



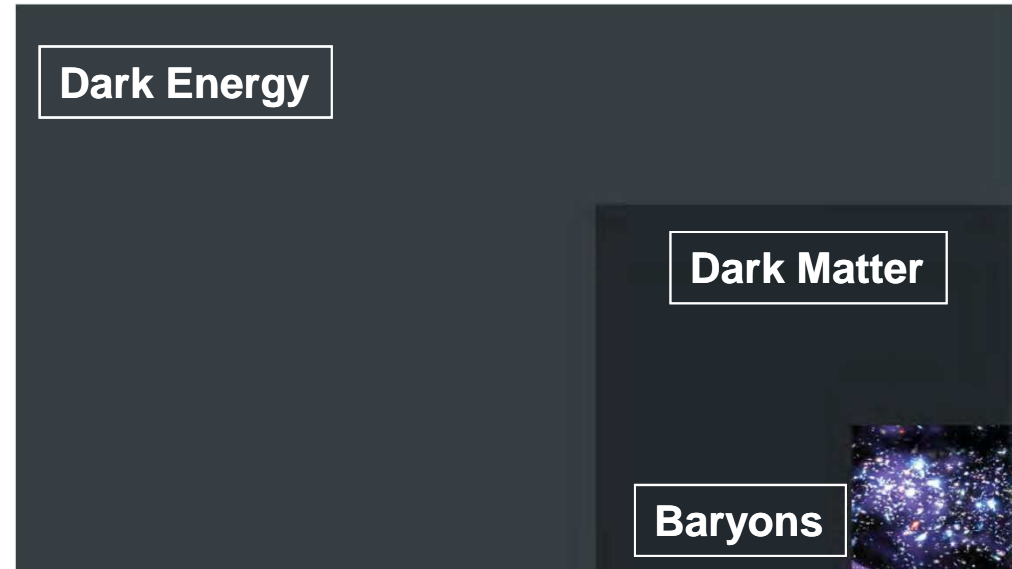
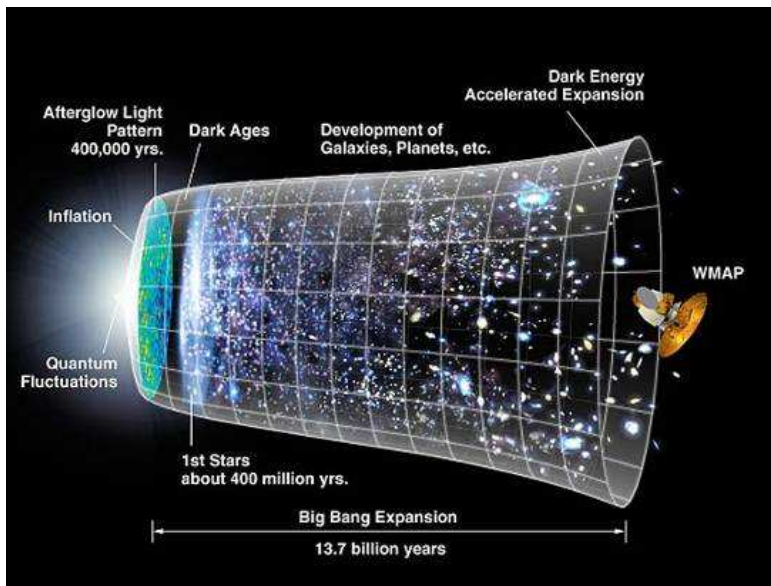
LineA: e-science center for Astronomy

Luiz Nicolaci da Costa

Laboratório Interinstitucional de e-Astronomia

Observatório Nacional

Scientific Motivation



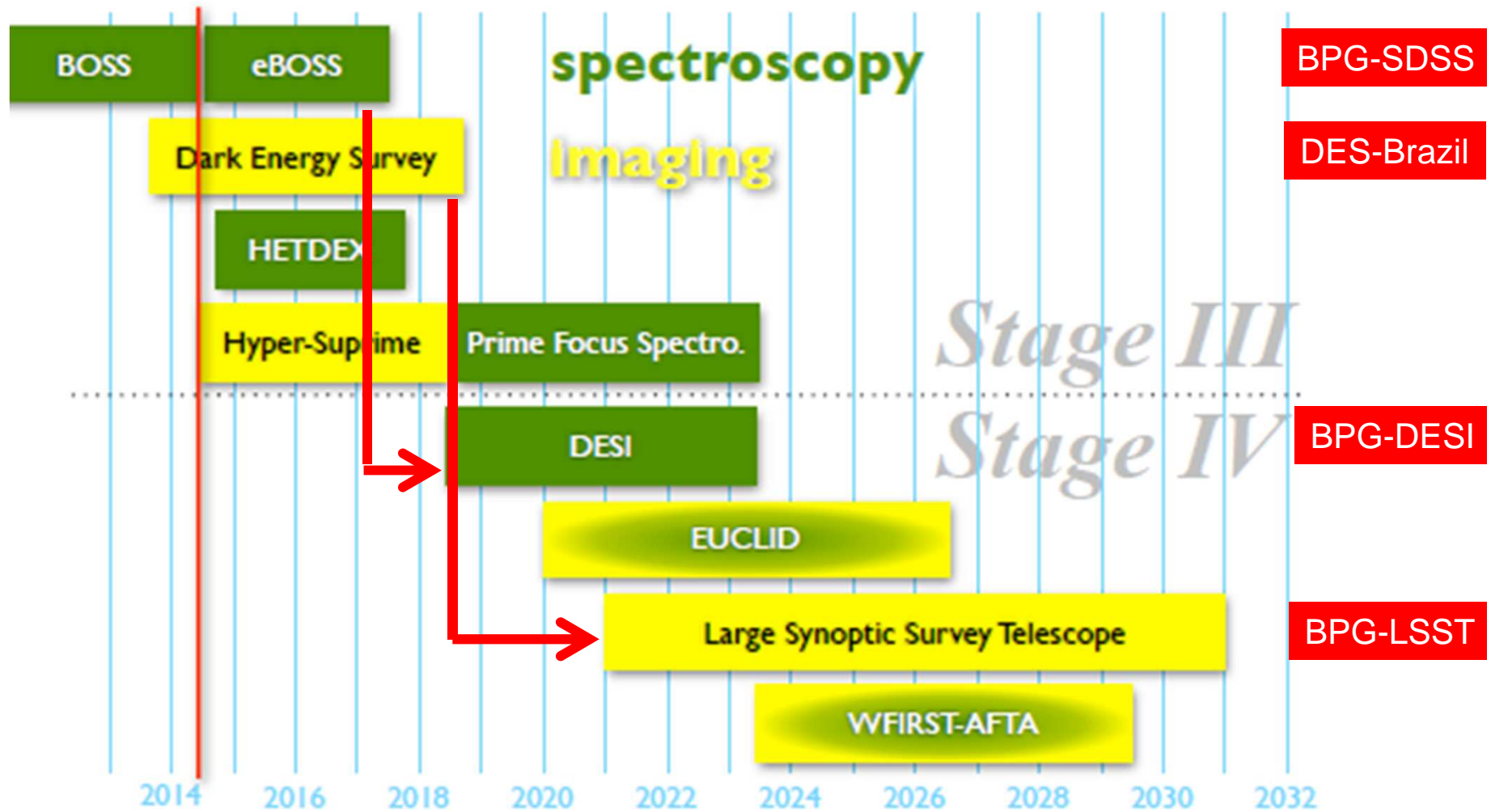
Implications:

- Cosmological constant ?
- Quantum vacuum energy ?
- Modified gravity theory ?
- A new kind of field ?



New Physics

The dark energy facilities roadmap



Legacy: Science & Technology



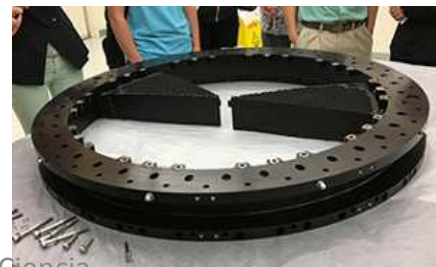
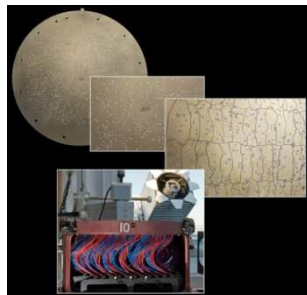
4 meter telescope
570 Megapixel camera
525 nights



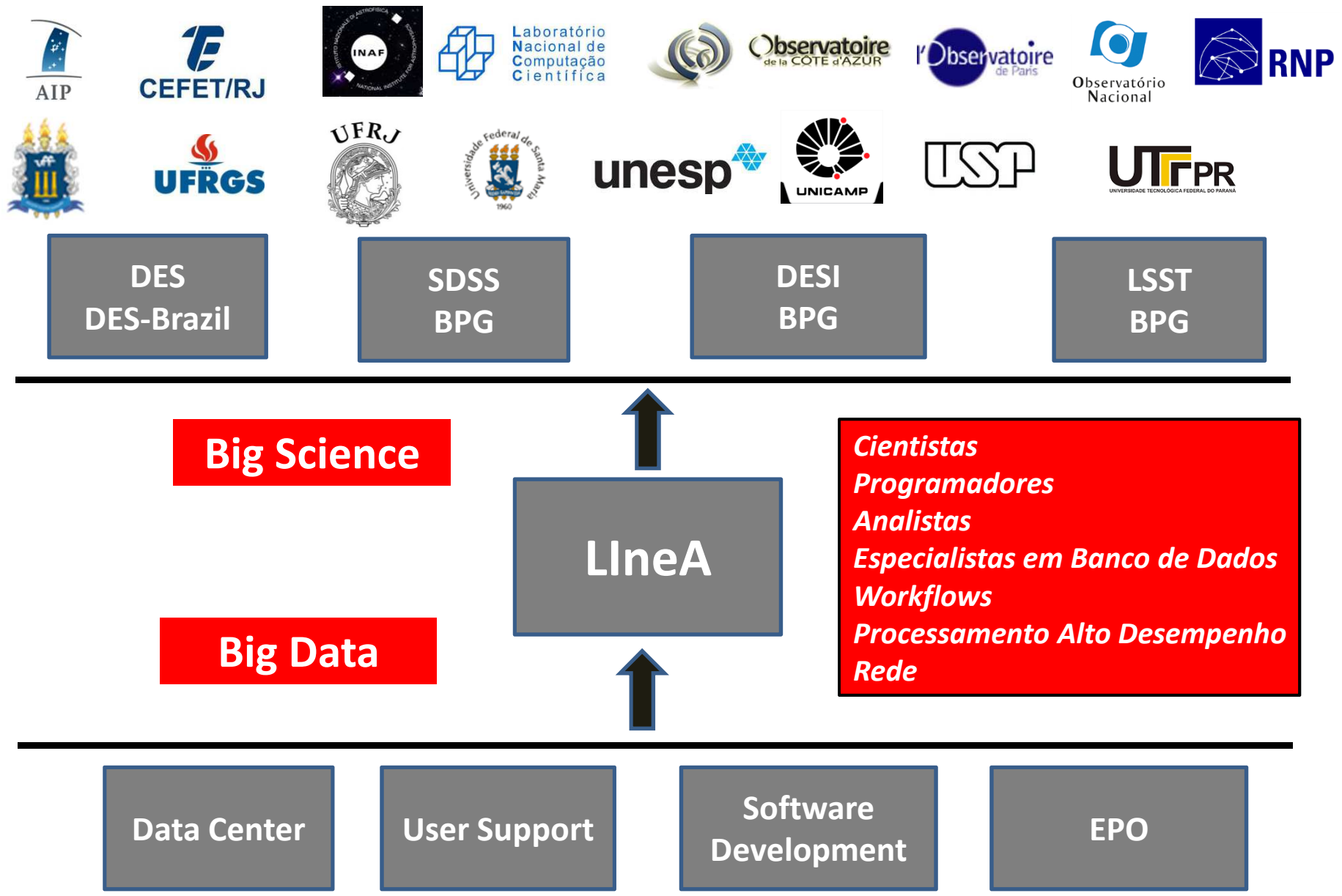
8 meter telescope
3200 Megapixel
3650 nights



