# OBSERVATIONAL RESULTS OF CALIBRATION AND NAVIGATION COSMIC APPARATUS (CA)

Yu.P. Shumilov[1], A.V. Dobrovolsky[2], N.G. Paltsev[2], Yu.A. Medvedev[2], M.P. Petrov[2], R.A. Chaichuk[2], L.V. Korniychuk[2], L.F.Tomak[2], E.A. Depenchuk[2]
[1]NPO 'Astrofizika', Moscow, Russia
[2]Department of Astronomy, Odessa State University, Odessa, 270014, Ukraine

ABSTRACT. Results are represented of photometric observation of nine calibration and navigation cosmic apparatus obtained at the Odessa Astronomical Observatory in September-October 1995.
**Key words:** cosmic apparatus, photometry.

According to the contract on collaboration with MPO "Astrophyzika" from the given elemental orbits, ephemerides are calculated and observations are carried out of cosmic objects numbered KA-077, -081, -090, -091, - 098, -150, -804,-805, ERIDAN, GEOS IK.

The given results represent observations of 37 transits of 9 cosmic objects. In process of 16 transits, coordinate and photometric information on 5 CA is obtained. In the rest transits the information was not registered due to faint objects' light and unfavorable observational conditions. The observations were made from September 25th to October 25th 1995, and since August 12th 1996 at the apparatus complex of photometric and coordinate observations of CA department of space research, Odessa Astronomical Observatory (KOD-1) certified by MPO 'Astrophyzika" in 1988 and process of joint work.

Cinetheodolite KT-50 - the azimuthal system of guiding fast moving objects - is used as a base tracking system. Mechanical part of the system has been modified: turn units' sensor are set in, a platform of optic-mechanical photometer block is introduced etc. To record the CA light, a one channel photometer at the photons' count with a spring-diaphragm is used. Electron part of the photometric channel consists of a frequency meter, control unit, record center and a high-voltage power supply, all connected logically, algorithmically and constructively.

For automatic obtaining the coordinate information on CA, an angle–measuring device is developed and manufactured permitting to yield coordinate information from KT-50 in real time scale suitable for the input in the computer.

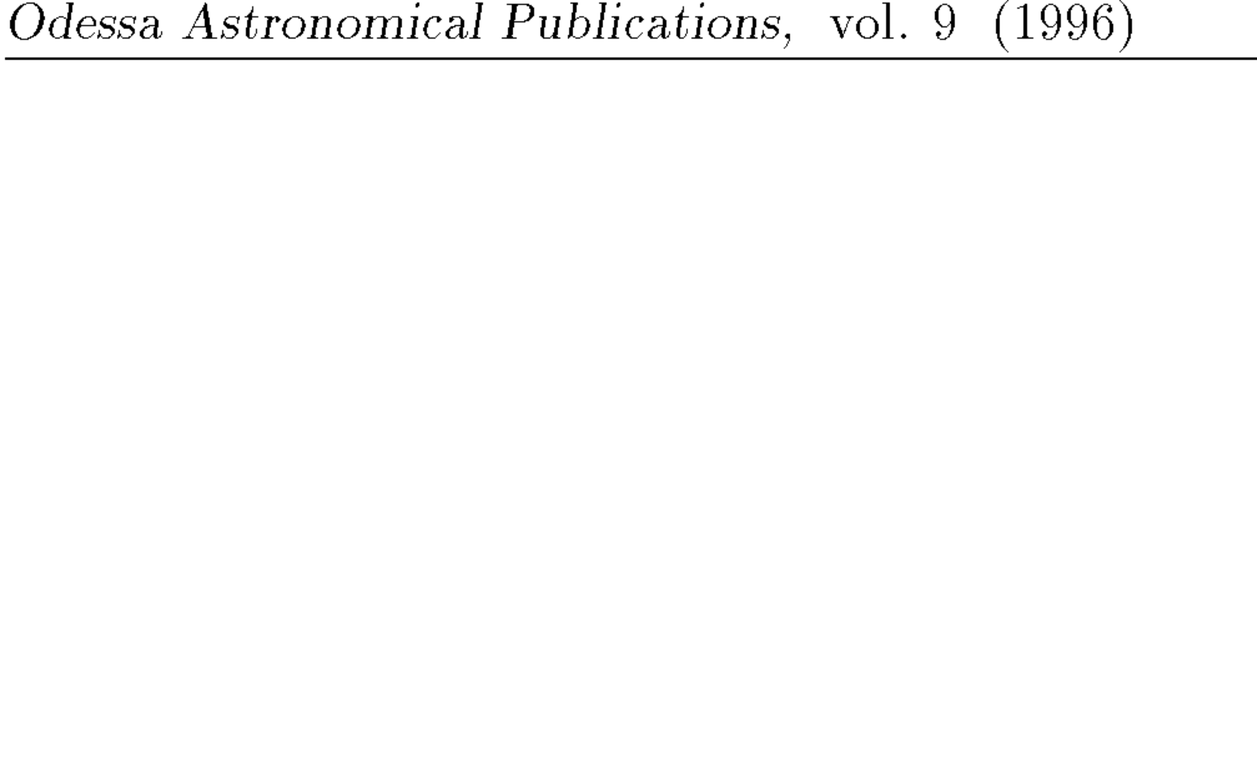
The list of objects observed is summarized in Table 1. For all the objects, light curves in direct intensities in the instrumental system are obtained. Apart from the CA observations every night, the observations of calibration stars and stars for atmospheric extinction determination were carried out. By using developed algorithms of malfunction, failure analysis and rejection data and algorithm of CA light curve formation in the instrumental system, the reduction of the data obtained is carried out. All the light curves are reduced to the brightness standard. Coordinate information and tabulated light curves are stored in the CA data bank of AO Space Researches department.

