MAST Users Group Meeting

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Kepler Archive

Dorothy Fraquelli

Kepler involves a number of branches and personnel at STScI. No one at STScI works full time on Kepler. Some work is done under contract with the Kepler project (i.e., the DMC) while other work is done under the MAST contract.

- Staffing for Kepler (2.1 FTE in FY 2012):
  + from ASB: Randy Thompson, Shui-AyTseng, Tim Kimball, Karen Levay and Myron Smith
  + from DPAS: Forrest Hamilton, Dorothy Fraquelli, Deborah Kenny, Faith Abney (lead) (Tracy Ellis, Tatjana Tomovic are backups for Hamilton)
  + from DSB: Christine Heller-Boyer
  + from ITSD: Tom Walker, Pat Taylor, David Unger

- The archive holds light curves, target pixel files and FFIs for quarters 0 through 13.
  + All data are public, except for Q10-13 GO data.
  + Q14 data are expected to arrive at the archive in January 2013.
  + Q15 observations are in progress on the spacecraft.

- Ancillary files, many added in 2012
  + Cotrending Basis Vectors
  + Focal Plane Characterization Models
  + Engineering files (long/short cadence collateral files, artifact removal pixel files, background pixel files and Reverse Clock files)
  + Spice Kernels (ephemeris)

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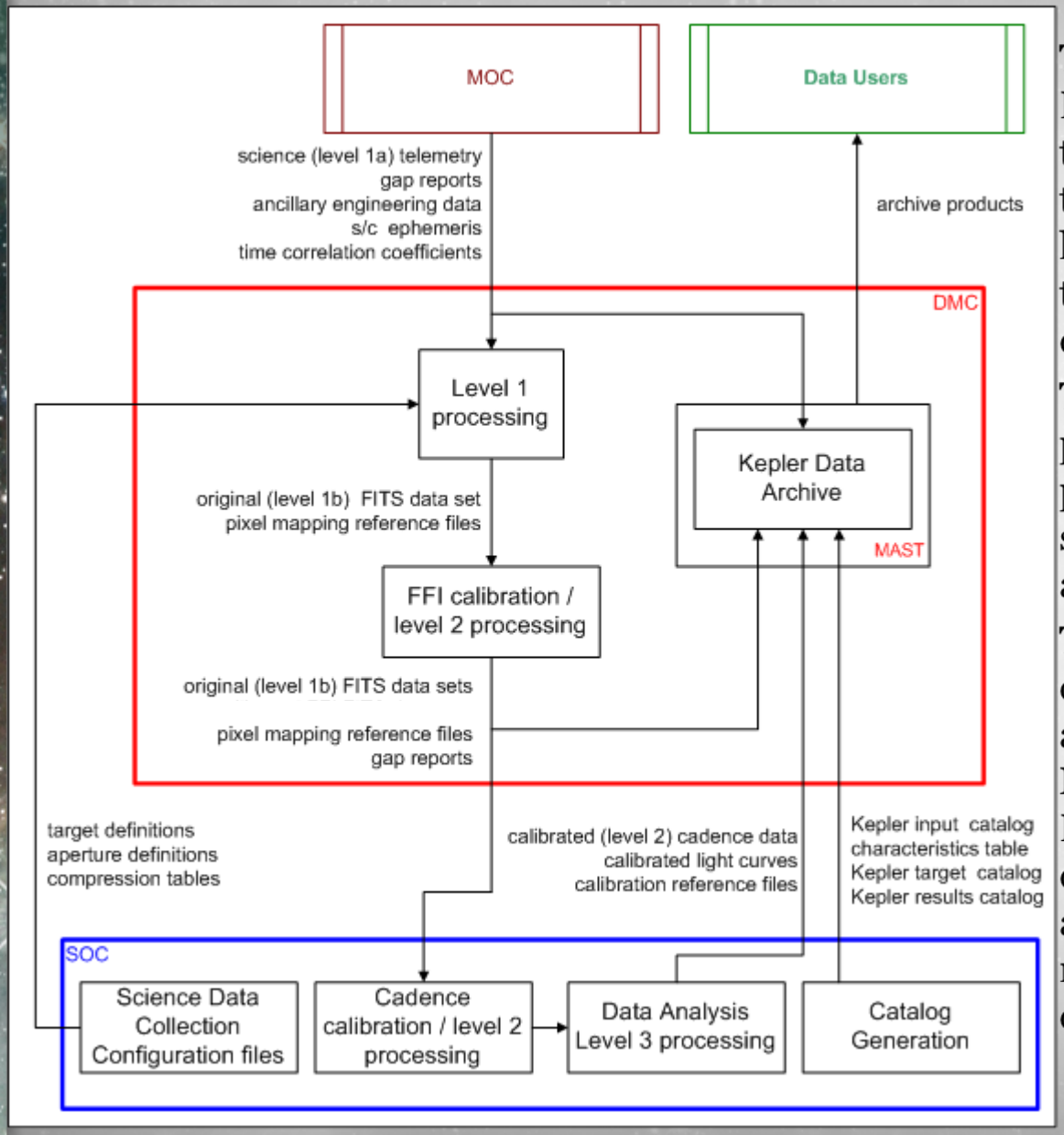
Data flow from Kepler →MOC → DMC (at STScI) → SOC (at Ames) → DMC → MAST