2.5 meter telescope
1000 fibers
By-hand



4 meter telescope
5000 fibers
automatic



Software Development

IT team

Afiliados

Cientistas

Pós-Doutorandos

Doutorandos

Mestrandos

Graduandos

Tecnologistas

Administrativo



Andrea Nunes



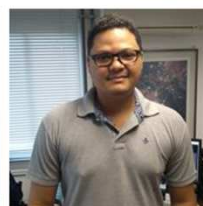
Carlos Adean



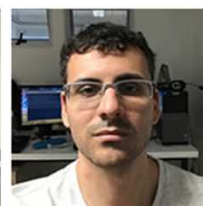
Carolina Felicissimo



Cristiano Singulani



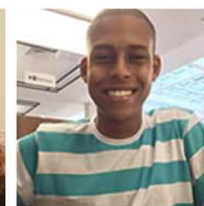
Eric Souza



Felipe Machado



Fernanda Mello



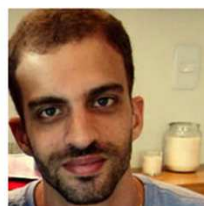
George Costa



Glauber Verde



Jeferson Souza



Guilherme Soares



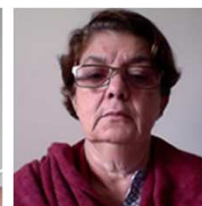
Leonardo Lacerda



Lucas Nunes



Maria Aparecida



Maria Sanchez



Rodrigo Souza

LineA Products

Verification



Quick Reduce
Quick Look Framework



CTIO



KPNO

Access/Validation



Data Science Server
LineA Science Server



Analysis



Science Portal
Small Solar System Objects Portal



(see R. Ogando's presentation)

Verification

Quick Reduce @ CTIO (Chile)

QR Monitor

Mode: **STOPPED** | Mode: **Automatic** | Environment: **ISISPI** | Disk Usage: **9%** | Current Observer: **DECam Observer**

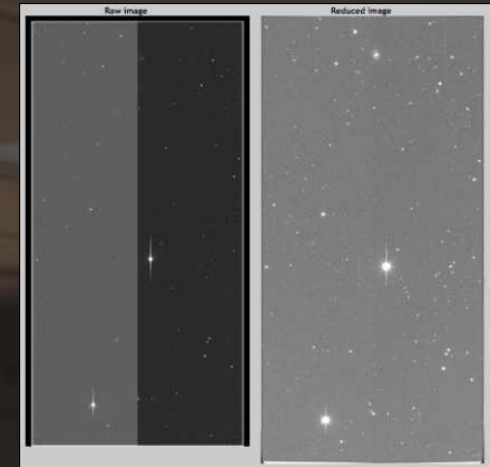
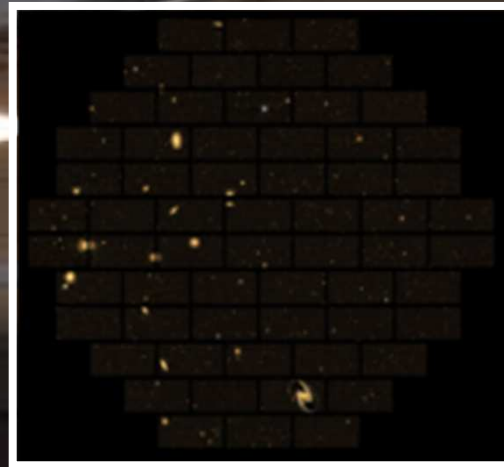
System Log:

- 2012-12-07 06:50:33 Starting process
- 2012-12-07 06:56:39 Finished process
- 2012-12-07 06:55:22 Number of CCDs to
- 2012-12-07 06:55:22 EXPOSURE ID 15875
- 2012-12-07 06:55:22 Starting process
- 2012-12-07 06:55:06 Transferring EXPOS
- 2012-12-07 06:53:52 Quick Reduce onlin

3-day Storage:

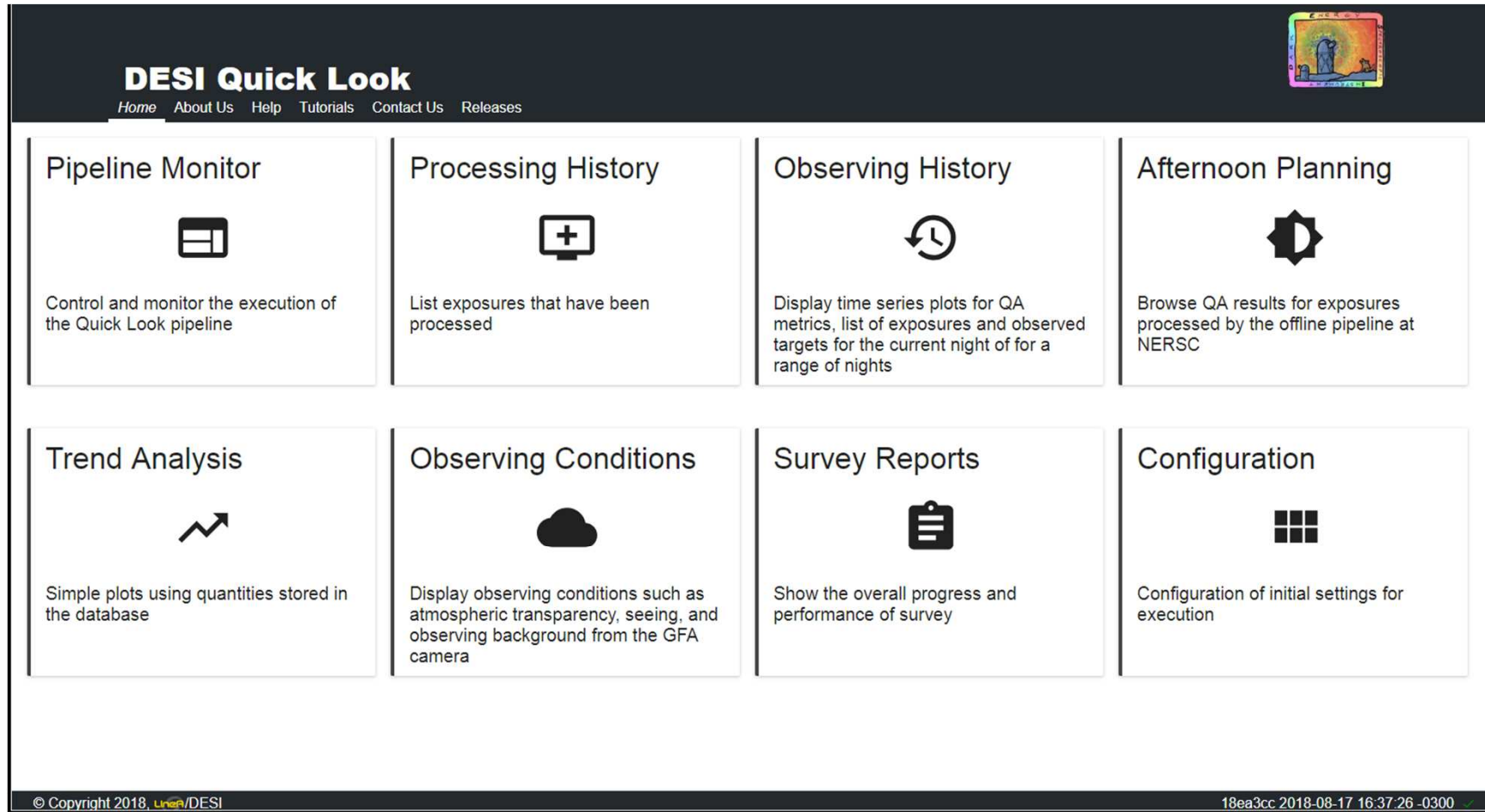
- 2012-12-11 01:30:12 EXPOSURE ID 160170
- 2012-12-11 01:29:35 EXPOSURE ID 160175
- 2012-12-11 01:22:44 EXPOSURE ID 160174
- 2012-12-11 01:22:09 EXPOSURE ID 160175
- 2012-12-11 01:14:58 EXPOSURE ID 160172

14 CCDs selected











Quick Look Framework (QLF) @ KPNO

analyze **15000** spectra/exposure



DESI Quick Look
[Home](#) [About Us](#) [Help](#) [Tutorials](#) [Contact Us](#) [Releases](#)

<h3>Pipeline Monitor</h3>  <p>Control and monitor the execution of the Quick Look pipeline</p>	<h3>Processing History</h3>  <p>List exposures that have been processed</p>	<h3>Observing History</h3>  <p>Display time series plots for QA metrics, list of exposures and observed targets for the current night or for a range of nights</p>	<h3>Afternoon Planning</h3>  <p>Browse QA results for exposures processed by the offline pipeline at NERSC</p>
<h3>Trend Analysis</h3>  <p>Simple plots using quantities stored in the database</p>	<h3>Observing Conditions</h3>  <p>Display observing conditions such as atmospheric transparency, seeing, and observing background from the GFA camera</p>	<h3>Survey Reports</h3>  <p>Show the overall progress and performance of survey</p>	<h3>Configuration</h3>  <p>Configuration of initial settings for execution</p>

© Copyright 2018, [Linera/DESI](#) 18ea3cc 2018-08-17 16:37:26 -0300 ✓

DESI Quick Look - Monitor



Status: Idle

Flavor: science

Process Id: 284

Exposure: 3905

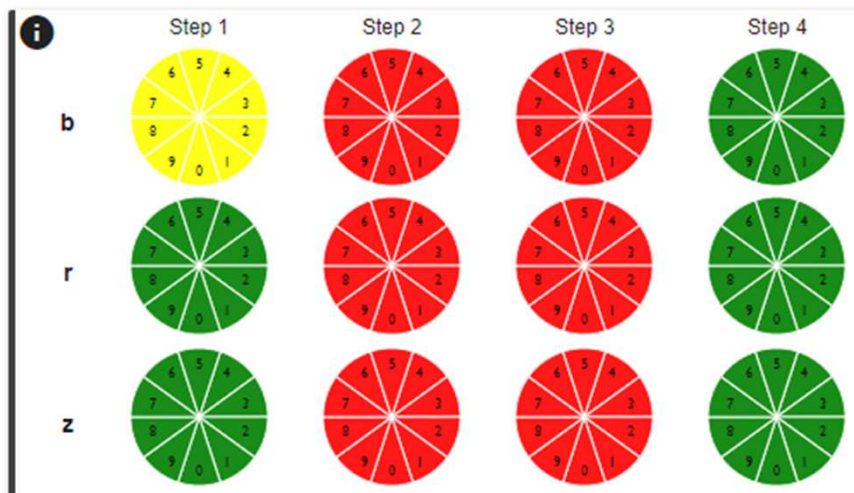
MJD: 58773.917

Date: 2019-10-17

STOP

RESET

CLEAR DISK



```

2018-08-21 21:03:43 Exposure 3905 is ready.
2018-08-21 21:03:43 Total runtime: 0:03:05.
2018-08-21 21:03:43 Ingestion complete: 0:00:05.
2018-08-21 21:03:38 Ingesting QAs...
2018-08-21 21:03:38 Exposure 3905 ended (0:03:00).
2018-08-21 21:03:38 Sky Subtraction ended (0:00:54).
2018-08-21 21:03:35 Fiber Flattening ended (0:00:53).
2018-08-21 21:03:33 Spectral Extraction ended (0:02:23).
2018-08-21 21:02:44 Sky Subtraction started.
2018-08-21 21:02:42 Fiber Flattening started.
2018-08-21 21:01:33 Pre Processing ended (0:00:52).
2018-08-21 21:01:10 Spectral Extraction started.
    
```

Access/Validation

Distribuição de Dados SDSS

SLOAN DIGITAL SKY SURVEY III
SkyServer DR14 LineA Mirror

Home | Data | Schema | Education | Astronomy | SDSS | Contact Us | Download | Site Search | Help

Welcome to the **DR14 LineA Mirror** site!!!

