MAST will provide the archive user interface for Kepler data, primarily light curves and target pixel data.

ASB Staffing for Kepler

Shui-Ay Tseng

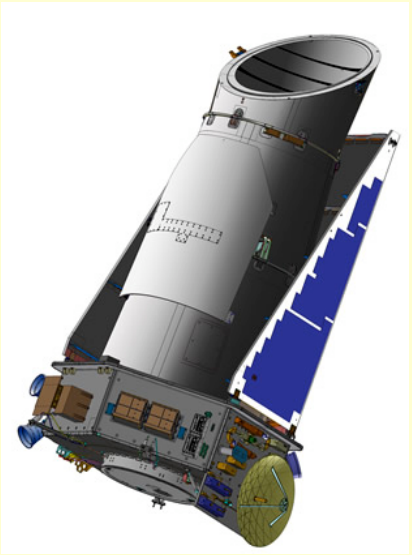
Dorothy Fraquelli

Randy Thompson

Myron Smith

Tim Kimball

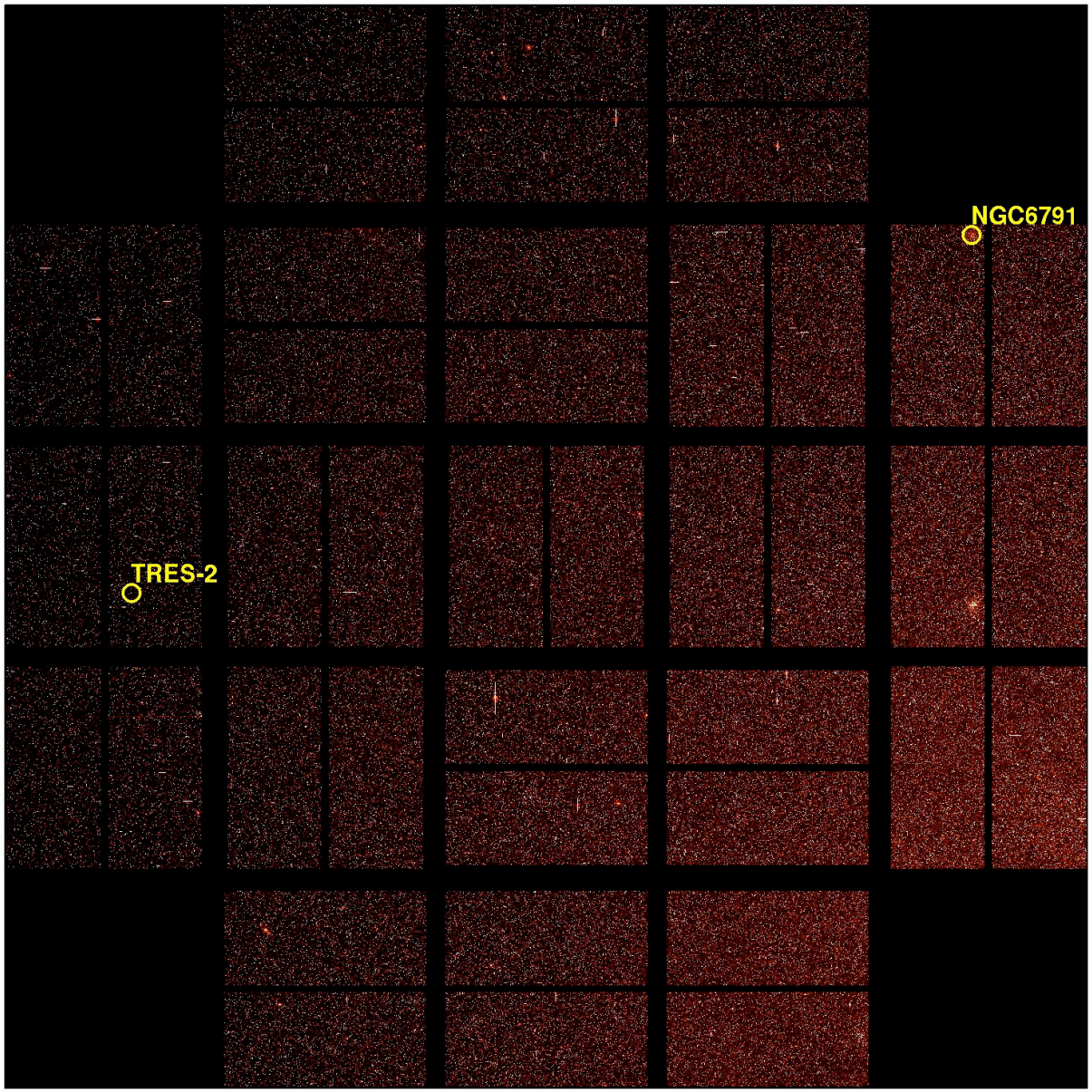
Kepler Update



- Launch was March 6, 2009.
- Dust cover ejection was April 8, 2009.
- Commissioning ended May 12, 2009.
- During last 10 days of commissioning, ~53k stars brighter than Kepler_mag 13.5 were observed as part of engineering checkout.
- During the 35 days from the end of commissioning to the first quarterly roll, ~145k stars were observed. (Quarter 1)
- These data were downlinked on June 16, 2009; transfer to the SOC was complete on June 23, 2009.

General Background

- The Key Project for Kepler is discovery and characterization of Earth-like planets around solar-type stars. The product is light curves.
- The data are dumped from Kepler on a monthly basis. The data flow is from Kepler to the Deep Space Network to the Mission Operations Center (LASP), to the Data Management Center (DMC at STScI), to the Science Operations Center (Ames), then back to the DMC for archiving. *This last transfer occurs quarterly.*
- Access to *data in* the Kepler archive is through MAST.



Kepler First Light Image

Documentation - Manuals

- Kepler Archive Manual – Project deliverable prepared by the DMC. Draft version with release planned for mid-July 2009.
- Kepler Instrument Handbook – Kepler Project has contracted with Jeff van Cleve to write this document. Draft version with release planned for mid-July 2009.
- Kepler Data Handbook – Kepler Project has contracted with Jeff van Cleve to write this document. Release planned in late 2009.

MAST Interface Pages

MAST anticipates 2 general types of users

> Proposers for Kepler time

> Archive users who wish to retrieve Kepler data

The needs of the groups are different. Proposers are searching for targets to observe and archive users are searching for existing data.

