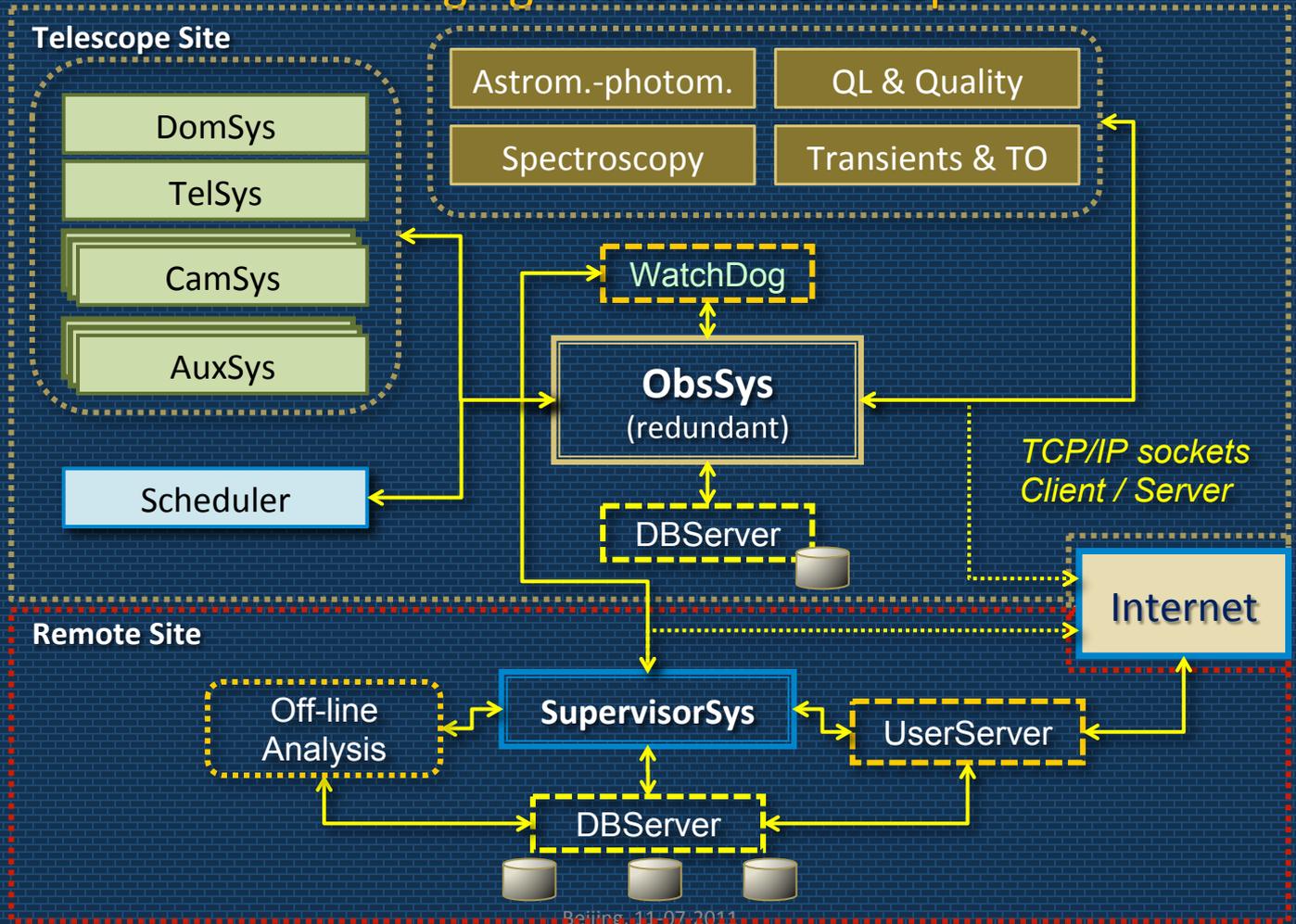
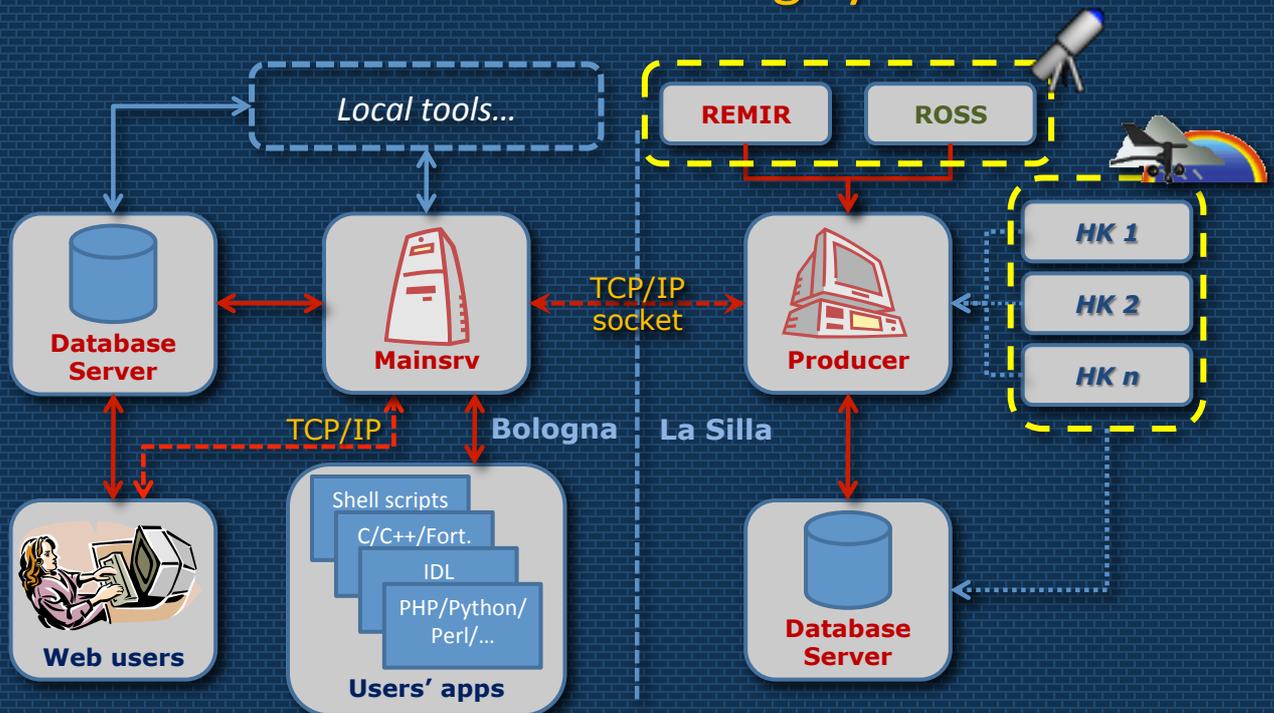


Managing a Robotic Telescope



A REM-like data handling system



See: ross.iasfbo.inaf.it/REMDB

The REM images management system

- **At La Silla**

- *Multi-thread images collector server*: communicates with the Bologna main-server (via socket port 9000) and local database server (MySQL - port 3306).
- Camera image injector client (could be directly linked in ObsSys).
 - example usage: **CameraROSS FITS_Image**

- **In Bologna**

- *Multi-thread images collector server*: communicates with La Silla server and local database server (MySQL) + any authorized client process (local or remote).

Also performs: 1. image header information extraction and insertion into the DB tables, 2. astrometry calculation, ...
- *Triggers* on insertion (etc.): distinct tables for ROSS & REMIR containing scientific images + Flat and Dark. The REM tables are automatically managed by the triggers. Users can access any of them.
- **MyRO** protected tables: dynamic *views* for record oriented filtered tables; each PI can only access his/her images + STD stars and calibration images.
- ...

