: DLFICQ to: TLM 48 98 9b 40 40 00 88 28 8c 92 86 66 01 09 f0 +1.0
from: DLFICQ to: TLM 48 98 9b 40 40 00 88 28 8c 92 86 66 01 09 f0 +1.0
from: DLFICQ to: TLM 48 98 9b 40 40 00 88 28 8c 92 86 66 01 09 f0 +1.0
from: DLFICQ to: TLM 48 98 9b 40 40 00 88 28 8c 92 86 66 01 09 f0 +1.0
from: DLFICQ to: TLM 48 98 9b 40 40 00 88 28 8c 92 86 66 01 09 f0 +1.0
from: DLFICQ to: TLM 48 98 9b 40 40 00 88 28 8c 92 86 66 01 09 f0 +1.0
from: DLFICQ to: TLM 48 98 9b 40 40 00 88 28 8c 92 86 66 01 09 f0 +1.0
  
```

Status messages

Packets received: 111 Last packet received: 04May08 09:57:25

Primary repository	Secondary repository
Disk: 0 Sent: 112	Disk: 0 Sent: 112

[09:57:22] Connected to server 131.180.117.51  
 [09:57:22] User NAME logged in  
 [09:57:01] Saving secondary repository data to disk  
 [09:57:00] Saving primary repository data to disk  
 [09:58:27] Saving primary repository data to disk  
 [09:58:02] Saving secondary repository data to disk

http://www.nl.com/index.aspx?id=7695\_15125 florida repeater council

SatPC32-1c [Standard E:Delfi-C3] [Registered Version]

File Tracking Satellites CAT Robot Mode Setup Programs Ancy ?

QTH: 6217/296 Sat in Sun Downlink: 0 Corr(+/-) 0 Uplink: 20 100 500 1K 5K D-Corr: Upl/Dwnl

R+ C+ A- U+ T1 U CW-AL 145927.831 04.05.2008  
M+ 21 G- S+ D+ M3 2D BH -2.153 13:59:21 U

A world map showing the satellite's ground track. The satellite is currently positioned over the Atlantic Ocean. Two ground stations are highlighted: B:AO-16 Aps:19:37 maxE:105 and C:AO-27 Aps:19:09 maxE:26.

Azimuth	Elevation	HA	Height	Range	L SSP B	Orbit	Squint	Aos	Los	MaxE
135.5	1.2	177.7	630	2816	295	12	91	--	*****	14:00 08

Symbol Lookup @MarketWatch Inc publicly traded investment management

# Successes of Delphi 3C Mission

- Experiment longevity
- Use of online support – ground station network
- Distributed Software with simplicity of Sound Card for receiving
- Carried Amateur Radio on-board for actual use by Hams mitigates Town and Gown issues



## When done using W4DFU

- Make sure all radios and connected equipment are turned off in the correct order
- It is OK to leave the computers on
- Make sure to ground all antennas
- Shut off the lights
- Lock the fence lock
- Make sure the door is locked when you leave
- If any questions or issues e-mail Dr. Jay Garlitz at [jgarlitz@ufl.edu](mailto:jgarlitz@ufl.edu) or call his cell, 352-246-6003.