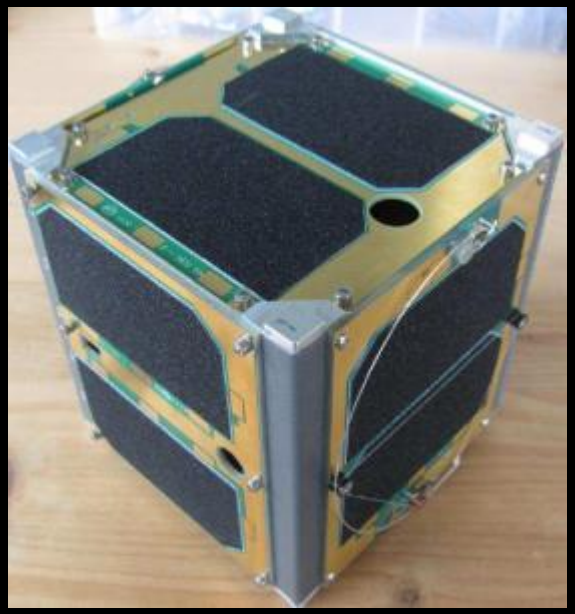
Fun with Satellites

Fox-1A AO-85 First of a Family

Uplink FM (67 Hz tone)	Downlink FM
435.170 MHz	145.980 MHz



WA9ONY
David Haworth

Image Credit: http://www.amsat.org/?page_id=1113
http://www.amsat.org/?page_id=2144

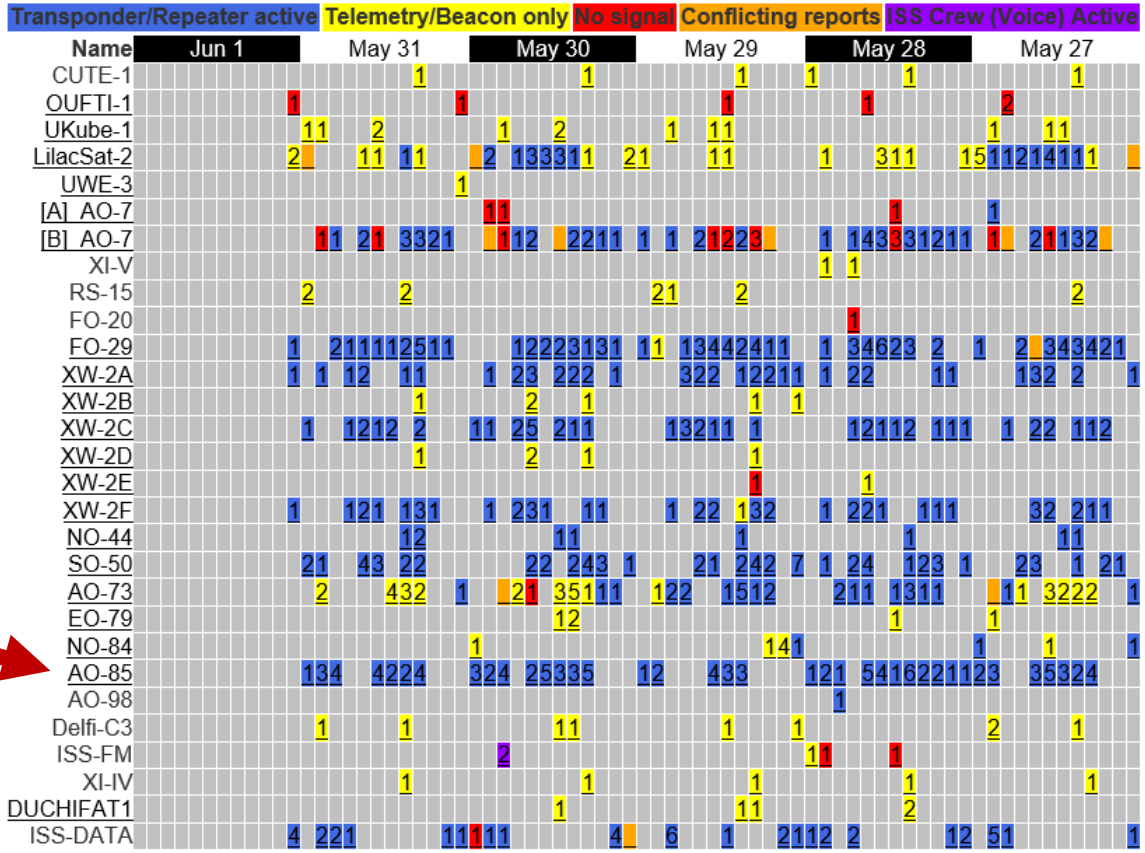
What is Active in Orbit

http://www.amsat.org/

AMSAT Live OSCAR Satellite Status Page

This web page was created to give a single global reference point for all users in the Amateur Satellite Service to show the most up-to-date status of all satellites as actually reported in real time by users around the world. Please help others and keep it current every time you access a bird.

If you want to practice reporting without affecting the real data, please select the dummy-satellites AO-98 and AO-99.



Hover mouse over number for more data. Satellites do not appear if they have no data available.

ARRL 2 Meter Band Plan

2 Meters (144-148 MHz)

144.00-144.05	EME (CW)
144.05-144.10	General CW and weak signals
144.10-144.20	EME and weak-signal SSB
144.200	National calling frequency
144.200-144.275	General SSB operation
144.275-144.300	Propagation beacons
144.30-144.50	New OSCAR subband
144.50-144.60	Linear translator inputs
144.60-144.90	FM repeater inputs
144.90-145.10	Weak signal and FM simplex (145.01,03,05,07,09 are widely used for packet)
145.10-145.20	Linear translator outputs
145.20-145.50	FM repeater outputs
145.50-145.80	Miscellaneous and experimental modes
145.80-146.00	OSCAR subband
146.01-146.37	Repeater inputs
146.40-146.58	Simplex
146.52	National Simplex Calling Frequency
146.61-146.97	Repeater outputs
147.00-147.39	Repeater outputs
147.42-147.57	Simplex
147.60-147.99	Repeater inputs

Notes: The frequency 146.40 MHz is used in some areas as a repeater input. This band plan has been proposed by the ARRL VHF-UHF Advisory Committee.

Fox-1A AO-85

http://www.n2yo.com/satellite/?s=40967

NORAD ID: 40967
Int'l Code: 2015-058D
Perigee: 506.9 km
Apogee: 797.7 km
Inclination: 64.8 °
Period: 97.6 minutes
Semi major axis: 7023 km
RCS: Unknown
Launch date: October 8, 2015
Source: United States (US)
Launch site: AIR FORCE WESTERN TEST RANGE (AFWTR)

Uplink (MHz): 435.185
Downlink (MHz): 145.979
Beacon (MHz): 145.979
Mode: FM CTCSS 67.0Hz/200bps DUV/9k6 FSK
Call sign:
Status: Active

1-Unit CubeSat developed by AMSAT

Family of CubeSats for universities science missions that qualify for free launches

Simultaneous amateur radio & scientific operations.

Analog stations using an handheld FM transceiver and a simple antenna to make contacts using the FOX-1A.

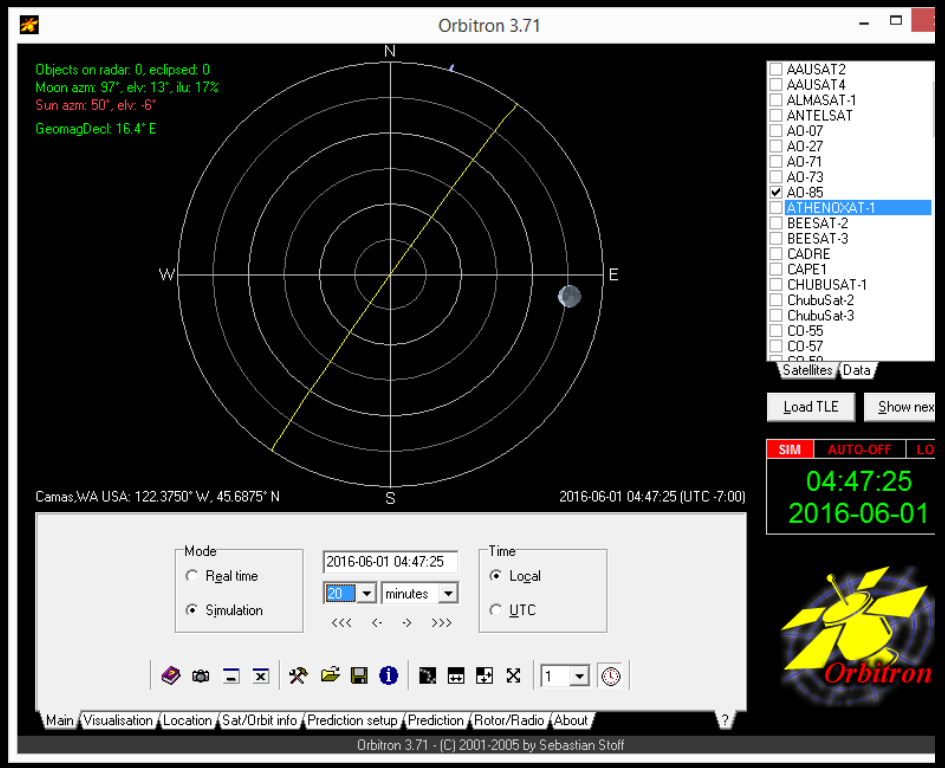
Fox-1A AO-85 Listening to Voice

Receiver FM 145.980 MHz +/- Doppler

- Satellite tracking software
- FM 2 m receiver
- 2 m antenna

2 m Antenna

Yaesu FT-817nd
or
Kenwood TH-D72A



Orbitron www.stoff.pl/ Demo

Satellite tracking • HAM radio • ISS • Visual observing • Tracking software • Iridium flares • Satellite tracking at home

Orbitron - Satellite Tracking System

sebastian stoff
h•o•m•e•p•a•g•e

home | downloads | cardware | forum | guestbook | chat | links | about me | my apps | email

version **3.71** - 2005.09.08 - Win 9x/Me/2k/XP/2k3/Vista

(C) 2001-2005 by Sebastian Stoff

Orbitron is Cardware!
Click here to see postcards list.
What is satellite tracking?

[More languages]
[For translators]

News RSS

2007.11.07: New Orbitron forum

2007.07.17: Dear Users...

2005.11.05: Web chat starts!

[More news]

100% CLEAN
NO SPYWARE
NO ADWARE
NO VIRUSES
SOFTPEDIA
certified by www.softpedia.com

Downloads

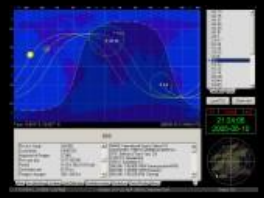
Orbitron 3.71, size: 2 MB
Site 1 - USA - Read me
Site 2 - Germany
Site 3 - Poland

[More downloads - TLE, Maps...]

LATEST POSTCARDS

Roland, F6HGD from Dole (France) • **Leonardo, PY2GLO** from Sao Paulo (Brazil) • **Robert, KI4BKE** from Holly Springs (NC, USA) • **Rene, WA6MJE** from Westlake Village (CA, USA) • [More]

Screenshots



Details

***Orbitron* is a satellite tracking system** for radio amateur and observing purposes. It's also used by weather professionals, satellite communication users, astronomers, UFO hobbyist and even astrologers.

Application shows the positions of satellites at any given moment (in real or simulated time). It's FREE (**Cardware**) and it's probably one of the easiest and most powerful satellite trackers, according to opinions of thousands of users from all over the world. I'm still working on it, waiting for your opinions and bug reports. Please try it. If you like it - tell your friends about it and send me a postcard...

