

DM organisation and reviews

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Data Management
LSST

5th March 2017, LSST JTM,
LA, California, USA.



1 Introducion

2 DM Organisation

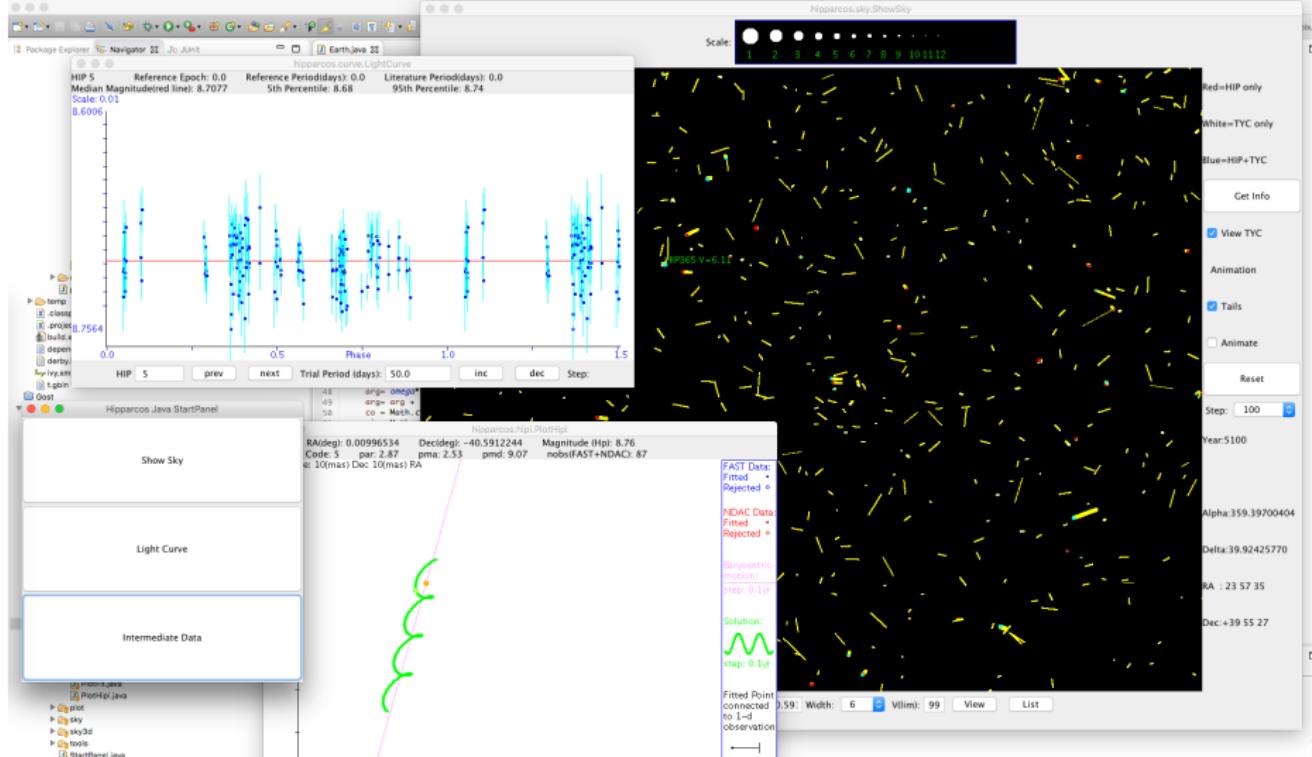
3 Milesones and Reviews



- 1985ish Life started with BASIC on a commodore
- 1993 graduated Computer Science Degree and Masters University College Cork, Ireland
- 1993 - 1997 Spacecraft Control Systems (C++) in ESA Mission Operations Centre Darmstadt Germany
- 1997 - 2001 Hipparcos, Integral, Planck, Gaia, Bepi-Sax (C,Java,Oracle, HTM, HEALPix) in ESA Technology Research Centre Noordwijk Netherlands
- 2001-2003 Commercial programming - some Astronomy (Java)
- 2003-2005 The Johns Hopkins, SDSS and National Virtual Observatory (C,C#,Java,Sqlserver)
- 2005-2014 Gaia Astrometric Solution and Science Operations (Java, Oracle, Intersystems Cache)
- 2012 PhD in Physics on Implementing the Gaia Astrometric Solution, Barcelona University
- 2014-2017 All ESA Science Ground Segments in Development

1997/98 Hipparcos Java Tools - learning Astrometry

<http://www.cosmos.esa.int/web/hipparcos/java-tools>





In the USA ..