Beijing, 11-07-2011

Producer & Mainsrv MCS config file

```
[Producer]
INTERFACE = eth0
PORT = 9000
PATH = /home/ross/store
TIMEOUT = 120000
Mainsrv_host = ross.iasfbo.inaf.it
Mainsrv_port = 9000
have_db = 1
use_ssl = 0
logfile = 1
logstdout = 0

[ROSS]
PATH = /home/ross/RossDB/ImageDB
HOST = ross
PORT = 9000
ID = 1

[REMIR]
PATH = /home/remir/archived
HOST = ross
PORT = 9000
ID = 2
```

```
[Mainsrv]
APPVERS = 0.2a
INTERFACE = eth0
PORT = 9010
PATH = /home/ross/incoming
TIMEOUT = 180000
Producer_host = 192.168.1.5
Producer_port = 9000
chunksize = 1638400
have_db = 1
use_ssl = 0
work = 1
work_cid = 0
clean_logout = 0
local_kills_mcs = 1
logfile = 1
logstdout = 0
ImgInfoFrom = HDR

[Mainsrv_EXTERNAL]
ls = /bin/ls
remlimgdb = /home/ross/bin/remlimgdb
gif = /home/ross/bin/rossimgplt
medw = /home/ross/bin/sexcat_medw
imgwcs = /home/ross/bin/imgwcs2sex
sexcat = /home/ross/mainsrv/MakeSexcat
```

Beijing, 11-07-2011

The REM images server: Producer (1)

```
#include "telServer.hh" // specific functions and
#include "cameraInfo.hh" // definitions (messages etc.)
```

```
... Local definitions ...
```

```
string cams[nc] = {CAM_ROSS,CAM_REMIR};
Record* v = new Record(); // Files list buffer
```

```
...
```

```
MCS_CUSTOM_LOCAL(Local);
```

```
private:
```

```
DBConn db;
Query* query;
Client* srvBO;
```

```
...
```

```
void printMsg(Client* cli) { ... }
```

```
void initial() { ... }
```

```
void final() { ... }
```

```
...
```

```
void run() {
```

```
    Conf conf(ROSSP_PRDCONF); // Read server config.
```

```
    ...
```

```
    for (;;) { // infinite loop
```

```
        while (v->count()==0) sleep_ms(1000);
```

```
        camera = (v->field(0).sval()).substr(0,3);
```

```
        ...
```

```
        srvBO = new Client(curPath, srvhost, srvport, false, false);
```

```
        srvBO->login(db_user, db_pass, db_name);
```

```
        ...
```

```
    }
```

```
}
```

```
MCS_CUSTOM_LOCAL_END(Local);
```

```
MCS_CUSTOM_USER(User);
```

```
private:
```

```
    Record* InfoRec; // FITS file info record from the Camera(s)
```

```
    ...
```

```
... Local methods ...
```

```
bool chkImgInPrdLog(Record* InfoR) { ... }
```

```
// Custom commands
```

```
RetVal hk_exec(CommandParser* cmd, bool& cmd_executed)
```

```
{
```

```
// From the Camera(s)
```

```
    if (cmd->cmpCmd(CMD_DEVICE_NAME)) { ... }
```

```
    if (cmd->cmpCmd(CMD_FILE_NOT_FITS)) { ... }
```

```
    if (cmd->cmpCmd(MCS_CMD_PUT)) { ... }
```

```
    if (cmd->cmpCmd(CMD_GET_PRD_PROCACTIVE)) { ... }
```

```
    if (cmd->cmpCmd(CMD_NEW_FILE_READY)) {
```

```
        v->addField(camera +bl+ this_sID +bl+ this_file_rec);
```

```
        ... }
```

```
// From the Mainsrv
```

```
    if (cmd->cmpCmd(CMD_SELECT_IDS_NSEND)) { ... }
```

```
    if (cmd->cmpCmd(CMD_SELECT_INDEX_RANGE)) { ... }
```

```
    return OK;
```

```
} // end hk_exec
```

```
void hk_postexec (CommandParser *cmd, RetVal ret) {
```

```
if (ret == OK) { // If the command were executed correctly
```

```
    if (cmd->cmpCmd(MCS_CMD_PUT)) { ... }
```

```
    if (cmd->cmpCmd(MCS_CMD_PUTDATA)) {
```

```
        Data d = rcv.pop();
```

```
        InfoRec = new Record(d.buffer());
```

```
        ... }
```

```
} // end hk_postexec
```

```
MCS_CUSTOM_USER_END(User);
```

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The REM images server: Producer (2)

```
MCS_CUSTOM_SERVER(User, Local);
```

```
// Main program: can add any start parameter
```

```
int main(int argc, char* argv[])
```

```
{
```

```
    ...
```

```
    if (strstr(argv[1], "-d") != NULL) { // clean Producer log table on start
```

```
        cout << "Cleaning the "+ DB_TABNAME_PROD +" table..." << endl;
```

```
        DBConn db1;
```

```
// For ROSS and REMIR
```

```
for (ic=0; ic<nc; ic++) {
```

```
    if (cams[ic] == CAM_ROSS)
```

```
        db1.connect(DB_USER_ROSS, DB_PASS_ROSS, DB_NAME_ROSS, DB_HOST);
```

```
    else if (cams[ic] == CAM_REMIR)
```

```
        db1.connect(DB_USER_REMIR, DB_PASS_REMIR, DB_NAME_REMIR, DB_HOST);
```

```
    else
```

```
        continue;
```

```
    Query* query1 = new Query(&db1, false);
```

```
    query1->simpleQuery("DELETE FROM "+ DB_TABNAME_PROD);
```

```
    query1->simpleQuery("ALTER TABLE "+ DB_TABNAME_PROD +" AUTO_INCREMENT=0");
```

```
    delete query1;
```

```
    db1.close();
```

```
}
```

```
// Initialize custom messages
```

```
mcs::Event::custom_init_vmsg = &initialize_messages;
```

```
// Start the MCS server
```

```
mcsCustomStart("Producer", ROSSP_PRDCONF);
```

```
}
```