The MOC receives data from Kepler and forwards them to the DMC. The DMC formats the data (FITS), archives the level 1 data and forwards them to the SOC. These are done monthly.

The SOC processes the data, producing light curves, target pixel files and FFIs, which are sent to the DMC quarterly for archiving.

The Kepler project sends other files to the DMC for archiving, DMC use and/or MAST use. These include the KIC, KTC (quarterly), lists of dropped or published targets, aperture definitions, data release notes, and others documents.

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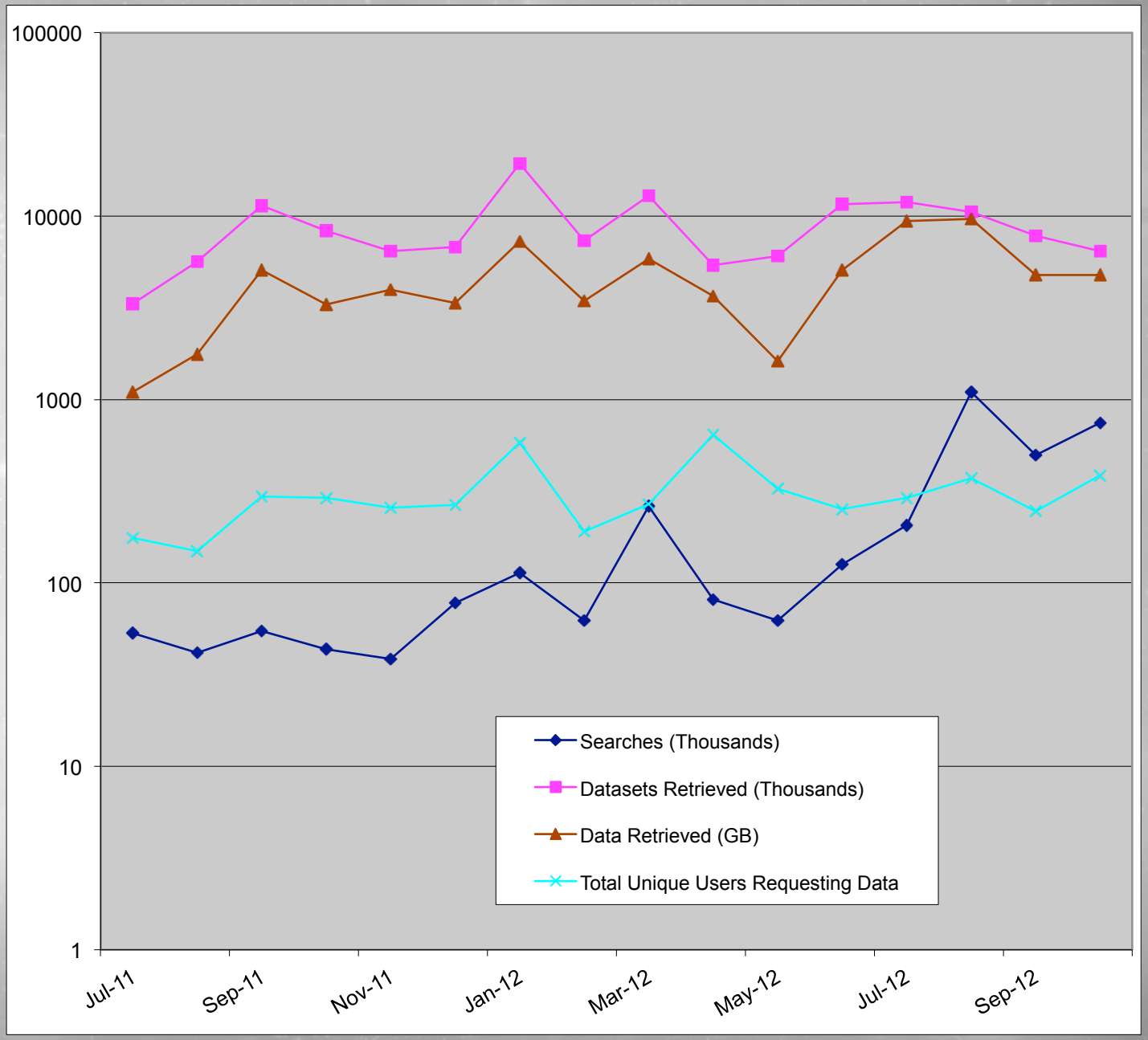
October 2012 Retrieval Statistics

