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BUSCA 97 AND 98 - URUGUAYAN SEARCH FOR SATELLITES, ASTEROIDS AND COMETS

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RESUMEN

Se describe la metodología que se ha seguido en las campañas de búsqueda de satélites, cometas y asteroides desarrolladas con el telescopio Schmidt con cámara CCD del Cerro Tololo Interamerican Observatory en 1997 y 1998. Se comparan los resultados de anteriores búsquedas (Palomar-Leiden Survey y Uppsala-ESO Survey of Asteroids and Comets) con el fin de discutir las principales contribuciones que implicarán los nuevos resultados.

ABSTRACT

We describe the procedure followed during the 1997 and 1998 survey campaigns of satellites, comets and asteroids. The observations were done with a large CCD attached to the Schmidt telescope of the Cerro Tololo Interamerican Observatory. A comparison of the results of previous searches (i.e. the Palomar-Leiden Survey and the Uppsala-ESO Survey of Asteroids and Comets) is also presented, in order to discuss the main contributions that wil come from the new results.

Key Words: **ASTEROIDS — COMETS — JUPITER SATELLITES — SEARCH**

During the 1997 and 1998 Jupiter's opposition, we performed searches of moving objects in the general direction of the planet with the Schmidt telescope (60/90 cm) at the Cerro Tololo Interamerican Observatory. The campaigns are refered as BUSCA 97 and 98, that stands for *Búsqueda Uruguaya de satélites, cometas y asteroides*. This is a continuation of two similar searches performed in 1992 and 1993 at the European Southern Observatory (the Uppsala-ESO Survey of Asteroids and Comets - UESAC 92 and 93) (Hernius et al. 1997). During two periods of $\sim$ 8 nights around two consecutive new moons we obtained several images of fields centered on the planet; we covered a region of $\sim 10\,\mathrm{deg} \times 10\,\mathrm{deg}$ per period.

The objetive is to look for new outer jovian satellites, comets undergoing a temporary satellite capture or a close encounter with the planet, as well as all the asteroids that were present in the field of view. As a difference with previous searches, in these campaigns we used large CCD. Therefore, we have to develop or adapt existing software for the automatic reduction of the data. The following steps are performed by the software:

• Extraction of all the sources. This task is performed with the package SExtractor developed by Bertin & Arnouts (1996). It can be downloaded from *ftp.iap.fr*, directory */pub/from-users/bertin/sextractor*.

• Astrometric determination of all the sources by comparison with the Guide Star Catalogue or the USNO 1.0. We use CCDAR, a package developed by M. Carpino for the astrometric reduction of CCD frames especially designed for the astrometry of minor bodies. It can be downloaded from *joplin.brera.mi.astro.it*, directory */pub/ccdar*.

• Identification of all the moving objects. By comparing images of the same field taken at different times during the same observing run, we match all the stars. The remaining objects are analysed to find candidates for moving objects. A candidate is selected when it appears in several images moving in a straight-line and it has similar magnitudes.

• Linkage and orbit determination. With the moving objects identified in each observing period we try to link them with the objects find in the next new moon to determine an orbit. The program Orbfit developed by Milani is used. It can be downloaded from *copernico.dm.unipi.it*, directory *pub/orbfit*.

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Thousands of asteroids have been found in each observing campaign. We are in the process to make the orbit determination that will enable us to perform a statistical analysis of the distribution of asteroids in the main belt.

In order to discuss the possible contribution of these new searches to our knowledge of the asteroidal main belt, we made a comparison of the distribution of asteroids discovered in two previous surveys: the Palomar-Leiden Survey (PLS, Van Houten et al. 1970) and Uppsala-ESO Survey of Asteroids and Comets (UESAC, Hernius et al. 1997). A notable increase in the number of outer main belt asteroids respect to inner ones is found when the size selection effect is removed (Hernius et al. 1997). A concentration of asteroids with perihelion longitude similar to that of Jupiter is observed, even in the de-biased samples (Tancredi 1998). No important difference is found between the distribution of outer and inner belt orbits. There seems to be a correlation of high-eccentricity asteroids at perihelion longitude similar to Jupiter's.

REFERENCES

Bertin, E., & Arnouts, S. 1996, AASS, 117, 393

Hernius, O., Lagerkvist, C.-I., Lindgren, M., Tancredi, G., Williams, G. 1997, AA, 318, 631

Tancredi, G. 1998, in Solar System Formation and Evolution, Eds. D. Lazzaro et al., Astronomical Society of the Pacific Conference Series 149, 135.

Van Houten, C.J., Van Houten-Groeneveld, I., Herget, P., Gehrels, T. 1970, A&ASS 2, 339