Quality tools for GSC2 (Java) →

CasJobs (C#)(O'Mullane et al., 2005)

View Jobs - Mozilla Firefox

File Edit View Bookmarks Tools Help

SDSS Query / CasJobs

Help Tools Query History MyDB Import Groups Output Profile Admin SkyServer Logout thinkar

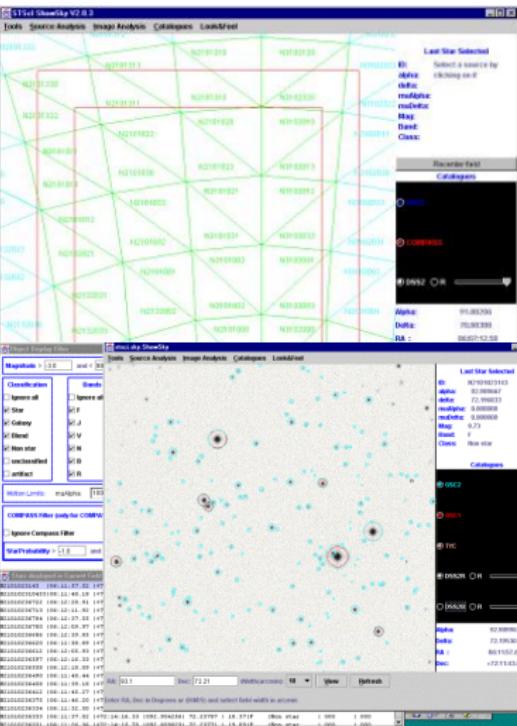
Refresh this page to get latest info

| Status | Target | Name Like |
|--------|--------|-----------|
| ANY | DR6 | |

Apply

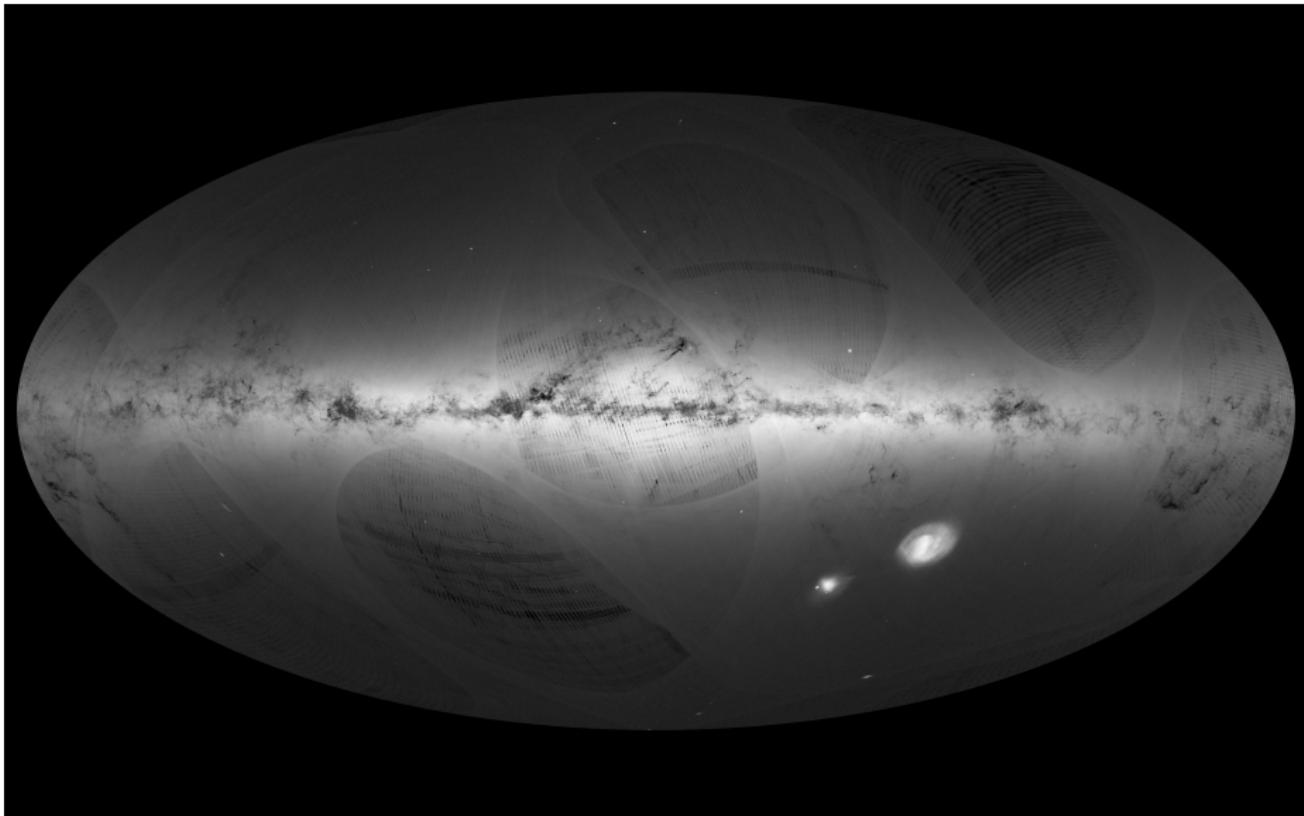
| Name | Query | Target | Submitted | Time (hours) | Rows | Status |
|-------------------------------|---------------------------------|----------------------|-----------------------|--------------|--------|----------|
| Info Quasar Search in Imaging | SELECT TOP 1000 run, DR6/600 | 7/15/2007 7:56:02 PM | 0:0:0 | 10 | Ready | |
| Info Quick Query | -- Galaxies meeting multiple s | DR6/1 | 7/15/2007 7:55:02 PM | 0:0:0 | 10 | Finished |
| Info Sample Query 1 | SELECT top 1000 G.ObjID, G.u, | DR6/600 | 7/15/2007 7:54:13 PM | 0:0:4 | 11308 | Started |
| Info My Query | select objid,ra,dec,modellmag_g | DR6/600 | 7/15/2007 12:17:42 AM | 0:0:4 | 11308 | Finished |
| Info My Query | SELECT count(*) as total | DR6/600 | 7/8/2007 11:28:37 AM | 0:1:1 | Failed | |
