Spitzer Space Telescope

Release Notes

MOPEX
MOsaicker and Point source EXtractor

June 15, 2007

1   Introduction

MOPEX is the Spitzer Science Center's imaging data analysis tool. The software includes several packages including the mosaicker and the point source extractor (APEX). MOPEX is intended to perform general purpose image analysis as well as Spitzer-specific tasks. In this new release, we provide a graphical user interface (GUI), as well as access to the software on the command line using Perl scripts.

MOPEX is designed to allow the user to:

- perform sophisticated background matching of individual data frames
- mosaic the individual frames downloaded from the Spitzer archive
- perform both temporal and spatial outlier rejection during mosaicking
- apply offline pointing refinement (it is already applied to IRAC BCDs)
- perform source detection on the mosaics using APEX
- extract point-source and psf-fitting photometry using APEX
- perform interpolation, coaddition, and extraction of MIPS SED data

In these release notes we provide information about the computing requirements needed to run MOPEX and the new features in this version. A regularly updated bugs and issues list maintain on the SSC Post-BCD website from which you downloaded the software. Documentation of MOPEX is provided in the online help within the GUI, and more information is available in the User's Guide on website.

We appreciate any feedback you have on this version of Spot. Just email the Spitzer Help Desk at help@spitzer.caltech.edu with your comments or questions.

2   Major Changes

2.1   GUI

The major change in this new release of MOPEX is the introduction of the GUI. The MOPEX GUI is designed to allow the user to interactively set the many parameters in the processing modules, and then to examine the output of each step. Template parameter sets are available as a starting point, but users are strongly recommended to evaluate the process as it applies to their own data. Different datasets require difference choices. The GUI includes module-by-module online help to allow easy access to the documentation.

While the GUI provides a new interface to access the MOPEX software, the underlying scripts and binaries are largely the same as those available in previous releases. Scripts that run on the command-line MOPEX can be imported into the GUI, and settings selected in the GUI can be exported

2.2   Changes in the new release

The following changes were made to the modules and scripts which both the command-line and GUI MOPEX use (updating them from the 1 March 2006 version):

- Environment settings for command-line MOPEX are now in *mopex-script-env.csh* instead of *mopex.csh*.
- The module "detect" was modified to provide higher precision in the x,y positions in the output detection table.
- The Perl module "mosaic.pl" was modified to allow use of existing Rmasks.
- The module "sed_fif" was modified to generate SED mosaics for special cases when PA_SLT ~= 0 or 180. The computation of ROT_SLT was also revised for all cases.
- A bug was fixed in the "aperture" module. It gave potentially incorrect aperture fluxes when distortion was present, for example in BCD data.
- Use of the Galactic and Ecliptic coordinate systems was implemented in addition to the Equatorial system Mopex has used so far. Also all of the projections implemented in the WCS library are now available for use in Mopex. The coordinate system and projection type of the mosaic are specified in the following namelist block:
        &FIDUCIALIMAGEFRAMEIN

        ...
        Projection_Type = "ARC",
        Coordinate_System = "Galactic",
        &END

  The default value of the projection type is "TAN" and of the coordinate system "J2000".
  The possible options for the coordinate system are "J2000", "Galactic", and "Ecliptic".
  The options for the projecton type are
        LIN, AZP, TAN, SIN, STG, ARC, ZPN, ZEA, AIR, CYP, CAR,
        MER, CEA, COP, COD, COE, COO, BON, PCO, GLS, PAR, AIT,
        MOL, CSC, QSC, TSC, NCP, DSS, PLT

- A new switch "use_extract_table_for_aperture" has been added to control the input of the aperture photometry module. The default value if 1, i.e. the extract table is used as input for the module aperture. If the switch is set to 0, then the detection table is used as input for the module aperture. It is especially useful for extended objects when point source fitting is not applicable and only aperture photometry measurements can be performed.

3   Minimum Recommended Hardware Configuration

MOPEX requires lots of memory and a fast processor in your computer. If you run MOPEX on a system with less memory or processor power than our minimum recommended configuration, the software may work, but it is likely to be slow, and you will probably see window redraw/refresh problems. While we suggest minimum hardware configurations, we recommend that users have more RAM (512 MB or above) and a fast processor, if you plan on intensive use of the visualization features within Spot. The minimum recommended hardware configurations are:

3.1   Sun WORKSTATIONS: Sun Ultra 5 with 256 MB RAM

If you are not using the visualization features in the MOPEX-GUI, then it may run acceptably on an Ultra 1 with 256 MB of RAM.

