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Observation of LEO satellites in radio band using GRAVES

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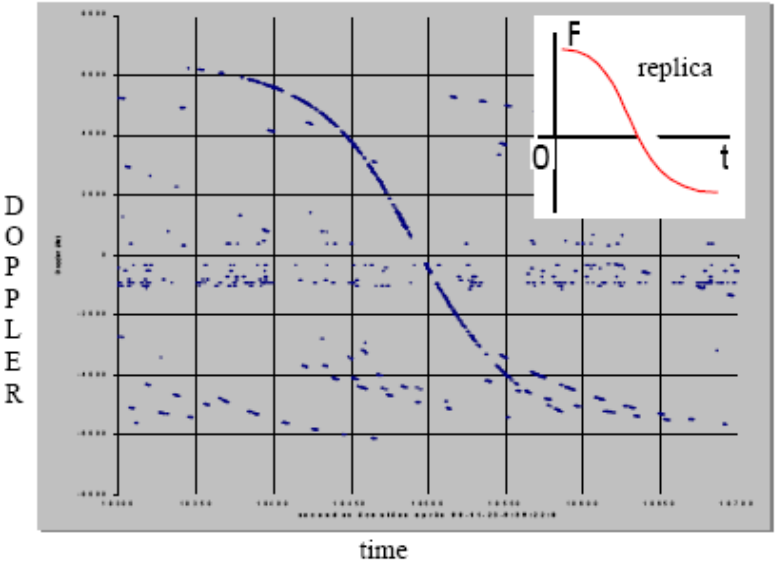
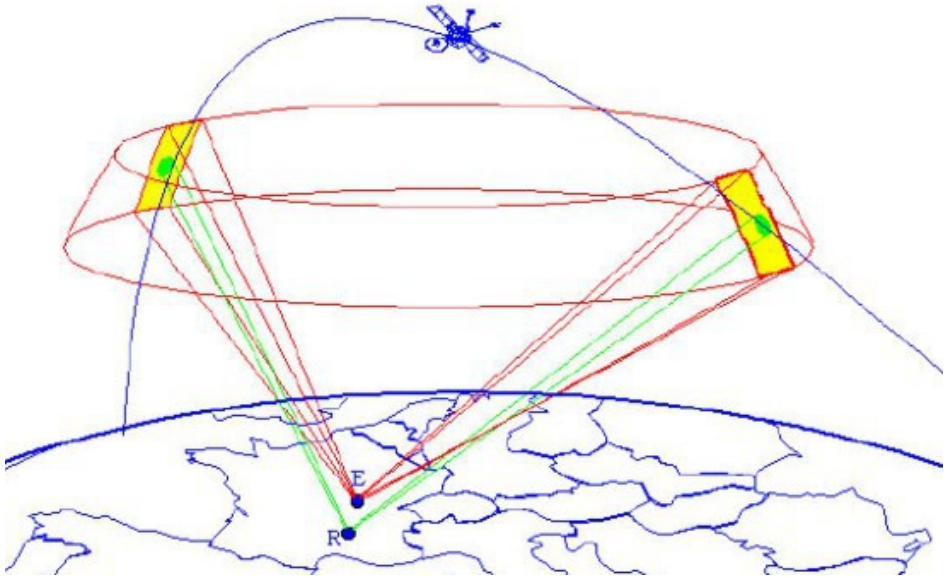
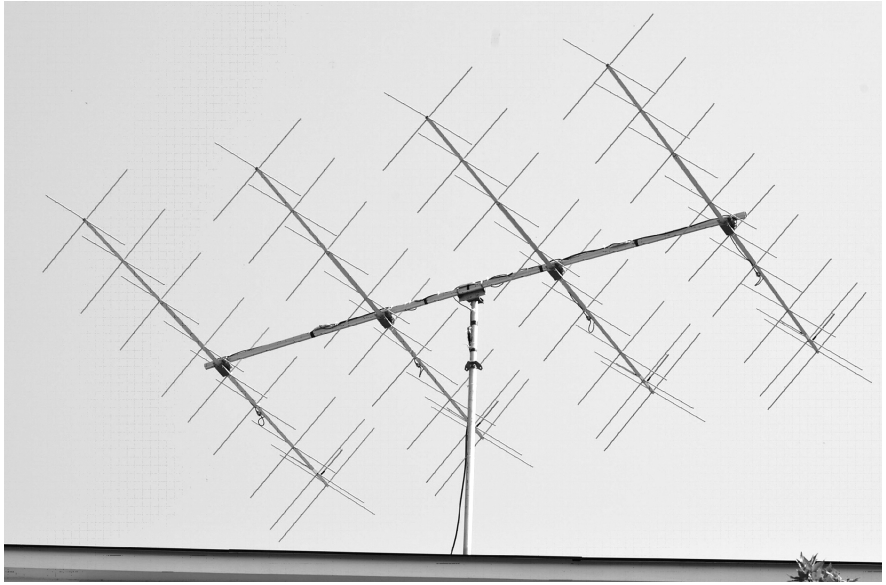
GRAVES Radar system