| Info My Query | SELECT TOP 1000 P.ObjID into m | DR6/600 | 7/8/2007 11:27:47 AM | 0:7:53 | 1000 | Finished |
| Info My Query | SELECT TOP 1000 run, | DR6/600 | 7/8/2007 11:27:22 AM | 0:0:1 | 1 | Failed |
| Info My Query | SELECT TOP 10000 run, | DR6/600 | 7/8/2007 11:27:06 AM | 0:0:2 | 10000 | Finished |
| Info My Query | select top 10 * into mydb.Myta | DR6/1500 | 6/26/2007 4:30:35 PM | 0:0:0 | 10 | Finished |
| Info My Query | select top 10 * from dr3quasar | DR6/1 | 6/26/2007 1:08:12 PM | 0:0:0 | 10 | Finished |
| Info My Query | select top 10 * from dr3quasar | DR6/1 | 6/26/2007 1:08:03 PM | 0:0:0 | 10 | Failed |

Contact
Version: v3_1_0 \$, \$Revision: 1.9 \$, Last modified: Thursday, September 14, 2006 at 9:54:32 PM





- ESAC Located near Madrid, Spain.
- Home of the Science Operations Department containing Operations Development Division.
- Develop Science Operations Systems:
 - People, Procedures and Software.
 - Interactions MOC and scientific communities.
 - Quite a bit of software - diverse - mainly Java but FORTRAN, C, C++, Python ..
 - Prepare for planning, simulations, instrument performance, commanding.
 - Hand over system to operations division after commissioning.





