

Swiss Space Summer Camp 2016

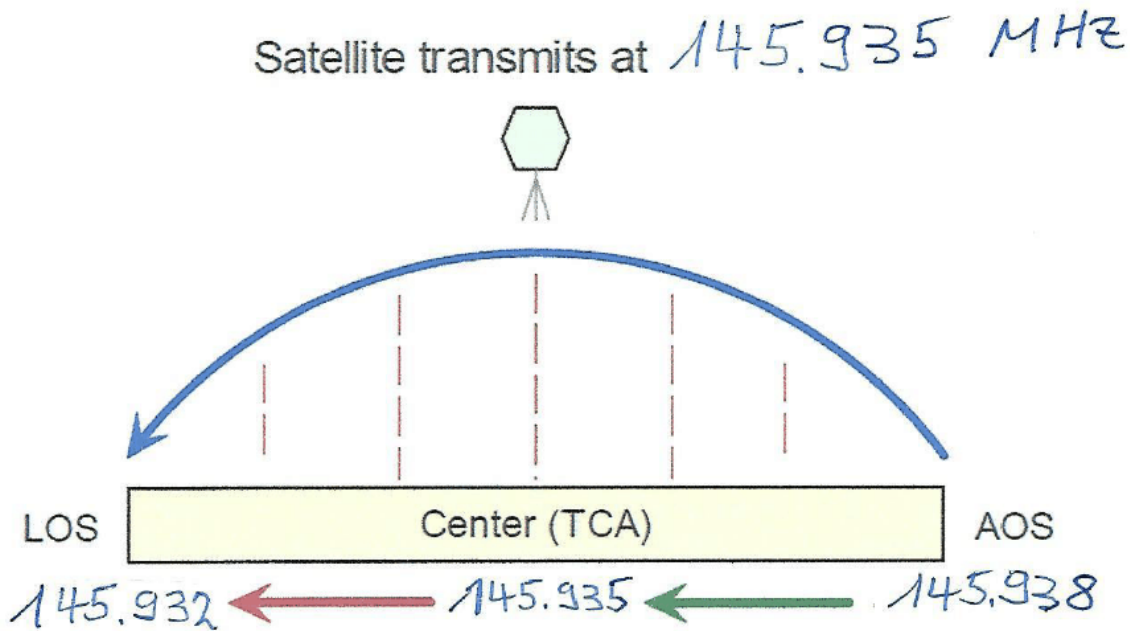
Simple Ground Station (GS)

Satellite Receive Procedures

Main topics: Receiving satellite signals
Prerequisites: Tested simple ground station consisting of antenna, amplifier, receiver HW + receiver SW

M. Klaper, version 1.0

1. Charts for manual Doppler correction (receiver side)



ISS Packet data	Down link [MHz]
AOS	145.8285
b	145.8267
MID	145.8250
d	145.8232
LOS	145.8215

Wishing you good luck

Your lecturer team

2. Preparation before pass

- Charge the batteries
- Check "Heavens-Above" for orbit data or use the handout. Check time and your location (!)
- Distribute tasks among group
- Build simple ground station (Antenna, Amplifier including switched on battery power, NESDR Smart dongle, cabling)
- Start required software, check configurations
- Await pass. The first sign of an impending pass is very often a slight reduction of the noise level. Do not use the squelch.

3. Receiving ISS data packets

Use the setup from System Test2, but tune your receiver to **145.825 MHz** and select FM. Use again modem **VHF AX.25 1200 bd.** and ensure that **VAC** is connected. The decoder application is **UISS**. Do not use the FUNcube dashboard. Adjust carefully for the Doppler shift.

4. Receiving FUNcube-1 (AO-73) telemetry

Use the setup from System Test2, but tune your receiver to **145.935 MHz** and select FM. Use the **FUNcube dashboard** and ensure that **VAC** is connected. Do not use the UISS decoder. Adjust carefully for the Doppler shift.

5. How can I be sure, that a signal stems from a satellite?

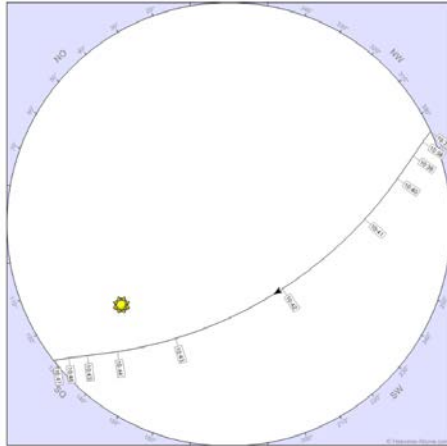
- Satellite signals are generally weak and they
- Always show a **Doppler effect**, i.e. the frequency changes slowly from high to low and has to be – in your case - compensated for by hand on the Variable Frequency Oscillator (VFO), i. e. where you tune for different radio stations. "Bigger" ground stations do this Doppler compensation by computer software.

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Betreff

6. Sky charts

Internationale Raumstation (ISS) - Überflugdetails [Startseite](#) | [Bedenqur](#) | [Info](#) | [Umlaufbahn](#) | [help](#)

Auf die Karte klicken, um einen Himmelsabschnitt zu vergrößern.



Bildgröße (000) (500 - 1600)

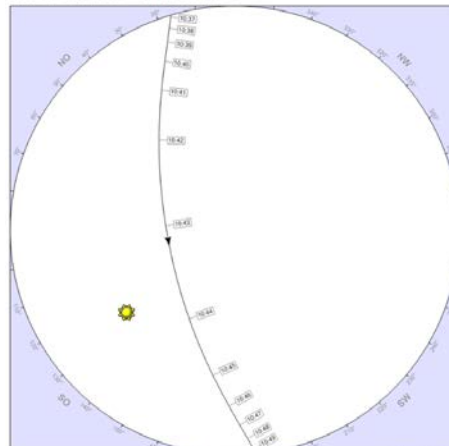
Datum: Freitag, 9. September 2016

Umlaufbahn: 402 x 405 km, 51.6° (Epoch: 06 September)

Ereignis	Zeit	Höhe	Azimut	Entfernung (km)	Helligkeit	Sonnenhöhe
Aufgang	10:36:45	0°	294° (WNW)	2.327	0.0	34.8°
Anstieg über 10°	10:38:51	10°	290° (WNW)	1.443	-0.9	35.1°
maximale Höhe	10:42:03	35°	211° (SSE)	406	-2.4	35.6°
Abfall unter 10°	10:45:17	10°	132° (SO)	1.478	0.9	36.0°
Untergang	10:47:23	0°	129° (SO)	2.318	1.5	36.3°

FUNcube-1 - Überflugdetails [Startseite](#) | [Bedenqur](#) | [Info](#) | [Umlaufbahn](#) | [help](#)

Auf die Karte klicken, um einen Himmelsabschnitt zu vergrößern.



Bildgröße (000) (500 - 1600)

Datum: Freitag, 9. September 2016

Umlaufbahn: 283 x 468 km, 97.7° (Epoch: 03 September)

Ereignis	Zeit	Höhe	Azimut	Entfernung (km)	Helligkeit	Sonnenhöhe
Aufgang	10:36:52	0°	13° (NO)	2.819	?	34.8°
Anstieg über 10°	10:39:03	10°	13° (NO)	1.916	?	35.1°
maximale Höhe	10:43:10	63°	101° (O)	660	?	35.7°
Abfall unter 10°	10:47:16	10°	182° (S)	1.904	?	36.3°
Untergang	10:49:28	0°	187° (S)	2.832	?	36.5°

Change history

version	date	state	changes and remarks	author
1.0	07-09-2016	draft	first version	M. Klaper

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