DYNASONDE 21 PRINCIPLES OF DATA PROCESSING, TRANSMISSION, STORAGE AND WEB SERVICE

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Abstract:

A new and advanced system for ionospheric radio sounding, the "Dynasonde-21", offers a comprehensive software suite for:

- local or remote, secure, system administration;

- easy and appropriate configuration changes;

- long-term autonomous operation;

- automatic application of powerful methods for scientific data analysis;

- real-time specification of ionospheric parameters;

- use of modern tools (RDBMS) for local and centralized storage of results;

- convenient and interactive data mining and visualization through a web service;

- automated transfer of negotiated real-time results to remote client applications.

Each Dynasonde 21 includes a small database management system, providing local scientific and system-configuration data storage; it binds components of the Dynasonde-21 software suite, by which they exchange information. Because of its relational nature, the DBMS is a convenient state-of-the art environment for data analysis. However, as always in geophysics, dramatic advances are possible from the capability to analyze data from broad, even global geographic regions, and to review long time series of data. Therefore, the optimum operation of a Dynasonde 21 site includes regular transmission of the analysis results to a central data repository, providing common access for the scientific community through the web. This web service is suggested to become a principal feature of the modern network of ionospheric sounding systems. Modern sounding results are supplied with objective error estimates. These features, available in real time, meet the requirements of assimilative ionospheric modeling to advance scientific understanding, for \"nowcasts\" of ionospheric weather, and forecasting.

An operating prototype of this web service for existing Dynasonde stations has been created through guest appointments at the National Geophysical Data Center of NOAA. Access is available through the Dynasonde web site http://www.ngdc.noaa.gov/stp/IONO/Dynasonde/. Principles and some specific examples of operation are presented in this paper.