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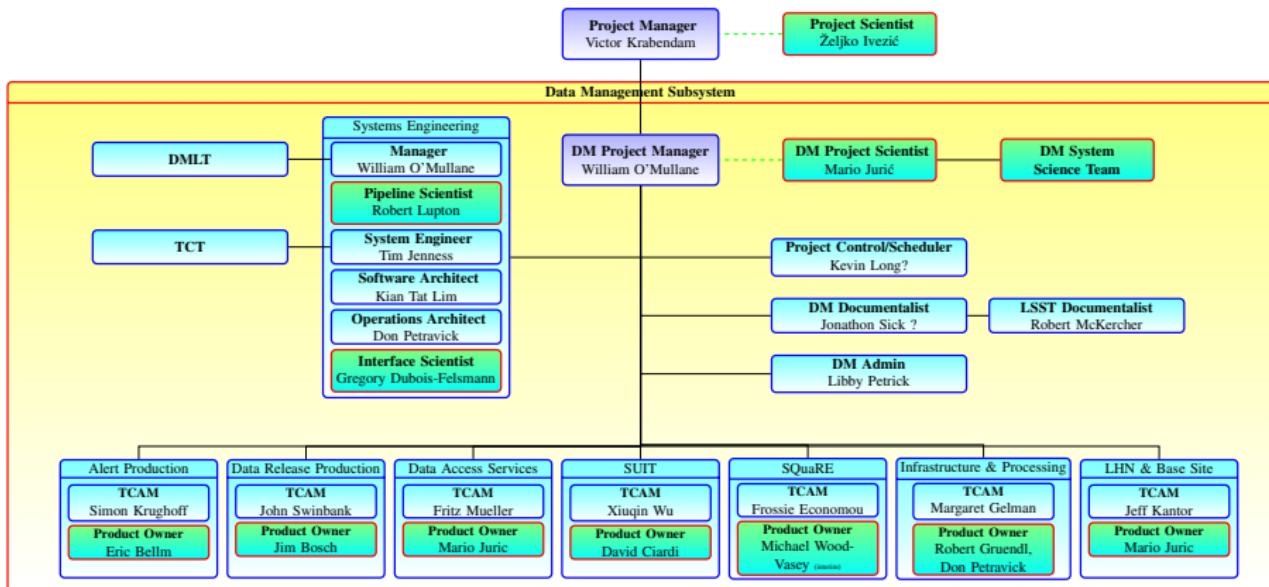
- Victor remains interim PM until April
- Have been trying to get an idea of DM organisation - talking to DMLT and TCAMS
- Following are some observations and draft ideas

Look out for a new version of LDM-294 - DM Management Plan

- It will detail roles and responsibilities in DM

DM Mission :

Stand up operable, maintainable, quality services to deliver high-quality LSST data products for science, all on time and within reasonable cost.





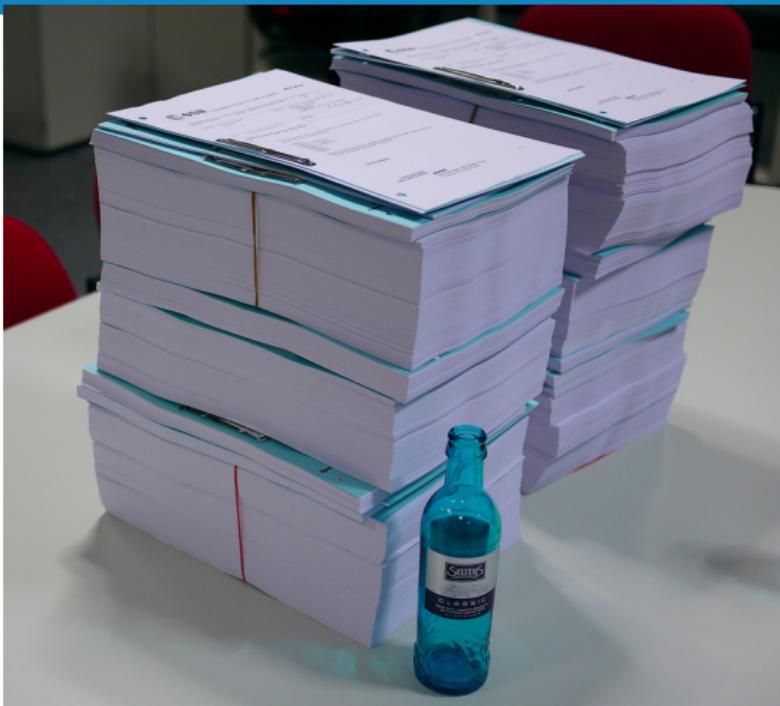
- Would like to get a list of products in DM
- Related to understanding the DM architecture - KT working on LDM-148 update more from him in a while
- Those are not Data Products - mostly Systems and Software artefacts
- For each product identify *Product Owner* and manager.
- This would change the org chart ..