748,896 searches

6,447,300 datasets retrieved

4,776 GB of data retrieved

386 unique users



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- MAST provides the archive user interface for Kepler data, which consist of light curves, target pixel files, full frame images (FFI), a variety of support files and documentation.

  + Standard MAST search forms for Target Searches, Data Discovery, FFI and Engineering Data Searches and the Kepler Input Catalog (KIC).

    > includes a plotter to preview public light curves

  + Direct download of CBV, Focal Plane Characteristics and Spice Kernel (ephemeris) files.

- MAST also provides a number of **value added** interfaces and services.

  + Target search has additional magnitudes/colors from cross matches to GALEX, UKIRT project (IRT), USNOb catalog, Isaac Newton Telescope Survey (KIS), Everett KPNO Survey (UBV) and SDSS/DR9. (see next presentation)

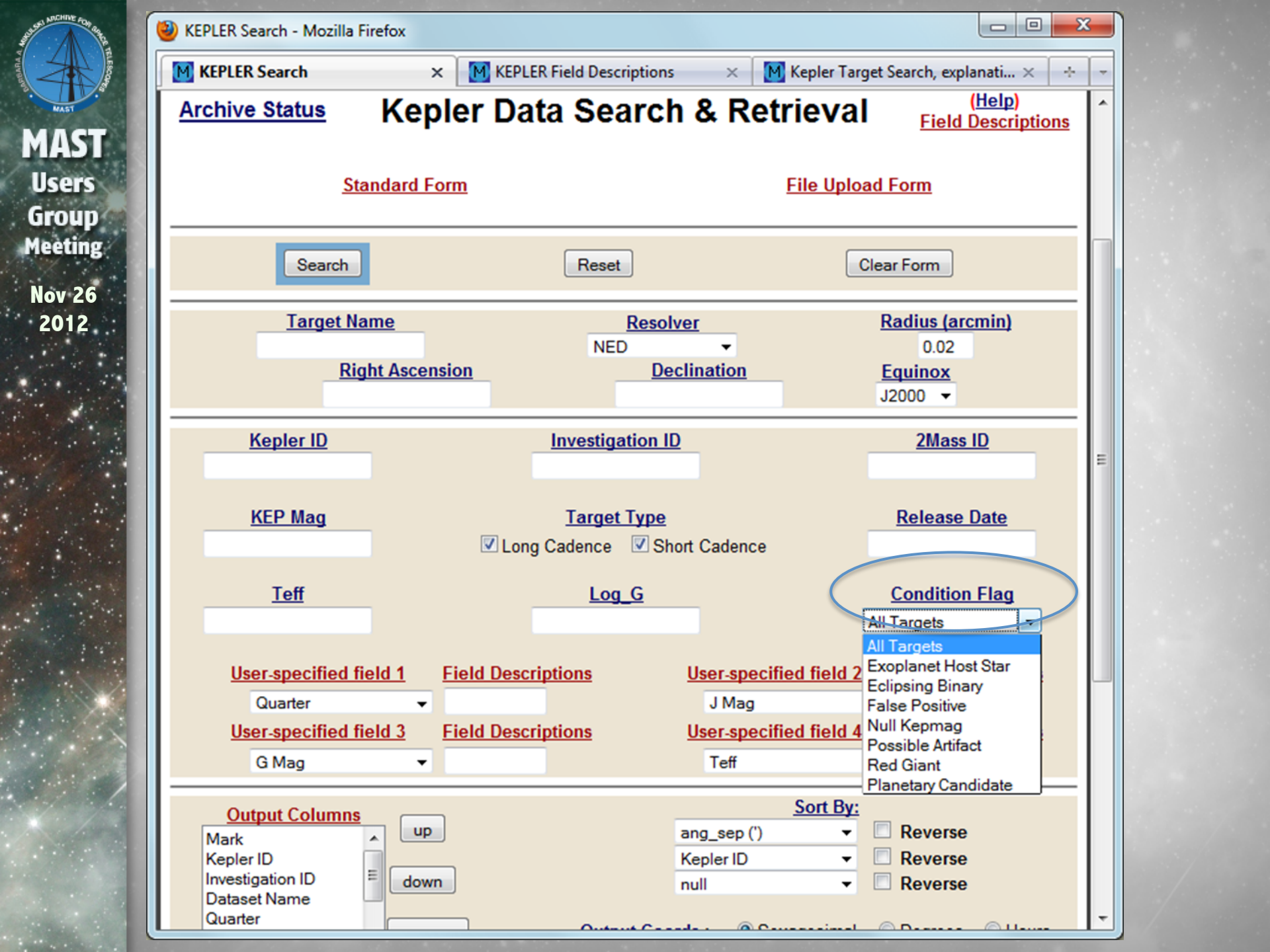
  + Display and direct download of FFIs

  + Direct download of target pixel files and tar files containing light curves based on investigation id, and public data by quarter.

  + Several VO services

  + Casjobs (direct query of the database) and more ….

- MAST will house the Kepler archive after end of mission.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Users
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KEPLER Search - Mozilla Firefox
KEPLER Search
KEPLER Field Descriptions
Kepler Target Search, explanati...
Archive Status
Kepler Data Search & Retrieval
(Help)
Field Descriptions
Standard Form
File Upload Form
Search
Reset
Clear Form
Target Name
Resolver
NED
Radius (arcmin)
0.02
Right Ascension
Declination
Equinox
J2000
Kepler ID
Investigation ID
2Mass ID
KEP Mag
Target Type
Long Cadence
Short Cadence
Release Date
Teff
Log_G
Condition Flag
All Targets
All Targets
Exoplanet Host Star
Eclipsing Binary
False Positive
Null Kepmag
Possible Artifact
Red Giant
Planetary Candidate
User-specified field 1
Field Descriptions
Quarter
User-specified field 2
J Mag
User-specified field 3
Field Descriptions
G Mag
User-specified field 4
Teff
Output Columns
Mark
Kepler ID
Investigation ID
Dataset Name
Quarter
up
down
Sort By:
ang_sep (')
Kepler ID
null
Reverse
Reverse
Reverse

Kepler Plot using Canvas

Select data to be plotted:

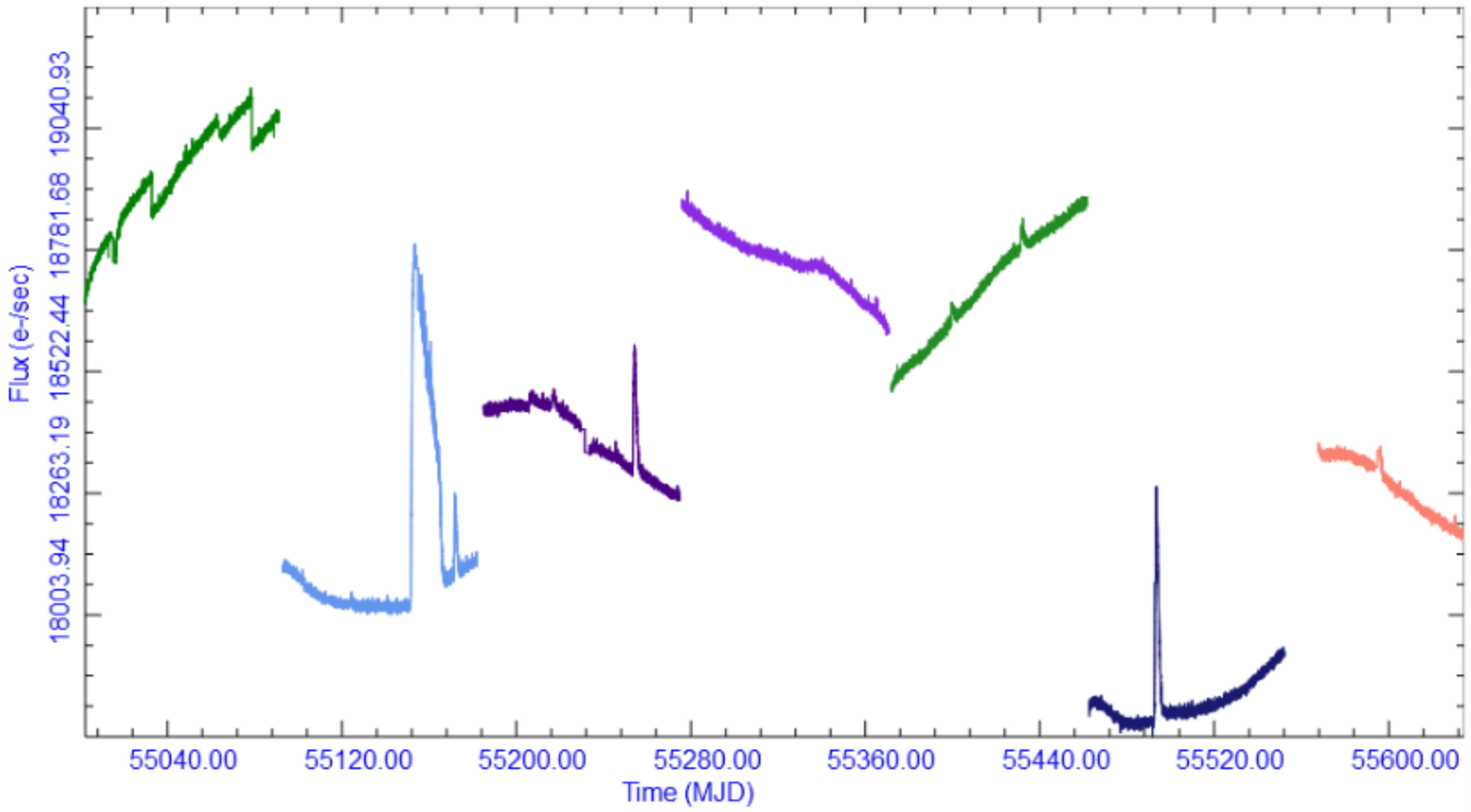
PDCsap Flux | Sap Flux | Both | Help | Start again

Plot range

Min Time: 55002.26 Max Time: 55634.84 Min Flux 17744.69 Max Flux 19300.18

scale factors (set to 0 to remove):

KPLR005438845-2009259160929: 1.00 KPLR005438845-2009350155506: 1.00 KPLR005438845-2010078095331: 1.00 KPLR005438845-2010174085026: 1.00 KPLR005438845-2010265121752: 1.00 KPLR005438845-2010355172524: 1.00 KPLR005438845-2011073133259: 1.00



Create png Image

Time , Flux = 55476.32 , 19262.16

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KEPLER_FOV Search - Mozilla Firefox

KEPLER_FOV Search | KEPLER Field Descriptions | Kepler Target Search, explanati...