FEATURES:

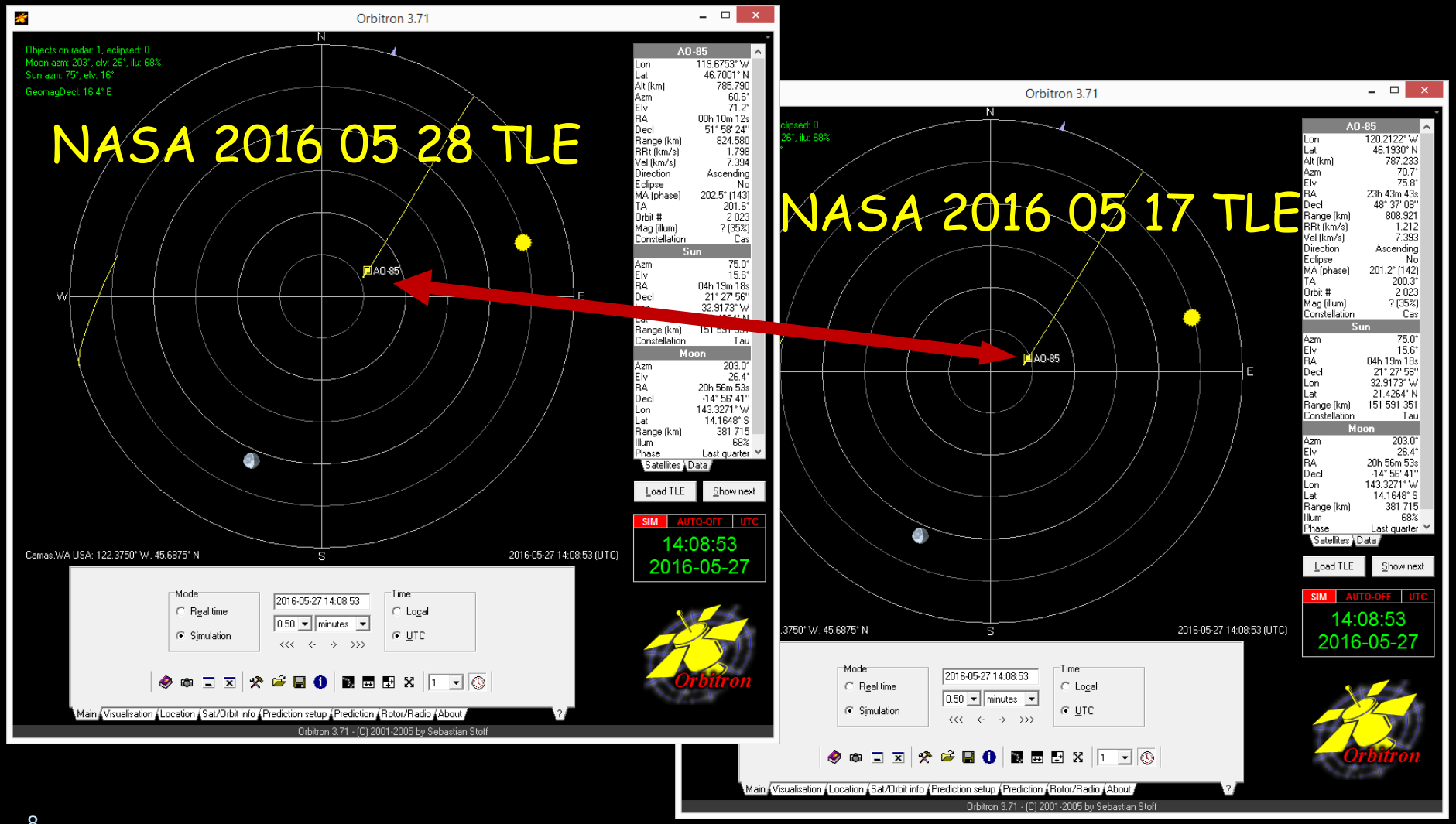
- NORAD SGP4/SDP4 prediction models
- 20 000 satellites can be loaded from TLE file(s) (auto: PC/Unix, 2/3 line)
- ALL of them can be tracked at the same time
- Sun and Moon tracking
- Full-screen, presentation modes
- Supported screen resolutions from 640x480
- Real-time mode / Simulation mode (free time control)
- Advanced passes & Iridium flares search engine (results printing)
- Miscellaneous options of visualisation
- Nightlife (dark color-scheme for night usage)

Satellite Tracking Software

- Needs your location
- Needs accurate time
- Need current satellite orbit data (TLE)