Table 1: Program stars

| Name of CO | Date of obs. | Time of outset | stell. mag. | Ext. coef. |
|---|---|---|---|---|
| CA-081 | 25.09.95 | 22 48 00 | 7 | 0.5 |
| CA-081 | 28.09.95 | 21 33 00 | 8 | 0.7 |
| CA-081 | 05.10.95 | 19 55 00 | 9 | 0.6 |
| CA-081 | 06.10.95 | 19 31 16 | 8 | 0.5 |
| CA-081 | 14.10.95 | 18 11 00 | 9 | 0.6 |
| CA-081 | 15.10.95 | 19 36 15 | 8 | 0.5 |
| CA-081 | 16.10.95 | 21 02 34 | 5 | 0.4 |
| CA-081 | 17.10.95 | 18 48 13 | 9 | 0.4 |
| CA-081 | 17.10.95 | 20 37 10 | 3 | 0.4 |
| CA-081 | 18.10.95 | 18 24 27 | 10 | 0.5 |
| CA-081 | 23.10.95 | 18 12 24 | 9 | 0.5 |
| CA-081 | 24.10.95 | 17 48 05 | 9 | 0.4 |
| CA-090 | 07.10.95 | 03 03 40 | 2 | 0.6 |
| CA-091 | 24.10.95 | 02 28 31 | 4 | 0.5 |
| CA-091 | 25.10.95 | 02 05 05 | 4 | 0.4 |
| CA-098 | 05.10.95 | 01 06 04 | 10 | 0.4 |
| CA-098 | 05.10.95 | 22 43 00 | 9 | 0.5 |
| CA-098 | 06.10.95 | 22 09 00 | 10 | 0.7 |
| CA-098 | 15.10.95 | 20 36 00 | 10 | 0.4 |
| CA-098 | 16.10.95 | 21 49 54 | 10 | 0.4 |
| CA-150 | 05.10.95 | 01 58 11 | 9 | 0.4 |
| CA-150 | 06.10.95 | 01 42 38 | 10 | 0.5 |
| CA-150 | 16.10.95 | 02 26 00 | 8 | 0.4 |
| CA-150 | 17.10.95 | 02 05 55 | 7 | 0.4 |
| CA-150 | 18.10.95 | 01 49 21 | 7 | 0.4 |
| CA-150 | 24.10.95 | 00 08 00 | 9 | 0.5 |
| CA-150 | 24.10.96 | 01 57 25 | 8 | 0.5 |
| CA-150 | 25.10.95 | 01 40 22 | 8 | 0.5 |
| CA-804 | 03.10.95 | 02 17 50 | 7 | 0.4 |
| CA-804 | 05.10.95 | 00 35 11 | 7 | 0.4 |
| CA-804 | 05.10.95 | 02 21 04 | 7 | 0.4 |
| CA-804 | 06.10.95 | 00 35 34 | 7 | 0.5 |
| CA-804 | 06.10.95 | 02 16 57 | 7 | 0.4 |
| CA-804 | 07.10.95 | 00 36 27 | 7 | 0.7 |
| CA-804 | 07.10.95 | 02 18 00 | 7 | 0.6 |
| ERIDAN | 25.10.95 | 02 17 03 | 4 | 0.4 |