The Graves Radar system is a bi-static radar system with a separate tx and rx location. Its main purpose is to detect low orbit satellites (500-1500 km) and determine their orbital parameters. Its operating at 143.050 MHz and on-the-air since November 2005. Radiated power of transmitter – 750 kW.





Equipment: antenna



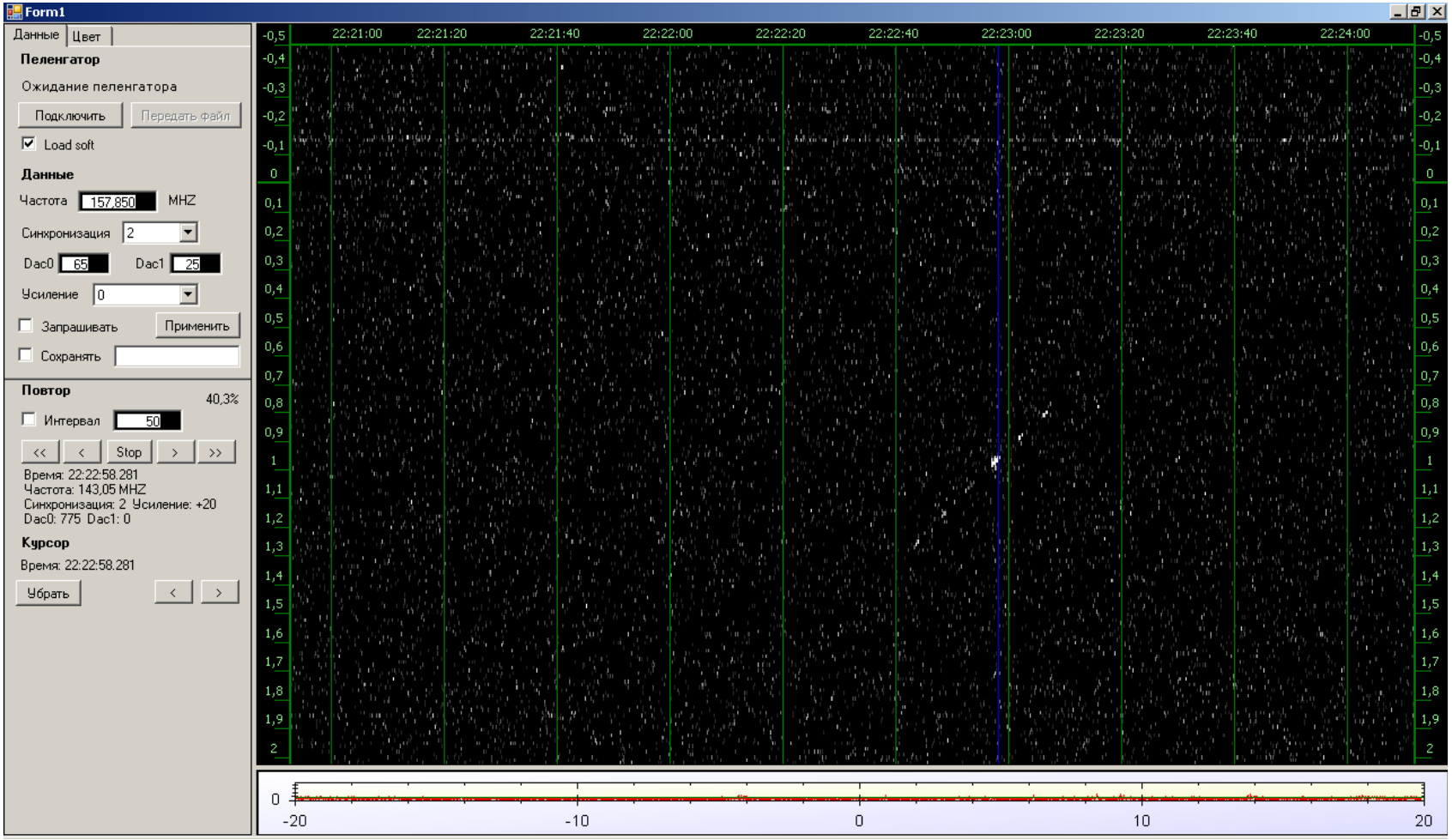
Frequency band, MHz	142…144
SWR	1.5
Antenna gain, dB	16.0
Back radiation level, dB	-20
Impedance, Om	50