MAST developed the Target Search page for proposers and the Data Search and Retrieval page for archive users.

Target Search Page

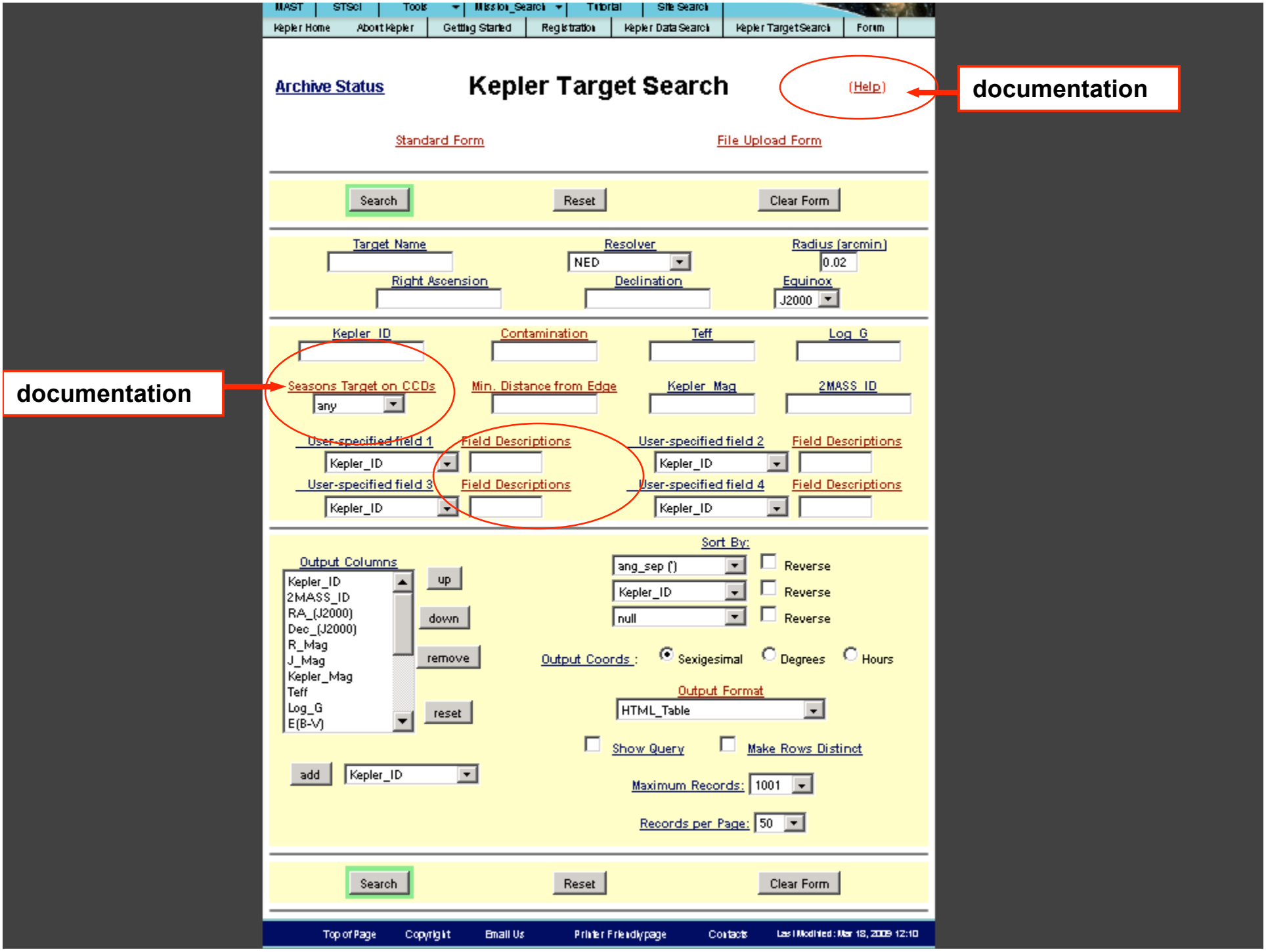
Search objects the Kepler Input Catalog (KIC) and the characteristics table (CT) have in common – These objects fall on the detectors.

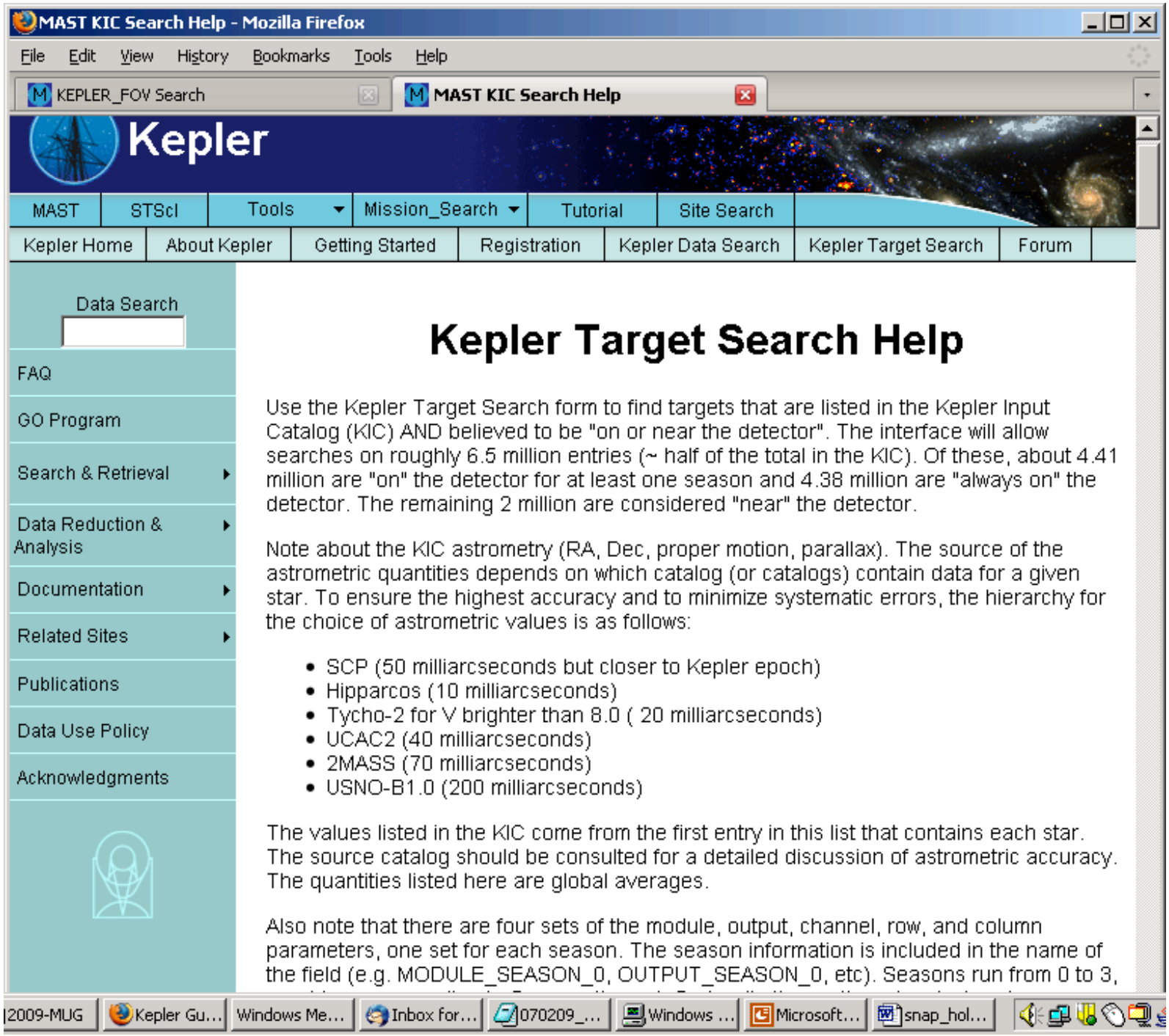
Search fields include astrophysical quantities