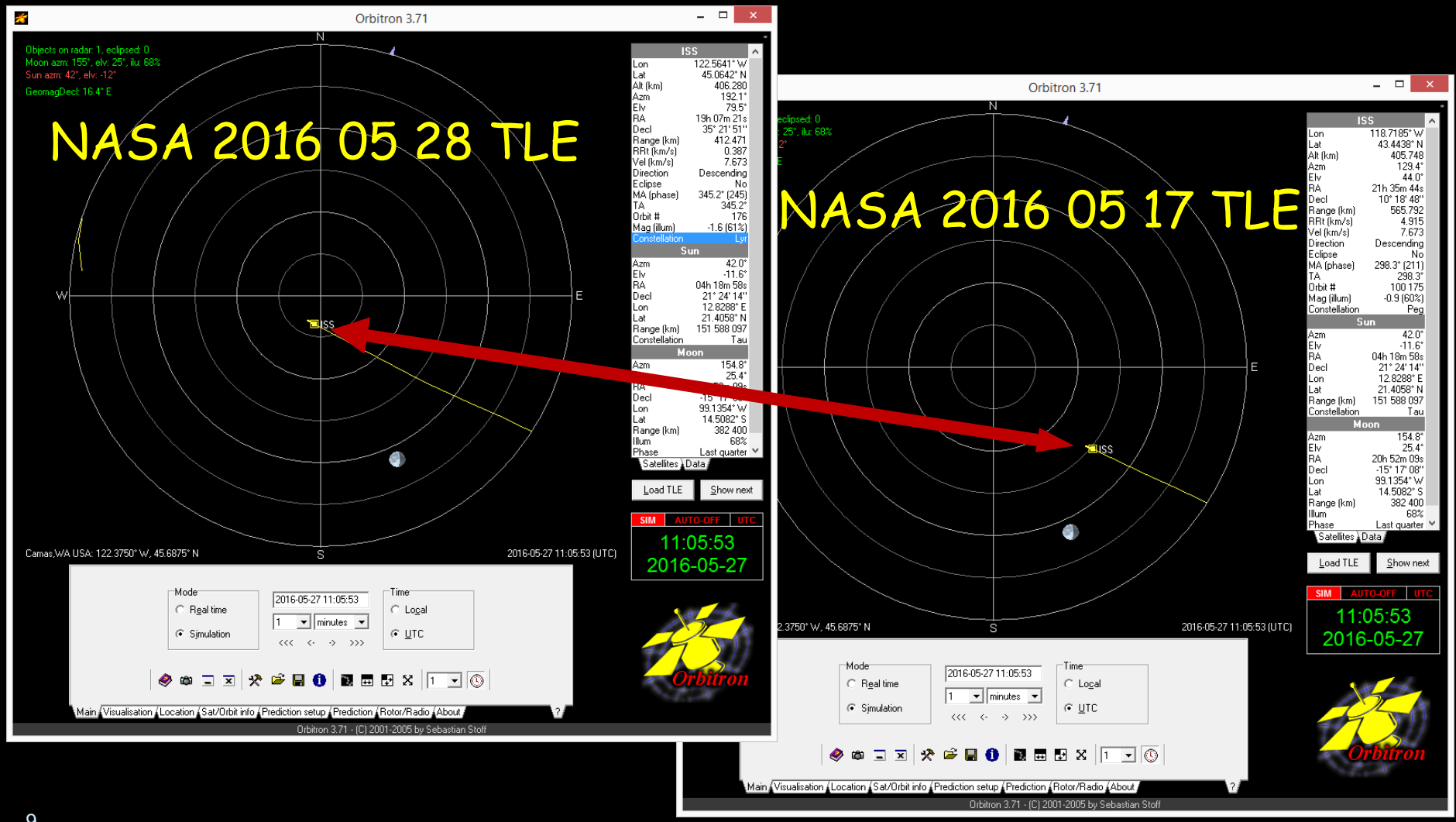
AO-85 Example of TLE Error of 11 Days

Azm 60.6° Elv 71.2 ° Azm 70.7° Elv 75.8°



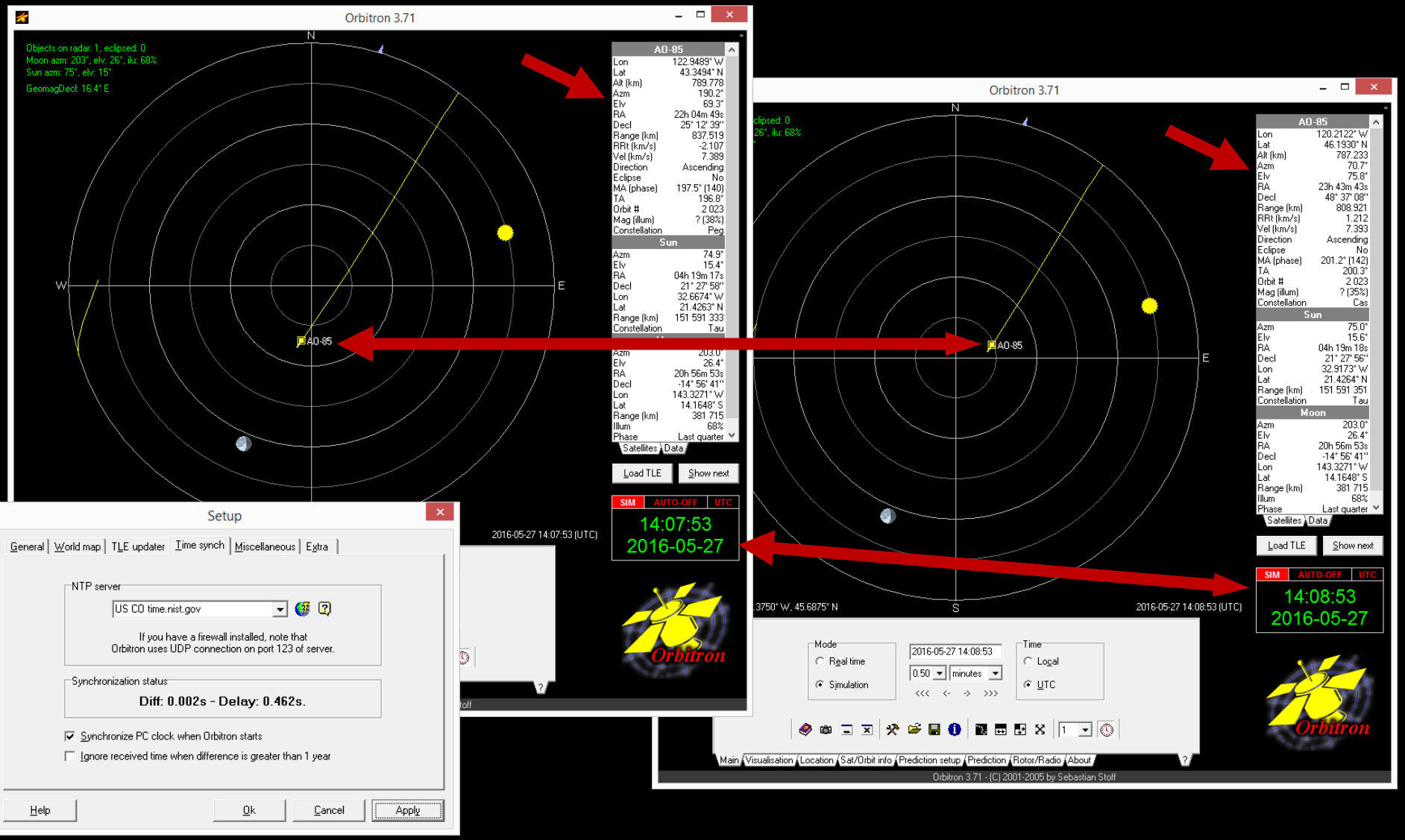
ISS Example of TLE Error of 11 Days

Azm 192.1° Elv 79.5° Azm 129.4° Elv 44.0°



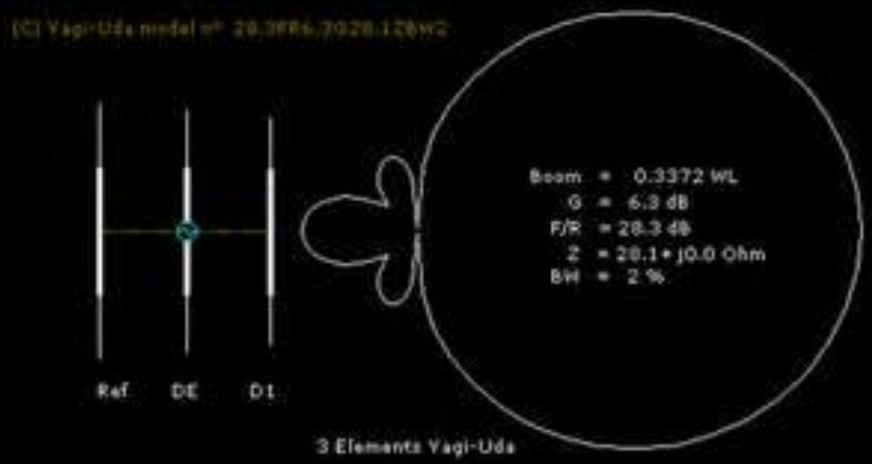
Example of Time Error of 1 Minute

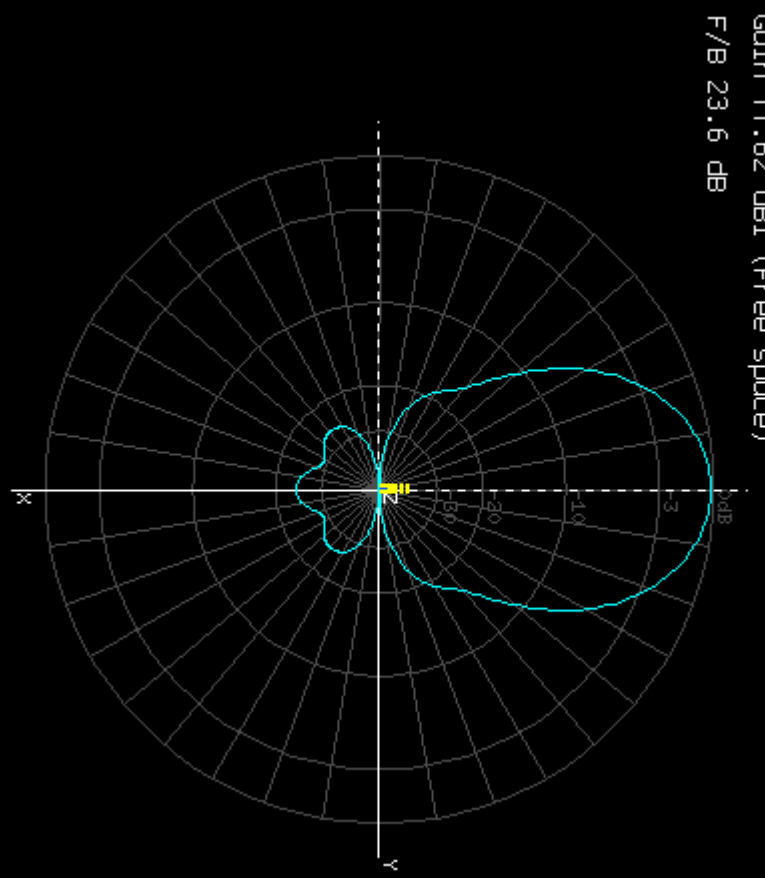
Azm 190.2° Elv 69.3° Azm 70.7° Elv 75.8°



Aiming the Antenna at the Satellite

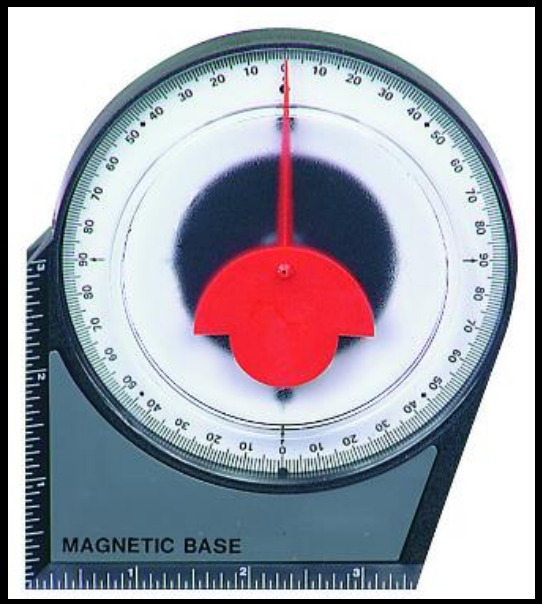
- Accuracy depends upon the antenna pattern.
- More gain requires more position accuracy.