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The REM images server: Camera client

```

#include "cameraInfo.hh"

// Main program: can add any start parameter
int main(int argc, char* argv[])
{
    ...
    if (strstr(argv[1], "-r") != NULL)
        rm_file = true;
    ...
    locPath = conf.sval(camName, "PATH") + sl;
    mcshost = conf.sval(camName, "HOST");
    mcSPORT = conf.ival(camName, "PORT");

// Read an info record from the file
Record *Info = new Record();

// Connect to the MCS server... and login
Client cli(locPath, mcshost, mcSPORT, false, false);
cli.login(DB_USER, DB_PASS, DB_NAME);

// Firstly tell the server our device name
cli.exec(CMD_DEVICE_NAME + bl+ camName);

// Loop on list of files
while( loop ) {
    if (is_fits) {
        int status = GetInfoHeader(absFile, Info);
    } else {
        Info->setNull();
        cli.exec(CMD_FILE_NOT_FITS);
    }
}

// Send the record (if a FITS file)
if (is_fits) {
    unsigned int size;
    void* buf = Info->getEntireBuffer(size);
    Data d(buf, size);
    free(buf);
    if (! cli.exec(MCS_CMD_PUTDATA, &d) )
        exit(4);

    Info->clear();
    while (cli.msg.count() > 0)
        cout << cli.msg.pop().sval() << endl;
}

// Notify that a new file is ready
cli.exec(CMD_NEW_FILE_READY + bl+ fname);

while (cli.msg.count() > 0)
    cout << cli.msg.pop().sval() << endl;

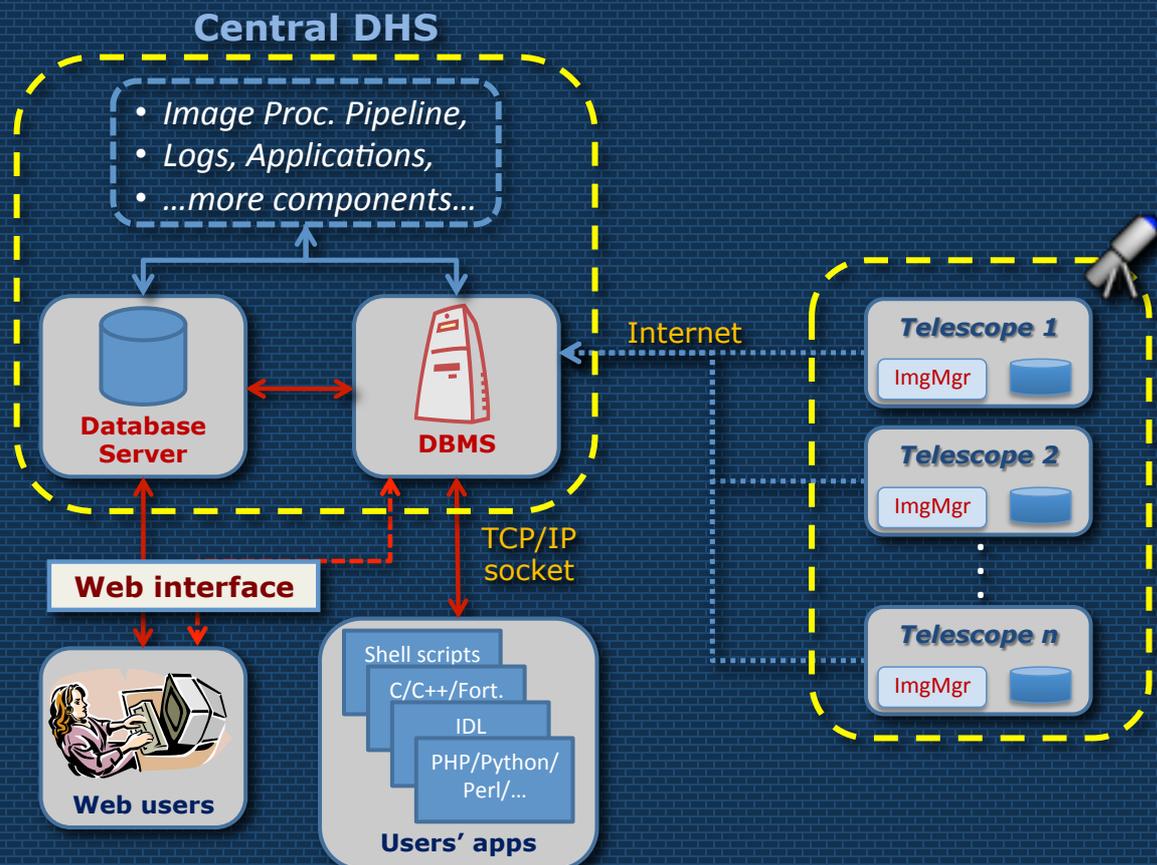
// Remove file?
if (rm_file)
    if (remove( absFile.c_str() ) != 0)
        perror( "Error deleting file" );
} // end loop on files

cli.exec(MCS_CMD_CLOSECLIENT);
}

```

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A possible "centralized" data handling system



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Database server and DBMS content



Telescopes Tables

- Telescopes info
- Cameras info
- FITS header info
- Meteo station info
- ...

Log Tables

- Users info
- Access info
- Telescopes server log
- MainsrvLog
- ...

At the Telescope

- Camera_client
- (LocalServer)

Products Tables

- Images (raw)
- Images (reduced)
- Flat frames
- Dark frames
- Bias frames
- Pipeline products
- External products
- ...

Views / Tools

- Views
- Stored procedures
- Stored functions
- Triggers
- UDF (C/C++)
- DB engines
- ...

Main Server

- TelServer
- myimgslog
- pgfimgplt
- SExtractor
- ...

Web interface

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Database server content



MySQL Workbench

SQL Editor (localhost)

Query 1

1

100% 1:1

Overview Output Snippets Query 1 Result

MySQL Schema MySQL Schema MySQL Schema MySQL Schema

Tables (11 items)

Add Table	AccessLog	CameraInfo	FitsHdr2Fld	FitsHdrInfo
ImgLog	MainsrvLog	Obslog_myro	PL_unames	PubObsLog
TelescopeInfo	TelServerLog			

Views (1 item)

- Obslog

Routines (1 item)

- ffname

Active schema changed to GBOTDB

→ User's view

→ FITS image directory

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Database server content: Telescope Tables



```
mysql> DESCRIBE TelescopeInfo;
```

Field	Type	Null	Key	Default	Extra
telcode	char(8)	NO	PRI		
name	char(16)	NO			
lon	float	NO		0	
lat	float	NO		0	
elev	float	NO		0	

```
mysql> SELECT * FROM TelescopeInfo;
```

telcode	name	lon	lat	elev
X01	REM	-70.7345	-29.2584	2377
J13	LiverpoolTel	-17.8792	28.7624	2363

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Database server content: Telescope Tables



```
mysql> DESCRIBE CameraInfo;
```

Field	Type	Null	Key	Default	Extra
telcode	char(8)	NO	MUL		
camera	enum('RATCAM', 'REMIR', 'ROSS')	NO		NULL	
pixscale	float	NO		0	
filtern	enum('UNKNOWN', 'SDSS-U', 'SDSS-G', 'SDSS-R', 'SDSS-I', 'SDSS-Z', 'V', 'R', 'I', 'Z', 'J', 'H', 'K', 'Ks', 'Amici', 'Grism')	NO		NULL	
filter	enum('U', 'G', 'R', 'I', 'Z', 'Ks', 'F', 'N', 'B', 'A', 'W', 'V', 'J', 'H', 'K')	NO		NULL	

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Database server content: Telescope Tables



```
mysql> SELECT * FROM CameraInfo;
```

telcode	camera	pixscale	filtern	filter	Enum types
X01	REMIR	1.221	Z	Z	
X01	REMIR	1.221	J	J	
X01	REMIR	1.221	H	H	
X01	REMIR	1.221	K	K	
X01	ROSS	0.575	V	V	
X01	ROSS	0.575	R	R	
X01	ROSS	0.575	I	I	
X01	ROSS	0.575	Amici	A	
J13	RATCAM	0.1395	SDSS-U	U	
J13	RATCAM	0.1395	SDSS-G	G	
J13	RATCAM	0.1395	SDSS-R	R	
J13	RATCAM	0.1395	SDSS-I	I	
J13	RATCAM	0.1395	SDSS-Z	Z	

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Database server content: Telescope Tables



```
mysql> SELECT * FROM FitsHdr2Fld;
```

kwdname	fldname	fldtype	flddesc
INSTRUME	instrume	STRING	Instrument/camera name
CAMERA	instrume	STRING	Instrument/camera name
CAT-RA	ras	STRING	Target RA
CAT-DEC	decs	STRING	Target Dec
OBJECT	object	STRING	Targeted object
USERID	pi_coi	STRING	Observer/PI name
OBSERVER	pi_coi	STRING	Observer/PI name
PI-COI	pi_coi	STRING	Observer/PI name
FILTER1	filter	STRING	Filter code
FILTER	filter	STRING	Filter code
DATE-OBS	date_obs	DATETIME	Date of observation start
CRVAL1	radeg	DOUBLE	Pointed RA field center
CRVAL2	decdeg	DOUBLE	Pointed Dec field center
AZIMUTH	azdeg	DOUBLE	Azimuth of pointing
ALTITUDE	eldeg	DOUBLE	Elevation of pointing

... continue ...