Equipment: receiver

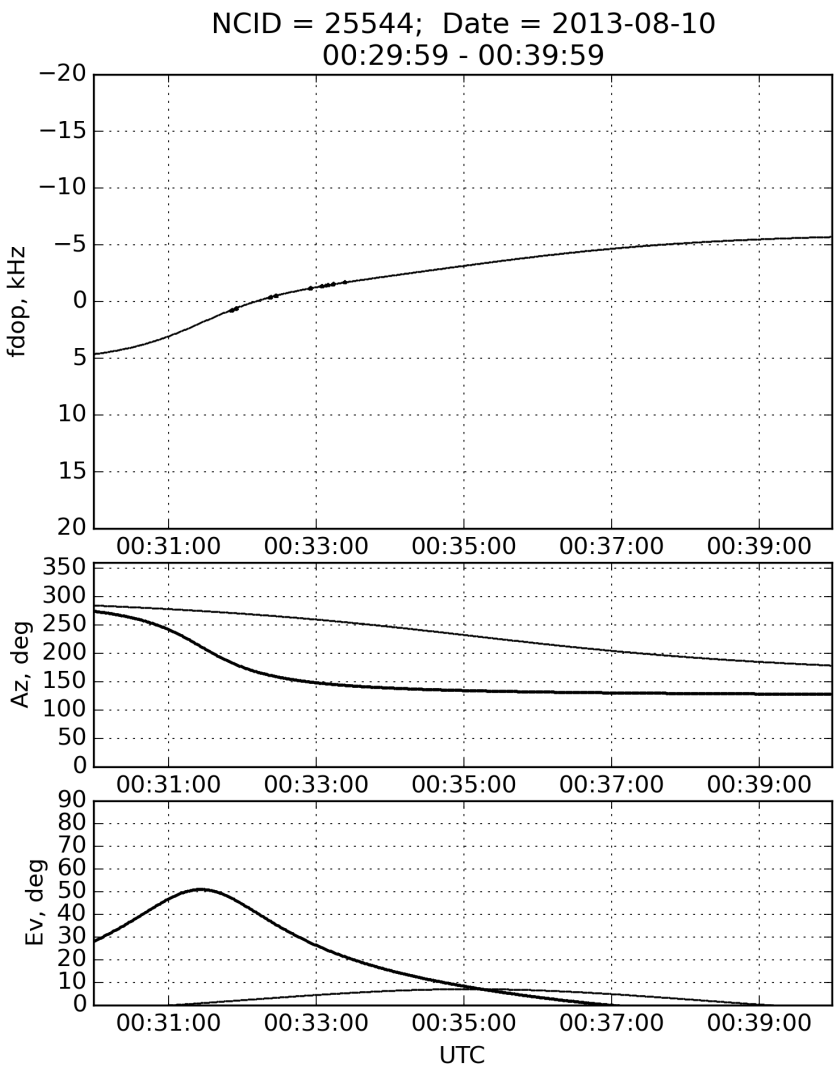
SDR Cobalt:

