

UNIVERSITY OF HAWAII AT MĀNOA

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Pan-STARRS Project Management System

NEOCP Process

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1 Overview

This document describes the operation of the NEOCP Process. The MPC's NEO Confirmation Page contains ephemerides for unconfirmed NEO's and related objects. This process includes retrieval of data from the NEOCP, finding field intersections, and determining candidate tracklets. The NEOCP Process consists of two phases, field intersection determination and candidate tracklet matching.

2 Methodology

2.1 NEOCP database

NEOCP ephemerides data is parsed and stored in a local MySQL database named `neocp`. At intervals of one hour, the NEOCP is continuously monitored for new data. When new data is available, the ephemerides are retrieved for each object appearing on the page. [insert database schema]

2.2 Field intersection determination

Field intersections are determined by two mode differentiated by the source of data being either the GPC log file or MOPS fields in the database. Possible field intersections are determined in a rapid manner using `fieldProximity`. Intersections are determined using `find-field-intersections.pl`.

2.2.1 GPC log processing

The GPC log file is parsed using `parse-gpc-log.pl`. The gpc log data is found in `gpc.txt`. For each object in the NEOCP database, the field positions and the ephemerides are processed using `fieldProximity` to find possible field intersections. Due to the design of `fieldProximity`, each ephemeris must be processed independently. An exhaustive search is performed. The following is an example of the command-line used.

```
fieldProximity fieldsfile file.fields trackfile file.ephem method 0 outfile
results.txt
```

Fields are retrieved according their MJD values where the MJD is within the NEOCP ephemerides time range.

2.3 Candidate tracklets

MOPS tracklets are matched with NEOCP ephemerides using the criteria of velocity, in deg/day, and position angle. For each possible field intersection, the tracklets within that field are compared to the ephemerides that were previously determined to possibly intersect with the field.

3 Summary

The NEOCP Process is designed to use ephemerides data from the MPC's NEO confirmation page to augment the MOPS recovery of NEOs and related objects. It performs this task in two phases—finding field intersections and matching candidate tracklets. Possible enhancements to the NEOCP process include expiring GPC field data and NEOCP data.