This website presents data from the Sloan Digital Sky Survey, a project to make a map of a large part of the universe. We would like to show you the beauty of the universe, and share with you our excitement as we build the largest map in the history of the world.

News
 The site hosts data from **Data Release 14 (DR14)**. What's new in DR14, what's new on this site and known problems. [More...](#)

SDSS-III is supported by

Powered by **Microsoft**

Site Traffic
 Privacy Policy

Data Access

- Navigate
- Quick Look | Explore
- Finding Chart
- Image List
- Search
 - IQS | SQS | IRSQS
 - SQL Search
 - Cross-ID
 - CasJobs

Education

- For Educators
- Lesson Plans
 - Middle School
 - High School
- College Lab Activities
- Instructor Guides
- Student/Public Research
- Galaxy Zoo
- Zooniverse
- Voyages

Links

- sdss3.org
- Data Release 14
- SDSS-III Science
- Science Archive Server
- About Astronomy
- About the SDSS
- About SkyServer
- VAO
- Credits

Help

- Start Here | FAQ
- Glossary
- Tool User Guides
- Cooking with Sloan
- SQL Tutorial
- About the Database
- Schema Browser
- Sample SQL Queries
- Data Release Papers

Contact Us

The constraints for boundaries of the different regions

Region	Start	End	RA	Dec	RA	Dec	RA	Dec
DR14-1	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
DR14-2	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
DR14-3	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
DR14-4	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
DR14-5	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
DR14-6	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
DR14-7	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
DR14-8	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
DR14-9	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
DR14-10	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00

LineA Science Server @ NCSA



DES Data Management

- Home
- Releases ▾
- Get Help
- Acknowledgements
- About Us

DR1 Data Access

If you'd like to access the images and catalogs from DES DR1, please use the complementary set of tools created by a collaborative effort between NCSA, NOAO, and LineA. These tools allow the users to access, obtain, visualize, and explore DES DR1 products. When using DES data and/or DES access tools please consider the notes in the [Acknowledgement](#) page. Click on the logos below to start exploring DES data tools. Follow the links below to learn more about each tool and their functionalities.



NCSA DESaccess



NOAO DataLab



DES-BRAZIL
LineA Science Server

From these institutions, a rich and complementary set of tools and interfaces were developed to access and interact with DES data in different



News

Sky Viewer

[More](#)

Target Viewer

[More](#)

User Query

[More](#)

Catalog Builder

[More](#)

Science Products

[More](#)

- 02/02/2018 - Release v0.20
- 01/17/2018 - Release v0.19
- 01/05/2018 - Release v0.18
- 12/22/2017 - Release v0.17
- 12/13/2017 - Release v0.16
- 12/01/2017 - Release v0.15
- 11/17/2017 - Release v0.14
- 11/14/2017 - Release v0.13
- 11/10/2017 - Release v0.12
- 10/27/2017 - Release v0.11
- 10/10/2017 - Release v0.10
- 09/19/2017 - Release v0.9



Follow us



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Sky Viewer

DES images exploration and validation

The screenshot displays the Sky Viewer web application interface. At the top, the title "Sky Viewer" is on the left, and a search bar with "ogando" and a home icon is on the right. A navigation bar below the title contains "RA, Dec (Deg)" and "RA (deg), Dec (deg)" dropdown menus. On the left side, a "Map viewer" sidebar includes a "Map Type" dropdown set to "Systematic Maps", a "Map Class" dropdown set to "Nimages", a "Filter" dropdown, and a checked "Display Map" checkbox. The main area shows a grayscale astronomical image of a star field with a white outline. A pink crosshair is centered on the image. In the top left of the image area, the coordinates "-35.29514" and "38.84712, 11.32195" are displayed. The bottom left corner shows "FoV: 180°" and the bottom right corner features the "ALADIN" logo. The footer text reads "Powered by LineA | Dark Energy Survey | NCSA".

Sky Viewer RA, Dec (Deg) RA (deg), Dec (deg) luiz

Y3A2
DES0225-1041
RA, Dec (deg): 36.45886, -10.66801
Mouse RA, Dec (deg): 36.46897, -10.67655

FoV: 3'

ALADIN

The image shows a screenshot of the 'Sky Viewer' web application. The interface features a dark header with the application name and a search bar. A sidebar on the left contains several icons for navigation and settings. The main area is a star field with a pink crosshair in the center. The top right corner has a user name 'luiz' and navigation icons. The bottom right corner has the 'ALADIN' logo. The bottom left corner shows the field of view 'FoV: 3''.

User Query

The screenshot displays the 'User Query' interface. On the left, there is a sidebar with a 'Release' dropdown set to 'Y3A1' and a list of tables including 'Y3A2 VHS DES' and 'Y3A2 WISE DES'. The main area is titled 'Query Definition' and contains the following fields:

- Name*:** Bright objects in a RA Dec box
- Description:** This query finds unique bright objects in an RA/Dec box.
- SQL Sentence*:**

```
1 -- Get the unique object ID, coordinates, and magnitude in g band
2 -- from the table containing basic photometric data (ex. magnitude, shape, basic star/galaxy classification) for unique objects.
3 -- A bright magnitude range is added for better visualization of sources at Target Viewer
4 SELECT coadd_object_id, ra ,dec, mag_auto_g
5 FROM DES_ADMIN.DR1_MAIN
6 WHERE ra > 35 and ra < 36
7 AND dec > -10 and dec < -9
8 AND mag_auto_g between 19 and 20
9 AND rounum < 300
```

At the bottom right of the query definition area are 'Check' and 'Preview' buttons. Below the query definition is a 'Table Content' section with a tab labeled 'My JOBS'. It shows a table with the following data:

coadd_obj...	ra	dec	mag_auto_g
106981709	35.00158	-9.963205	19.638950...
106981199	35.002735	-9.957192	19.244644...
106969345	35.003103	-9.806516	19.081388...
150601289	35.005447	-9.041974	19.909435...
150601497	35.008215	-9.047639	19.787481...

Target Viewer

Target Viewer dri-admin

Galaxy Clusters 4

ID	RA (deg)	Dec (deg)	Radius ...	SNR	Richness ↓	Photo-z	Rating	Reject	Comme...
1	352.56421	-1.32768	1.351	20.481	63.791	0.528	☆☆☆☆☆	<input type="checkbox"/>	
2	354.40602	0.26741	1.930	26.346	60.224	0.298	☆☆☆☆☆	<input type="checkbox"/>	
3	353.18190	-1.10601	1.146	17.774	51.366	0.517	☆☆☆☆☆	<input type="checkbox"/>	
4	326.02488	-0.45611	1.535	12.963	50.512	0.606	☆☆☆☆☆	<input type="checkbox"/>	
5	348.93379	0.88096	1.693	17.905	47.048	0.367	☆☆☆☆☆	<input type="checkbox"/>	
6	328.23196	-1.24810	1.180	14.227	45.201	0.727	☆☆☆☆☆	<input type="checkbox"/>	
7	323.82821	1.42421	1.829	24.049	44.888	0.277	☆☆☆☆☆	<input type="checkbox"/>	
8	1.73020	-0.69364	1.072	15.961	43.767	0.552	☆☆☆☆☆	<input type="checkbox"/>	
9	340.74337	0.68564	0.877	18.851	43.115	0.666	☆☆☆☆☆	<input type="checkbox"/>	
10	342.47825	-0.68539	1.510	14.704	42.700	0.471	☆☆☆☆☆	<input type="checkbox"/>	
11	336.41973	1.07613	1.620	24.320	41.820	0.304	☆☆☆☆☆	<input type="checkbox"/>	
12	358.88012	1.76582	1.798	17.361	41.654	0.260	☆☆☆☆☆	<input type="checkbox"/>	
13	353.96347	0.59132	1.264	12.407	41.494	0.781	☆☆☆☆☆	<input type="checkbox"/>	
14	3.72544	-0.95229	1.398	13.031	41.282	0.542	☆☆☆☆☆	<input type="checkbox"/>	
15	327.22515	-1.14552	1.094	13.508	40.816	0.718	☆☆☆☆☆	<input type="checkbox"/>	
16	338.91310	1.51802	5.157	22.825	40.505	0.080	☆☆☆☆☆	<input type="checkbox"/>	
17	356.86499	-0.15375	1.420	21.723	40.375	0.291	☆☆☆☆☆	<input type="checkbox"/>	
18	330.88256	-1.51619	1.213	18.222	39.260	0.418	☆☆☆☆☆	<input type="checkbox"/>	
19	321.16986	-1.56133	0.889	16.961	37.475	0.500	☆☆☆☆☆	<input type="checkbox"/>	
20	354.14998	-1.47077	2.053	18.490	37.455	0.183	☆☆☆☆☆	<input type="checkbox"/>	
21	345.64608	0.04290	1.295	9.947	36.670	0.534	☆☆☆☆☆	<input type="checkbox"/>	
22	336.21627	1.11054	1.073	14.091	36.596	0.653	☆☆☆☆☆	<input type="checkbox"/>	
23	349.49418	0.15091	1.206	10.158	36.064	0.804	☆☆☆☆☆	<input type="checkbox"/>	
24	345.53551	-1.39092	1.084	11.300	36.003	0.720	☆☆☆☆☆	<input type="checkbox"/>	
25	338.96833	1.53242	7.357	21.736	35.021	0.068	☆☆☆☆☆	<input type="checkbox"/>	
26	349.63171	0.57267	0.990	13.292	35.018	0.733	☆☆☆☆☆	<input type="checkbox"/>	
27	341.17558	0.01473	1.042	13.333	34.014	0.655	☆☆☆☆☆	<input type="checkbox"/>	