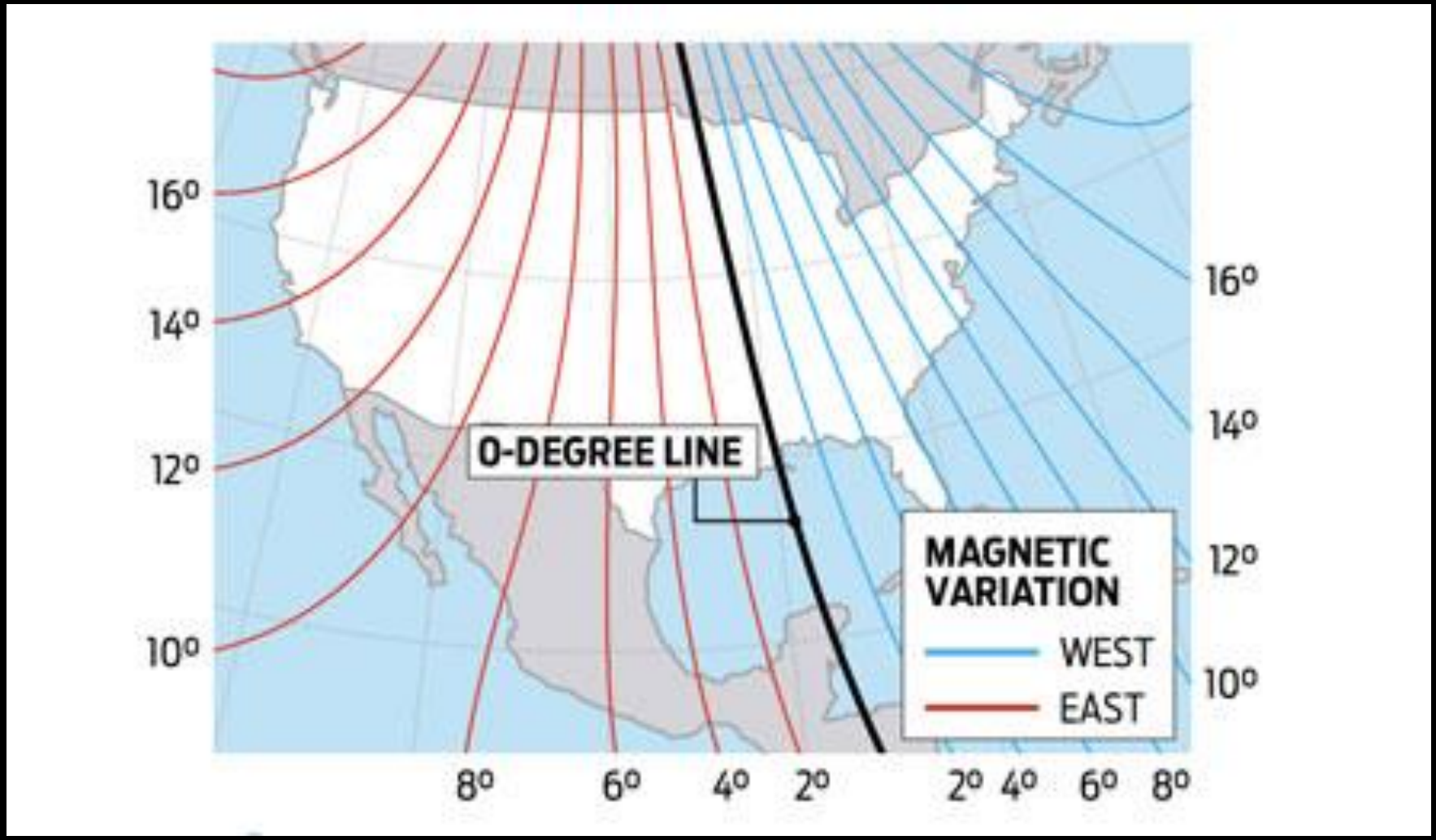
Aiming the Antenna at the Satellite

- Compass & Angle Gauge



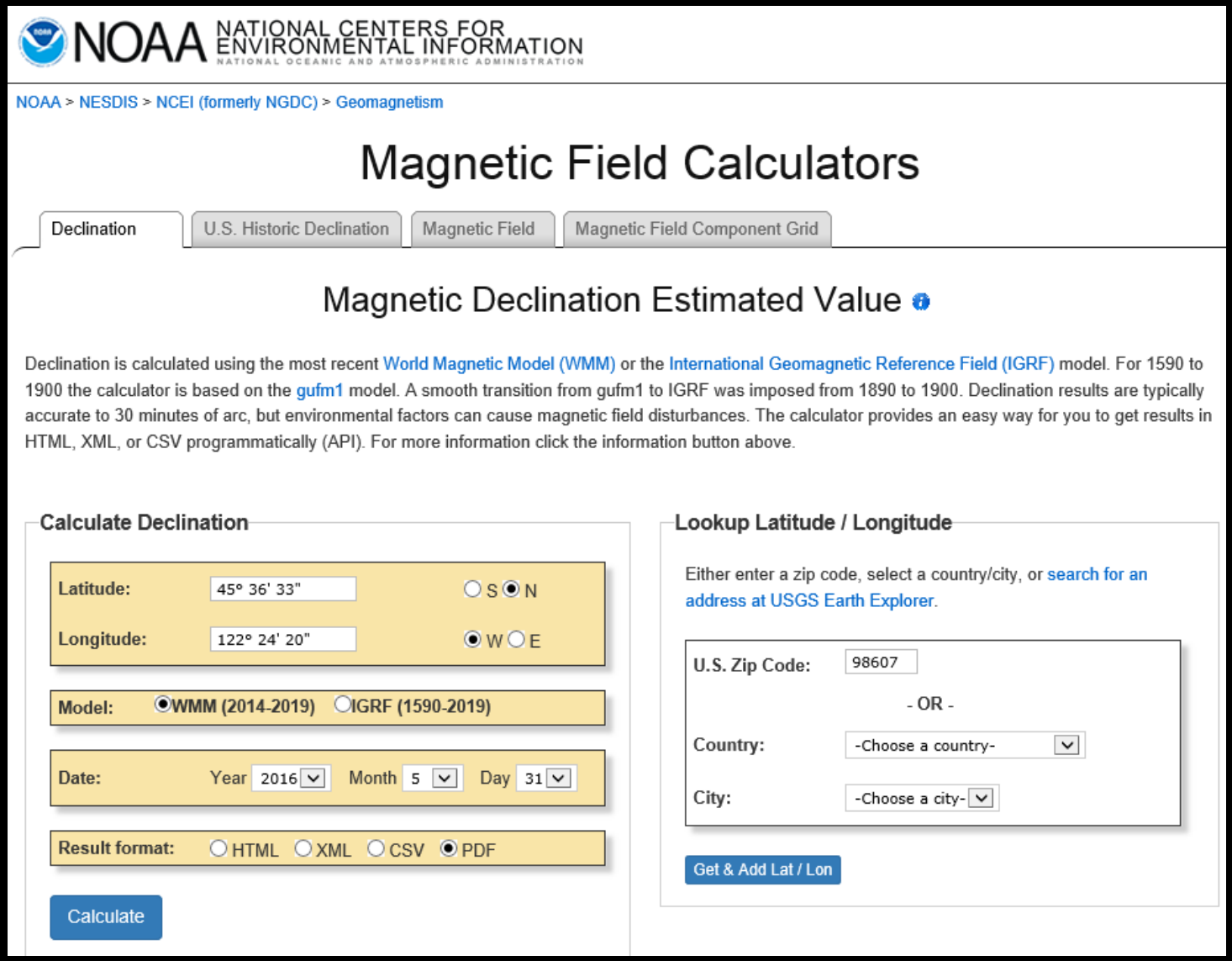
Magnetic Declination

http://www.backpacker.com/skills/navigation/manually-adjust-declination/



Magnetic Declination

http://www.ngdc.noaa.gov/geomag-web/

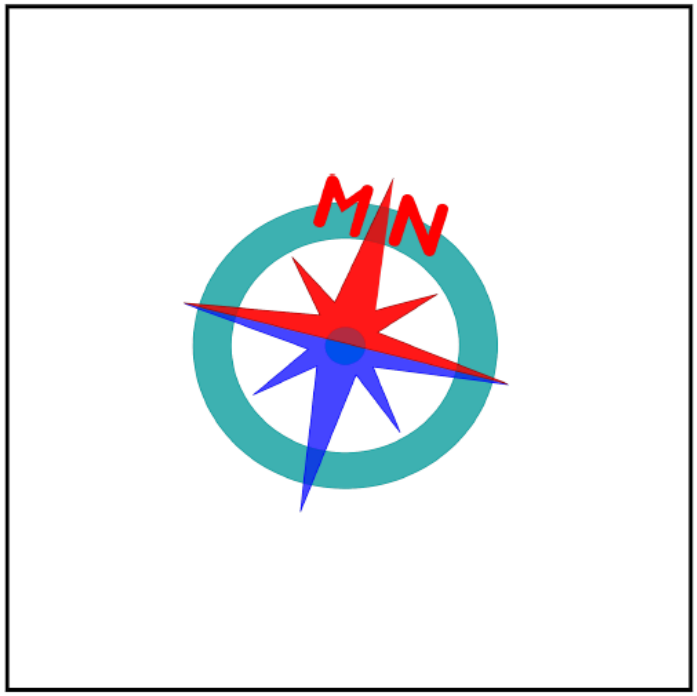


Magnetic Declination

http://www.ngdc.noaa.gov/geomag-web/

Declination

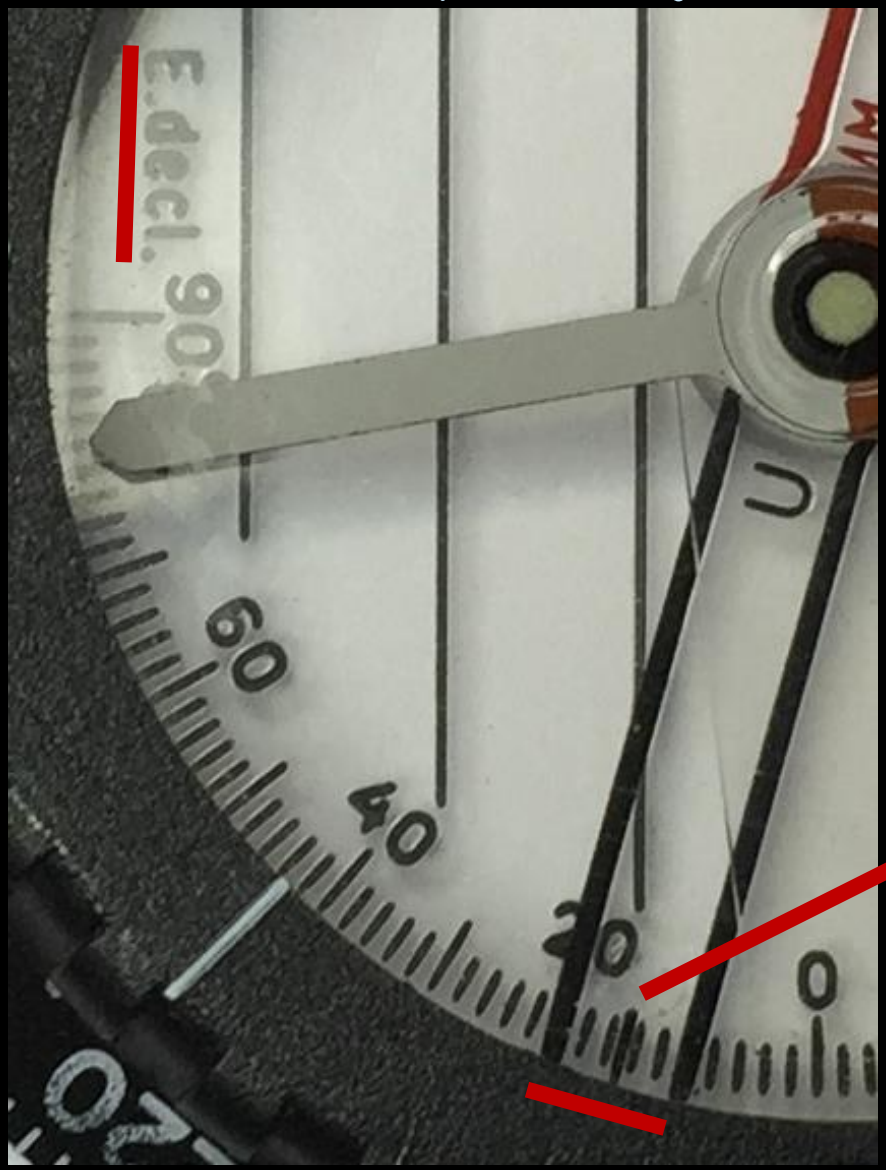
Date	2016-05-31
Latitude	45° 36' 33" N
Longitude	122° 24' 20" W
Elevation	0.0 km GPS
Model Used	WMM2015
Declination	15° 28' E changing by
	0° 8' W per year
Uncertainty	0° 22'

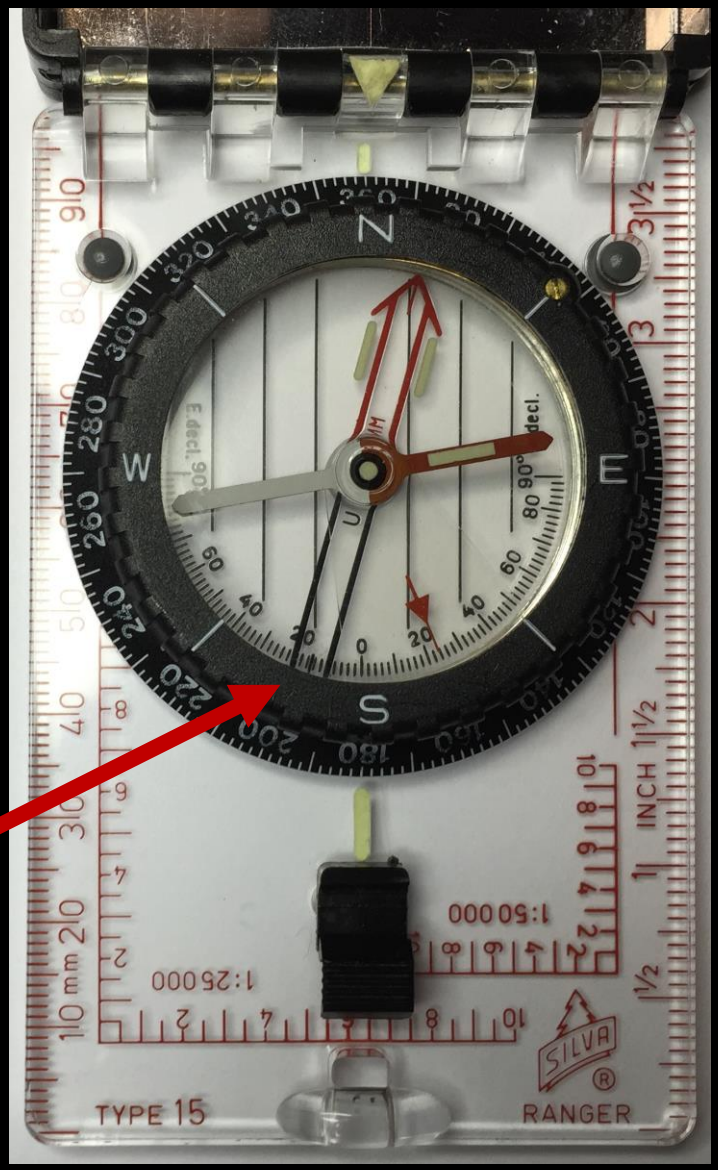


Compass shows the approximate bearing of the magnetic north (MN)

Magnetic Declination

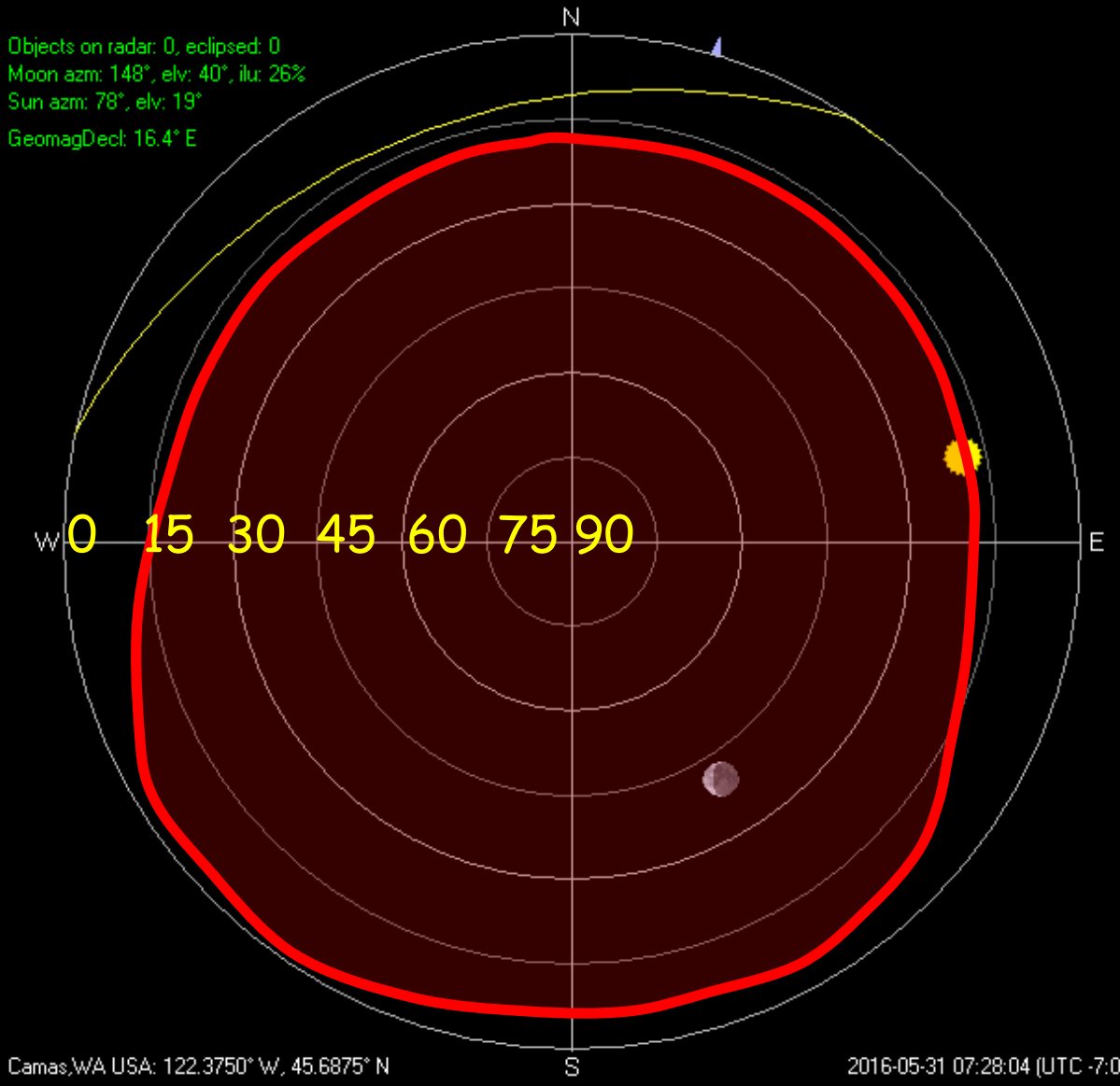
Compass Adjustment for 15° East





Radio Horizon

Obstructions Blocking the Signal: Buildings, Hills, etc.



Antenna Polarization

Causes Signal Fading

- Rotating a linear polarized antenna by 45 can go from no signal heard to a strong clear signal.

