

A world map with a blue tint, showing satellite orbits as yellow and red dashed lines. A red circle highlights North America, and a red pin is located in the western US. Several satellite icons are scattered across the map.

it's **Sat Easy**

Work the FM Repeater Satellites

Quick – Easy - Cheap

Dan's (W6DPM) Sat System



KLM VHF & UHF Circularly Polarized Antennas



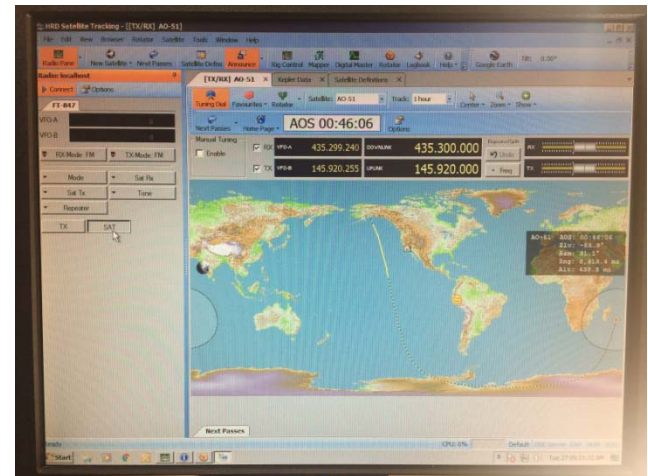
Yeasu Az/EL antenna rotor



Yeasu FT 736R Transceiver



Ham Radio Deluxe



The Catalyst – Rocket Day

- Somehow I became the coordinator for our special event station for Rocket Day.
- The Strathearn Park folks really wanted something tying in Space - the ISS !!!??
- The ISS wasn't going to pass overhead
- I figured maybe we could at least hear an amateur satellite beacon or something.
- With about 2 weeks to go, I began my research.
- Hooray Google



Satellite Research

- One of my first discoveries was that it is possible to actually hear some satellites with an HT using its rubber duck.
- Then I came across a few videos showing how to actually work a satellite using a HT
 - <https://vimeo.com/6868846>
 - <https://www.youtube.com/watch?v=bT131WBHKxc>
 - <https://www.youtube.com/watch?v=01IbCbEmHDE>
- With a week to go, I thought
“Hey, maybe I can do this!”

More Research

- First – What satellites were possible
 - Basic training – Amsat's Getting Started With Amateur Satellites
 - Satellite tracking app – GoSatWatch
 - FM Repeater sats using VHF/UHF ex: SO-50, AO-85
 - AO-85 was making a good pass on Rocket Day - I'm HOOKED!
- Next – an antenna
 - Arrow was available at HRO!
- HT?
 - FT470 and FT530 were recommended and owned but the batteries had died. Ordered new.
 - VX-6 ? It allows setting cross band Receive/Transmit

Thanks to Mike Tweedy for capturing my first satellite contact as W6S on Rocket Day at Strathearn Park.

Rocket Day 2018



Online Resources

- AMSAT – NA

- <https://www.amsat.org/>

- Getting Started With Amateur Satellites
digital edition included with 1st year membership

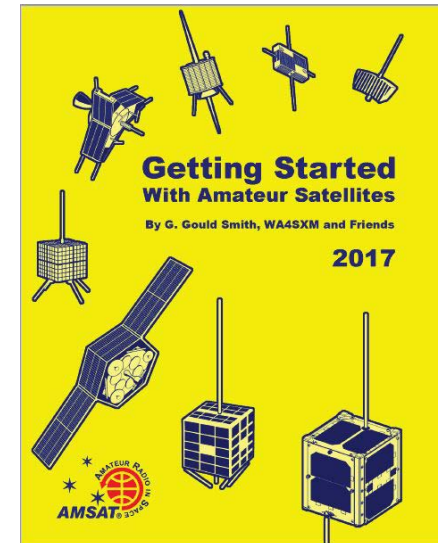


- N2YO



- Tracking **18987** objects
as of 28-Feb-2018

- GoSatWatch - Apple iOS App



OSCAR

Orbiting Satellites Carrying Amateur Radio

- **18987** objects being tracked in Earth orbits as of 28-Feb-2018
- 315 amateur radio satellites being tracked in Earth orbits
- Approx 168 currently active amateur radio satellites
<http://www.ne.jp/asahi/hamradio/je9pel/satslist.htm>
- **91 OSCARs 1961 – 2018**
- **29 Currently active OSCARs**