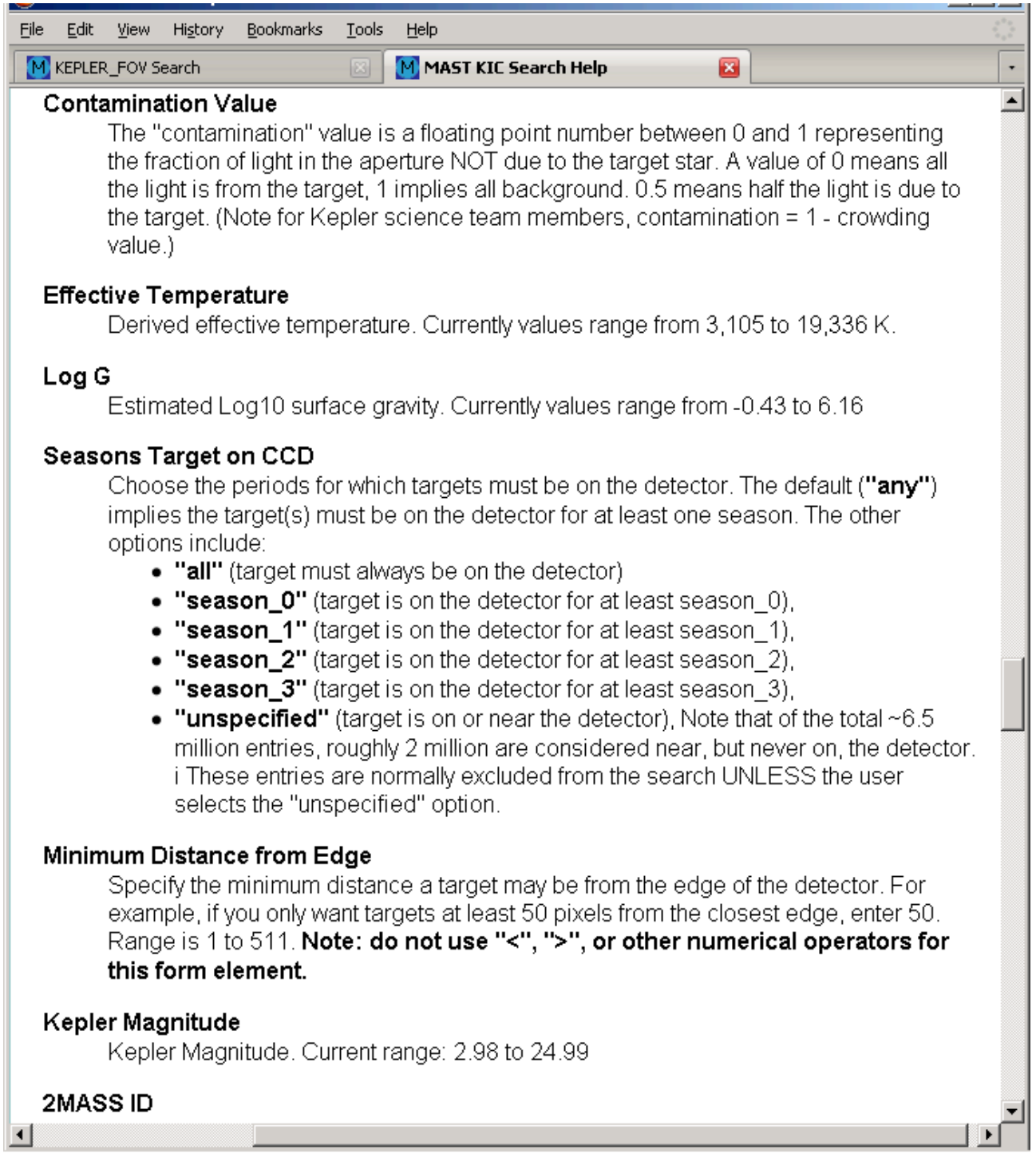
Modified and/or additional fields – seasons on CCD, minimum distance from edge, contamination

Reserved target flag (planned) – These objects are Key Project targets and may not be proposed.