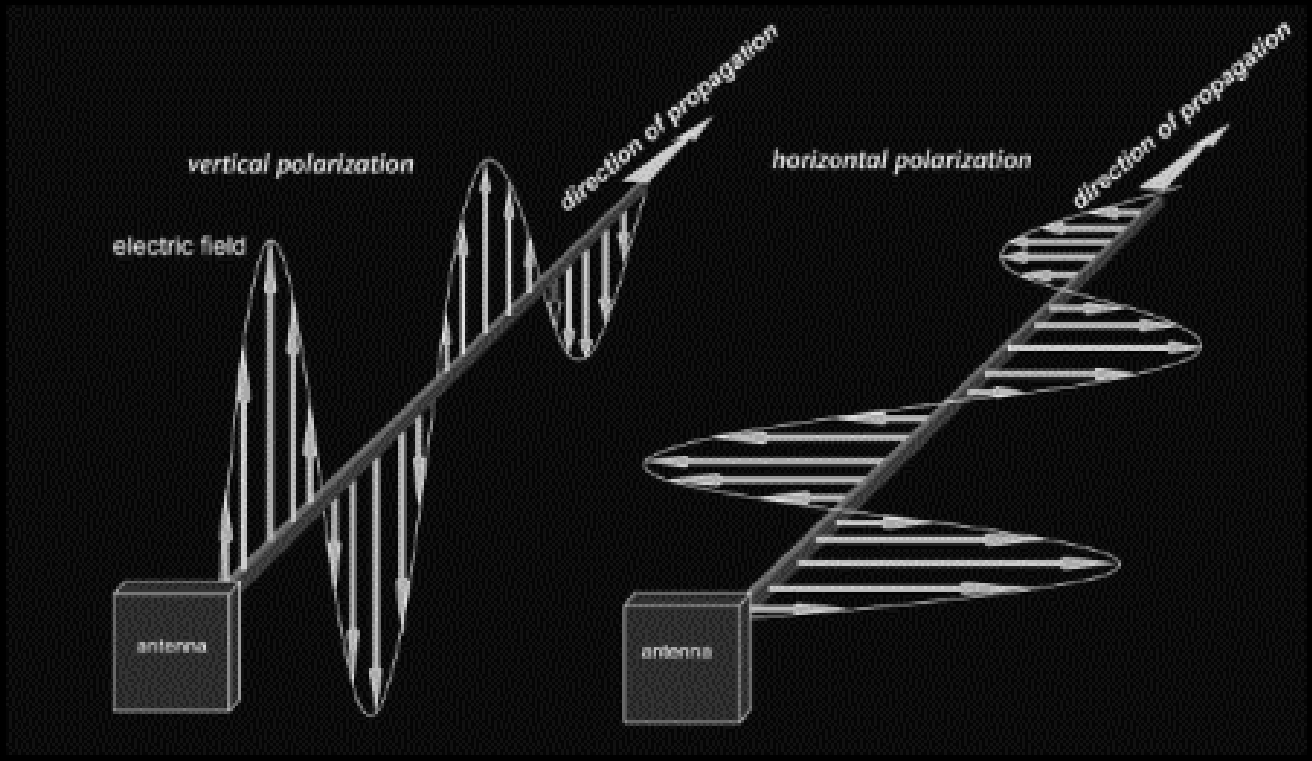
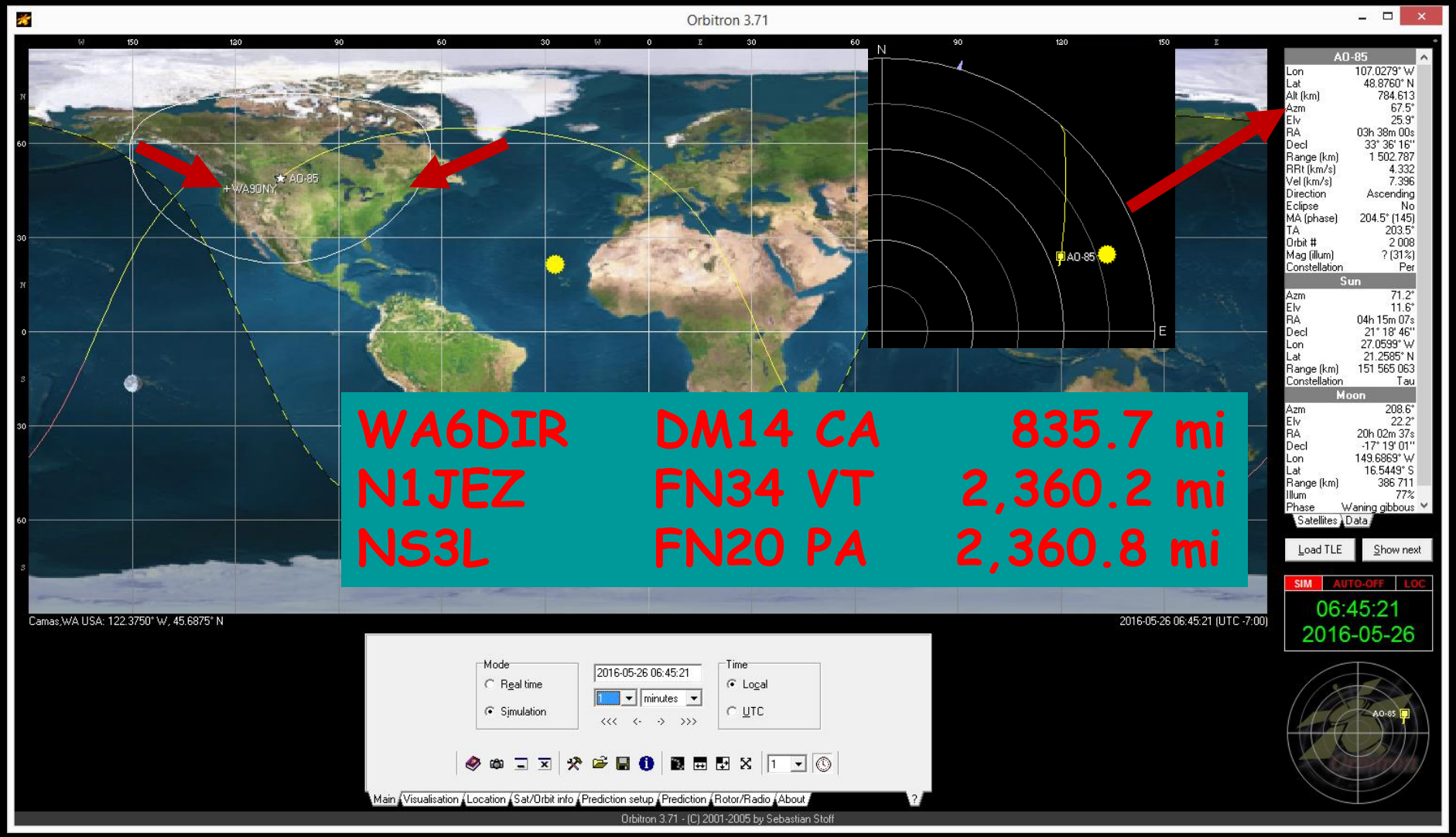


Image Credit: http://www.mpantenna.com/what-is-antenna-polarization/

FOX-1 AO-85 Footprint

Azm 67.5° Elv 25.9°



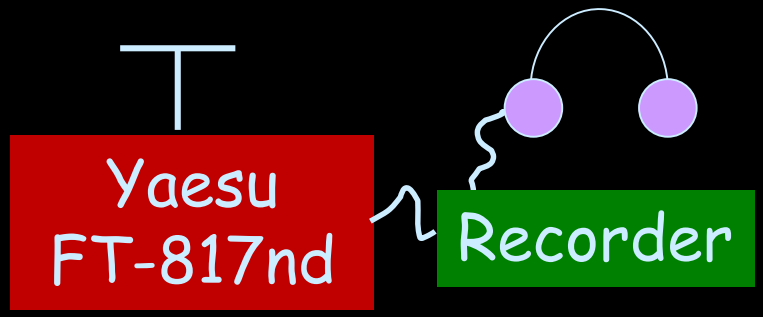
Duplex vs. Simplex Communications

- Simplex
  - Talking & listening frequency is the same
  - You cannot hear yourself talking
  - Normal for one transceiver with one VFO & one antenna
- Duplex
  - Talk & listen frequencies are different
  - With satellites you can hear yourself taking
  - Typically two radios with two antennas
    - One setup for listening
    - One setup for talking

Fox-1A AO-85 Repeater Ground Station

Receive for Listening

Arrow 2 m
3 el Yagi Antenna



FM
145.980 MHz

Transmit for Talking

Arrow 70 cm
7 el Yagi Antenna

FM CTCSS 67 Hz
435.170 MHz
5 Watts
~2:1 SWR

Fox-1A AO-85

Voice Identification When Idle

- To save power the repeater is turned off after ~1 minute without hearing a signal with CTCSS 67 Hz tone.

- When the repeater is off, about every two minutes is a voice identification.
  - "This is amateur radio satellite FOX-1"

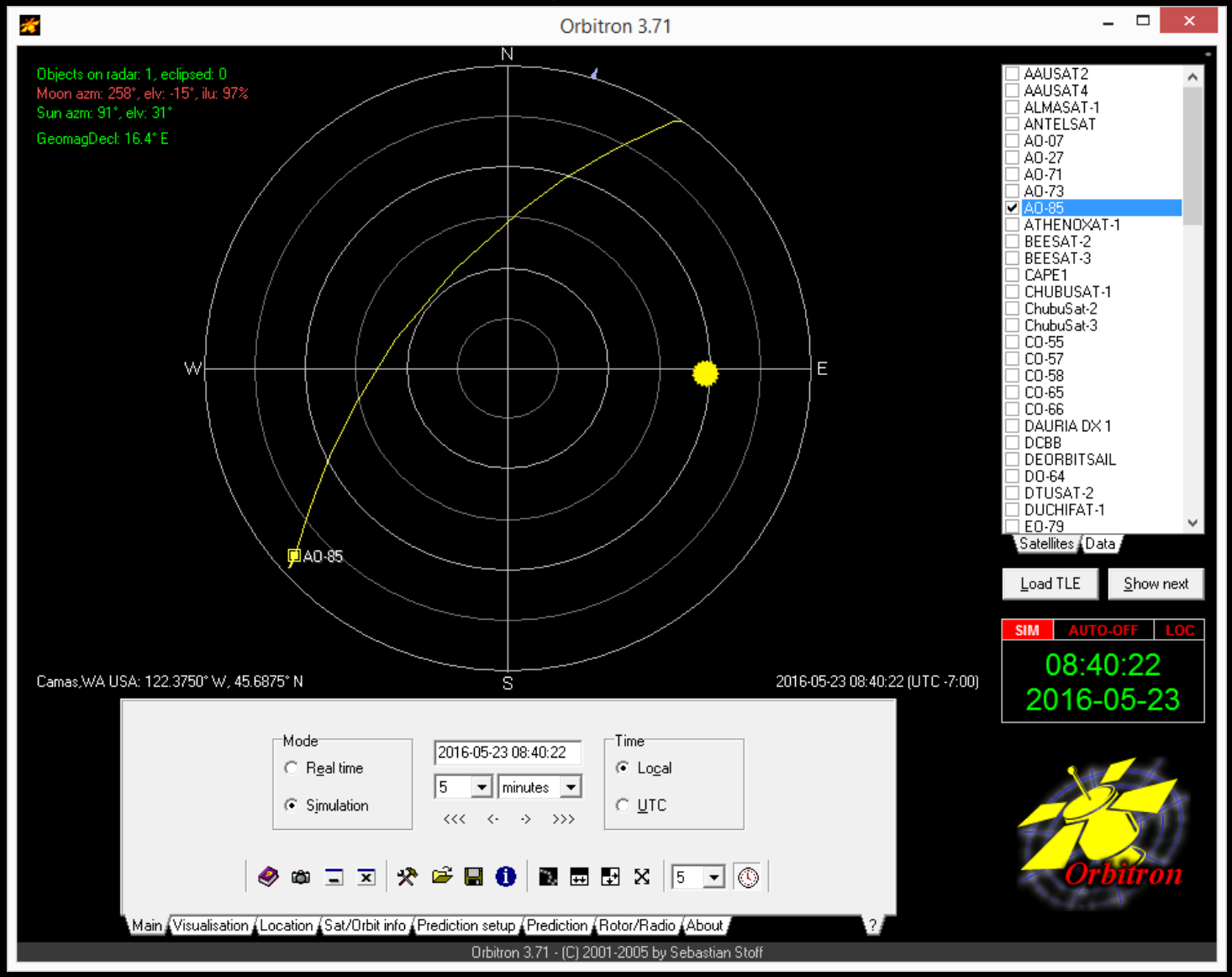
- Demo FOX-1 voice id

First Voice Test

- Make sure you can hear FOX-1
  - If no voices do you hear the repeater is on
    - You will hear a increase in the background noise
  - If repeater is off wait to hear the FOX-1 voice id.
- Make sure no one is using FOX-1 before doing your test.
  - FOX-1 has very little usage when it is over the Pacific ocean
- Pick a pass with FOX-1 elevation greater than 30°
  - Higher the elevation, stronger the signal to & from FOX-1
- Transmit your call sign and listen
  - Did you hear your self?
  - If not, rotate antenna 45° and try again