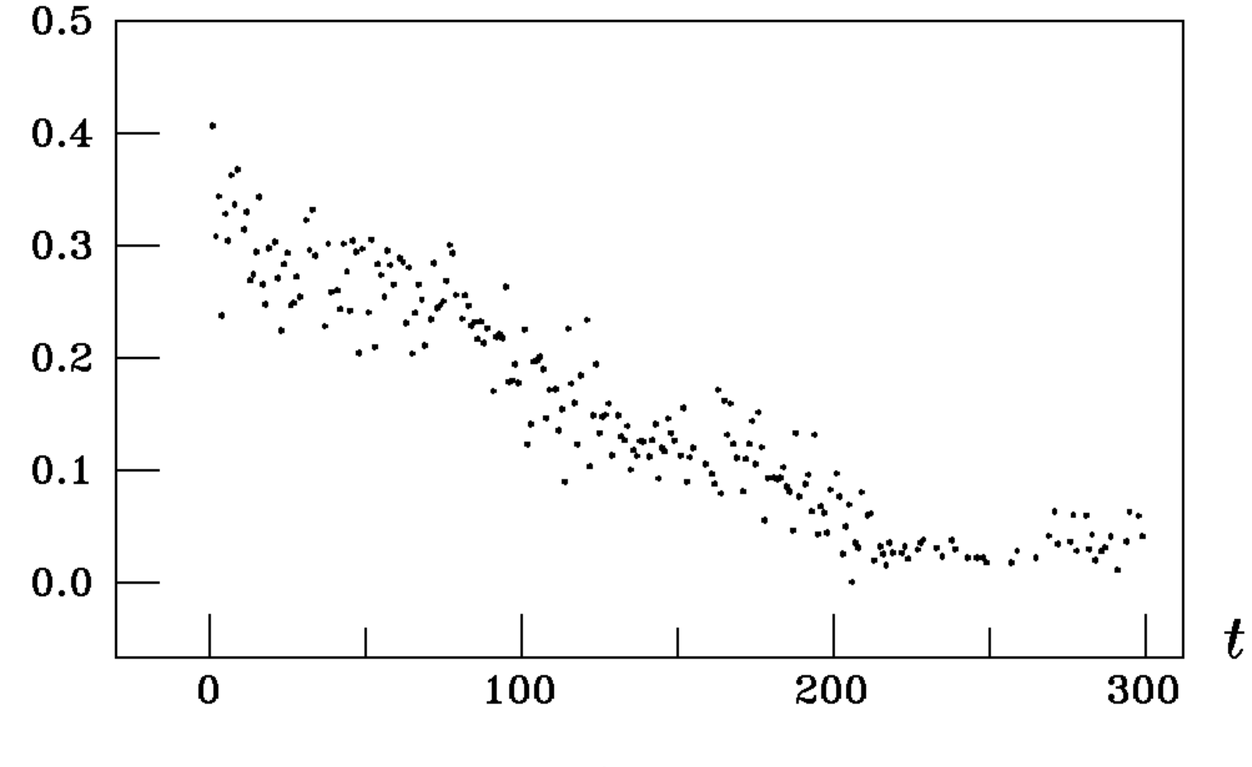
As is seen from appearances of light curves observed by CA, the given objects can be discriminated, and their behavior can be traced in orbit that is of important informational value for functioning circumterrestrial space control systems.