Currently password protected (i.e., not public)


MAST
STScI
Tools
Mission_Search
Tutorial
Site Search
Kepler Home
About Kepler
Getting Started
Registration
Kepler Data Search
Kepler Target Search
Form
Archive Status
Kepler Target Search
(Help)
documentation
Standard Form
File Upload Form
Search
Reset
Clear Form
Target Name
Resolver
NED
Radius (arcmin)
0.02
Right Ascension
Declination
Equinox
J2000
Kepler_ID
Contamination
Teff
Log_G
documentation
Seasons Target on CCDs
any
Min. Distance from Edge
Kepler_Mag
2MASS_ID
User-specified field 1
Kepler_ID
Field Descriptions
User-specified field 2
Kepler_ID
Field Descriptions
User-specified field 3
Kepler_ID
Field Descriptions
User-specified field 4
Kepler_ID
Field Descriptions
Output Columns
Kepler_ID
2MASS_ID
RA_(J2000)
Dec_(J2000)
R_Mag
J_Mag
Kepler_Mag
Teff
Log_G
E(B-V)
up
down
remove
reset
add
Kepler_ID
Sort By:
ang_sep ()
Kepler_ID
null
Reverse
Reverse
Reverse
Output Coords :
Sexigesimal
Degrees
Hours
Output Format
HTML_Table
Show Query
Make Rows Distinct
Maximum Records:
1001
Records per Page:
50
Search
Reset
Clear Form
Top of Page
Copyright
Email Us
Printer Friendlypage
Contacts
Last Modified: Mar 18, 2009 12:10


MAST KIC Search Help - Mozilla Firefox
File Edit View History Bookmarks Tools Help
KEPLER_FOV Search
MAST KIC Search Help
Kepler
MAST STScI Tools Mission_Search Tutorial Site Search
Kepler Home About Kepler Getting Started Registration Kepler Data Search Kepler Target Search Forum
Data Search
FAQ
GO Program
Search & Retrieval
Data Reduction & Analysis
Documentation
Related Sites
Publications
Data Use Policy
Acknowledgments
Kepler Target Search Help
Use the Kepler Target Search form to find targets that are listed in the Kepler Input Catalog (KIC) AND believed to be "on or near the detector". The interface will allow searches on roughly 6.5 million entries (~ half of the total in the KIC). Of these, about 4.41 million are "on" the detector for at least one season and 4.38 million are "always on" the detector. The remaining 2 million are considered "near" the detector.
Note about the KIC astrometry (RA, Dec, proper motion, parallax). The source of the astrometric quantities depends on which catalog (or catalogs) contain data for a given star. To ensure the highest accuracy and to minimize systematic errors, the hierarchy for the choice of astrometric values is as follows:
SCP (50 milliarcseconds but closer to Kepler epoch)
Hipparcos (10 milliarcseconds)
Tycho-2 for V brighter than 8.0 (20 milliarcseconds)
UCAC2 (40 milliarcseconds)
2MASS (70 milliarcseconds)
USNO-B1.0 (200 milliarcseconds)
The values listed in the KIC come from the first entry in this list that contains each star. The source catalog should be consulted for a detailed discussion of astrometric accuracy. The quantities listed here are global averages.
Also note that there are four sets of the module, output, channel, row, and column parameters, one set for each season. The season information is included in the name of the field (e.g. MODULE_SEASON_0, OUTPUT_SEASON_0, etc). Seasons run from 0 to 3,
2009-MUG
Kepler Gu...
Windows Me...
Inbox for...
070209_...
Windows ...
Microsoft...
snap_hol...



Contamination Value

The "contamination" value is a floating point number between 0 and 1 representing the fraction of light in the aperture NOT due to the target star. A value of 0 means all the light is from the target, 1 implies all background. 0.5 means half the light is due to the target. (Note for Kepler science team members, contamination = 1 - crowding value.)

Effective Temperature

Derived effective temperature. Currently values range from 3,105 to 19,336 K.

Log G

Estimated Log10 surface gravity. Currently values range from -0.43 to 6.16

Seasons Target on CCD

Choose the periods for which targets must be on the detector. The default (**"any"**) implies the target(s) must be on the detector for at least one season. The other options include:

- **"all"** (target must always be on the detector)
- **"season_0"** (target is on the detector for at least season_0),
- **"season_1"** (target is on the detector for at least season_1),
- **"season_2"** (target is on the detector for at least season_2),
- **"season_3"** (target is on the detector for at least season_3),
- **"unspecified"** (target is on or near the detector), Note that of the total ~6.5 million entries, roughly 2 million are considered near, but never on, the detector. i These entries are normally excluded from the search UNLESS the user selects the "unspecified" option.