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Database server content: Telescope Tables



```
mysql> SELECT * FROM FitsHdr2Fld;
```

kwdname	fldname	fldtype	flddesc
...			
MJD	mjdobs	DOUBLE	MJD of observation start
EXPTIME	exptime	FLOAT	Exposure time
SEEING	seeing	FLOAT	Seeing at observation start
ESTSEE	seeing	FLOAT	Seeing at observation start
AIRMASS	airmass	FLOAT	Airmass at observation start
MOONDIST	moondist	FLOAT	Moon distance at observation start
MOONFRAC	moonphas	FLOAT	Moon phase at observation start
MOONPHAS	moonphas	FLOAT	Moon phase at observation start

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Database server content: Telescope Tables



Join example: get all the available filters for REM.

```
mysql> SELECT t.name,c.camera,c.filter FROM TelescopeInfo AS t,  
CameraInfo AS c WHERE t.telcode=c.telcode AND t.telcode='X01';
```

name	camera	filter
REM	REMIR	Z
REM	REMIR	J
REM	REMIR	H
REM	REMIR	K
REM	ROSS	V
REM	ROSS	R
REM	ROSS	I
REM	ROSS	A

Joined tables content

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Database server content: Telescope Tables



Join example: get all the FITS header keywords to read for RATCam...

```
mysql> SELECT a.kwdname,a.kwdtype,b.fldname,b.fldtype FROM FitsHdrInfo AS a, FitsHdr2Fld AS b WHERE a.kwdname=b.kwdname AND instrume='RATCam';
```

kwdname	kwdtype	fldname	fldtype
INSTRUME	STRING	instrume	STRING
TELESCOP	STRING	telescop	STRING
CAT-RA	STRING	ras	STRING
CAT-DEC	STRING	decs	STRING
OBJECT	STRING	object	STRING
OBSTYPE	STRING	obstype	STRING
USERID	STRING	pi_coi	STRING
FILTER1	STRING	filter	STRING
DATE-OBS	STRING	date_obs	DATETIME
CRVAL1	DOUBLE	radeg	DOUBLE
CRVAL2	DOUBLE	decdeg	DOUBLE
AZIMUTH	DOUBLE	azdeg	DOUBLE
ALTITUDE	DOUBLE	eldeg	DOUBLE
MJD	DOUBLE	mjdobs	DOUBLE
EXPTIME	FLOAT	exptime	FLOAT
ESTSEE	FLOAT	seeing	FLOAT
AIRMASS	FLOAT	airmass	FLOAT

19 rows

Joined tables content

Database server content: Log Tables



```
mysql> DESCRIBE ImgsLog;
```

Field	Type	Null	Key	Default
autoID	int(10) unsigned	NO	PRI	NULL
datein	datetime	NO		0000-00-00
htmID_6	smallint(5) unsigned	NO		0
ras	char(12)	NO		
decs	char(12)	NO		
radeg	double unsigned	NO		0
decdeg	double	NO		0
az	double unsigned	NO		0
alt	double	NO		0
gl	tinyint(2) unsigned	NO		0
gb	tinyint(2) unsigned	NO		0
telescop	char(20)	NO		
instrume	char(8)	NO		
object	char(20)	NO		none
pi_coi	char(32)	NO		nobody
filter	char(8)	NO		
date_obs	datetime	NO		0000-00-00
mjdobs	double unsigned	NO		0
exptime	float unsigned	NO		0
seeing	float unsigned	NO		0
airmass	float unsigned	NO		0
moondist	float	NO		0
moonphas	float	NO		0
fname	char(32)	NO		

MCS server content



- MCS User Thread customization ⇒ custom commands.
 - In addition to the MCS intrinsic commands, it implements all the *user defined commands* a client can invoke, e.g. to manage images collection from the telescopes, to produce a plot, to query the DB, to execute a particular task on one or more images, etc.
 - Automatically execute sub-commands specific to a given command.
- MCS Local Thread customization ⇒ custom behavior of the server, i.e. what the server has to do locally at the server start/end and as a result of a client command, e.g.
 - Compress / decompress the image.
 - Log images to DB on arrival.
 - Produce quick look drawings.
 - Perform image analysis.

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MCS server content



- MCS customization with external programs.
 - MCS *user defined commands*, can invoke external applications passing them all the server accessible products and retrieving any output like files and data of any type. External tasks include:
 - ✓ Quality assessment
 - ✓ Clean image
 - ✓ Astrometry
 - ✓ Photometry
 - ✓ Cross match
 - ✓ Send reports / warnings
 - ✓ Plot images / stats
 - ✓ ...

Beijing, 11-07-2011

The REM web-based archive browser



- ESO La Silla ⇒ 60–cm optical/IR, 10'×10' field of view, 10°/s point.
 - REMIR: 1 ÷ 2.3 μm [z', J, H, K'].
 - ROSS: 0.45 ÷ 0.9 μm [R, V, I, Amici].
- Meant for GRB follow-up. Working since summer 2003.
- > 1.5×10⁶ images collected so far (excl. Dark/Flat).

Beijing, 11-07-2011

The REM web-based archive browser

http://ross.iasfbo.inaf.it/REMDB/obslog.php

The Mozilla Organi... SuSE - The Linux E... MCS home page

Select ALL where ImgNight ≥ 2010-05-07 ≤ 2010-05-07 Distinct Obj-PI-Filt. Retrieve imgs

Order by Date Ascending Format LongTab Coords STD string 20 imgs/pg Go! Log-out ross

Filename	Object	RA	Dec	uniqueID	Date	Time	PI-CoI	Texp	Filter	ObsType	MJD
V567_Sco_1_1_K_5	V567_Sco	16:49:50.64	-40:55:05.5	261430105	2010-05-08	10:20:09	Marcio_Catelan	1	K	GENSTAR	55324.43066
V567_Sco_1_1_K_4	V567_Sco	16:49:50.64	-40:55:05.5	261430104	2010-05-08	10:20:02	Marcio_Catelan	1	K	GENSTAR	55324.43058
V567_Sco_1_1_K	V567_Sco	16:49:50.64	-40:55:05.5	261430199	2010-05-08	10:19:56	Marcio_Catelan	1	K	GENSTAR	55324.43051
V567_Sco_1_1_K_sky	V567_Sco	16:49:50.64	-40:55:05.5	261430198	2010-05-08	10:19:56	Marcio_Catelan	1	K	GENSTAR	55324.43051
V567_Sco_1_1_K_3	V567_Sco	16:49:50.64	-40:55:05.5	261430103	2010-05-08	10:19:56	Marcio_Catelan	1	K	GENSTAR	55324.43051
V567_Sco_1_1_K_2	V567_Sco	16:49:50.64	-40:55:05.5	261430102	2010-05-08	10:19:49	Marcio_Catelan	1	K	GENSTAR	55324.43043
V567_Sco_1_1_K_1	V567_Sco	16:49:50.64	-40:55:05.5	261430101	2010-05-08	10:19:42	Marcio_Catelan	1	K	GENSTAR	55324.43035
WY_Sco_2_10_K_5	WY_Sco	16:33:20.40	-26:11:14.6	261420105	2010-05-08	10:17:24	Marcio_Catelan	10	K	GENSTAR	55324.42875
WY_Sco_2_10_K_4	WY_Sco	16:33:20.40	-26:11:14.6	261420104	2010-05-08	10:17:08	Marcio_Catelan	10	K	GENSTAR	55324.42856
WY_Sco_2_10_K	WY_Sco	16:33:20.40	-26:11:14.6	261420199	2010-05-08	10:16:52	Marcio_Catelan	10	K	GENSTAR	55324.42838
WY_Sco_2_10_K_sky	WY_Sco	16:33:20.40	-26:11:14.6	261420198	2010-05-08	10:16:52	Marcio_Catelan	10	K	GENSTAR	55324.42838
WY_Sco_2_10_K_3	WY_Sco	16:33:20.40	-26:11:14.6	261420103	2010-05-08	10:16:52	Marcio_Catelan	10	K	GENSTAR	55324.42838
WY_Sco_2_10_K_2	WY_Sco	16:33:20.40	-26:11:14.6	261420102	2010-05-08	10:16:36	Marcio_Catelan	10	K	GENSTAR	55324.42819
WY_Sco_2_10_K_1	WY_Sco	16:33:20.40	-26:11:14.6	261420101	2010-05-08	10:16:21	Marcio_Catelan	10	K	GENSTAR	55324.42802
GK_Nor_2_12_K_5	GK_Nor	15:34:50.88	-58:23:58.6	261410105	2010-05-08	10:13:46	Ronald_Mennickent	12	K	GENSTAR	55324.42623
GK_Nor_2_12_K_4	GK_Nor	15:34:50.88	-58:23:58.6	261410104	2010-05-08	10:13:28	Ronald_Mennickent	12	K	GENSTAR	55324.42602
IMG1261240	GK_Nor	15:34:44.64	-58:24:34.6	261410200	2010-05-08	10:13:12	Ronald_Mennickent	30	I	GENSTAR	55324.42584
GK_Nor_2_12_K	GK_Nor	15:34:50.88	-58:23:58.6	261410199	2010-05-08	10:13:10	Ronald_Mennickent	12	K	GENSTAR	55324.42581
GK_Nor_2_12_K_sky	GK_Nor	15:34:50.88	-58:23:58.6	261410198	2010-05-08	10:13:10	Ronald_Mennickent	12	K	GENSTAR	55324.42581
GK_Nor_2_12_K_3	GK_Nor	15:34:50.88	-58:23:58.6	261410103	2010-05-08	10:13:10	Ronald_Mennickent	12	K	GENSTAR	55324.42581