Y1 Wide Survey - STRIPE82 | DES2331-0124

RA, Dec (Deg) 352.56398, -1.32800

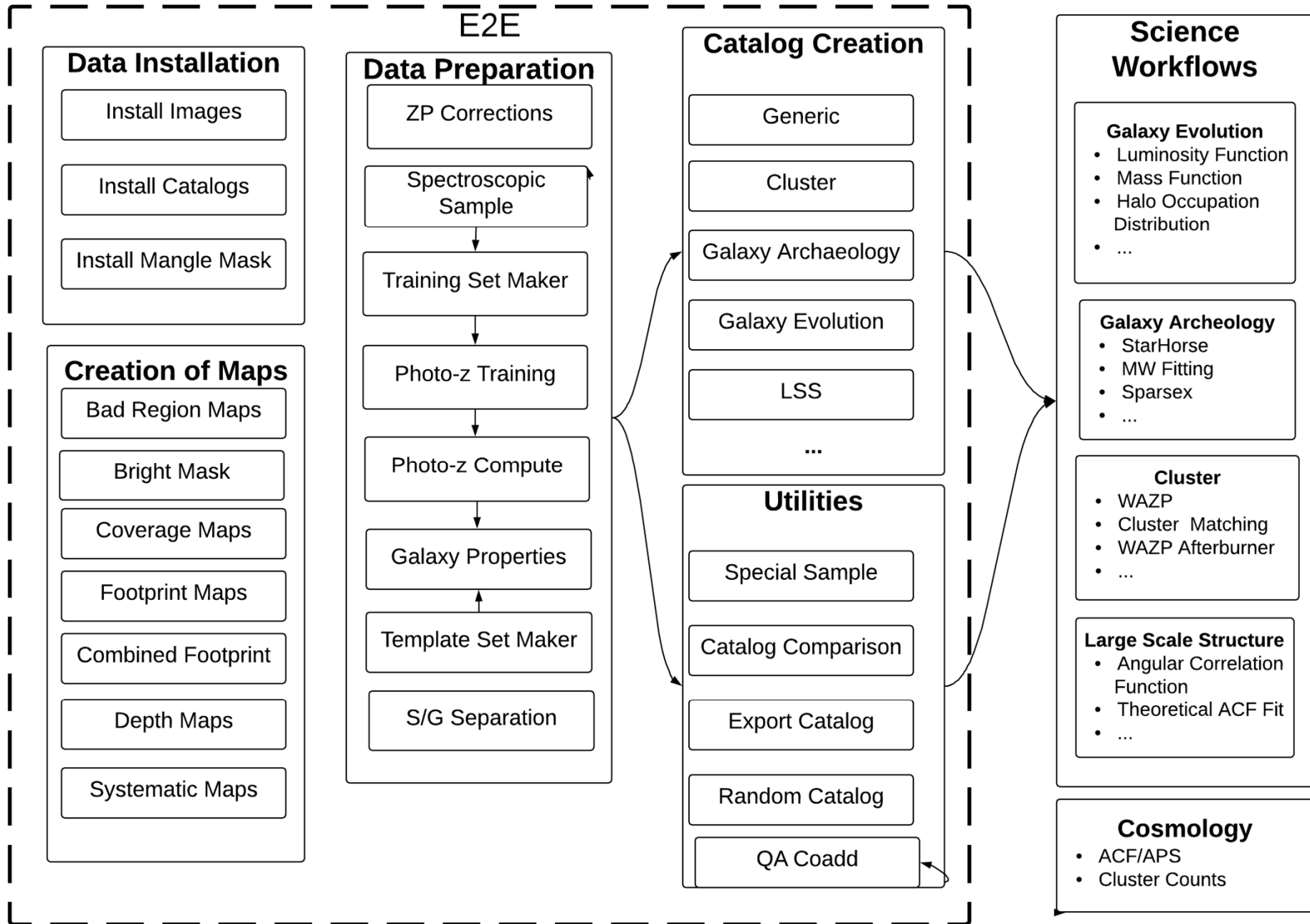
Mouse RA, Dec (352.56120, -1.32197)

Page 1 of 118 | Displaying 1 - 100 of 11772

Powered by LineA | Dark Energy Survey | NCSA

Analysis

Science Portal



Science Portal: Analysis

The screenshot shows the Science Portal interface. At the top is a navigation bar with links: My Workspace, Pipelines, Tools, Data Server, Documentation, Help, and the user name Luiz da Costa. Below the navigation bar is a main content area titled "DES Science Portal: Workflows". The text states: "The Science Portal has two instances:" followed by a bulleted list: "Workflows: hosts workflows for Quality Assessment (QA), for the creation of Value-Added Catalogs (VACs) and for Science Analysis." and "Data Server: provide access to the Catalog Server and published results". Below this, it says: "The system is designed to be self-evident, use the help icon '?' available on each page." and "The Science Portal is a facility developed by LineA. If you have any question please contact us through the helpdesk@linea.gov.br".

A red-bordered box highlights the "Goals:" section, which contains a bulleted list:

- Streamline data handling
- Streamline complex processes
- Facilitate changes in configuration parameters
- Provide provenance
- Provide code versioning
- Easy access to results
- Assure reproducibility
- Assure code legacy
- Assure scalability

On the right side of the interface is a "Tweets" section with a "Follow" button. It displays three tweets from "Des Portal Testing" (@desportal_linea):

- 1h: QR results for night 2015-06-13 / 2015-06-12 are available
- 21h: The status of 3.0 (WISE) has been updated to "Do not use".
- 21h: The status of 3.0 (WISE) has been updated to "OK".

At the bottom of the page, there is a footer with "Update Time: Fri May 29 18:06:03 2015", "Ciberinfraestrutura para la Ciencia", the page number "25", and "Powered by LineA".

DES Science Portal - Science Workflows

The screenshot displays the DES Science Portal interface. At the top, a navigation bar includes links for Dashboard, My Workspace, Pipelines, Tools, Data Server, Documentation, and Help, along with the user name Julia Gschwend. A dropdown menu is open under the Pipelines section, listing various workflow categories: Data Installation, Data Preparation, Science-Ready Catalogs, Science Analysis (highlighted), Parameter Estimation, Utilities, Special Samples, and Examples. The Science Analysis category is further expanded to show a list of specific workflows: LSS, Cluster, SN, WL, Simulation, Galaxy Archeology, Galaxy Evolution, QSO, Strong Lensing, and Combined Probes. To the right of the menu, a Twitter feed is visible, showing three tweets from @desportal_linea, each announcing a new training process published by Christophe Benoist. A red box in the bottom left corner contains the text '50+ pipelines'.

Dashboard My Workspace Pipelines Tools Data Server Documentation Help Julia Gschwend

>>

DES Science Portal: Workflows

The Science Portal has two instances:

- **Workflows:** hosts workflows for Science Analysis.
- **Data Server:** provide access to the data.

The system is designed to be self-evident.

Science Analysis

- LSS
- Cluster
- SN
- WL
- Simulation
- Galaxy Archeology
- Galaxy Evolution
- QSO
- Strong Lensing
- Combined Probes

Tweets by @desportal_linea

Des Portal Testing @desportal_linea
A new Training Set Maker process was published by Christophe Benoist. [des-portal.linea.gov.br/VP/getViewProc...](#)

Des Portal Testing @desportal_linea
A new Photo-z Training process was published by Christophe Benoist. [des-portal.linea.gov.br/VP/getViewProc...](#)

Des Portal Testing @desportal_linea
A new Training Set Maker process was published by

Embed View on Twitter

50+ pipelines

Portal Dashboard

DES Science Portal Dashboard

Release: Y1A1 Dataset: STRIPE82

Data Installation

Pipeline	Start	Duration	Runs	Status
QA Coadd	2016-08-01 10:36:05	02:09:47	1	●
Install Catalogs	2016-01-29 08:27:26	03:51:24	1	●
Install Mangle Mask	2017-09-25 15:30:23	01:14:44	2	●
Install Bright Mask	2018-07-04 16:33:39	00:01:16	5	●
Install Depth Maps	2017-10-31 16:38:27	00:08:05	8	●
Systematic Maps	2017-05-09 09:30:20	00:50:20	2	●
Zeropoint Correction	2017-10-10 15:12:29	00:43:30	2	●

Data Preparation

Pipeline	Start	Duration	Runs	Status
SG Separation	2018-07-20 11:10:55	00:43:44	14	●
Spectroscopic Sample	2018-08-17 14:25:18	01:21:05	67	●
Training Set Maker	2018-08-23 16:45:37	00:05:53	53	●
Photo-z Training	2018-08-02 06:52:07	03:54:31	63	●
Photo-z Compute	2018-08-23 17:40:14	00:06:43	77	●
Galaxy Properties	2016-11-17 13:41:08	03:20:53	1	●
Photo-z Validation	2018-08-23 17:15:02	00:03:14	4	●
Template Set Maker				●

Science-ready Catalogs

Pipeline	Start	Duration	Runs	Status
Cluster	2018-08-01 17:08:37	00:34:04	89	●
GE	2018-08-07 18:13:10	00:28:07	2	●
GA	2017-12-04 16:17:22	00:10:34	4	●
LSS	2017-06-22 12:02:54	00:17:32	2	●
Generic				●
Generic Y3				●

Special Samples

Pipeline	Start	Duration	Runs	Status
ELG Sample				●
RED LSS Sample				●
Catalog Association				●
Early and Late-type Galaxies				●
Cluster and Field Galaxies				●

Science Workflows

Pipeline	Start	Duration	Runs	Status
ACF Fullshape	2017-11-16 15:34:02	00:00:17	9	●
ACF GE				●
ACF LSS	2017-11-06 14:11:13	00:20:56	1	●
Luminosity Function				●
Cluster Cosmology				●
ACF Covariance Matrix				●
StarHorse	2017-05-17 10:21:31	02:04:36	1	●

Parameter Estimation

Utilities

Pipeline	Start	Duration	Runs	Status
Catalog Comparison	2016-12-13 11:10:15	00:33:01	9	●
Cluster-Cluster Matching	2018-06-25 14:07:02	00:16:25	27	●
Cluster-Halo Matching	2017-04-18 09:20:56	00:14:51	1	●
Concatenate Fields	2017-02-01 23:33:59	00:51:11	5	●
Download Tool	2018-08-21 20:40:48	03:25:04	117	●
Export Table	2018-06-15 17:50:39	00:06:30	247	●
Unload	2018-08-14 11:52:30	00:00:38	132	●

Portal Dashboard

DES Science Portal Dashboard

Release: Y1A1 Dataset: STRIPE82

Data Installation

Pipeline	Start	Duration	Runs	Status
QA Coadd	2016-08-01 10:36:05	02:09:47	1	●
Install Catalogs	2016-01-29 08:27:26	03:51:24	1	●
Install Mangle Mask	2017-09-25 15:30:23	01:14:44	2	●
Install Bright Mask	2018-07-04 16:33:39	00:01:16	5	●
Install Depth Maps	2017-10-31 16:38:27	00:08:05	8	●
Systematic Maps	2017-05-09 09:30:20	00:50:20	2	●
Zeropoint Correction	2017-10-10 15:12:29	00:43:30	2	●