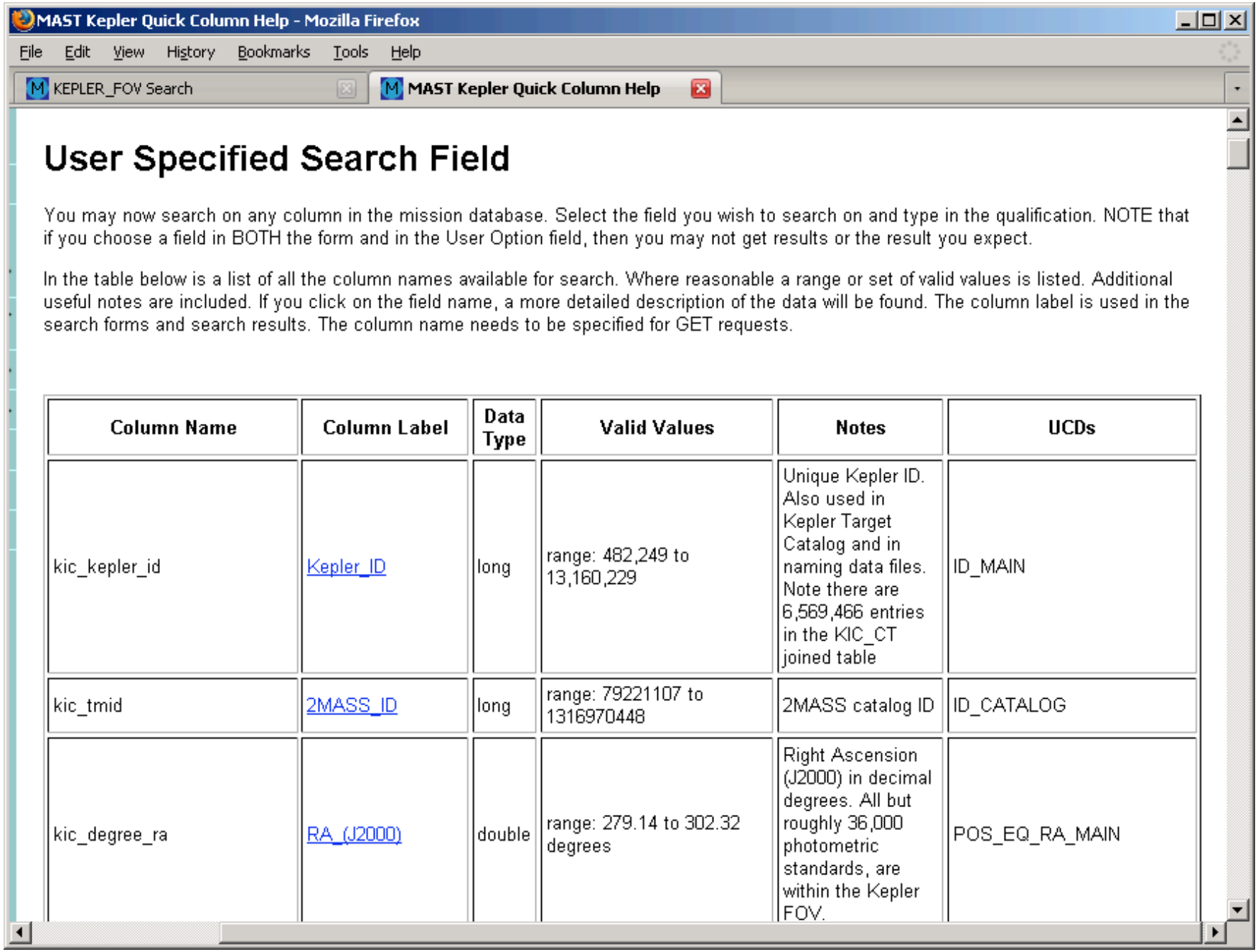
Minimum Distance from Edge

Specify the minimum distance a target may be from the edge of the detector. For example, if you only want targets at least 50 pixels from the closest edge, enter 50. Range is 1 to 511. **Note: do not use "<", ">", or other numerical operators for this form element.**

