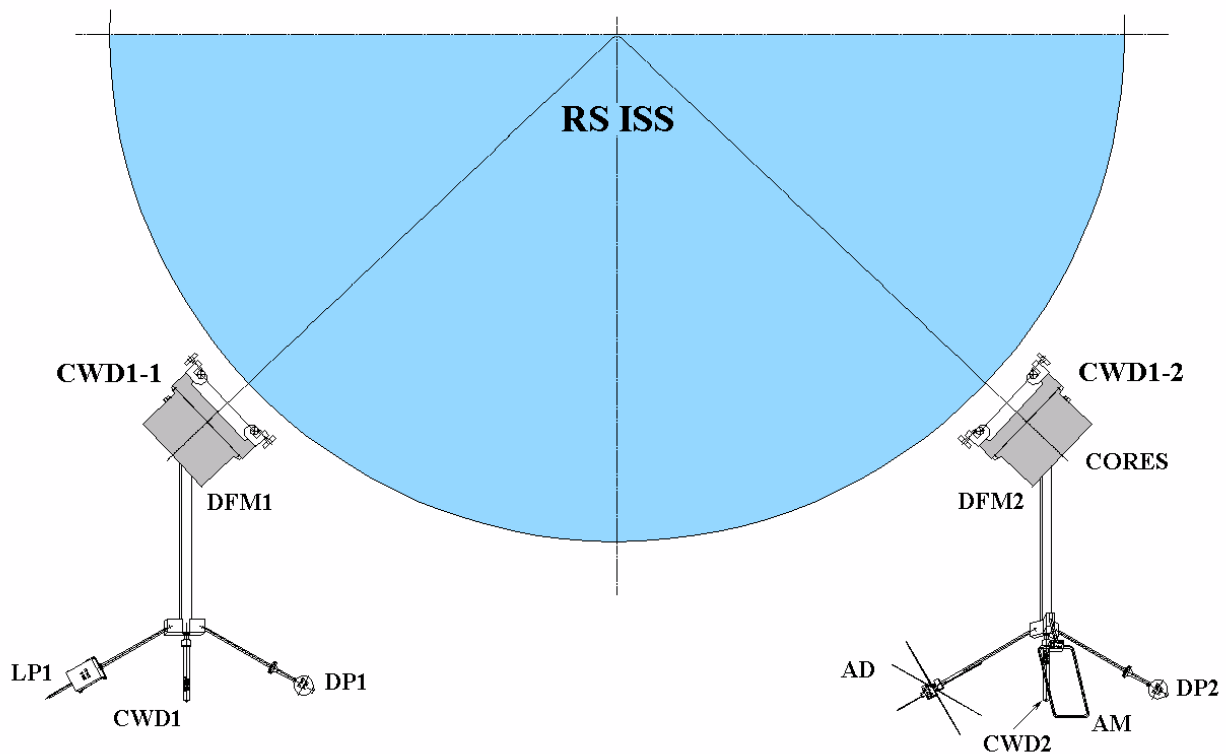


## The Plasma-Wave Complex of scientific instrumentation for wave and plasma parameters measurements in the frame of Russian Segment of ISS.

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The Plasma-Wave Complex (PWC) will be implemented in the OBSTANOVKA (ENVIRONMENT in English) experiment planned onboard of Russian segment of ISS (RS ISS). The “OBSTANOVKA (1 stage)” will be carried out to provide a databank of electromagnetic fields and of plasma-wave processes occurring in the ISS near-surface zone (NSZ) to study the plasma component factors of near-Earth space (NES). The results will be used in the field of applied geophysics, ecology, space weather monitoring, and also for the updating of operational requirements used in space engineering and technology.



*Plasma wave instruments (CWD1-1 and 1-2) are able to measure thermal ionospheric plasmas (LP1 and 2), quasistatic electric (CWD1 and 2) and magnetic (DFM1 and 2) fields, electromagnetic emissions (AD and AM), superthermal electrons (CORES) and variations of the ISS electric potential (DP1 and 2).*

*The data acquisition and telemetry systems are located indoors, onboard the RS ISS.*

The goals of “OBSTANOVKA (1 stage)” experiment can be formulated as follows study:

- plasma-wave processes arising in NSZ from the interaction of super-large SC with the ionosphere;
- environmental plasma and electromagnetic fields disturbance levels from the technical injection from ISS and mechanisms of artificial electromagnetic waves distribution;
- mass characteristics of heavy molecular ions ( $\text{NO}^+$  and  $\text{O}_2^+$ ) in NSZ on the basis of the measured VLF noise and plasma concentration data;
- geophysical plasma-wave processes connected to *solar - magnetosphere - ionosphere - atmosphere - lithosphere* interactions;
- ecological monitoring of low-frequency electromagnetic radiation of anthropogenic character, and also connected with global hazard;
- space weather conditions in equatorial, middle-latitude and sub-aurora ionosphere.

The PWC measure physical parameters:

•current parameters (in two points):

- electrons temperature,  $T_e$  – 1000 - 6000 K
- electrons and ions density,  $N_e, N_i$  -  $1 \cdot 10^9 - 1 \cdot 10^{13} \text{ m}^{-3}$
- DC electric and magnetic fields and currents;
- AC electric and magnetic fields and currents;
- spectra of ELF-VLF-HF electromagnetic fluctuation (<15 MHz).

•current plasma and ISS potential 0 – 200 V;

•electron spectra with energy range 0,01-10 keV and oscillations HF: 0- $10^7$  Hz; VLF: 0- $10^4$  Hz; ELF: 0-150 Hz.

The results of the OBSTANOVKA experiment (beginning realization 2005) are common for all participants (see above the list of organization). The continuous work in ionosphere (altitude of 350-450 km) within not less than 5 years is planned. This data may be used in the SWENET frame.