Data Preparation

Pipeline	Start	Duration	Runs	Status
SG Separation	2018-07-20 11:10:55	00:43:44	14	●
Spectroscopic Sample	2018-08-17 14:25:18	01:21:05	67	●
Training Set Maker	2018-08-23 16:45:37	00:05:53	53	●
Photo-z Training	2018-08-02 06:52:07	03:54:31	63	●
Photo-z Compute	2018-08-23 17:40:14	00:06:43	77	●
Galaxy Properties	2016-11-17 13:41:08	03:20:53	1	●
Photo-z Validation	2018-08-23 17:15:02	00:03:14	4	●
Template Set Maker				●

Science-ready Catalogs

Pipeline	Start	Duration	Runs	Status
Cluster	2018-08-01 17:08:37	00:34:04	89	●
GE	2018-08-07 18:13:10	00:28:07	2	●
GA	2017-12-04 16:17:22	00:10:34	4	●
LSS	2017-06-22 12:02:54	00:17:32	2	●
Generic				●
Generic Y3				●

Special Samples

Pipeline	Start	Duration	Runs	Status
ELG Sample				●
RED LSS Sample				●
Catalog Association				●
Early and Late-type Galaxies				●
Cluster and Field Galaxies				●

Science Workflows

Pipeline	Start	Duration	Runs	Status
ACF Fullshape	2017-11-16 15:34:02	00:00:17	9	●
ACF GE				●
ACF LSS	2017-11-06 14:11:13	00:20:56	1	●
Luminosity Function				●
Cluster Cosmology				●
ACF Covariance Matrix				●
StarHorse	2017-05-17 10:21:31	02:04:36	1	●

Parameter Estimation

Utilities

Pipeline	Start	Duration	Runs	Status
Catalog Comparison	2016-12-13 11:10:15	00:33:01	9	●
Cluster-Cluster Matching	2018-06-25 14:07:02	00:16:25	27	●
Cluster-Halo Matching	2017-04-18 09:20:56	00:14:51	1	●
Concatenate Fields	2017-02-01 23:33:59	00:51:11	5	●
Download Tool	2018-08-21 20:40:48	03:25:04	117	●
Export Table	2018-06-15 17:50:39	00:06:30	247	●
Unload	2018-08-14 11:52:30	00:00:38	132	●

Data Preparation

Data Preparation				
Pipeline	Start	Duration	Runs	Status
SG Separation	2018-07-20 11:10:55	00:43:44	<u>14</u>	●
Spectroscopic Sample	2018-08-17 14:25:18	01:21:05	<u>67</u>	●
Training Set Maker	2018-08-23 16:45:37	00:05:53	<u>53</u>	●
Photo-z Training	2018-08-02 06:52:07	03:54:31	<u>63</u>	●
Photo-z Compute	2018-08-23 17:40:14	00:06:43	<u>77</u>	●
Galaxy Properties	2016-11-17 13:41:08	03:20:53	<u>1</u>	●
Photo-z Validation	2018-08-23 17:15:02	00:03:14	<u>4</u>	●
Template Set Maker				●

Process: Photo-z Compute (77)

Refresh	Save	Publish	Report												
Process ID	Start time	End time	Versi...	Duration	Owner	Status	Saved	Share	Published	Provenance	Comments	Product log	Products	Export	
4027	2018-08-23 1...	2018-08-23 1...	☰	00:06:43	Hillysson ...	●	---	🔗	---	👤	📄	🔗	🔗	↶	
4020	2018-08-23 1...	2018-08-23 1...	☰	00:15:52	Cristiano ...	●	---	🔗	---	👤	📄	🔗	🔗	↶	
4013	2018-08-21 1...	2018-08-21 1...	☰	00:32:41	Cristiano ...	●	---	🔗	---	👤	📄	🔗	🔗	↶	
4012	2018-08-21 1...	2018-08-21 1...	☰	00:16:51	Cristiano ...	●	---	🔗	---	👤	📄	🔗	🔗	↶	
4009	2018-08-20 1...	2018-08-20 1...	☰	00:39:07	Cristiano ...	●	---	🔗	---	👤	📄	🔗	🔗	↶	
4008	2018-08-20 1...	2018-08-20 1...	☰	00:00:20	Cristiano ...	●	---	🔗	---	👤	📄	🔗	🔗	↶	
4003	2018-08-17 1...	2018-08-17 1...	☰	00:14:35	Cristiano ...	●	---	🔗	---	👤	📄	🔗	🔗	↶	
4000	2018-08-17 1...	2018-08-17 1...	☰	00:01:22	Cristiano ...	●	---	🔗	---	👤	📄	🔗	🔗	↶	
3999	2018-08-17 1...	2018-08-17 1...	☰	00:03:08	Cristiano ...	●	---	🔗	---	👤	📄	🔗	🔗	↶	
3997	2018-08-17 1...	2018-08-17 1...	☰	00:13:52	Cristiano ...	●	---	🔗	---	👤	📄	🔗	🔗	↶	
3996	2018-08-17 1...	2018-08-17 1...	☰	00:03:22	Cristiano ...	●	---	🔗	---	👤	📄	🔗	🔗	↶	
3995	2018-08-17 1...	2018-08-17 1...	☰	00:17:06	Cristiano ...	●	---	🔗	---	👤	📄	🔗	🔗	↶	
3938	2018-08-02 0...	2018-08-02 0...	☰	01:13:08	Christoph...	●	✓	🔗	✓	👤	📄	🔗	🔗	↶	
3936	2018-08-02 0...	2018-08-02 0...	☰	00:08:10	Christoph...	●	---	🔗	---	👤	📄	🔗	🔗	↶	
3935	2018-08-02 0...	2018-08-02 0...	☰	00:20:04	Christoph...	●	✓	🔗	✓	👤	📄	🔗	🔗	↶	
3929	2018-08-01 1...	2018-08-01 1...	☰	00:25:24	Julia Gsch...	●	---	🔗	---	👤	📄	🔗	🔗	↶	
3924	2018-07-30 1...	2018-07-30 1...	☰	00:04:13	Christoph...	●	---	🔗	---	👤	📄	🔗	🔗	↶	
3893	2018-07-19 1...	2018-07-19 1...	☰	00:32:12	Hillysson ...	●	✓	🔗	✓	👤	📄	🔗	🔗	↶	
3309	2018-02-08 1...	2018-02-08 2...	☰	03:58:31	Julia Gsch...	●	✓	🔗	---	👤	📄	🔗	🔗	↶	
3308	2018-02-08 1...	2018-02-08 2...	☰	01:35:46	Julia Gsch...	●	✓	🔗	✓	👤	📄	🔗	🔗	↶	
3307	2018-02-08 1...	2018-02-08 1...	☰	00:51:47	Julia Gsch...	●	✓	🔗	---	👤	📄	🔗	🔗	↶	
3306	2018-02-08 1...	2018-02-08 1...	☰	00:23:32	Julia Gsch...	●	✓	🔗	---	👤	📄	🔗	🔗	↶	

Process: Photo-z Compute (77)

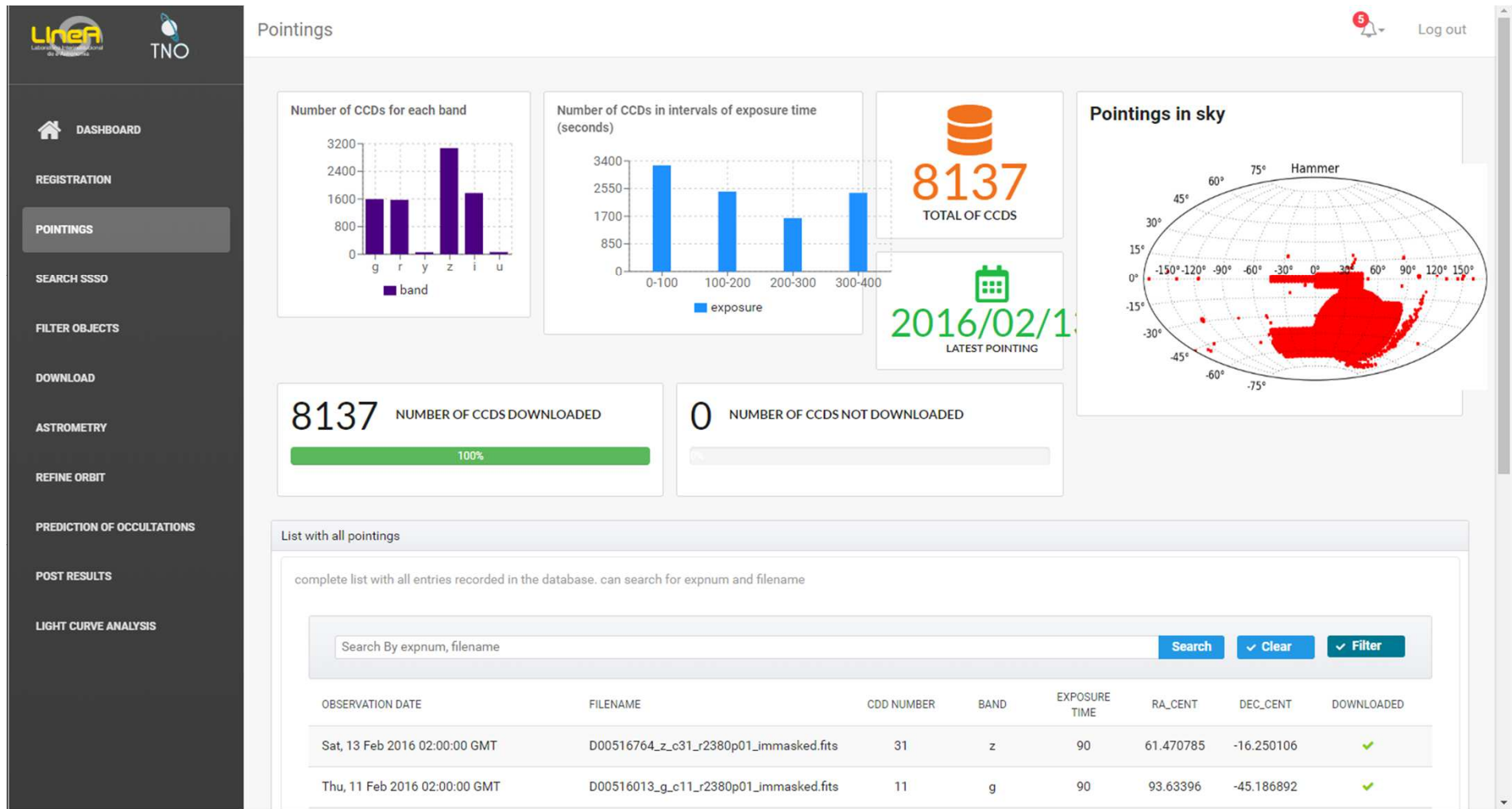
Process ID	Start time	End time	Versi...	Duration	Owner	Status	Saved	Share	Published	Provenance	Comments	Product log	Products	Export
4027	2018-08-23 1...	2018-08-23 1...	☰	00:06:43	Hillysson ...	●	---	🔗	---	👤	📄	🔗	🔗	↻
4020	2018-08-23 1...	2018-08-23 1...	☰	00:15:52	Cristiano ...	●	---	🔗	---	👤	📄	🔗	🔗	↻
4013	2018-08-2...	2018-08-2...	☰	...	...	●	---	🔗	---	👤	📄	🔗	🔗	↻
4012	2018-08-2...	2018-08-2...	☰	...	...	●	---	🔗	---	👤	📄	🔗	🔗	↻
4009	2018-08-2...	2018-08-2...	☰	...	...	●	---	🔗	---	👤	📄	🔗	🔗	↻
4008	2018-08-2...	2018-08-2...	☰	...	...	●	---	🔗	---	👤	📄	🔗	🔗	↻
4003	2018-08-1...	2018-08-1...	☰	...	...	●	---	🔗	---	👤	📄	🔗	🔗	↻
4000	2018-08-1...	2018-08-1...	☰	...	...	●	---	🔗	---	👤	📄	🔗	🔗	↻
3999	2018-08-1...	2018-08-1...	☰	...	...	●	---	🔗	---	👤	📄	🔗	🔗	↻
3997	2018-08-1...	2018-08-1...	☰	...	...	●	---	🔗	---	👤	📄	🔗	🔗	↻
3996	2018-08-1...	2018-08-1...	☰	...	...	●	---	🔗	---	👤	📄	🔗	🔗	↻
3995	2018-08-1...	2018-08-1...	☰	...	...	●	---	🔗	---	👤	📄	🔗	🔗	↻
3938	2018-08-0...	2018-08-0...	☰	...	...	●	---	🔗	---	👤	📄	🔗	🔗	↻
3936	2018-08-0...	2018-08-0...	☰	...	...	●	---	🔗	---	👤	📄	🔗	🔗	↻
3935	2018-08-0...	2018-08-0...	☰	...	...	●	---	🔗	---	👤	📄	🔗	🔗	↻
3929	2018-08-0...	2018-08-0...	☰	...	...	●	---	🔗	---	👤	📄	🔗	🔗	↻
3924	2018-07-3...	2018-07-3...	☰	...	...	●	---	🔗	---	👤	📄	🔗	🔗	↻
3893	2018-07-19 1...	2018-07-19 1...	☰	00:02:12	Hillysson ...	●	✓	🔗	✓	👤	📄	🔗	🔗	↻
3309	2018-02-08 1...	2018-02-08 2...	☰	03:58:31	Julia Gsch...	●	✓	🔗	---	👤	📄	🔗	🔗	↻
3308	2018-02-08 1...	2018-02-08 2...	☰	01:35:46	Julia Gsch...	●	✓	🔗	✓	👤	📄	🔗	🔗	↻
3307	2018-02-08 1...	2018-02-08 1...	☰	00:51:47	Julia Gsch...	●	✓	🔗	---	👤	📄	🔗	🔗	↻
3306	2018-02-08 1...	2018-02-08 1...	☰	00:23:32	Julia Gsch...	●	✓	🔗	---	👤	📄	🔗	🔗	↻