Kepler Magnitude

Kepler Magnitude. Current range: 2.98 to 24.99

2MASS ID

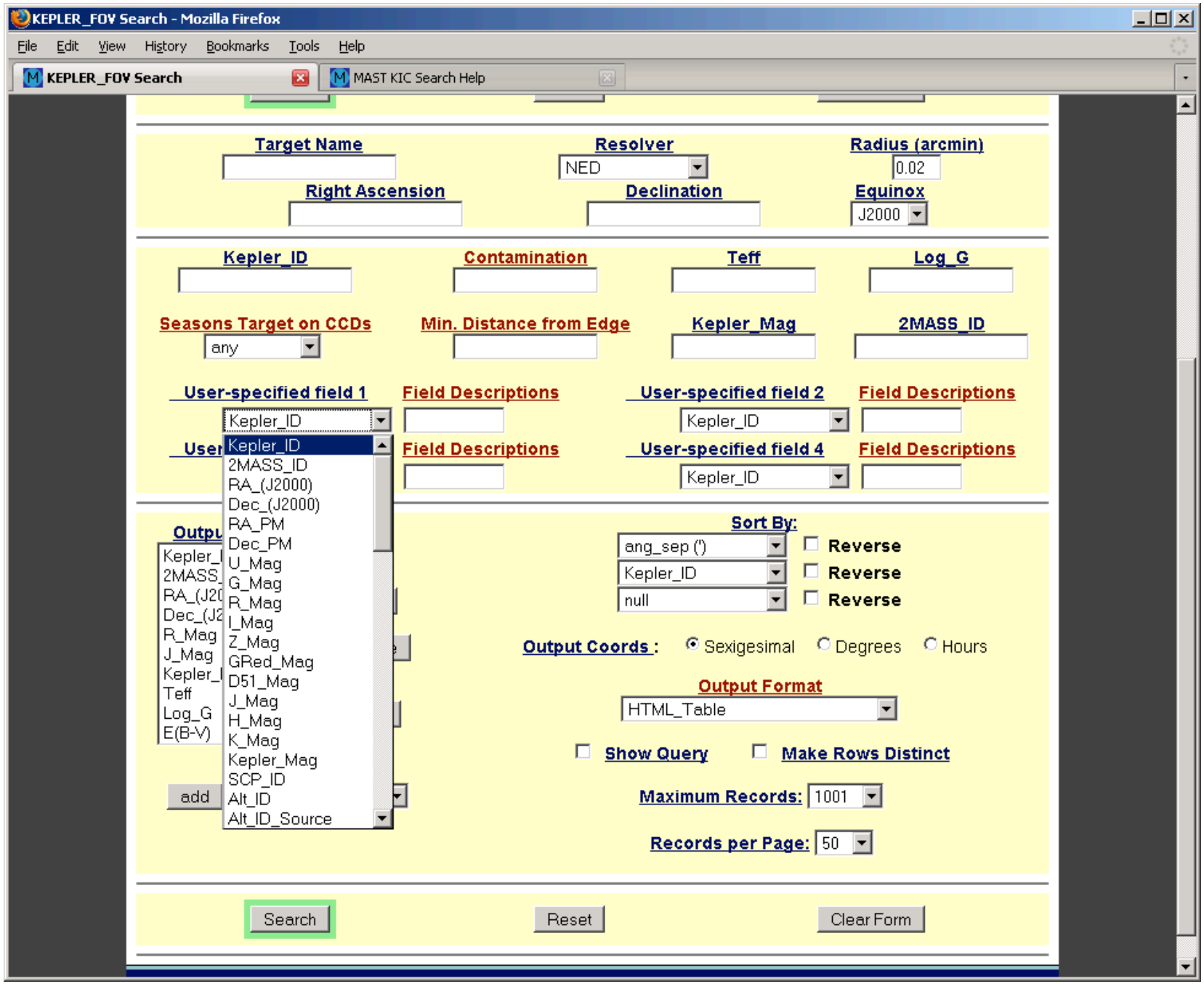


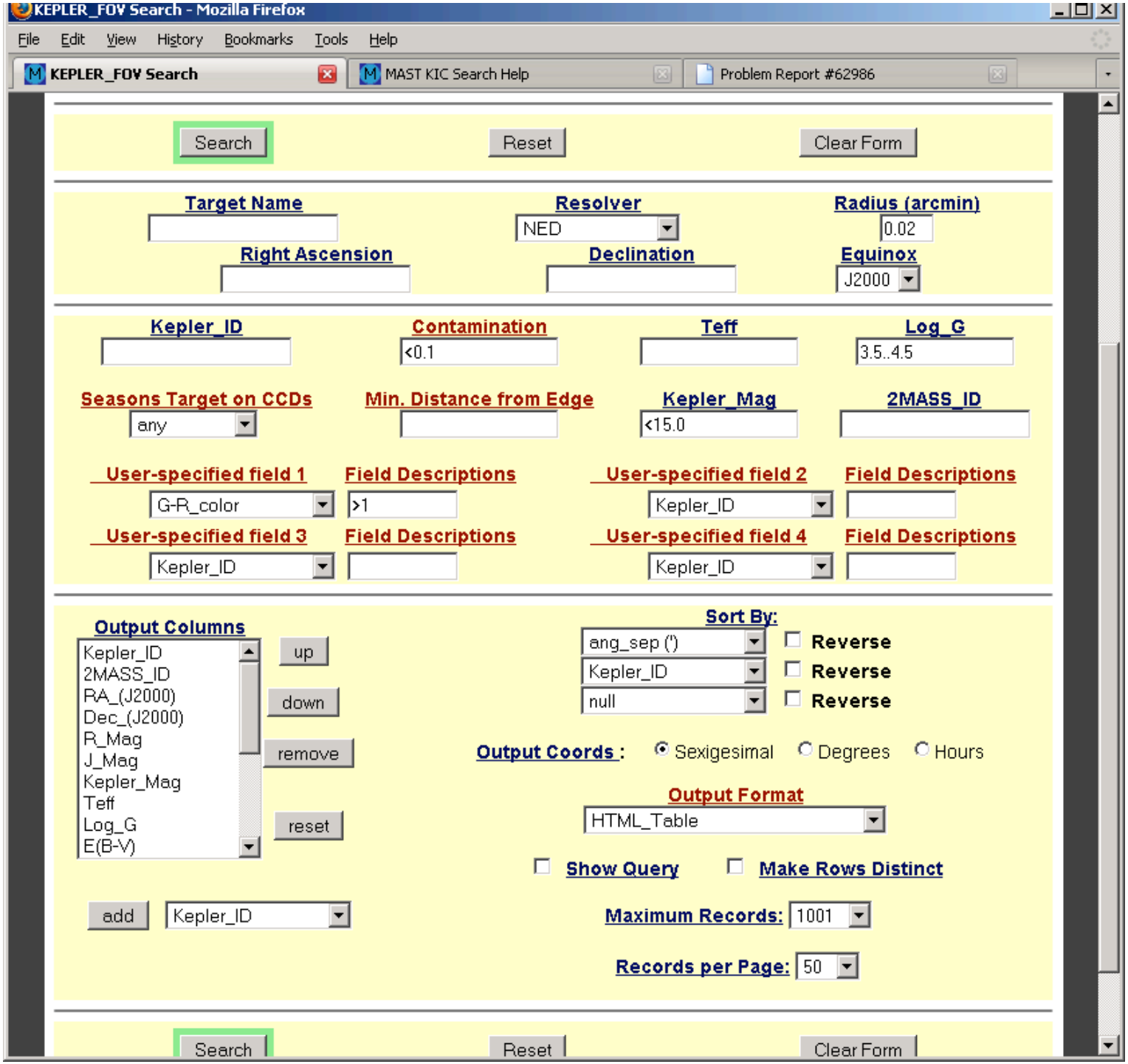
User Specified Search Field

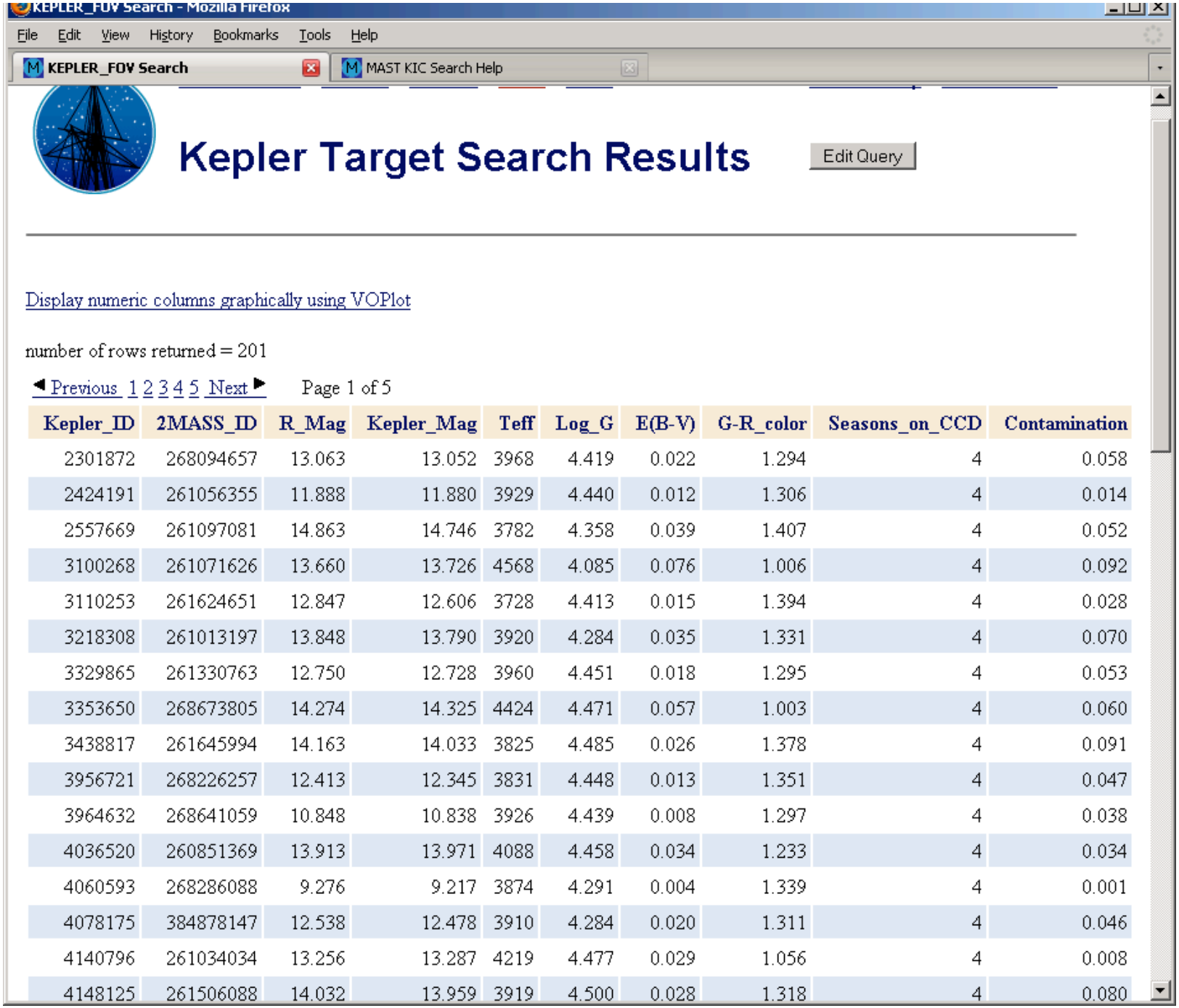
You may now search on any column in the mission database. Select the field you wish to search on and type in the qualification. NOTE that if you choose a field in BOTH the form and in the User Option field, then you may not get results or the result you expect.

