

**OBSERVATION OF GEO AND LEO SATELLITES BY  
RADIO-TECHNICAL MEANS IN THE RESEARCH  
INSTITUTE "MYKOLAIV ASTRONOMICAL  
OBSERVATORY"**

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The RI "MAO" radio-technical means are fully passive. To track satellites they use radio signals emitted by the satellites themselves. Thus, the following were developed and put into operation: 1) Simple INTerferometer NETwork (SintNet) for monitoring the orbital position of geostationary (GEO) satellites; 2) Doppler station (DS) for clarifying the orbital elements of low Earth orbit (LEO) satellites. Two SintNet operate now: European and Chinese. The European SintNet consists of 10 stations and tracks 3 co-located satellites simultaneously. The Chinese SintNet consists of 4 stations and tracks one satellite. The error in determining the coordinates of the satellites is about 200 m.

The Doppler station operates in the frequency range 430-440 MHz. It uses signal spectrum analysis to determine the frequency  $F(t)$  of the radio signal emitted by LEO satellite and received by the station at time  $t$ . The SGP4/SDP4 analytical model of the satellite's motion is applied to the analysis  $F(t)$  and to clarify the satellite orbital elements. Errors in the measurement of the Doppler frequency shift and time are 4 sm/s and 30 ms respectively.