Selected 1817 entries, shown 1 - 20 UT now: Jun 07 2010 09:42:48

Page: 1 2 3 4 >> 14 ... 91 1

Used query:
SELECT * FROM REMImgs.Obslog WHERE (date_obs > '2010-05-07 22:00:00' AND date_obs < '2010-05-08 12:00:00') ORDER BY date_obs DESC LIMIT 0,20

Your WHERE clause: Distinct... Retrieve imgs Go!

REM images browser: [Credits](#) Written by L. Nicastro
Read the [usage permission rules](#). Version: 0.2e, 17-Jun-2008

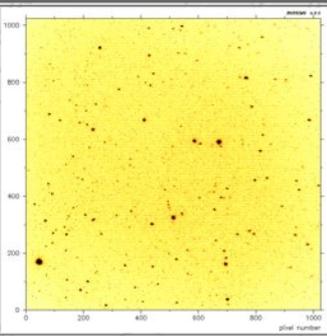
Go BACK or to the REM images browser page

Beijing, 11-07-2011

The REM web-based archive browser

Select ALL where **ImgNight** >= 2010-05-07 <= 2010-05-07 Distinct Obj-PI-Filt. Retrieve imgs

Order by Date Ascending Format LongTab Coords STD string 5 imgs/pg [Log-out ross](#)



317787, **IMG126I240 (SExCat)**: [Tools](#) [RefCats](#) [Aladin](#) [17](#)

Object: **GK_Nor** (GENSTAR) PI: **Ronald_Mennickent**

RA: **15:34:44.64** Dec: **-58:24:34.6** Date: **2010-05-08** UT: **10:13:12**

Gl: **322.973** Gb: **-2.042** MJD: **55324.42584**

Filter: **I** Exp.: **30 s**

ObsID: **26141** SubID: **2** DithID: **0**

ObID: **112897** PropID: **21701** Processing status ID: 3

ROSS Raw Direct image Sky chart: [GSC-2.3](#), [USNO-B1.0](#), [2MASS](#), [Google Sky](#)

Inserted on 2010-05-08 20:26:08. PI user name: **rmennickent**

Filename	Object	RA	Dec	uniqueID	Date	Time	PI-CoI	Texp	Filter	ObsType	MJD
GK_Nor_2_12_K_4	GK_Nor	15:34:50.88	-58:23:58.6	261410104	2010-05-08	10:13:28	Ronald_Mennickent	12	K	GENSTAR	55324.42602
IMG126I240	GK_Nor	15:34:44.64	-58:24:34.6	261410200	2010-05-08	10:13:12	Ronald_Mennickent	30	I	GENSTAR	55324.42584
GK_Nor_2_12_K	GK_Nor	15:34:50.88	-58:23:58.6	261410199	2010-05-08	10:13:10	Ronald_Mennickent	12	K	GENSTAR	55324.42581
GK_Nor_2_12_K_sky	GK_Nor	15:34:50.88	-58:23:58.6	261410198	2010-05-08	10:13:10	Ronald_Mennickent	12	K	GENSTAR	55324.42581
GK_Nor_2_12_K_3	GK_Nor	15:34:50.88	-58:23:58.6	261410103	2010-05-08	10:13:10	Ronald_Mennickent	12	K	GENSTAR	55324.42581

Selected **1817** entries, shown 16 - 20 UT now: Jun 07 2010 09:52:59

Page: 1 2 3 4 5 6 7 >> 17 ... 364 [4](#)

Used query:
 SELECT * FROM REMImgs.Obslog WHERE (date_obs > '2010-05-07q 22:00:00' AND date_obs < '2010-05-08 12:00:00') ORDER BY date_obs DESC LIMIT 15,5

Your WHERE clause: Distinct... Retrieve imgs

REM images browser: [Read the usage permission rules.](#) [Credits](#) Written by **L. Nicastro**
Version: 0.2e, 17-Jun-2008

Go [BACK](#) or to the [REM images browser page](#)

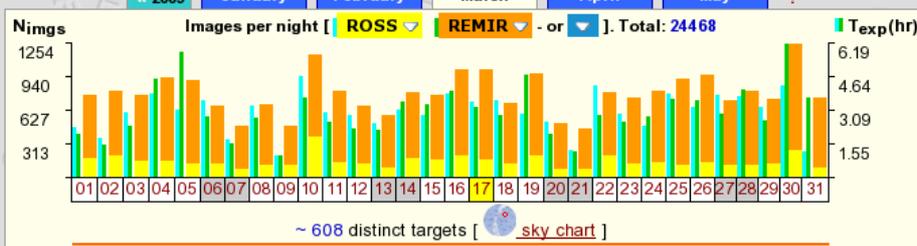
Beijing, 11-07-2011

The REM web-based archive browser

Select ALL where **ImgNight** >= 2010-03-17 <= 2010-03-17 Limit Distinct Obj-PI-Filt. Retrieve imgs

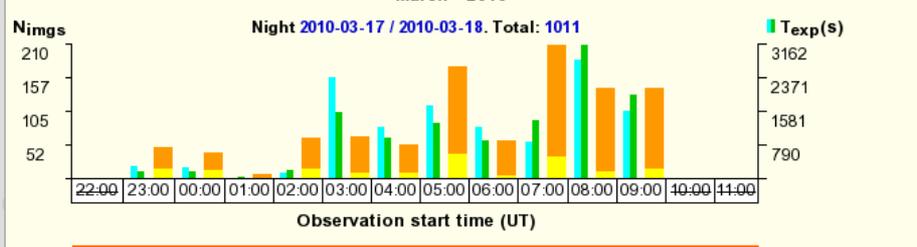
Order by Date Ascending Format LongTab Coords STD string 20 imgs/pg [Log-out ross](#)

Navigation: << 2009 January February **March** April May ?