Kepler Target Search

Archive Status

(See Explanations for more information)

(Help)
Field Descriptions

Standard Form | File Upload Form

Search | Reset | Clear Form

Target Name | Resolver: NED | Radius (arcmin): 0.04

Right Ascension | Declination | Equinox: J2000

Kepler_ID | Data Availability Flag | Teff

Catalogs: KIC Targets Only
- KIC Targets Only
- KIC + UBV + KIS Targets
- Targets from all Catalogs

Seasons on CCDs: any

Min. Distance from Edge (px)

e 1: gJ_KIC_IRT | Color/Mag 2: NUVg_kis | Value 2 | Condition_flag: All Targets

User-specified field 1: J_IRT | Field Descriptions
User-specified field 2: gK | Field Descriptions
User-specified field 3: JK | Field Descriptions
User-specified field 4: gJ_KIC_IRT | Field Descriptions

Output Columns
RA (J2000)
Dec (J2000)
Kepler_ID
up
down

Sort By:
ang_sep (')
Kepler_ID
Reverse
Reverse

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KEPLER_FFI Search - Mozilla Firefox

KEPLER_FFI Search | KEPLER Field Descriptions | Kepler Target Search, explanati...

Kepler Full Frame Image (FFI) & Engineering Data Search

Archive Status

(Help)
Field Descriptions

Standard Form

File Upload Form

Search | Reset | Clear Form

Archive Class

Full Frame Images (FFI)

- Full Frame Images (FFI)
- Long Cadence Collateral (CLL)
- Short Cadence Collateral (CLS)
- Artifact Removal Pixel (ARP)
- Background pixel (BKG)
- Ancillary Engineering Data (ENG)
- Reverse Clock (RVC)

File Name

Quarter

End Time

Use ... iptions

User-specified field 2

File Name

Field Descriptions

Output Columns

Mark
File Name
Archive Class
Start Time
End Time
Archive Date
Quarter

up | down | remove | reset

add | Mark | add all

Sort By:

File Name — Reverse
null — Reverse
null — Reverse

Output Format

HTML_Table

Show Query | Make Rows Distinct

Maximum Records: 1001

Records per Page: 100

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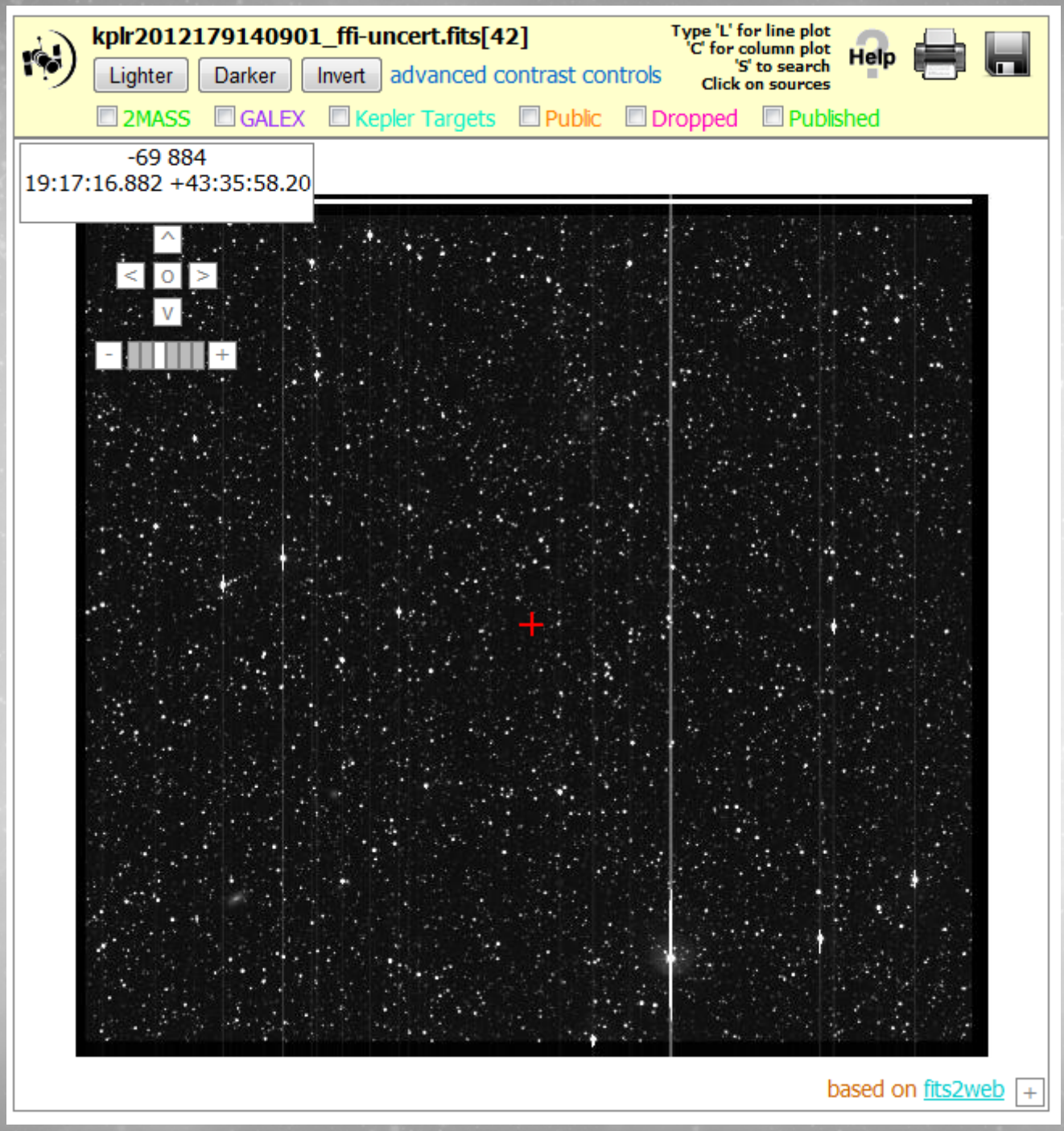