FM Repeater Satellites

• Name	Number	Uplink	Downlink	Beacon	Mode	Call
• FMN-1 (FengMaNiu-1)	43192	145.945	435.350	435.350	FM, 9600bps BPSK	BUAABJ
• Fox-1D ((RadFxSat, AO-92)	43137	435.350	145.880	145.880	FM CTCSS 67.0Hz/200bps	DUV
• Fox-1B ((RadFxSat, AO-91)	43017	435.250	145.960	145.960	FM CTCSS 67.0Hz/200bps	DUV
• CAS-2T	41847	145.925	435.615	435.710	FM,CW	CAS2T
• Fox-1A (AO-85)	40967	435.172	145.980	145.980	FM CTCSS 67.0Hz/200bps	DUV
• LAPAN-A2/ORARI (IO-86)	40931	435.880	145.880	145.825	FM_tone 88.5Hz,APRS	YBSAT1
• SO-50 (SaudiSat-1c)	27607	145.850	436.795		FM_tone 67.0Hz	
• UO-11 (UoSAT-2)	14781	145.826	435.025	2401.500	(V)FM,(S)PSK	UOSAT-2

Data from <http://www.ne.jp/asahi/hamradio/je9pel/satslist.htm>

FM Repeater Satellites

the Easy Way

- Handheld 146/437 Dual Band Yagi Antenna
- 146/437 Dual Band Radio
- Optional
 - Tripod with antenna adapter
 - Digital audio recorder
 - Satellite tracker app on portable device

146/437 Antennas

- Arrow II LEO Satellite Yagi Antenna
- Elk Periodic Dual Band Antenna
- WA5VJB Cheap Yagi Antenna www.wa5vjb.com
- Juan's CJU and Ioio Antennas www.ea4cax.com

Radios

- FM Dual Band – Full Duplex Cross Band
- HTs
 - Yeasu VX-6, FT-470, FT-530
 - Icom IC-W2A, IC-W32 (w/ 5 digit S/N)
 - Kenwood TH-D7, TH-D72A
- Mobiles
 - IC-2710, 2720, 2728H, 2800
 - TM-D700A, D710A, D710GA, 741, 742, 941, 942
 - FT-5100, 5200, 8800, 350

My Satellite System

- Arrow II 146/437-10WBP Antenna
- Yeasu VX-6 Dual Band HT
- Camera Tripod
- Home made tripod adapter
- Digital audio recorder
- iPad with GoSatWatch app

Setting up my Yeasu VX-6 HT

VX-6 Supports split band Transmit/Receive
430 MHz band has significant Doppler shift
Program a series of memories to cover pass for
each satellite.

Receive Frequency	Transmit Frequency	Offset Direction	Operating Mode	Name	Tone Mode	CTCSS
436.805	145.85	Split	FM	SO-50	Tone	103.5 Hz
436.805	145.85	Split	FM	SO-50-1	Tone	103.5 Hz
436.8	145.85	Split	FM	SO-50-2	Tone	103.5 Hz
436.795	145.85	Split	FM	SO-50-3	Tone	103.5 Hz
436.79	145.85	Split	FM	SO-50-4	Tone	103.5 Hz
436.785	145.85	Split	FM	SO-50-5	Tone	103.5 Hz

