S0FT-HARDWARE COMPLEX "ASTRONOMICAL PANORAMIC PHOTOMETER-POLARIMETER". A. P. Vidmachenko[1], V. V. Konichek[2], V. V. Korokhin[2], V. A. Psaryov[2], I. E. Sinelnikov[2], E. V. Shalygin[2]. [1]Main Astronomical Observatory of the National Academy of Sciences, (MAO), Ukraine, vida@MAO.Kiev.UA. [2]Astronomical Institute of V. N. Karazin Kharkiv National University, konichek@astron.kharkov.ua

Introduction: 12-channel astronomical digital panoramic photometer-polarimeter has been constructed for using in planet and astrophysical researches. The device is accompanied with guiding and applied computer programs. The first equipment complex is to be mounted on astronomical telescope AZT-2 (Goloseevo, Main Astronomical observatory) and the second one is planned to be used on 1m telescope Zeice-1000 (Simeiz, Koshka mount).

Mechanical construction. The total weight of photometer is about 20 kg. Filters block (revolving 12-position disk) and rectangle box (110mm x 220mm x 380mm) of photometer are fixed on a round pod for installing on telescope. Mechanics block of photometer consists of three removable components: unit of rotating phase plate, two (red and blue) polaroids unit, and polarization scale-control polaroid unit. On the outside of the box digital CCD camera (either Alta U41 (2000x2000) or ST-10) and apparatus interface block are fixed.

Optical features. The main optical element of the polarimeter is a halfwave ($\lambda/2$) superachromatic phase plate (SAPP), which rotates of searching celestial body radiation on a fixed angle during measurement procedure. In multicomponents SAPP optical axes of opposite components coincide closely. Phase shift of the central component is 180^0 for the requisite spectral interval center wavelength λ_0, and its axis is turned on angle α with regard to extreme components axes. Between central and utmost components some additional symmetric components are inclined, it improves parameters of the plate and spreads its working spectral range. Such construction of phase plate minimizes of beams declinations and surface reflection losses.

Three such SAPP (spectral ranges 355-800 nm, 360-900 nm and 450-1100 nm, which depends on the raised scientific problems) were manufactured for the panoramic polarimeter.

Mechanical devices controller. For control of different mechanical modules (filters wheel, analyzer input and rotator, etalon input and so on) special libraries of classes have been developed. For controlling the devices, interface module "Elexol Either I/O 24" (www.elexol.com) is using. It provides 24 two-directional lines for input or output and is connected to PC via Ethernet.

Our software encapsulates all low and high-level functions for controlling the interface module and our mechanical devices. It is possible to control the devices both using graphical user interface by the user (clicking buttons, inputting numerical data, selecting from lists and so on) and programmatically from programs.

CCD matrices controller. It is assumed that our photopolarimeter must work with different types of CCD matrices. That is why we have developed special abstract program class which encapsulates most common procedures and function for controlling the CCDs and acquiring the observational data. All concrete CCDs will be controlled through this class. Now library for well-known "SBIG" ST-family of matrices has been fully realized. Development of library for "Apogee" ALTA CCDs is in progress.

End-user's software. For controlling the process of observation as a whole end-user's "xCatPhot" application has been developed. This application allows to control all mechanical devices and CCD both manually by observer and programmatically during automatic observations. The program has comfortable, comprehensible user's interface and let carry out observations maximally effectively. All acquired data are saved into files in FITS-format [1], which is standard for astronomers. It allows to use a lot of programs for processing observed data, including our xIRIS.

xIRIS Framework. All software for the device is based on xIRIS Framework developed by Korokhin V. and others at Astronomical Institute of KhNU. xIRIS is working under the Microsoft .NET platform. This makes xIRIS really multi-platform software (functioning not only under MS Windows), provides the possibility of constructing distributed data processing systems, using a lot of programming languages for development and using most modern programming technologies. xIRIS contains the set of ready applications and libraries of program classes for different levels of using.

There are 3 way for using xIRIS: (1) using the ready application-components for visualization and editing of different kinds of data ("xWiser" for images, "xEditor" for textual data, "xGrid" for tables, "xTree" for hierarchical data and so on); (2) data processing without programming using visual tools ("xLauncher", "xIntrgrator") for constructing so-called chain processing algorithms using ready procedures from xIRIS steps libraries; (3) "real" programming without any restrictions of any algorithm, including xIRIS steps libraries for extension of xIRIS functionality.

References: [1] Wells D.C. et. al (1981) *Astron. Astrophys. Suppl. Ser.* 44, 363-370.