Fox-1A AO-85 Repeater Test

Morning 5/23/2016

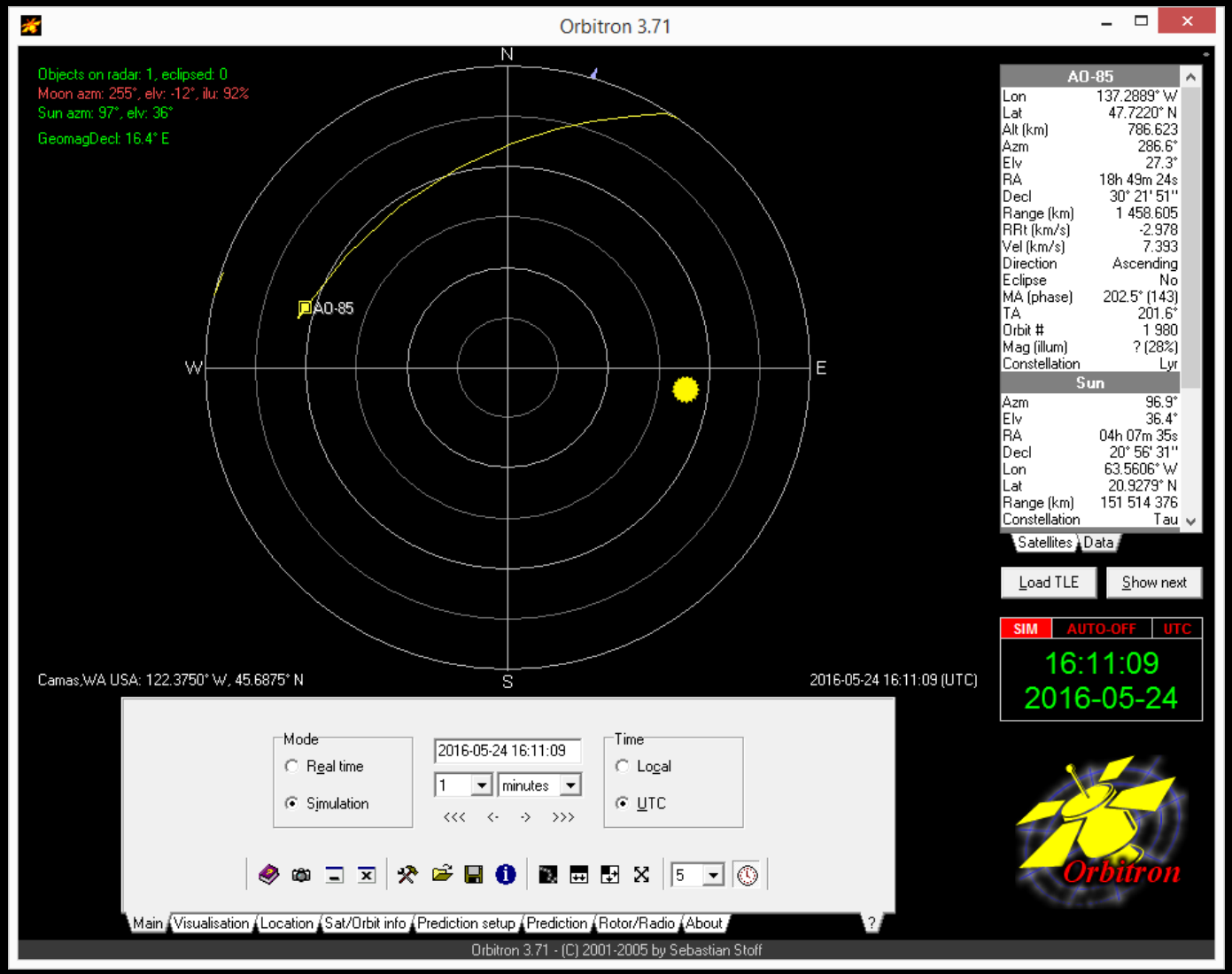


Fox-1A AO-85 Repeater Test

Morning 5/23/2016 Video

Fox-1A AO-85 First Contact

1611 GMT 5/24/2016



Fox-1A AO-85 First Contact

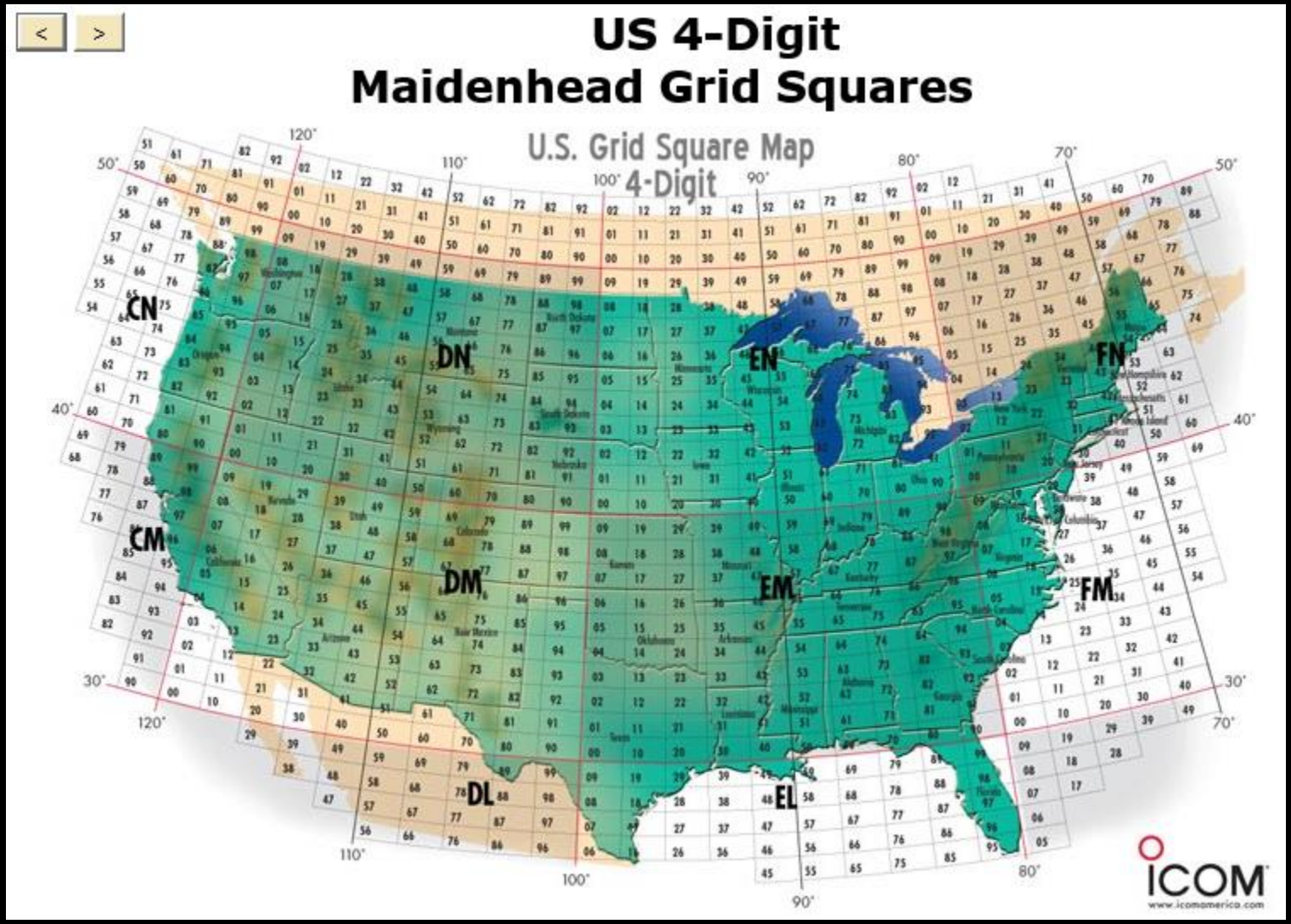
1611 GMT 5/24/2016 Video

Successful Contact

- Exchange call sign
- Exchange information
  - HF bands use signal RS or RST
  - Satellites use grid location, first four
    - Maidenhead location system
      - https://en.wikipedia.org/wiki/Maidenhead_Locator_System