In the table below is a list of all the column names available for search. Where reasonable a range or set of valid values is listed. Additional useful notes are included. If you click on the field name, a more detailed description of the data will be found. The column label is used in the search forms and search results. The column name needs to be specified for GET requests.

Column Name	Column Label	Data Type	Valid Values	Notes	UCDs
kic_kepler_id	Kepler_ID	long	range: 482,249 to 13,160,229	Unique Kepler ID. Also used in Kepler Target Catalog and in naming data files. Note there are 6,569,466 entries in the KIC_CT joined table	ID_MAIN
kic_tmid	2MASS_ID	long	range: 79221107 to 1316970448	2MASS catalog ID	ID_CATALOG
kic_degree_ra	RA_(J2000)	double	range: 279.14 to 302.32 degrees	Right Ascension (J2000) in decimal degrees. All but roughly 36,000 photometric standards, are within the Kepler FOV.	POS_EQ_RA_MAIN


KEPLER_FOV Search - Mozilla Firefox
File Edit View History Bookmarks Tools Help
KEPLER_FOV Search
MAST KIC Search Help
Target Name
Resolver
NED
Radius (arcmin)
0.02
Right Ascension
Declination
Equinox
J2000
Kepler_ID
Contamination
Teff
Log_G
Seasons Target on CCDs
any
Min. Distance from Edge
Kepler_Mag
2MASS_ID
User-specified field 1
Kepler_ID
Field Descriptions
User-specified field 2
Kepler_ID
Field Descriptions
Field Descriptions
User-specified field 4
Kepler_ID
Field Descriptions
Kepler_ID
2MASS_ID
RA_(J2000)
Dec_(J2000)
RA_PM
Dec_PM
U_Mag
G_Mag
R_Mag
I_Mag
Z_Mag
GRed_Mag
D51_Mag
J_Mag
H_Mag
K_Mag
Kepler_Mag
SCP_ID
Alt_ID
Alt_ID_Source
Kepler_I
2MASS_
RA_(J2
Dec_(J2
R_Mag
J_Mag
Kepler_I
Teff
Log_G
E(B-V)
add
Sort By:
ang_sep (')
Reverse
Kepler_ID
Reverse
null
Reverse
Output Coords :
Sexigesimal
Degrees
Hours
Output Format
HTML_Table
Show Query
Make Rows Distinct
Maximum Records:
1001
Records per Page:
50
Search
Reset
Clear Form


KEPLER_FOV Search - Mozilla Firefox
File Edit View History Bookmarks Tools Help
KEPLER_FOV Search
MAST KIC Search Help
Problem Report #62986
Search
Reset
Clear Form
Target Name
Resolver
NED
Radius (arcmin)
0.02
Right Ascension
Declination
Equinox
J2000
Kepler_ID
Contamination
<0.1
Teff
Log_G
3.5..4.5
Seasons Target on CCDs
any
Min. Distance from Edge
Kepler_Mag
<15.0
2MASS_ID
User-specified field 1
G-R_color
Field Descriptions
>1
User-specified field 2
Kepler_ID
Field Descriptions
User-specified field 3
Kepler_ID
Field Descriptions
User-specified field 4
Kepler_ID
Field Descriptions
Output Columns
Kepler_ID
2MASS_ID
RA_(J2000)
Dec_(J2000)
R_Mag
J_Mag
Kepler_Mag
Teff
Log_G
E(B-V)
up
down
remove
reset
add
Kepler_ID
Sort By:
ang_sep (')
Reverse
Kepler_ID
Reverse
null
Reverse
Output Coords :
Sexigesimal
Degrees
Hours
Output Format
HTML_Table
Show Query
Make Rows Distinct
Maximum Records:
1001
Records per Page:
50
Search
Reset
Clear Form



Kepler_ID	2MASS_ID	R_Mag	Kepler_Mag	Teff	Log_G	E(B-V)	G-R_color	Seasons_on_CCD	Contamination
2301872	268094657	13.063	13.052	3968	4.419	0.022	1.294	4	0.058
2424191	261056355	11.888	11.880	3929	4.440	0.012	1.306	4	0.014
2557669	261097081	14.863	14.746	3782	4.358	0.039	1.407	4	0.052
3100268	261071626	13.660	13.726	4568	4.085	0.076	1.006	4	0.092
3110253	261624651	12.847	12.606	3728	4.413	0.015	1.394	4	0.028
3218308	261013197	13.848	13.790	3920	4.284	0.035	1.331	4	0.070
3329865	261330763	12.750	12.728	3960	4.451	0.018	1.295	4	0.053
3353650	268673805	14.274	14.325	4424	4.471	0.057	1.003	4	0.060
3438817	261645994	14.163	14.033	3825	4.485	0.026	1.378	4	0.091
3956721	268226257	12.413	12.345	3831	4.448	0.013	1.351	4	0.047
3964632	268641059	10.848	10.838	3926	4.439	0.008	1.297	4	0.038
4036520	260851369	13.913	13.971	4088	4.458	0.034	1.233	4	0.034
4060593	268286088	9.276	9.217	3874	4.291	0.004	1.339	4	0.001
4078175	384878147	12.538	12.478	3910	4.284	0.020	1.311	4	0.046
4140796	261034034	13.256	13.287	4219	4.477	0.029	1.056	4	0.008
4148125	261506088	14.032	13.959	3919	4.500	0.028	1.318	4	0.080