In 1996 due to unfavorable weather conditions (Moon, clouds etc) the objects were not found so far.

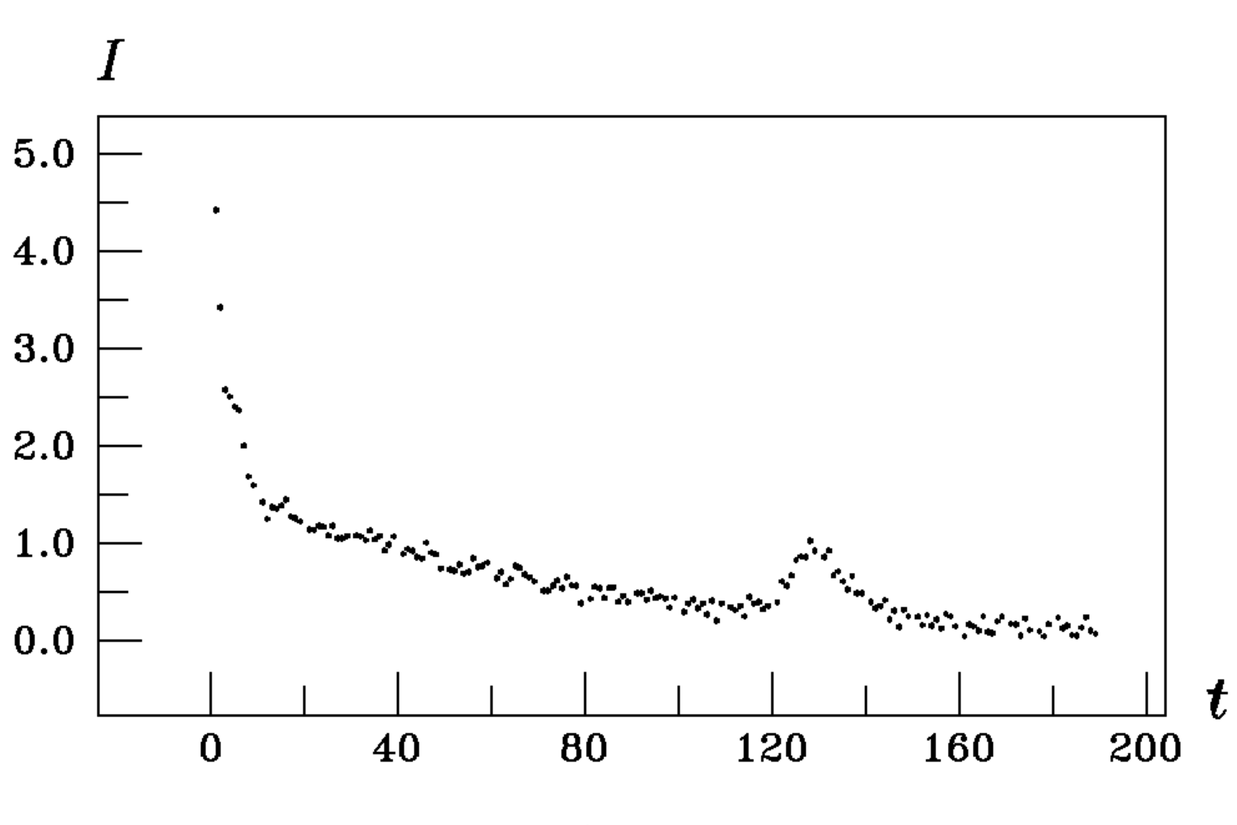



KO−081, 25.09.95 UT=$22^h51^m278$, $\sigma t=0^s348$, et.=1360


KO−090, 07.10.95 UT=$03^h03^m402$, $\sigma t=0^s349$, et.=1330




KO−081, 24.10.95, UT=$17^h49^m254$, $\sigma t=0^s348$, et.=1170




KO−091, 25.10.95 UT=$02^h05^m482$, $\sigma t=0^s348$, et.=1080

Figure 1. Finding charts for V Sge