US Grid Squares

http://www.coilgun.info/rover/grid_map_us_4digit.htm

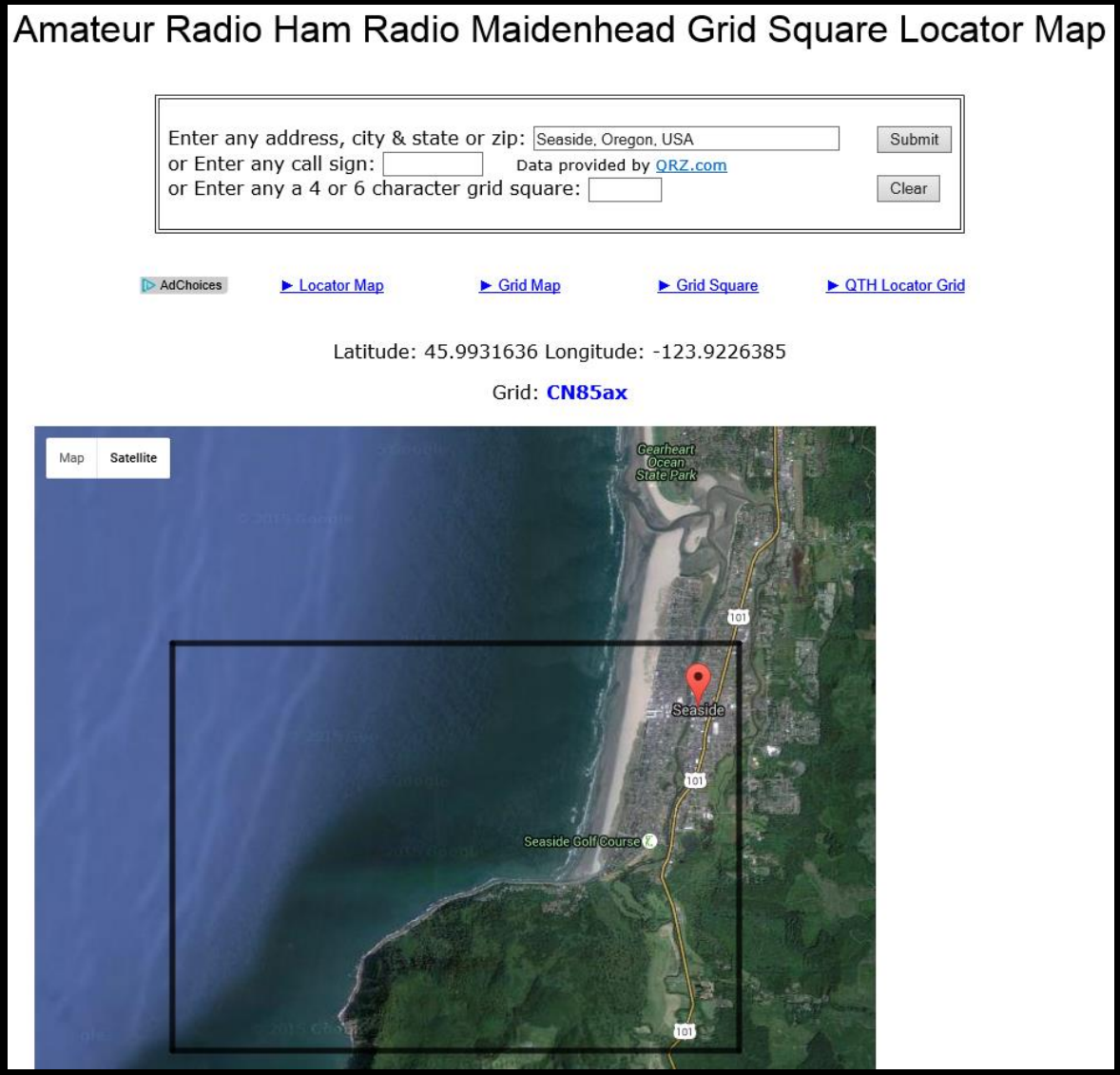


Oregon Grid Squares

http://www.coilgun.info/rover_or/home_map.htm

Seaside OR in Grid Square CN85ax

http://www.levinecentral.com/ham/grid_square.php

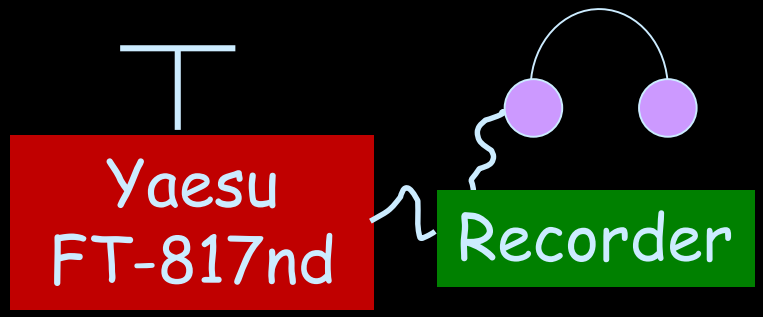


Fox-1A AO-85 Repeater Comm

Receive for Listening

Transmit for Talking

Arrow 2 m
3 el Yagi Antenna



Arrow 70 cm
7 el Yagi Antenna

FM
145.980 MHz

FM CTCSS 67 Hz
435.170 MHz
5-50 Watts
~2:1 SWR

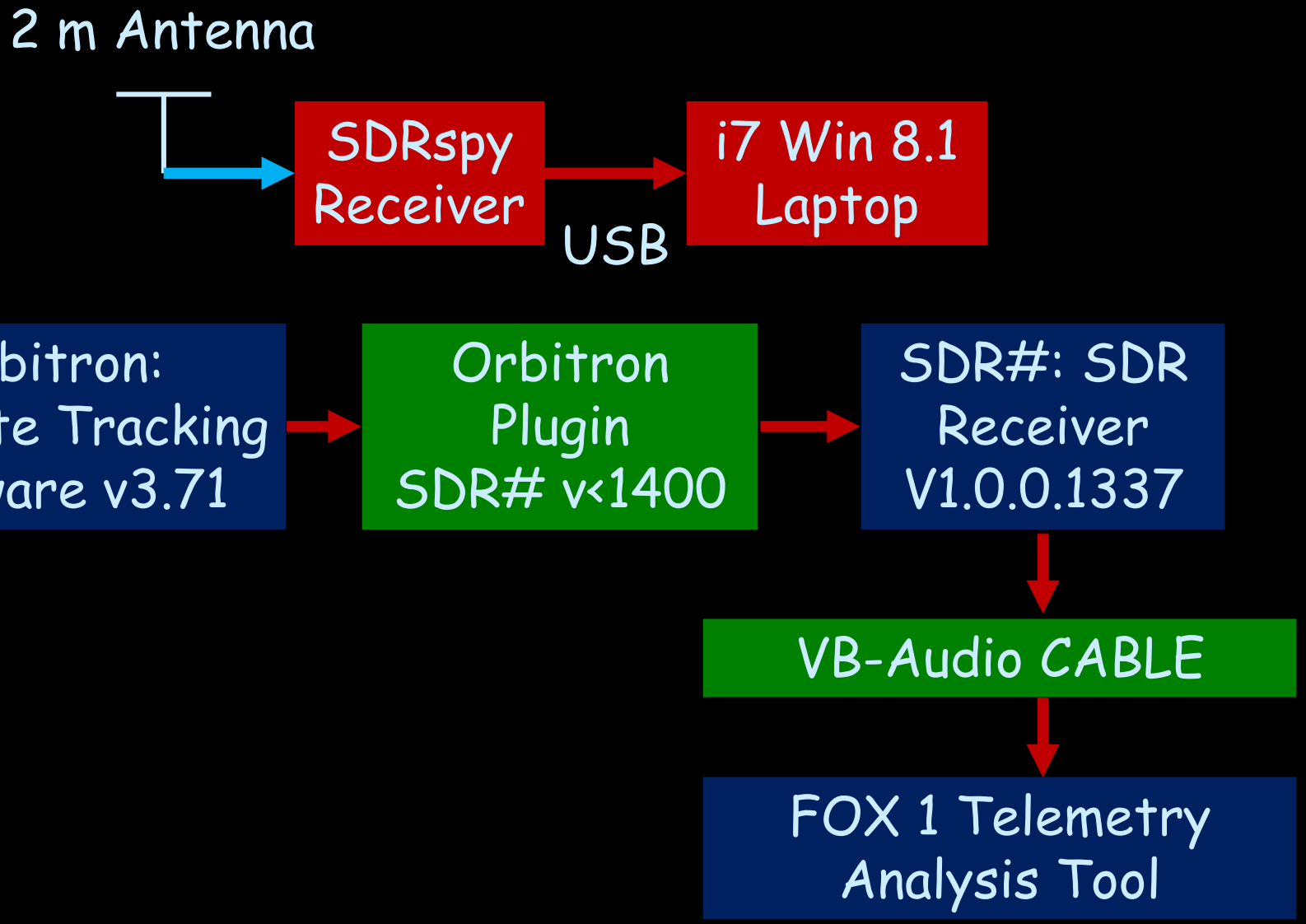
Fox-1A AO-85

Sample Contacts Last Part of May 2016

- WA6DIR DM14 Larry 50 W
- KB6LTY DM14 50 W
- W6WW DM14 5 W
- N6NUG DM12 50 W
- W6BJB DN60 50 W
- W0DHB DN70 50 W
- VE4JRB EN19 50 W

Fox-1A AO-85 Data (DUV)

145.980 MHz +/- Doppler Shift Signal



Fox-1A Telemetry

http://www.amsat.org/tlm/leaderboard.php?id=1&db=FOXDB

Fox-1A Telemetry Leaderboard

Ground station	DUV Frames	9k6 Frames	Last 7 days
SP5ULN	94594	15	3128
SP8CGR	87189	50	271
N8MH	66230	695	1792
VE3HII	65804	32	330
G0MRF	64372	28	2273
WA4SCA	58428	7	2674
KD8CAO	52173	42	0
K4OZS	48825	423	1871
PB0AHX	48480	16	640
ON4HF	46137	4	137
G4MDH	42895	0	1932
SP3MCY	40570	6	1042
AC2CZ	39440	78	1243
G7WIQ	36861	0	1605
WA6FWF	35298	17	0
KB6LTY	34042	0	1445
M0SAT	32232	15	79
PY2RN	29599	0	263
W2BFJ-Win1	27708	96	818
ON5APO-JO21	26405	0	0
PU3XGS	24095	0	559
EA1JM	23383	0	49
AD7MQ	23208	6	737
N0JY	21476	270	1719
AD7NP	17199	0	0
KD7YZ	16734	140	0
DK3WN	15662	13	1378
JA3FWT	15490	0	118
rainer	14032	0	0
PE0SAT	13690	0	4
K6FW	11511	0	0
G7GQW	11486	0	55
AK4TX	10929	5	580
W7KKE	9621	0	0
WA9ONY-CN85	9264	0	1002

Fox-1A: latest spacecraft health
Frames last 90 mins : 506
From ground stations:
K4CME K4RGK WA4SCA N0JY KO6TZ
AD7MQ KB6LTY WA9ONY-CN85 PU3XGS

Frames Received last 24 hours: 4419
Total Frames Since Launch: 1495585

Fox-1A Telemetry

http://www.amsat.org/tlm/ground_station.php?id=1&db=FOXDB&station=WA9ONY-CN85

FOX-1A: Ground Station WA9ONY-CN85

Ground station	DUV Frames	HighSpeed Frames	Frames Received last 90 mins : 59
WA9ONY-CN85	9264	0	**Frames Received last 24 hours:** 172

Real Time Payloads: 3162

Max Payloads: 492

Min Payloads: 380

Total Fox Telemetry Payloads: 4034

Experiment Payloads: 5283

Total Payloads: 9317

Using Demodulator:

- FoxTelem 1.03h - 3 March 2016 (windows 8)

Station Receiver(s):

- Airspy

Fox-1Cliff & Fox-1D Launch

Launch No Earlier Than July 28, 2016

- Fox-1Cliff and Fox-1D will be integrated onto the Spaceflight Sherpa platform for its maiden flight aboard a SpaceX Falcon 9 launch from Vandenberg Air Force Base.
- http://www.amsat.org/?p=5219

Fox-1A AO-85 Information

http://www.amsat.org/

Fox-1A AO-85 Information

http://www.amsat.org/

Imagine!

Your amateur radio contacts via satellite ...

AMSAT Fox-1Cliff and Fox-1D will fly aboard the 2016 SHERPA SpaceX Falcon 9 launch

AMSAT® is dedicated to keeping amateur radio in space. Its membership includes a worldwide group of radio hams who monitor amateur radio satellite signals and use satellites for QSOs. They also design and build the satellites, and control them once in orbit.

Since 1961, more than 80 amateur radio satellites have successfully reached orbit and begun operation. Our Vision is to deploy satellite systems with the goal of providing wide area and continuous coverage. AMSAT will continue active participation in human space missions and support a stream of Low Earth Orbiting satellites developed in cooperation with the educational community and other amateur satellite groups.

We are always interested in future development for opportunities to reach higher orbits and pioneering communications capabilities.

We'd Like to Have You as a Member

Both you and AMSAT will benefit when you join. You get the AMSAT Journal bimonthly and support from AMSAT Area Coordinators. Member dues and donations provide AMSAT's primary support.

AMSAT makes it possible ... We'll show you how!

AMSAT pioneered the concept of small satellites in low orbits. AMSAT's Project Fox consists of a series of CubeSats that will provide FM transponders with a 70 cm uplink with a 2 meter downlink that will match the ground performance of previous FM satellites.

AMSAT is preparing a fleet of five amateur radio cubesats ...

- **Fox-1A** (AO-85) was launched on a NASA ELaNa flight on 8 October 2015, and is currently operational. This satellite has a UHF uplink and a VHF downlink.
- **RadFxSat (Fox-1B)** will fly with the Vanderbilt University radiation experiments and is expected to launch in January 2017.
- **Fox-1Cliff** will launch on Spaceflight's maiden mission of the SHERPA multi-cubesat deployer during the second quarter of 2016. UHF and L-band uplinks with the VHF downlink will be available.
- **Fox-1D** will launch on the same mission as Fox-1Cliff in the second quarter of 2016. Similar to Fox-1Cliff, Fox-1D will also have an FM transponder with UHF and L-band uplinks and a VHF downlink.
- **RadFxSat-2 (Fox-1E)** will carry a Mode V/U linear transponder. The transponder is planned to be 30 kHz wide and will also have a 1200 bps BPSK telemetry beacon. It has been accepted for an ELaNa launch, possibly in 2017.

Recommended checklist for your station gear to get started using AMSAT's Fox-1 satellites

❒ Dual-band Radio Operation

FM transmitter capability on 435 MHz and FM receiver capability on 145 MHz. A full-duplex radio (capable of receiving and transmitting simultaneously) is recommended. Options include:

- A dual-band, full-duplex handheld radio
- Separate handheld radios (one to transmit and one to receive)
- Separate multi-mode radios such as a Yaesu FT-817 (in FM mode).
- Even if you don't have a UHF transmitter you can still monitor the 145 MHz downlink on most 2M FM rigs - get started by listening.

❒ Directional Antenna

To make successful contacts, operating with your HT's flexible antenna will not work. Popular directional antenna options include:

- Dual-band Arrow Yagi Antenna
- Dual-band Elk Log Periodic Antenna
- Building your own, to get started see: http://www.amsat.org/?page_id=2144
- Some satellite passes may be occasionally received with just the flexible antenna so don't let lack of a beam prevent you from receiving experimentation!

❒ Satellite Tracking Applications

You'll need to know when the satellite is in range of your station and where to point your antenna. Web, PC, and smartphone trackers include:

- http://tinyurl.com/amsat-predict
- http://www.n2yo.com/
- http://amsat.org.ar/sat.htm
- Linux: Predict and GPredict programs
- Windows: SatPC32 (see AMSAT store)
- Mac OS X: MacDoppler (see AMSAT store)
- iPhone/iPad: GoSatWatch, PocketSat3 & Satellite Explorer Pro
- Android: AmsatDroid FREE & PocketSat3

The Radio Amateur Satellite Corporation - AMSAT

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Find out more and join at http://www.amsat.org

On-the-air with Fox-1A (AO-85)

Orbital predictions are needed to tell you when to listen and where to point your antenna. You'll need to tell the web site your location:

- Grid square, or
- Latitude and Longitude, or
- For some, selecting the nearest major city is enough to start with for manual tracking.
- Select the satellite you want to track.
- If using a computer tracking program, you'll need to load tracking data, called Keplerian elements, into the software. Initially, we recommend the web until you have had a chance to learn more.

Your tracking program can now tell you the basic parameters of the satellite pass:

- **AOS/LOS** - the time of the Acquisition of Satellite (beginning of the pass) and Loss of Satellite (end of the pass).
- **Azimuth** - this is the direction (e.g., north, south, east, west) which updates as the satellite flies through your view of the sky. These are true directions, not magnetic.
- **Elevation** - this is how many degrees above the horizon the satellite will be flying (0° is the horizon and 90° is directly overhead).

Fox-1 Frequencies

	Uplink FM (67 Hz tone)	Downlink FM
Fox-1A	435.170 MHz	145.980 MHz
RadFxSat (Fox-1B)*	435.250 MHz	145.960 MHz
Fox-1C*	435.300 MHz / 1267.300 MHz **	145.920 MHz
Fox-1D*	435.350 MHz / 1267.350 MHz **	145.880 MHz

* Frequencies may vary slightly after launch.
** Switchable by command station, not operational simultaneously

Tune the right frequency. The UV frequency plan used by Fox-1A makes tuning for Doppler shifts no harder than the VU configuration, but it does require some change of technique to decide when to tune. With UV, each station needs to tune their uplink based on their specific location with respect to the satellite. How do you do this?

While the satellite's receiver AFC will help minimize the needed transmission Doppler correction, you must be prepared to make adjustments when using an HT or similar equipment. Some HTs may be set for 2.5 KHz channel spacing, but 5 KHz spacing with the satellite AFC should be adequate. For a typical HT with 5 KHz spacing, the following memory frequencies are suggested:

Fox-1A Doppler Shift Correction

	Your Transmit Frequency (with 67 Hz tone)	Your Receive Frequency
AOS (Mem.1)	435.160 MHz	145.980 MHz
Approaching (Mem.2)	435.165 MHz	145.980 MHz
Passing (Mem.3)	435.170 MHz	145.980 MHz
Departing (Mem.4)	435.175 MHz	145.980 MHz
LOS (Mem.5)	435.180 MHz	145.975 MHz

If Fox-1 is heading directly toward you, the Doppler shift will be greatest, but except for passing overhead, it will change relatively slowly. Lower passes will have smaller maximum shift, but it will change continuously throughout the pass. Learning to compensate for this is a necessary operator skill. Using the recommended full-duplex operation will allow you to hear if you are tuned on-frequency.