Provenance

Name	Process ID	Product log	Comments
Photo-z Compute	4020	🔗	📄
Photo-z Training	3922	🔗	📄
Training Set Maker	3921	🔗	📄
SG Separation	1985	🔗	📄
Spectroscopic Sample	3795	🔗	📄
SG Separation	3525	🔗	📄
SG Separation	2437	🔗	📄
Install Catalogs	35	🔗	📄
Install Catalogs	472	🔗	📄
SG Separation	2584	🔗	📄
Install Catalogs	35	🔗	📄
Install Catalogs	139	🔗	📄
Install Catalogs	119	🔗	📄
Install Catalogs	35	🔗	📄
Install Catalogs	35	🔗	📄

Solar System Objects Portal

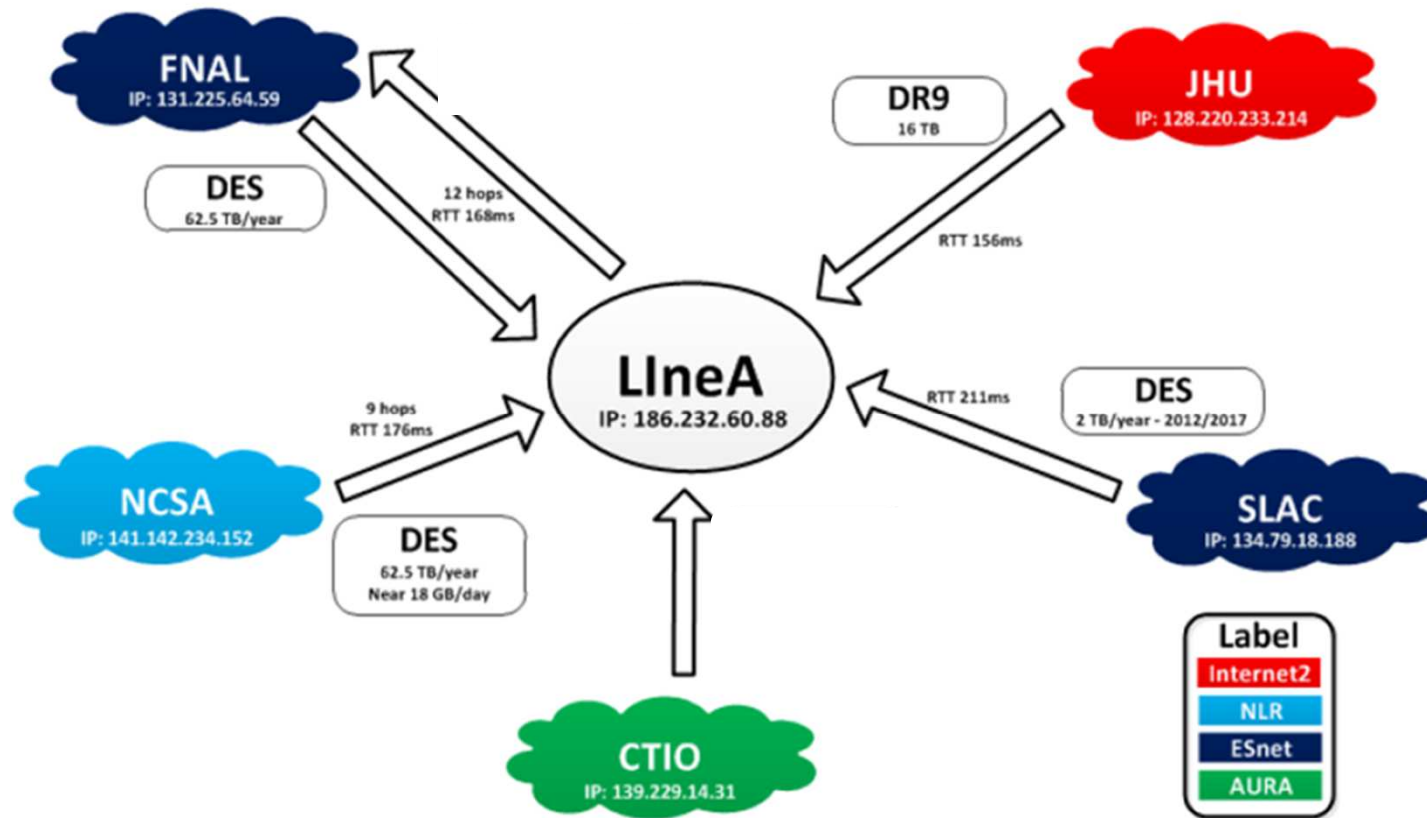
First three years 4,3 millions CCDs examined GAIA+LSST => industrial scale



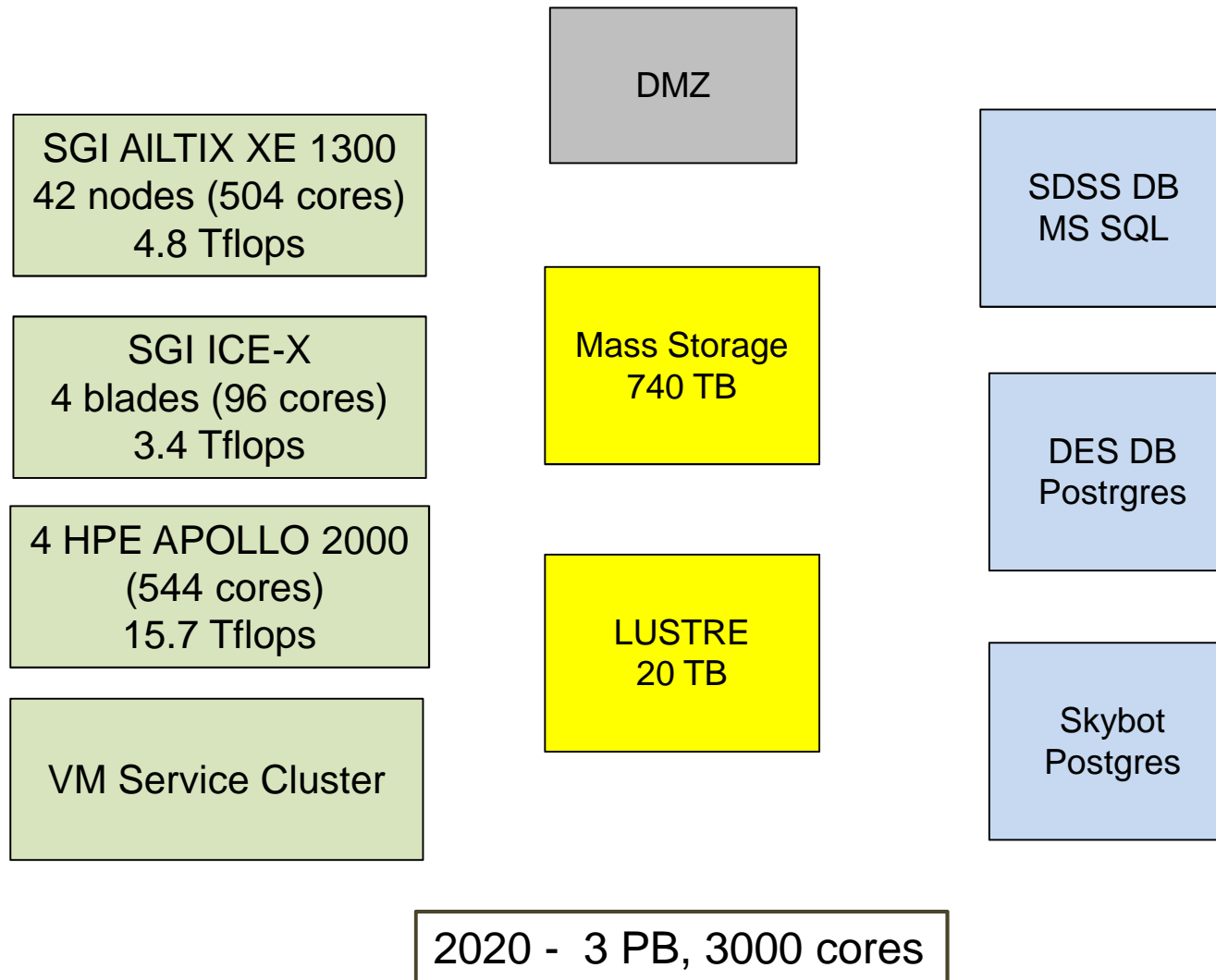
(see M. Banda's presentation)