Data Search and Retrieval Page

Searches the Kepler Target Catalog (KTC), the archive database and the KIC

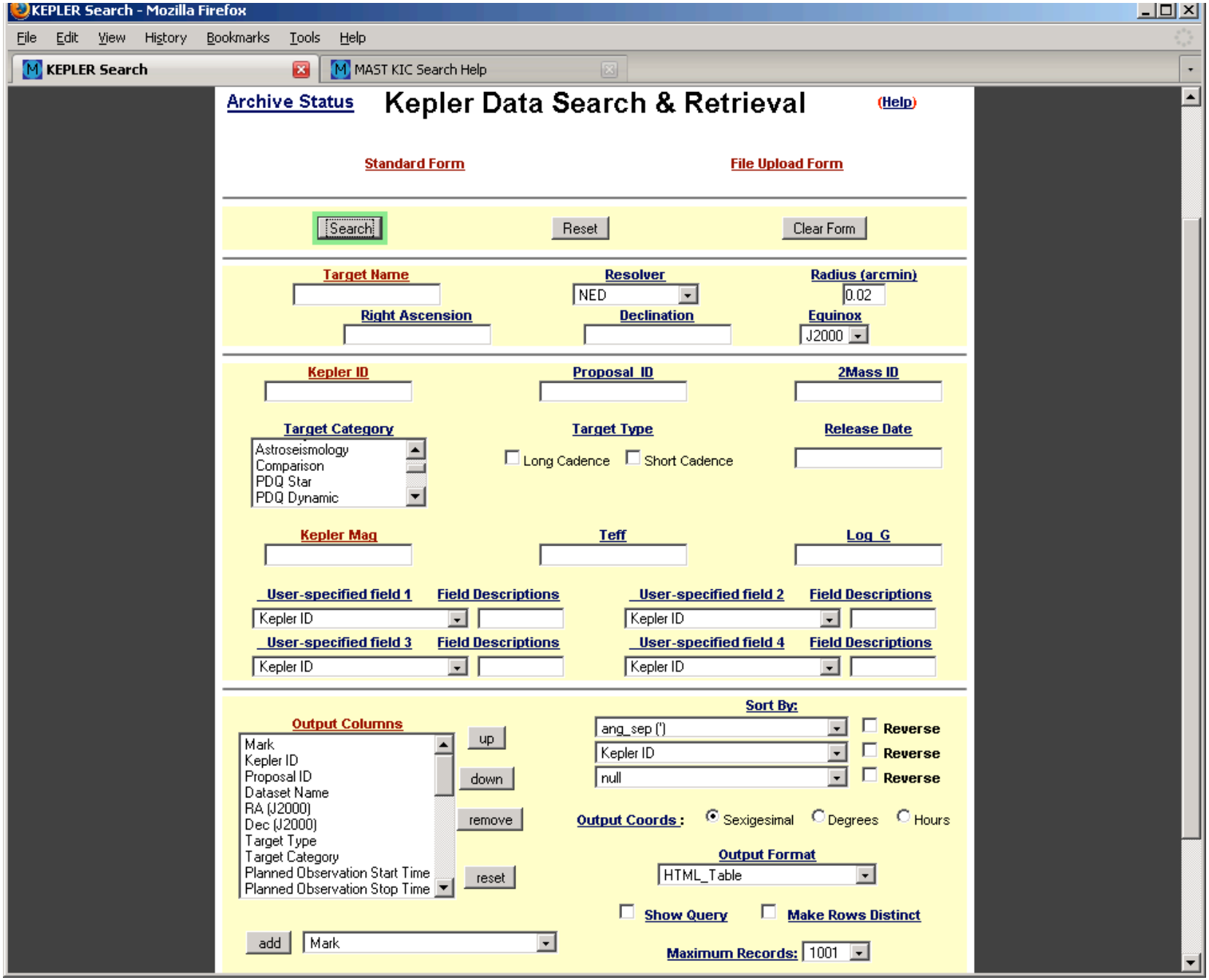
> still under development, password protected

Features similar to the Target Search page.

Note the Release Date – can qualify to search to return information only for data that are public

KIC astrophysical values available through user-specified fields.

Lack of a current KTC and archive has limited testing.


KEPLER Search - Mozilla Firefox
File Edit View History Bookmarks Tools Help
KEPLER Search
MAST KIC Search Help
Archive Status
Kepler Data Search & Retrieval
(Help)
Standard Form
File Upload Form
Search
Reset
Clear Form
Target Name
Resolver
NED
Radius (arcmin)
0.02
Right Ascension
Declination
Equinox
J2000
Kepler ID
Proposal ID
2Mass ID
Target Category
Astroseismology
Comparison
PDQ Star
PDQ Dynamic
Target Type
Long Cadence
Short Cadence
Release Date
Kepler Mag
Teff
Log_G
User-specified field 1
Field Descriptions
Kepler ID
User-specified field 2
Field Descriptions
Kepler ID
User-specified field 3
Field Descriptions
Kepler ID
User-specified field 4
Field Descriptions
Kepler ID
Output Columns
Mark
Kepler ID
Proposal ID
Dataset Name
RA (J2000)
Dec (J2000)
Target Type
Target Category
Planned Observation Start Time
Planned Observation Stop Time
up
down
remove
reset
add
Mark
Sort By:
ang_sep (')
Reverse
Kepler ID
Reverse
null
Reverse
Output Coords :
Sexigesimal
Degrees
Hours
Output Format
HTML_Table
Show Query
Make Rows Distinct
Maximum Records:
1001

Non-Target Data

- Full Frame Image (FFI) – pre/post-roll image of Kepler field of view
- Cadence – 1min/30min sum of pixel values for all targets

Don't expect to have much demand for these data, but still need an interface.

Design is in progress.

Times in Kepler Data Headers

Several FITS keywords in the Kepler data headers relate to time.

Rule of thumb:

- primary header keywords are UTC (geocentric)
- extension keywords are TDB (barycentric)

Light curve headers may be different.

- The DMC is working with SOC developers on the light curve headers.

Barycentric Dynamic Time (TDB)

By definition, TDB contains a relativistic correction.

>These corrections amount to as much as about 1.6 millisecs and are periodic with an average of zero.

The times in the Kepler data headers do *not* contain this relativistic correction.