Images per night [**ROSS** **REMIR** - or]. Total: 24468

~ 608 distinct targets [[sky chart](#)]



Night 2010-03-17 / 2010-03-18. Total: 1011

Observation start time (UT)

Beijing, 11-07-2011

The GAIA-GBOT demo archive browser (1)

Select ALL where ImgNight >= <= Limit Retrieve imgs

Order by Date Ascending Format LongTab Coords STD string 20 imgs/pg Go! Log-out Rusr

?	Camera	RA	Dec	Gl	Gb	Date	Time	Object	PI-CoI	ObsType	ObsID	Temp	Filter	Seeing	Airmass	MJD
?	RATCam	23:21:54.117	-15:17:46.96	58.026	-66.075	2010-09-07	23:38:28	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	10.7772	1.59	55446.98505
?	RATCam	23:21:54.117	-15:17:46.96	58.026	-66.075	2010-09-07	23:37:40	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	10.907	1.59	55446.9845
?	RATCam	23:21:54.117	-15:17:46.96	58.026	-66.074	2010-09-07	23:36:55	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	10.7751	1.6	55446.98397
?	RATCam	23:21:54.117	-15:17:46.96	58.026	-66.074	2010-09-07	23:36:07	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	11.4029	1.6	55446.98342
?	RATCam	23:21:54.117	-15:17:46.96	58.026	-66.075	2010-09-07	23:35:21	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	11.6406	1.6	55446.98288
?	RATCam	23:21:54.117	-15:17:46.96	58.026	-66.075	2010-09-07	23:34:34	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	12.0636	1.61	55446.98234
?	RATCam	23:21:54.117	-15:17:46.96	58.026	-66.075	2010-09-07	23:33:46	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	11.3381	1.61	55446.98178
?	RATCam	23:21:54.117	-15:17:46.96	58.027	-66.074	2010-09-07	23:33:00	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	9.8419	1.62	55446.98126
?	RATCam	23:21:54.117	-15:17:46.96	58.027	-66.074	2010-09-07	23:32:14	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	10.4286	1.62	55446.98072
?	RATCam	23:21:54.117	-15:17:46.96	58.026	-66.074	2010-09-07	23:31:30	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	11.2107	1.62	55446.98021
?	RATCam	23:10:11.321	-18:3:39.06	48.864	-64.996	2010-09-01	00:45:56	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	8.30612	1.51	55440.0319
?	RATCam	23:10:11.321	-18:3:39.06	48.864	-64.996	2010-09-01	00:45:09	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	8.25493	1.51	55440.03136
?	RATCam	23:10:11.321	-18:3:39.06	48.864	-64.996	2010-09-01	00:44:23	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	7.01907	1.52	55440.03083
?	RATCam	23:10:11.321	-18:3:39.06	48.864	-64.996	2010-09-01	00:43:39	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	7.30587	1.52	55440.03031
?	RATCam	23:10:11.321	-18:3:39.06	48.864	-64.996	2010-09-01	00:42:53	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	12.3738	1.52	55440.02978
?	RATCam	23:10:11.321	-18:3:39.06	48.865	-64.996	2010-09-01	00:42:06	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	7.76103	1.52	55440.02924
?	RATCam	23:10:11.321	-18:3:39.06	48.864	-64.996	2010-09-01	00:41:18	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	8.32804	1.52	55440.02868
?	RATCam	23:10:11.321	-18:3:39.06	48.865	-64.996	2010-09-01	00:40:30	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	8.42392	1.52	55440.02813
?	RATCam	23:10:11.321	-18:3:39.06	48.864	-64.996	2010-09-01	00:39:43	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	8.86924	1.53	55440.02759
?	RATCam	23:10:11.321	-18:3:39.06	48.865	-64.996	2010-09-01	00:38:57	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	8.43971	1.53	55440.02706

Selected 100 entries, shown 1 - 20 UT now: Mar 12 2011 08:21:53

Page: 1 2 3 4 5 1

Used query: SELECT * FROM Obslog ORDER BY date_obs DESC LIMIT 0,20

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The GAIA-GBOT demo archive browser (2)

Select ALL where ImgNight >= <= Limit Retrieve imgs

Order by Date Ascending Format LongTab Coords STD string 20 imgs/pg Go! Log-out Rusr



'c_e 20100831 54 10 1 1 SDSS-R 20.0'

81. **c e 20100831 54 10 1 1 (SExCat):**

Object: **Planck** (EXPOSE) PI: **Steele.Iain**

RA: **23:10:11.321** Dec: **-18:3:39.06** Date: **2010-09-01** 5:56

Gl: **48.864** Gb: **-64.996** MJD: **55440.0319**

Filter: **R** Exp.: **20 s**

Seeing: **8.31"** Airmass: **1.51**

PropID: **DL10B01** ObsID: **OBS_1**

ConfigID: **220120** GrpNumOb: **-1**

Moon_{dist}: **80.3°** Moon_{ph}: **0.564228**

Noise_{tot}: **8.75004** RMS: **3.49735** [ADU/pix]

Cleaned R image Sky chart: [GSC-2.3](#) [2MASS](#) [Google Sky](#)

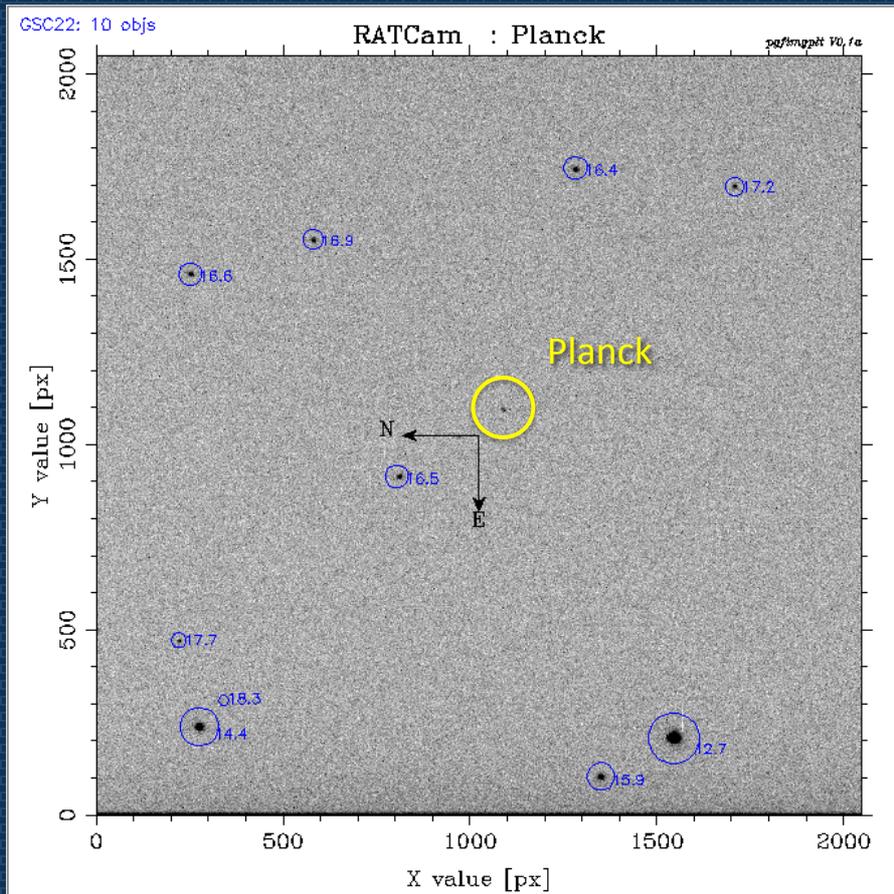
Tools RefCats Aladin 11

- UCAC 2
- UCAC 2 - annot.
- UCAC 3
- UCAC 3 - annot.
- USNO-B1.0
- USNO-B1.0 - annot.
- GSC-2.2
- GSC-2.2 - annot.
- GSC-2.3
- GSC-2.3 - annot.
- 2MASS
- 2MASS - annot.