LineA Infrastructure

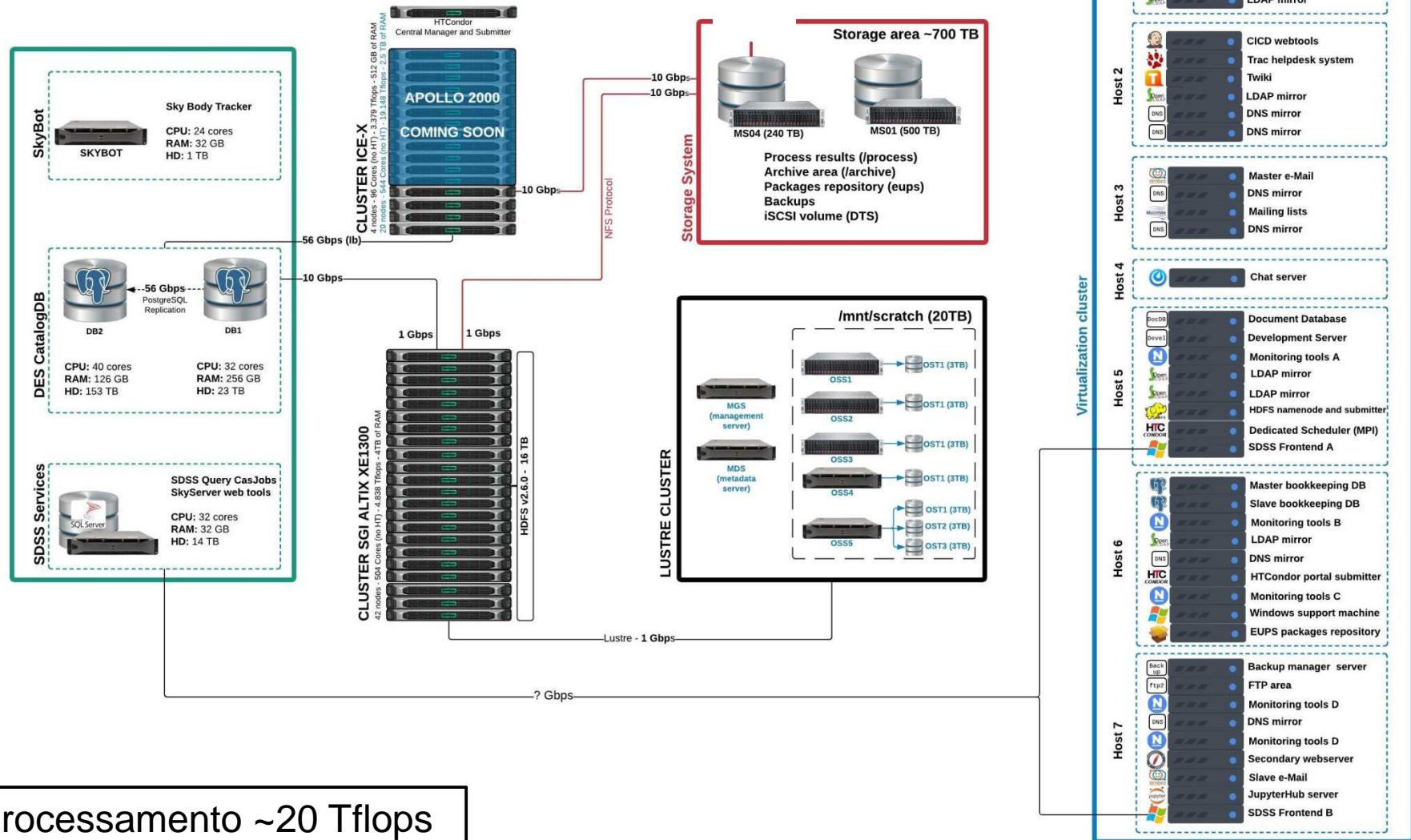
Data Transfer



Computational Infrastructure



Centro de Acesso e Processamento de Dados (CAPDA)



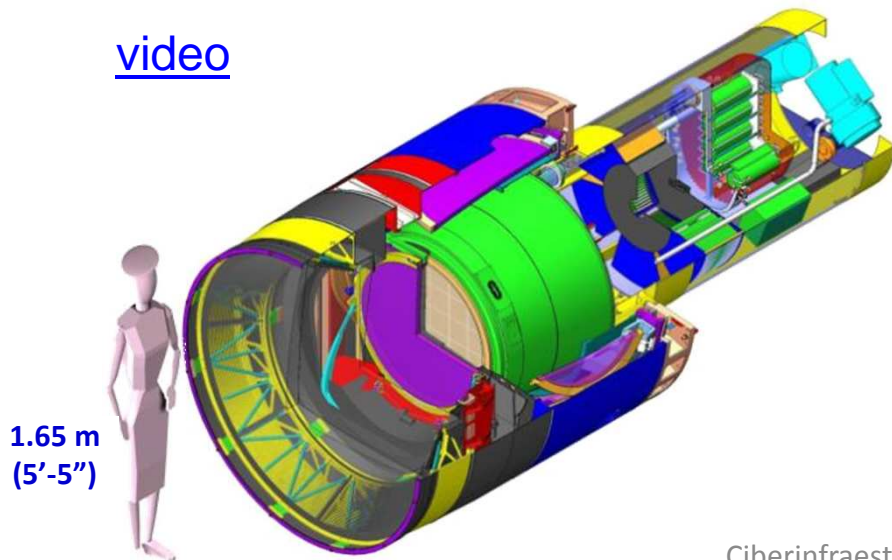
Processamento ~20 Tflops
Storage ~ 740 TB

Future: the LSST challenge

LSST



[video](#)



1.65 m
(5'-5")

Estimated numbers for DR-1 release

Objects = 18 billion

Sources = 350 billion (single epoch)

Forced Sources = 0.75 trillion

Estimated numbers for DR-11

Objects = 37 billion

Sources = 7 trillion (single epoch)

Forced Sources = 30 trillion

Visits observed = 2.75 million

Images collected = 5.5 million

Alert Production:

Real-time alert latency = 60 seconds

Average number of alerts per night =
"about 10 million"

Data and compute sizes:

Final database size = 15 PB

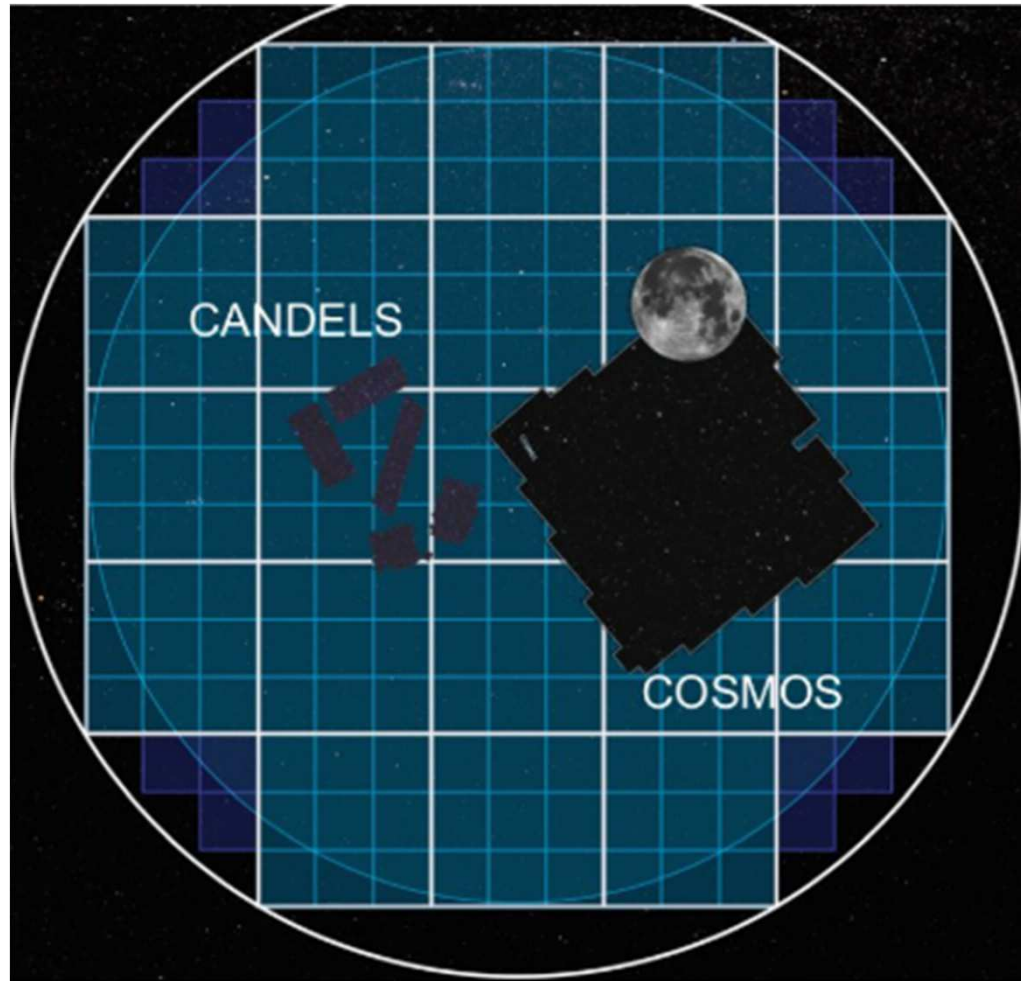
Final disk storage = 0.4 Exabytes

Peak number of nodes = 1750 nodes

Peak compute power = 1.8 PFLOPS

1 billion dollars

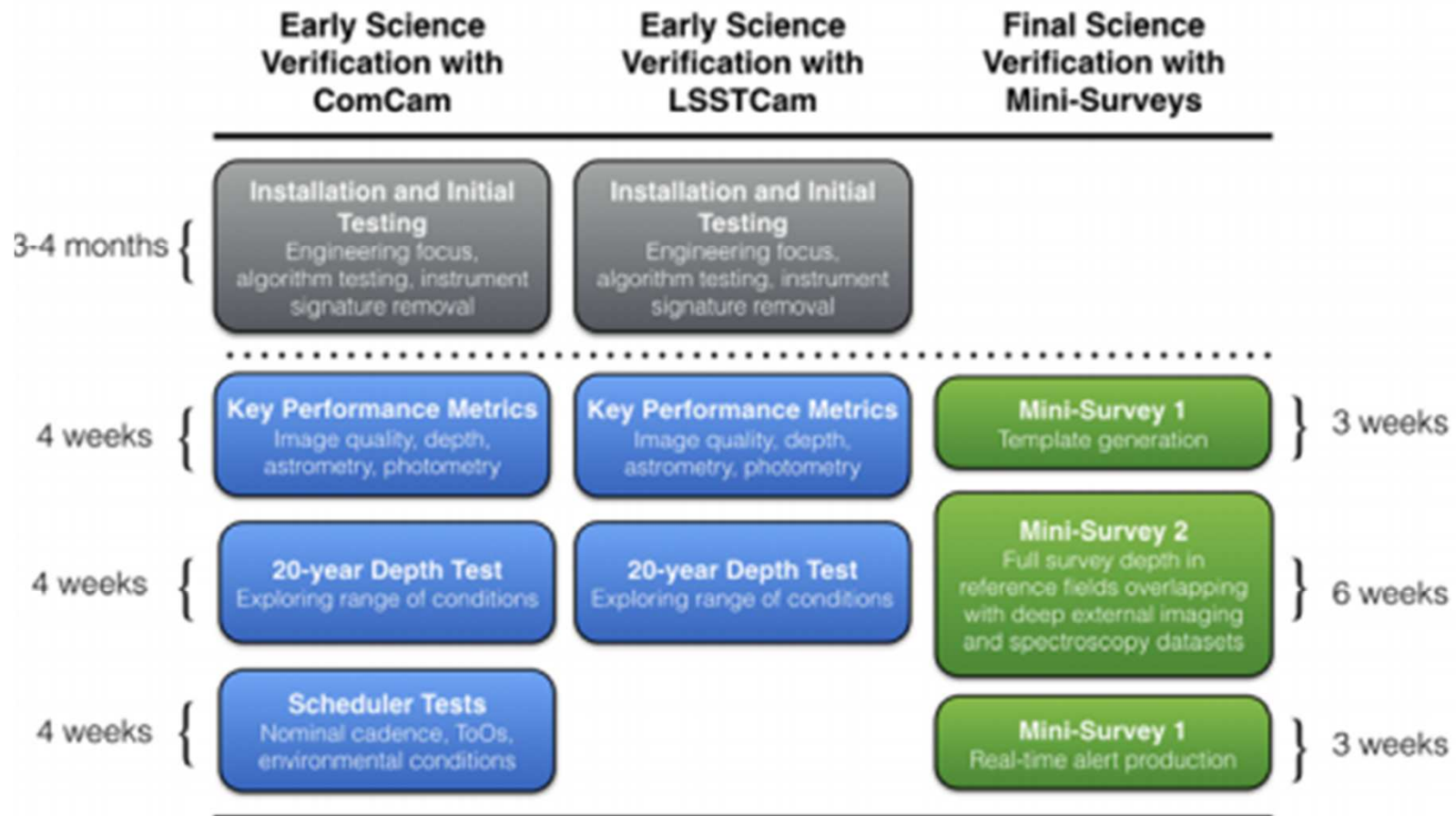




9 square degrees

3.2 Gpixels

Data Production Milestone	Start Date
First calibration data from Auxiliary Telescope	November 2018
First on-sky and calibration images with ComCam	May 2020
Images from Camera re-verification at Summit Facility	July 2020
Sustained observing with ComCam	August 2020
First on-sky and calibration data from Camera+Telescope	February 2021
Sustained scheduler driven observing with Camera+Telescope	April 2021
Start Science Verification mini-Surveys	June 2021



LSST Operations: Sites and Data Flows



French IN2P3 Site

Data Release production
(subject to final agreement approval)



Archive Site

Archive Center

Alert Production
Data Release Production
Calibration Products Production
EPO Infrastructure
Long-term Storage (copy 2)

Data Access Center

Data Access and User Services

Split Data Release

Processing : 50% @
NCSA / 50% @ CC-IN2P3
2 copies of the data

Dedicated Long Haul Networks

Two redundant 40 Gbit links from La Serena
to Champaign, IL (existing fiber)

HQ Site

Science Operations
Observatory Management
Education and Public Outreach



Summit and Base Sites

Telescope and Camera
Data Acquisition
Crosstalk Correction
Long-term storage (copy 1)
Chilean Data Access Center

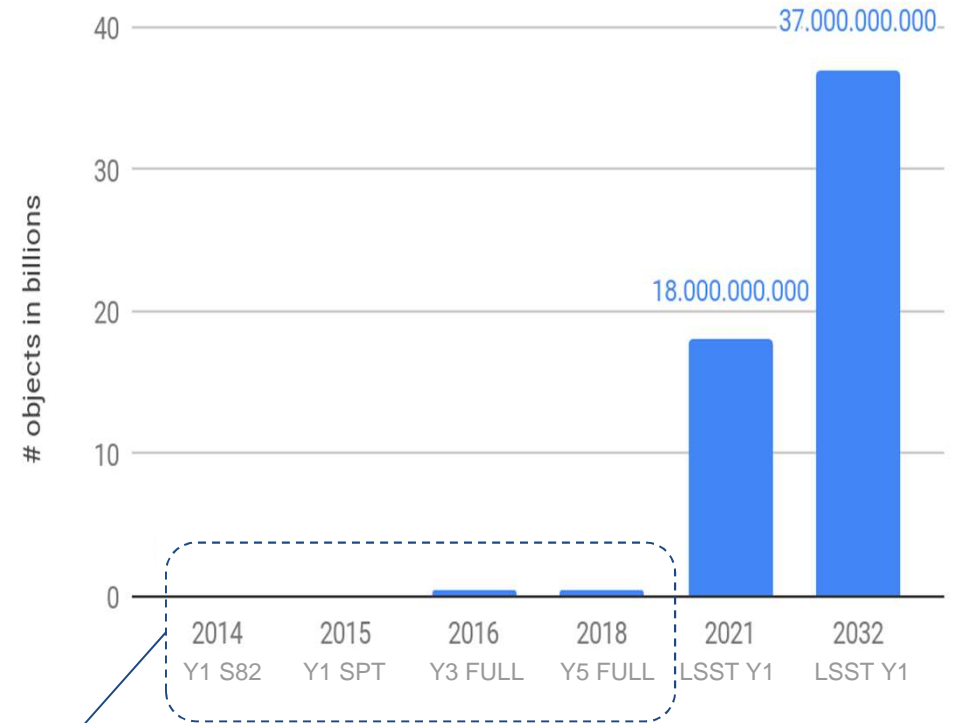


Tabela 19.5 - Modelo de crescimento do centro de dados regional do LSST.

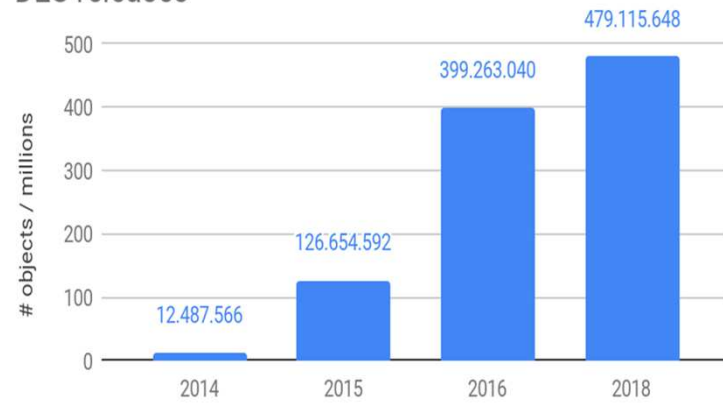
Ano do levantamento	Ano calendário	Storage (TB)	Processamento (TeraFlops)	# Nós	Processamento (# Cores)
	2019	618	1,5	9	365
	2020	618	1,5	9	365
1	2021	12.735	29,0	104	6.543
2	2022	19.180	55,4	178	11.888
3	2023	27.286	83,2	241	17.326
4	2024	35.518	111,9	287	22.372
5	2025	44.075	141,6	332	27.300
6	2026	53.006	172,1	307	31.965
7	2027	62.332	203,4	289	36.200
8	2028	72.076	235,2	273	40.193
9	2029	82.189	266,9	258	43.993
10	2030	92.691	299,0	245	47.172

Number of objects

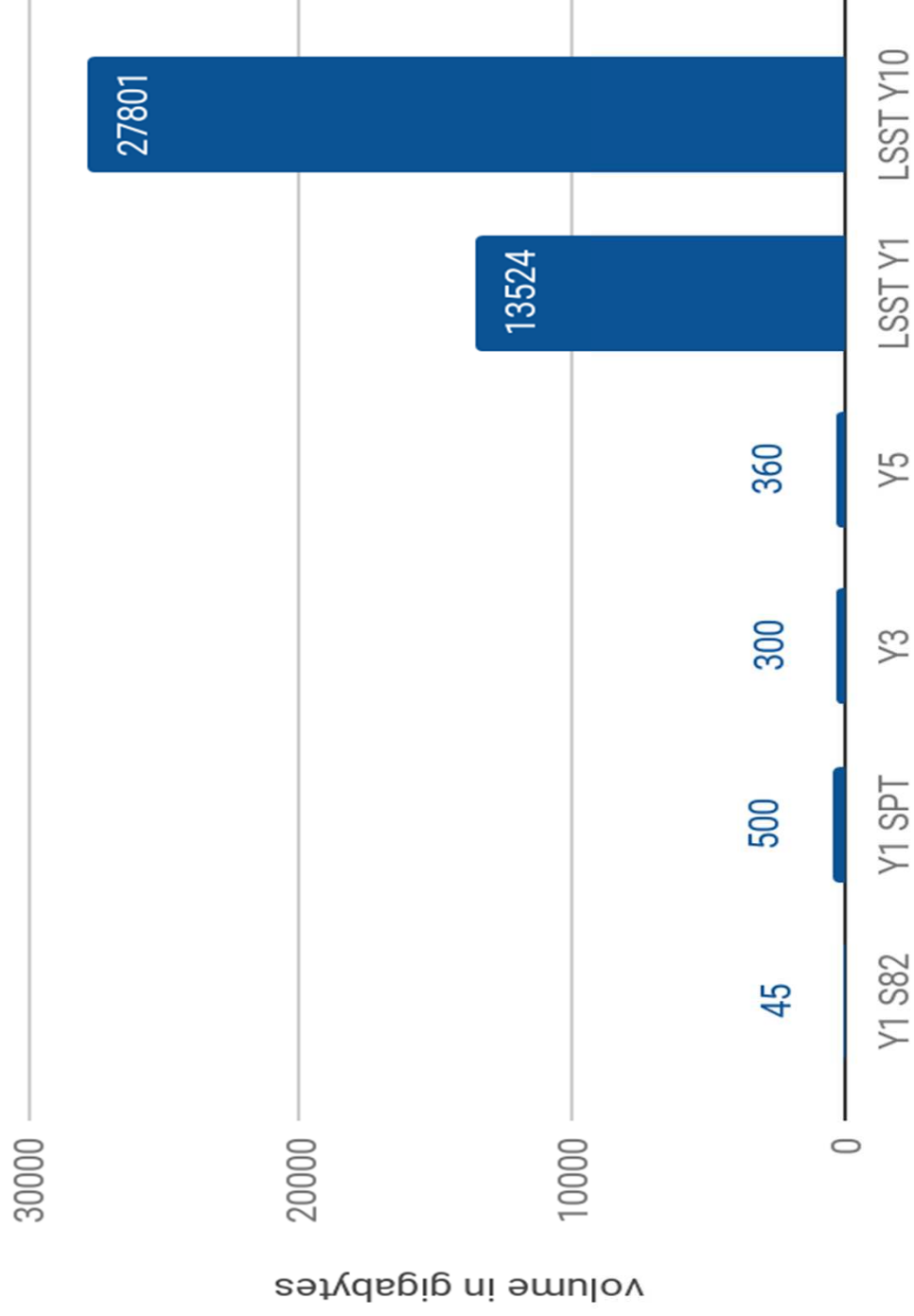
DES and LSST releases



DES releases



Data releases - flat files (GB)



Summary

- LSST is a reality
- Operation of test camera starts 2020 survey 2022
- Challenge: how to scale from DES (data transfer, storage, processing)
- Need to integrate portal to cloud to distribute storage and computing
- Goal: implementation of a regional Data Access Center (DAC)