Input frequency range - 25-3300 MHz;
an input impedance of 50 ohms;
the speed of adjustment of frequency of 100 microseconds;
the value of output frequency - 10.7 MHz or 70 MHz (depending on the version);
band reception for 10.7 MHz - 6.5 MHz to 70 MHz - 23 MHz;
number of transport ducts -1;
voltage - 12 V;
Power Consumption - 15 Watts.

Measured signal



Results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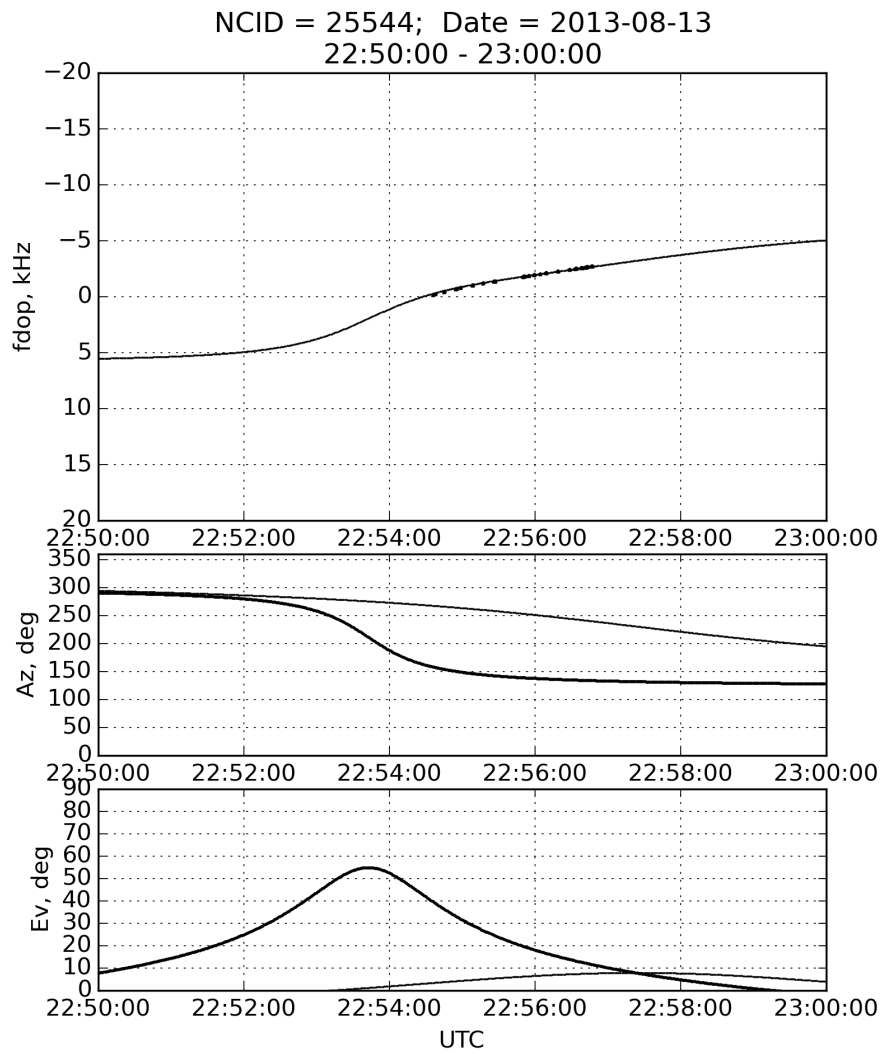
Ev, deg
00:31:00
00:33:00
00:35:00
00:37:00
00:39:00
UTC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22:58:00
23:00:00
UTC

Conclusions

Orbit improvement using the method of differential correction based on the analytical model of satellites motion (two-body problem) by all position of satellite

Thank you!