3.2   Windows PC (2000, NT, XP): 512 MB RAM

3.3   Windows PC (Vista): 1 GB RAM

3.4   Linux PC: 256 MB RAM

We have done limited testing on Linux systems running with a Pentium 2 processor at 266 MHz and 256 MB of RAM, as well as with a Pentium 3 processor and 256 MB of RAM.

3.5   Mac PC: 512 MB RAM

We have tested the MOPEX GUI on a G4 with 512 MB RAM, and it runs acceptably.

4   Operating System Configurations Supported

The majority of the testing for this version of Spot has been done under Solaris 2.8, Windows XP, Linux, and Mac OSX. We do not anticipate major problems with other flavors of Windows. Except for Mac, all of the versions of Spot come with JAVA 1.5.

4.1   UNIX: Solaris 2.8+

The software has been tested on Solaris 2.8 and 2.10.

4.2   WINDOWS: NT, 2000, XP, Vista

The functionality of the software has been tested using Windows XP. Minimal testing has been completed using other versions of Windows, but we do not anticipate problems. With Windows, e.g., XP, Vista, you may need system administration privileges for software installation.

4.3   LINUX: RedHat 8.0, 9.0; Fedora Core; Enterprise

MOPEX on Linux runs acceptably on RedHat 8.0, 9.0. The command-line MOPEX has encountered problems under other flavors of Linux. We recommend that users with those systems try the MOPEX GUI.

4.4 Mac: OS X

The MOPEX GUI requires JAVA 1.5, so Mac OS 10.4 is required. (**Note: The GUI will not run under Mac OS 10.3**.) Apple offers JAVA 1.5 (JAVA 2 Standard Edition [J2SE] 5.0) as a software update. By now, nearly all Mac OS 10.4 systems should be running JAVA 1.5, unless you have not allowed software updates to run over a year or so. You may need system administration privileges for software installation.

5 Getting Started

5.1 Installing the Software

MOPEX is distributed as a tar file from the SSC's Post-BCD website. Instructions are available on that page for installation. A second tar file of sample data is also available. Example namelists are provided in the *cdf* directory that utilize this sample data.

5.2 Starting the GUI

After completing the installation instructions, the MOPEX GUI can be launched from the executable file (the command "mopex" in Unix-like environments, or clicking on the MOPEX icon in windows-like environments). When the software first starts, you will be presented with a blank, blue window. Go to the "Help" menu to get introductory material by selecting "Overview". To begin using the program, go to the "File" menu and open either a new pipeline or read in your existing MOPEX namelist.

MOPEX takes text files containing lists of FITS images as input. To facilitate transition between the GUI and the command-line MOPEX, we recommend that filenames contain the full path.

5.3 Running the command line scripts

Instructions for running the command line scripts are available in the User's Guides. We recommend that first time users begin with the GUI before attempting the command-line MOPEX.

6 Updates

Future updates to MOPEX will be distributed via the "auto-update" function of the GUI. To use the auto-update, MOPEX needs to be able to connect to the internet. The net status is displayed at the bottom of the GUI. If you do not see "Net Up", you may need to address the problem. The GUI shares its update functionality with Spitzer's SPOT; please see the SPOT user's guide for more information.

Updates will provide new functionality and cal files as they are developed. Existing files may be replaced if new versions are distributed with the same name, but other files will not be deleted. So, if you modify namelists or calfiles, we recommend changing their

name to protect them from being overwritten. Even in you do not plan to use the GUI to run the scripts, we recommend using the update function rather than reinstalling all of MOPEX when updates become available.

7 Reporting Bugs and Issues

The current list of known bugs and issues is updated regularly and kept on the Post-BCD web page from which you downloaded this software. If you think you have found a bug, before reporting it please check the bugs list and read the previous section to discover if it is a 'feature' we already know about. Also check the appropriate section of the User's Guide to understand what the software is doing.

If you have found a real bug, then please do let us know via Email, or use the Bug report form at http://ssc.spitzer.caltech.edu/propkit/spot/bugform.html.

1. Email a description of the problem to the Help Desk at help@spitzer.caltech.edu.

2. Include the hardware configuration you are using (e.g. SunBlade 100, 512 MB).

3. Please attach the MOPEX GUI log file if you find the error using the GUI. Each time you run MOPEX, it creates a file called 'mopex-DATE_TIME.log.' The log files can be found in the default directory created when you install the software. The default directories are:

Solaris/Linux/Mac   ~/.spot
Windows ME   c:\spot
Windows NT/2000/XP c: \Documents and Settings\{username}\Application Data\Spot

Please note that Application Data is a *hidden folder*. If you want to see the Application Data folder, select the Show Hidden Folders option under Folder Options from the Tools menu.

The text showing in any error windows that pop up in MOPEX should show up in the log file as well.