



Moving Object Tracklet Reporting Procedure



I. Introduction

This document is intended to provide sufficient direction to complete a regular submission to the MPC of moving object candidate tracklets as detected by the WMOPS (WISE Moving Object Pipeline Software) subsystem. WMOPS is run once every two days, at an approximate interval of once every 30 scans. Output will be generated in the form of two MPC-formatted detection lists (**.mpc** files) with two associated files (**.mpc.sids** files) for Quality Assurance (QA) analysis. Three additional files (**.rpt**, **.relog** and **.detlog**) will also be generated for compilation of SSOID comparison statistics. Finally, a **.orbit** file will be generated which pairs orbital fits WMOPS tracklet designations, along with orbit's sky-plane coordinates (projected RA and Dec) for the reported times for comparison with the actual data.

II. WMOPS QA Structure

The first set of **.mpc** and **.mpc.sids** files (the *sound* tracklets) are for those tracks which have passed the automated QA checks in WMOPS, including length-of-tracks, track linearity or orbit fit checks, point psf rchi2 pathologies, multi-band detections, and color/temp consistency. These should be ready-to-go, for the most part, and all set to send off to the MPC. The second set (of the *unverified* tracks) consists of the tracks found by WMOPS which have not passed the automated QA checks.

III. Procedure

What follows are the basic steps to perform before submitting reports to the MPC:

1. *Sound* tracklets

- [1] Perform a word-count check on the *sound.mpc* file, to confirm the length falls within the bounds of normality, as determined during the IOC.
- [2] Look over the file briefly (unix head or tail commands are sufficient).
- [3] Confirm the SSOID *reliability* and *completeness* values in the SSOID.**rpt** file are within the normative range.
- [4] Look over the WMOPS run generated plots which include:
 - Color vs. Distance plot.
 - rchi2 histogram.

- orbital fit parameters for all "sound" objects: a vs. e, a vs. i, and e vs. i.
- size distributions for successfully fitted objects.

[5] Notify WMOPS core team members if there is an error, otherwise send the report to the MPC, in the specified ftp directory (cfa-ftp.harvard.edu). Tim Spahr is our primary contact at MPC. He will often be the first to view our reports, so immediately after this is done, you should inform him that you deposited the file in the ftp directory, the time-span of the orbits the file covers, and any concerns there may be, and cc the WMOPS [core team](#) members.

2. *Unverified* tracklets

These remaining tasks are meant to verify the questionable tracklets and prepare them for MPC submission.

[6] Make sure the QA routines generated the necessary plots, thumbnails and linked html pages from the **.mpc** and **.mpc.sids** files for the *unverified* tracklets.

[7] Review the pages:

- start with the object list page, proceeding in order. After reviewing a questionable tracklet, issuing a "confirm/reject/indeterminate" verdict will return you to the top-level object list page.
- review the thumbnail images first. These are arranged in three sets of W2, W3, and W4. The top row for each set is comprised of on-object detections, and the last two images in the row as a the co-added detections and bands 2-4 three-color co-added image. The following rows (up to 16) are off-object frames of the same sky location as the top-row's, i.e. taken when the object has moved off of that location. The bottom row is the co-added sky positions (w/o the on-object detections). Ideally, the object should be present in the top row and absent in the other rows, but if it is slow-moving, it may end up as a trailed object in the bottom row co-adds.
- next review the tracklet plots (time vs. RA, time vs. dec, ra vs. Dec with *orbitfit* positions overlaid). If you see several bad points in the candidate tracklet, such that they dominate the orbit fit, reject it. If the fit is decent, and most of the points fall over the fit, than confirm the track. If it is "indeterminate", mark it so, but use this option sparingly; they will have to be reviewed by a WMOPS core science team member. There should only be a few of these per day.

[8] At the bottom of each object page, there are the "confirm/reject/indeterminate" verdict links. When you are satisfied with the object, click the appropriate link to mark the tracklet as confirmed, or "reject" to remove it from the candidate tracklet list for reporting to the MPC.

[9] When finished reviewing all the objects, click on the "generate report" link at the bottom of the object list page. Ftp the "verified.mpc" formatted file to the MCP and email Tim Spahr about the delivery of checked objects. The "indeterminate" objects will be saved in mpc and mpc.sids format, but not reported.

Email WMOPS core-team members when the tracklets have been reviewed.

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Last update - [1 October 2009]

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