

Let's Go to Space

Technician Exam Preparation Class
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Many Amateur Radio Satellites Are Waiting for You

- A “space station” is any amateur station located 50km or more above the earth’s surface
 - Most amateur satellites are in low earth orbit (**LEO**)
- In order to talk with or through a “space station” you need to know the satellite’s real position, azimuth, elevation from start to finish of the pass, frequencies to use

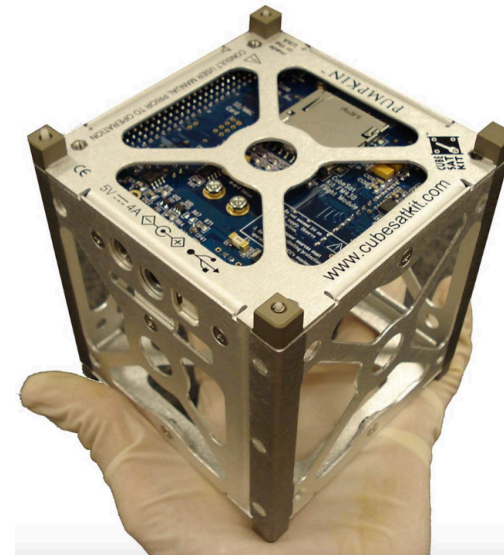


- The “**Keplerian Elements**” are the critical time, azimuth, and elevation data needed to compute the satellite’s position

T8B03, T8B06, T8B10

Satellites Continued

- Most amateur satellites have a beacon: continuous faint transmission that carries digitized telemetry about the health and status of the satellite itself
 - Anyone can receive and decode the telemetry. Once a radio signal has been transmitted it becomes public domain
- Almost all transmission modes are used, CW, Data, SSB, FM with FM being the most popular with Technicians
- Satellites usually are spinning to reduce overheating of the solar panels. The spin may cause signals to fade in and out
- As the satellite passes the frequency will change ... Doppler Shift



- It is important to use the lowest power setting needed to successfully complete the transmission to or through the satellite
 - Too high power will block other users or saturate the signal to make it unintelligible
 - Your signal strength on the uplink should match the signal strength on the downlink

T8B01, T8B05, T8B07, T8B09, T8B12, T9B02, T9B04

And Finally, Space Stations Modes

Most amateur radio satellites operate as “repeaters” ... receiving a signal on one frequency and transmitting it simultaneously on another.

Since there is limited space and power, the input frequency (uplink) is on one band and the output frequency (downlink) is on a different band

The “mode” of the satellite indicates where the uplink and downlink are located. For instance, Mode U/V means uplink on the 70cm band and downlink on the 2meter band

Band	Freq Range	Mode
HF	21-30 MHz	H
VHF	144-148 MHz	V
UHF	435-438 MHz	U
L band	1.26-1.27 GHz	L
S band	2.4-2.45 GHz	S
C band	5.8 GHz	C
X band	10.4 GHz	X
K band	24 GHz	K

A Satellite Contact Video

- <https://www.youtube.com/watch?v=7p-BAeWf0U0>



AO-91 and AO-92

**Jot down any questions
you may have to ask
during the online meeting**