?	Camera	RA	Dec	Gl	Gb	Date	Time	Object	PI-CoI	ObsType	ObsID	Temp	Filter	Seeing	Airmass	MJD
?	RATCam	23:21:54.117	-15:17:46.96	58.026	-66.075	2010-09-07	23:38:28	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	10.7772	1.59	55446.98505
?	RATCam	23:21:54.117	-15:17:46.96	58.026	-66.075	2010-09-07	23:37:40	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	10.907	1.59	55446.9845
?	RATCam	23:21:54.117	-15:17:46.96	58.026	-66.074	2010-09-07	23:36:55	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	10.7751	1.6	55446.98397
?	RATCam	23:21:54.117	-15:17:46.96	58.026	-66.074	2010-09-07	23:36:07	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	11.4029	1.6	55446.98342
?	RATCam	23:21:54.117	-15:17:46.96	58.026	-66.075	2010-09-07	23:35:21	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	11.6406	1.6	55446.98288
?	RATCam	23:21:54.117	-15:17:46.96	58.026	-66.075	2010-09-07	23:34:34	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	12.0636	1.61	55446.98234
?	RATCam	23:21:54.117	-15:17:46.96	58.026	-66.075	2010-09-07	23:33:46	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	11.3381	1.61	55446.98178
?	RATCam	23:21:54.117	-15:17:46.96	58.027	-66.074	2010-09-07	23:33:00	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	9.8419	1.62	55446.98126
?	RATCam	23:21:54.117	-15:17:46.96	58.026	-66.074	2010-09-07	23:32:14	Planck	Steele.Iain	EXPOSE	OBS_1	20	R	10.4286	1.62	55446.98072

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The GAIA-GBOT demo archive browser (3)



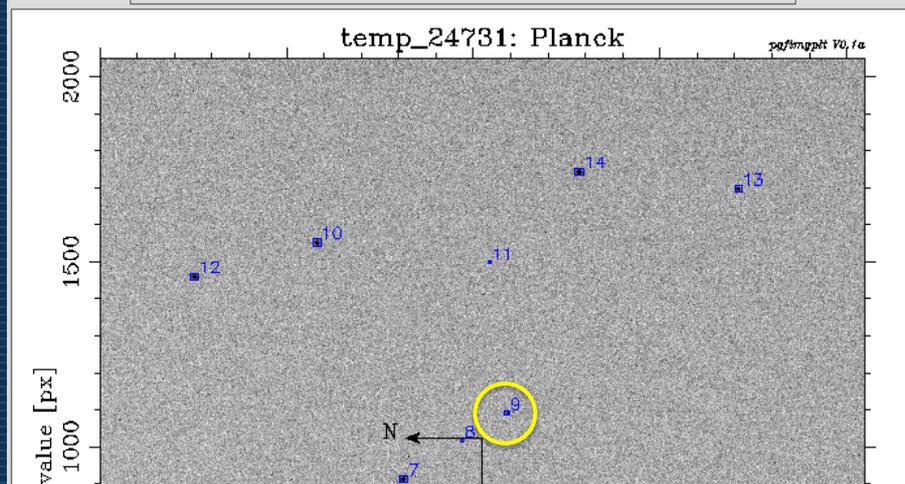
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The GAIA-GBOT demo archive browser (4)

?

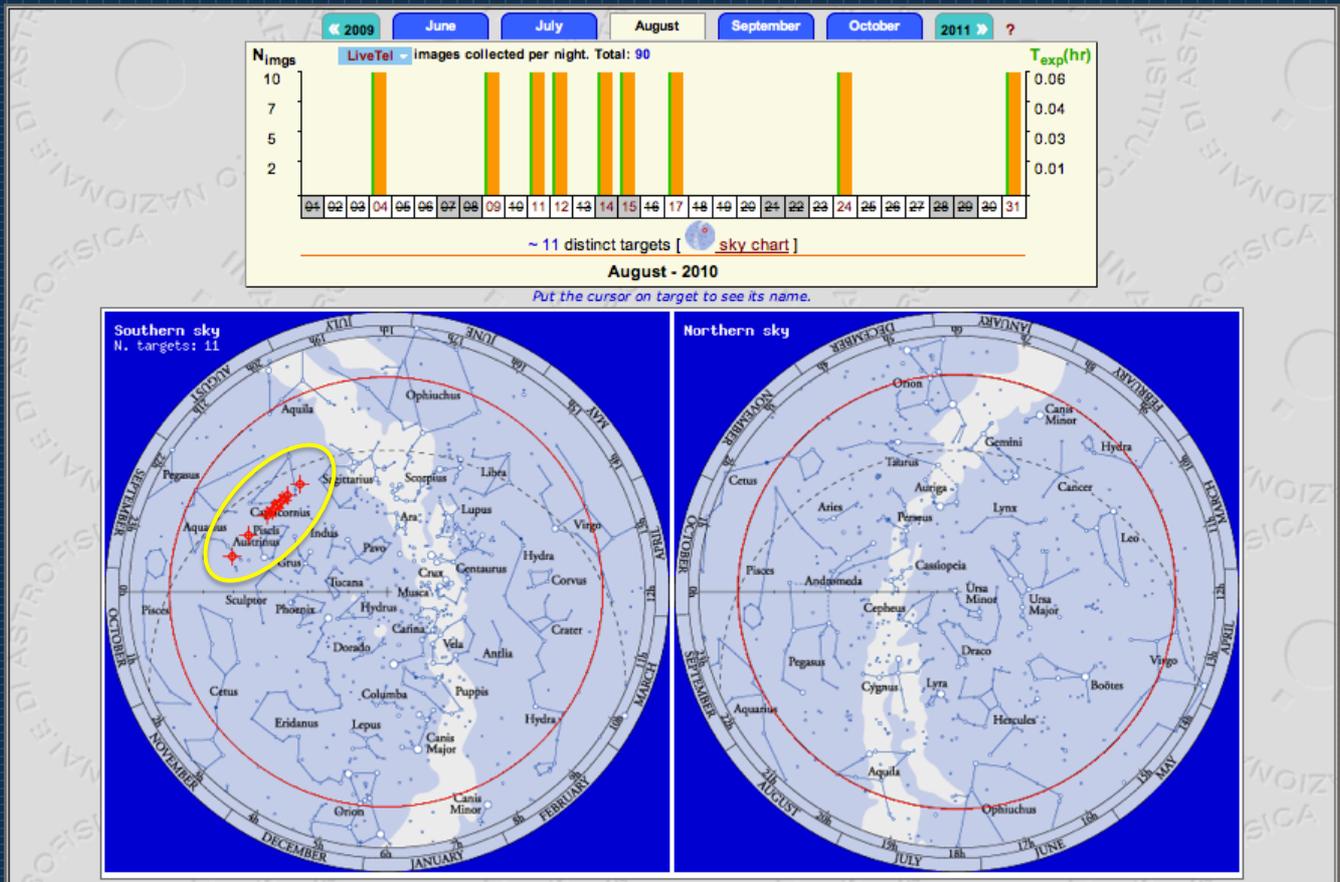
ID	Xmin	Xmax	X	Ymin	Ymax	Y	MagAper	ErrMagA	MagBest	ErrMagB	Bckg	Elong	Flags
1	1	2048	416.823	1	14	1.229	13.0359	0.0207	6.5977	0.0014	10.5106	266.659	27
2	801	2048	1486.860	1	4	1.000	13.1887	0.0223	7.2698	0.0015	9.939198	378.787	27
3	1338	1364	1350.601	94	114	103.900	12.6281	0.0172	10.7004	0.0105	9.681357	1.154	0
4	1521	1572	1547.138	186	235	208.994	9.5611	0.0038	7.6618	0.0017	9.334565	1.075	0
5	257	292	276.028	223	255	238.210	11.3088	0.0087	9.4202	0.0043	9.124107	1.105	0
6	216	231	222.694	465	477	470.315	14.3995	0.0515	12.6550	0.0394	8.255416	1.193	0
7	802	824	812.485	904	923	913.301	13.2921	0.0250	11.4828	0.0165	8.551344	1.078	0
8	967	975	971.231	1014	1025	1020.227	15.1114	0.0878	13.6103	0.0810	8.493636	1.319	0
9	1082	1097	1089.879	1088	1099	1093.653	14.4816	0.0546	12.5177	0.0404	8.331888	1.174	2
10	572	591	581.820	1543	1561	1551.849	13.5771	0.0299	11.6800	0.0201	8.701831	1.156	0
11	1039	1048	1042.413	1495	1504	1499.328	15.5923	0.1288	13.8430	0.1132	8.718512	2.199	2
12	241	264	253.852	1452	1469	1460.155	13.4092	0.0269	11.5108	0.0192	8.320092	1.184	0
13	1701	1718	1709.561	1689	1705	1696.421	14.0045	0.0393	12.0857	0.0280	8.810527	1.146	0
14	1273	1295	1283.316	1733	1753	1742.609	13.2487	0.0244	11.3234	0.0163	8.871246	1.126	0

