DEEP SKY SURVEYS WITH RATAN-600

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Blind Sky surveys with RATAN-600 were suggested by the general PROJECT of AVP (1968). A Flat mirror was included into the main CIRCLE structure to carry out quick all-sky survey, as successfully was made with the Kraus telescope of Ohio University. In 1960th the Sky seemed to be filled by first generation young objects with inverted and SSA spectra, which were missing in the meters wavelengths catalogs. The Sternberg Astronomical Institute of the Moscow State University group have surveyed the sky zone DEC:0-14deg with sub-Jy sensitivity at the 2-8 cm wavelength and the first big (8500) list of objects detected at 4 GHz objects was published just before the famous 87GB catalog appeared (see the Zelenchuk survey catalog in CATS data base). The CMB anisotropy studies were early on included in the high priority scientific targets. The first deep blind sky survey was done at 4 cm wavelength in the winter 1975-1976 with sub-mK sensitivity, but only results interesting for CMB people were published, and they reject all available in 70-th variants of the theories of galaxies formation. The second epoch of deep blind surveys started after installation of the world best cryo-receiver at 7.6 cm (with $\sim$2mK/s$^{1/2}$ sensitivity). The first 17 Feb. 1980 24h- drift scan demonstrated that about 200 details may be found on this record and may be classified as radio sources, and we integrated point sources (PS) and CMB anisotropy tasks in the experiment. Several regions were selected for deep surveys, including the celestial Pole, the Declination of SS433 strip, and the Declination of 3C84 (near the RATAN zenith) strip. Weakness of the CMB anisotropy requires a great averaging (hundreds daily scans) and we observed some regions during many years. At all frequencies lower 10 GHz we see a confusion limit, and we proposed ways to suppress this noise using specific shape of the RATAN-600 beam. It helps us to reach the few mJy level at cm wavelengths and much below by P(D) analysis. The multi-frequency mode of observations, important for SCREENS (foregrounds) cleaning in the CMB experiments, turned out to be useful for a spectral classification of the PS appearing on the scans. Now it is clear for all CMB groups, that the depth of the CLEANING from PS is the real limit of CMB dedicated experiments, including the PLANCK mission. The problem with PS objects at CMB frequencies connects with an absolutely unknown Source Population (between IRAS and NVSS, or GB). At RATAN-600 we try to use SELF CLEANING mode, using much higher resolution than required by CMB physics (sub-degree scales). A huge amount of data collected during the CMB experiments should be used by PS people. I shall present the positive and negative experience, connected with the international BIG TRIO program, and problems with detection of a new population at cm wavelengths. The present state of RATAN-600 “Cold” and RATAN-600 Zenith Field (RZF) blind surveys will be mentioned, as well as the present-day situation with High Frequencies Sky Surveys. This presentation describes results of several groups in SAO and in SPb-branch of SAO, and now is partially supported by the RFBR grant 05-02-17521, OF RAS, SPb Center of RAS.