In the past year the archive has received:

- Updated light curves for Q0-Q8 (improved software)
- Q10-Q13 light curves, target pixel files and FFIs
- Co-trending Bias Vectors (CBV)
- Updated list of released Kepler Planetary Candidates (KOI)
- Data Release Notes and updated documentation
- ABC files (artifact, background and collateral files)

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In progress or expected from 2011-2012

- Additional High Level Science Products - none delivered
- Kepler Colors Table - **operational, more colors coming**
- Interfaces for the SPICE Kernels (aka ephemeris), Ancillary Engineering Data and Reverse Clock data - **done**
- Pixel Response Function files and a CBV-like interface for retrieval - **done**
- Support for Kepler Senior Review Proposal - **done**
- Another CT - **done**
- Operations is moving from Solaris/SyBase to linux/sqlserver; expect to see improved performance. - **done, performance improved by factor of 2**
- Continued receipt of monthly and quarterly data transmissions, and quarterly KTCs - **done**
- Transfer of target pixel files to the KASC group - **done**

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In progress or expected

- Kepler Colors Table - plan to add more colors as available
- Updated Q0-Q13 light curves to fix a Barycentric Time/leap second issue (March – May 2013).
- Coordinate with NexSci for delivery of Confirmed Planet information
- Continued receipt of monthly and quarterly data transmissions, and quarterly KTCs
- Transfer of target pixel files to the KASC group
- Additional High Level Science Products

Discussion Point

- Adding Kepler light curves to the MAST Portal
  + treat as a catalog or as an observation log?
    > observation log results in more rows than the Portal can handle

Kepler Legacy Archive

We expect to be involved in the planning of the Kepler Legacy Archive.

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Kepler Acronyms

ASB – Archive Sciences Branch
CBV – Co-trending Basis Vectors
CT – Characteristics Table
DPAS – Data Processing and Services
DSB – Data Software Branch
DMC – Data Management Center located at STScI
KASC – Kepler Asteroseismic Science Consortium
FFI – Full Frame Image
IRT – UK IR Telescope survey – J
KIC - Kepler Input Catalog
KIS – Kepler Isaac Newton Telescope survey – U, g, r, I, H-alpha
KTC - Kepler Target Catalog
MOC - Mission Operations Center located at LASP in Boulder
Q# - quarter, as in Q1 is Quarter 1
RVC – Reverse Clock Cadence
SOC – Science Operations Center located at NASA Ames
TPF – Target Pixel File
UBV – Everett et al survey – U, B, V