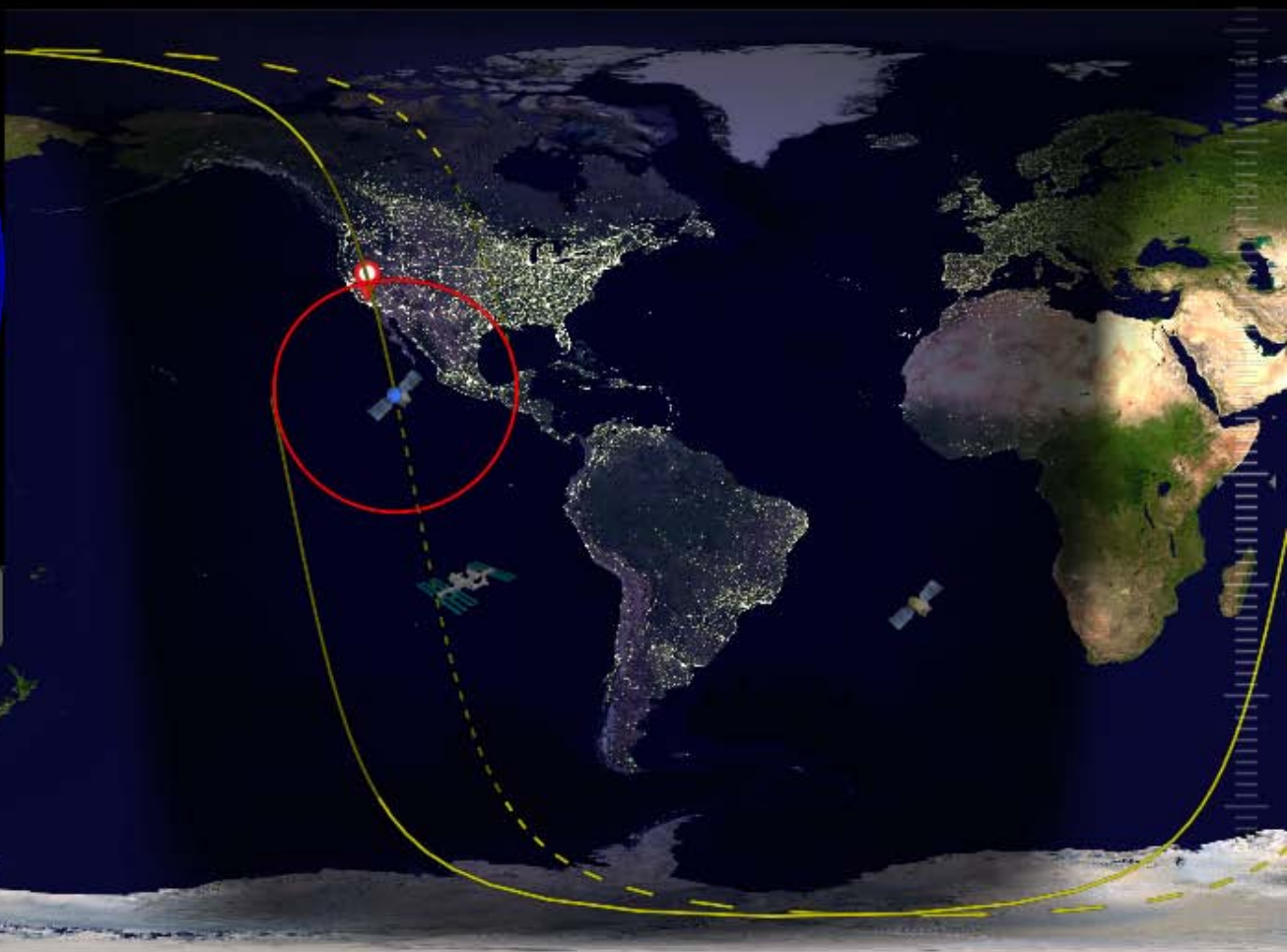
GoSatWatch

< Passes

AO-92



↑ 10° S	→ 76° E	↓ 10° N
9:00:27 PM	9:04:04 PM	9:07:42 PM



AO-92	☉ 16.6°N	↗ 1340 mi	△ 4.0°
🕒 17042 mph	🌐 113.4°W	↑ 310 mi	⊕ 163.3°S