Median Width and Height (pix.): 21.50 18.50 Average Width and Height (pix.): 22.83 20.50



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The GAIA-GBOT demo archive browser (5)



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Archive browser main “ingredients”

- **LAMP**
 - Manually installed (from source code) MySQL, Apache, PHP
 - Customized “httpd.conf” to manage .fits, .sexcat, .spe files
- **JavaScript**
 - Used for various handy pages manipulation and tags creation
- **Perl with LWP, HTTP, GD ... (DBI, DBD)**
 - Used for graphics
- **External utility programs**
 - Things like SExtractor, MySQL catalogues reader, images display, FITS header reader, (spectral plot), etc.
- **MyRO**
 - User’s access privilege system

And MCS?

- Not quite in the current version; we can discuss about it ...

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A few questions (see first slide)

- Do we have information about the computer systems at the various telescopes?
 - We can ignore scheduling and local image archiving system, but need to be able to install some pieces of s/w.
- Who will be involved *and* contribute to the DHS implementation?
 - All the various aspects are to be considered; S/W and DB experts must be present in the team.
 - How many person/month are (or will be) allocated to the project?
 - Need to have some involvement of, at least, one person per telescope.
- Who will coordinate/supervise (in all phases?) the DHS?
 - Work must start ASAP with a prototype system and a simulator.
 - Assuming FITS images, a consistent header info must be agreed.
 - Data access policy?
- Where will the main data center be?
- Are there any specific funds allocated or foreseen?

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DIF indexed catalogues in Turin (R. Smart)

TblName	OrigCatName	TblName	OrigCatName
GSC22	GSC 2.2	DB	COMPASS
GSC23	GSC2.3.1	DBGSC2	COMPASS
GSC24	GSC2.4 HGL	DBGSC2N	COMPASS
TYCHO2	Tycho-2	DBGSC2N0	COMPASS
CU3QSO	LQRF	DBGSC2N1	COMPASS
DENIS	DENIS 2	DBGSC2N2	COMPASS
FIRST	FIRST	DBGSC2N3	COMPASS
HIP	HIPPARCOS	DBGSC2S	COMPASS
IGSL	IGSL2	DBGSC2S0	COMPASS
NPM2	NPM	DBGSC2S1	COMPASS
PARSECPMV1	PARSEC PM	DBGSC2S2	COMPASS
TMASSg	2MASS XSC	DBGSC2S3	COMPASS
TMASS	2MASS PSC	DBN	COMPASS
USNOB	USNOB 1.0	DBN0	COMPASS
ESOPM	PARSECPMV1	DBN1	COMPASS
UCAC	UCAC3	DBN2	COMPASS
UCAC2	UCAC v2	DBN3	COMPASS
SDSS	DR7	DBS	COMPASS
GSPC2	---	DBS0	COMPASS
PMUSNOB1	---	DBS1	COMPASS
PMUSNOB2	---	DBS2	COMPASS
PPLT	---	DBS3	COMPASS
PPMXL	---	gshplt	---
PDAT	---	regions	---
PDATALL	---	pmgs	---
DBSDSS	---	pmgsall	---
MASTER	---	hpix	---
mdbcu3auxdataigsl2igslsource	IGSL Latest		

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Catalogues info and Sky queries

Catalogues content description via DB tables CatDesc and CatParams

```
mysql> DESCRIBE CatDesc;
```

Field	Type	Null	Key	Default	Extra
DbName	char(30)	NO	MUL	NULL	
TblName	char(30)	NO		NULL	
ColName	char(30)	YES		NULL	
CatIDNumber	smallint(6)	NO		0	
EntryDate	char(20)	NO		2000-01-01 00:00:00	
ModifDate	char(20)	NO		2010-05-01 00:00:00	
OrigCatName	char(30)	NO			
FullCatName	char(60)	NO			
Reference	varchar(60)	NO			
Comment	varchar(200)	NO			

```
mysql> SELECT COUNT(*) FROM CatDesc WHERE DbName='TOCats';
```

count(*)
55

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Catalogues info and Sky queries

```
mysql> SELECT * FROM CatDesc WHERE DbName='TOCats' AND  
TblName='GSC23' \G
```

```
***** 1. row *****  
    DbName: TOCats  
    TblName: GSC23  
    ColName: htmID_6  
CatIDNumber: 1  
    EntryDate: 2007-01-01  
    ModifDate: 2007.07  
OrigCatName: GSC2.3.1  
FullCatName: Guide Star Catalog  
    Reference: Lasker 2008AJ...136..735L  
    Comment: incl PMs with systematic errors
```

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Catalogues info and Sky queries

```
mysql> SELECT DISTINCT ColName FROM CatParams WHERE DbName='TOCats'
      AND TblName='GSC23';
```

```
+-----+
| ColName          |
+-----+
| BGSC2mm          | | IGSC2mm          |
| CLASSIFICATION  | | MASTERhpx6      |
| DECmas           | | RAmas           |
| DECPMdmass      | | RAPMdmass       |
| eDECPMdmass     | | RAPMdmass       |
| EP00000c        | | RGSC2mm         |
| eRAPMdmass      | | runningnumber   |
| gscID2          | | sourceStat      |
| htmID_6         | | VGSC2mm         |
+-----+
```

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Catalogues info and Sky queries

```
mysql> SELECT * FROM CatParams WHERE DbName='TOCats' AND
      TblName='GSC23' AND ColName='RGSC2mm';
```

```
+-----+-----+-----+-----+-----+
| DbName | TblName | ColName | elem | val |
+-----+-----+-----+-----+-----+
| TOCats | GSC23   | RGSC2mm | FAMILY | Magnitude |
| TOCats | GSC23   | RGSC2mm | DATATYPE | Int |
| TOCats | GSC23   | RGSC2mm | NULLVALUE | Null |
| TOCats | GSC23   | RGSC2mm | OFFSET | 0 |
| TOCats | GSC23   | RGSC2mm | SCALE | 1e-3 |
| TOCats | GSC23   | RGSC2mm | ACCURACY | 10 |
| TOCats | GSC23   | RGSC2mm | ISUNSIGNED | F |
| TOCats | GSC23   | RGSC2mm | MAXVAL | 28000 |
| TOCats | GSC23   | RGSC2mm | MINVAL | -3000 |
| TOCats | GSC23   | RGSC2mm | OUTNAME | R |
| TOCats | GSC23   | RGSC2mm | OUTUNIT | mag |
| TOCats | GSC23   | RGSC2mm | UNIT | milli-mags |
+-----+-----+-----+-----+-----+
```

Enum
types

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