Fox-1A Operating Hints

- Use a small beam like the Arrow Yagi or Elk log periodic, clear of obstructions.
- Select the 67.0 Hz CTCSS for transmit
- Uplink power should be on the order of 200 W EIRP for full quieting at lower antenna elevation angles. With an Arrow, 5 W has been used successfully to make contacts.
- Open your Squelch all the way
- Use a combo headphone/boom mike to reduce feedback/echo (and give you a free hand)
- Use a printout or your laptop, smartphone or tablet to track the satellite path over your QTH
- Have an audio recorder to log the QSO (it is difficult to talk, point the antenna, do PTT operation, remember the callsign, and think - all at the same time)
- Set your transmit and receive frequencies in memories to make tuning easier
- Twist the antenna as the pass progresses for best received signal. When using crossed-yagis like an Arrow, twist the antenna 90-degrees when you transmit; the Fox antennas are co-linear.

The Arrow Antenna. Photo credit: KB1SF

The Elk Antenna. Photo credit: elkantennas.com

Learn how easily you can make your own satellite antenna Photo credit: VE2ZAZ.net

Suggested Fox-1 Basic QSO Tips

A very busy single channel FM satellite is like any FM repeater and you do not call CQ. Exchanges will be crisp and very short, so do not expect to have a lengthy conversation about the weather or your station configuration. Most importantly listening is important: if two other stations are in the middle of the exchange, let them finish. Even though a pass is short, the exchanges are even shorter. You will get a shot so please be patient and respectful of others.

- Listen for others
- Listen for yourself using full-duplex operating technique "W4ABC" (make sure you have your PL switched on!)
- You hear "K9XYZ"
- You say "K9XYZ W4ABC EM74"
- You hear "W4ABC K9XYZ QSL EN52"
- You say "K9XYZ W4ABC QSL 73"
- Please do not call "CQ Satellite" on the FM birds

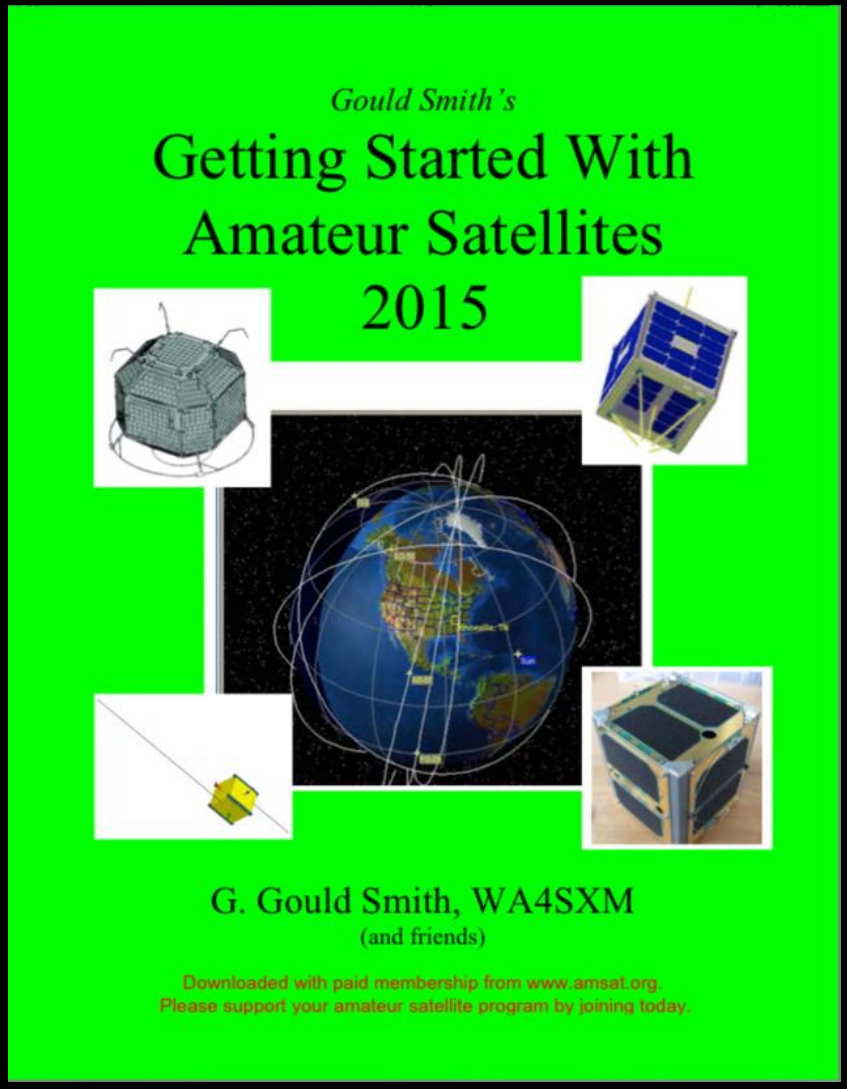
You'll find all the details in AMSAT's book:

AMSAT offers the Getting Started with Amateur Satellites book... Available on-line at:

http://store.amsat.org/catalog/

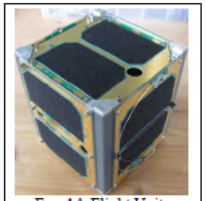
Fox-1A AO-85 Information

http://www.amsat.org/



Fox-1A

Name(s):	*Fox-1A*
NASA catalog number:	TBD
Launch:	27 August 2015 (Planned) Atlas 5, NROL-55 Vandenberg AFB, CA
Orbit:	LEO (Low Earth Orbit)
Inclination:	64°
Eccentricity:	0. 200
Period:	97 minutes
Estimated orbital lifetime:	5+ years
Altitude:	~470-780 km (~295-490 miles)
Size:	10 x 10 x 10 cm (4 inch cube)
Weight:	1.3 kg (~3 pounds)
Transmit power:	400-800 mW
Downlink:	145.980 MHz FM voice FSK digital data up to 9600 bps
Uplink:	435.180 MHz FM voice (67.0 Hz PL (CTCSS))


Fox-1A Flight Unit

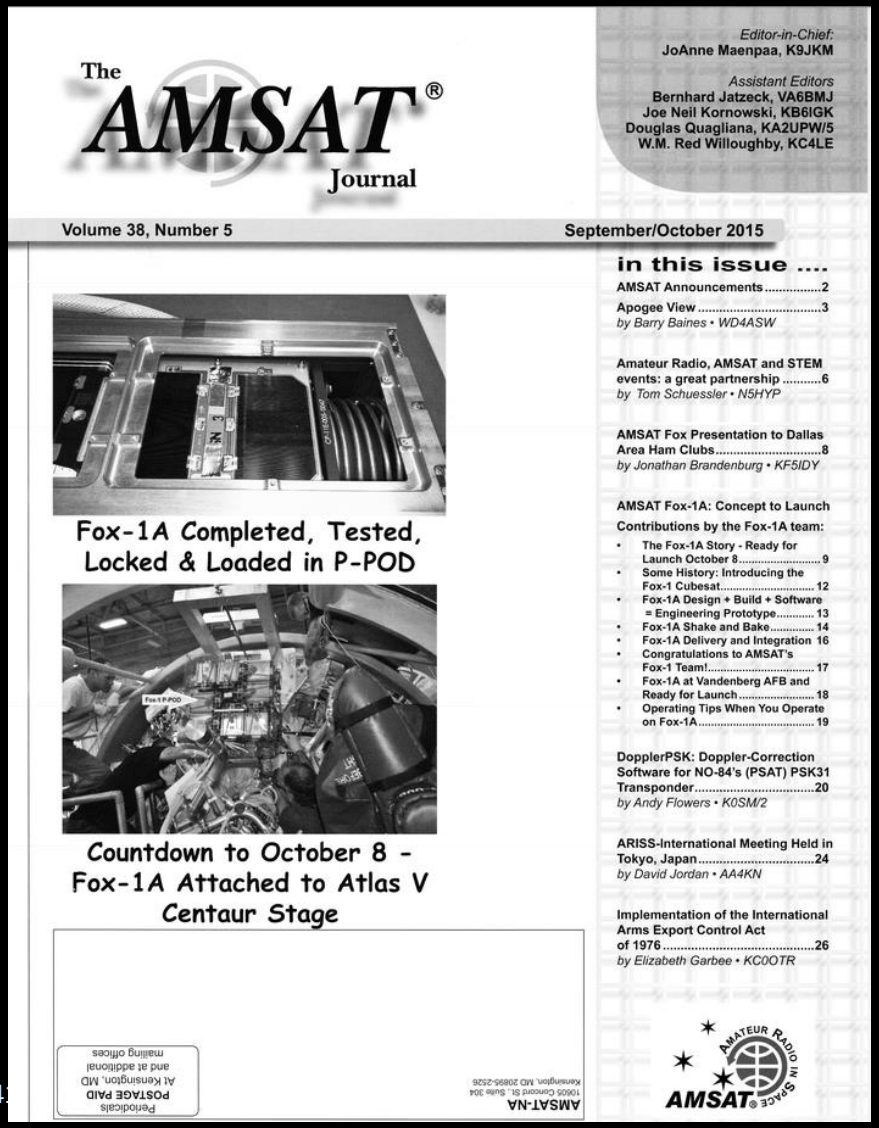
Fox-1A is the first in a new generation of AMSAT-NA CubeSats. CubeSats take advantage of the ability to provide functionality in a satellite you can hold in your hand comparable to one which would take up most of a desktop 10-20 years ago. Despite their small size, CubeSats have launch prices commensurate with their capabilities, and are currently running about $125,000 for the smallest "one unit" (1U) versions. Fortunately NASA and other agencies see the education value of these satellites, and are willing to provide free launches to satellites which have a significant educational purpose. Since AMSAT-NA has always included a strong educational component, we have paired with universities who will provide experiments while we provide the basic spacecraft and communications.

The voice portion of the satellite will operate as a cross-band or "bent pipe" FM repeater. The 2 m downlink and the 70 cm uplink, known as Mode-B or UV, will both use FM voice modulation, and can be worked using the **recommended** equipment used for AO-51, SO-50, and other FM satellites. As with some earlier FM satellites, to conserve battery power for use over populated areas, the transmitter will turn on when the receiver detects a 67. 0 Hz PL (CTCSS) tone. Once the satellite detects the 67.0 Hz tone, the transmitter will stay on for at least 1 minutes, or as long as it continues to detect the tone.

Fox-1A will be an "Easier-Sat" for two reasons: The use of a 2 m downlink will make the satellite approximately 6 dB stronger than the usual 70 cm downlink with the same transmitter power, and the satellite receiver will have Automatic Frequency Control (AFC) to assist in Doppler correction on the uplink. That will make it possible to access the satellite even if the ground station uplink is a bit off frequency. As with other FM satellites, stronger stations will have an advantage. Please use the **minimum** power

Fox-1A AO-85 Information

http://www.amsat.org/



The AMSAT® Journal

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Volume 38, Number 5 — September/October 2015

Fox-1A Completed, Tested, Locked & Loaded in P-POD

Countdown to October 8 - Fox-1A Attached to Atlas V Centaur Stage

in this issue ....

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Volume 38, Number 6 — November/December 2015

AO-85
Now Orbiting and Operating!

Photo: United Launch Alliance

in this issue ...

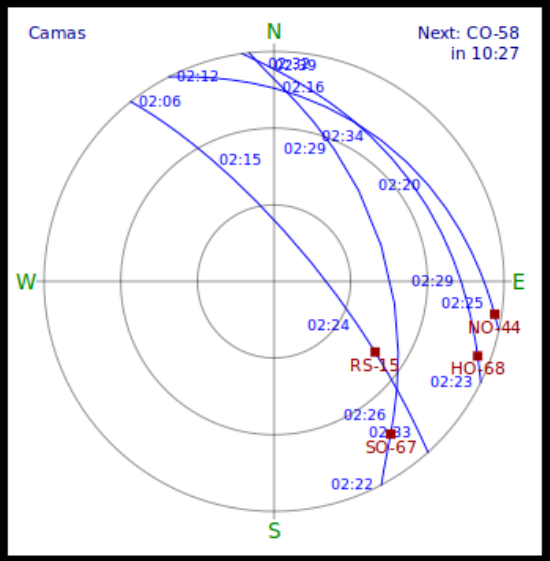
Fox-1A AO-85

Summary

- FM repeater
  - Easy to hear
  - Hard to talk to with low power
  - Good results without Doppler shift correction
- Data Under Voice (DUV)
  - Easy with SDR radios
  - Not possible with some transceivers
    - Low pass filters remove the low frequency data
- More FOX type satellites are schedule this year
  - FOX-Cliff
  - FOX-D

www.stargazing.net/david/satellites/2meters.html

ISS & Satellites on 2 Meters



Summary

Listening to the International Space Station (ISS) and satellites in orbit with a focus on radio signals in the amateur radio 2 meter band comprising frequencies from 144.000 MHz to 148.000 MHz.

The satellite radio signals are classified into two groups: voice and data tranmissions.

Presentation

- Fun with Satellites presentation at SEA-PAC June 4, 2016
- FUNcube-1 (AO-73) 2 Meter Satellite Telemetry presentation at SEA-PAC June 6, 2015