Also in LDM-294:

- Would like an open Risk approach - anyone can raise a risk (Tim working on that)
- Configuration control (change management, configuration item lists for deployments)
- Product assurance and Scientific Validation
- Document management - in next slides
- ...

Mainly these will be high level and point to the details in other documents.

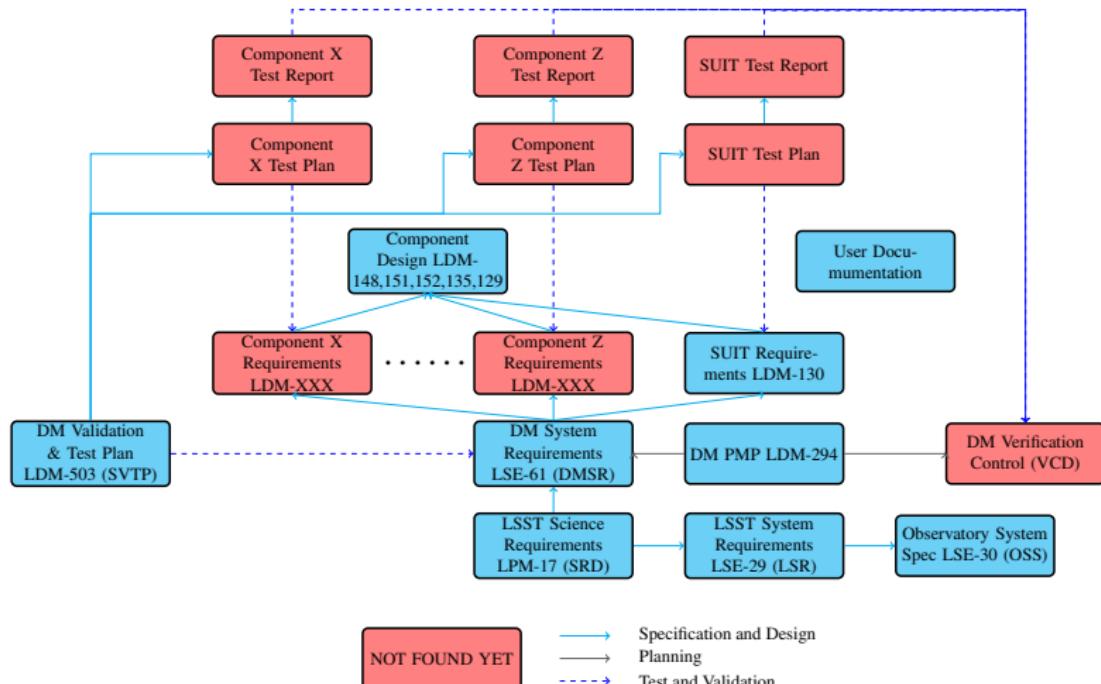


The FOP is followed by the spacecraft operators - the paper copy is just in case the computers fail - could be useful!

But we should avoid *write only* documents.



- We will be working on a Documentation Tree for DM
- Some documents exist - some have not yet been found
- Wish to figure out what is missing
- LDM-294 will have a section on documentation
- Adhere to LSST Document Plan LPM-051?
- Would like a bibtex file of all Docushare issued documents
- **All products should be listed and for each product the set of docs expected and the dates**
 - each document type is targeted at a different audience (e.g. Requirement, Design/Implementation, Installation, User ...)
 - not all products have all document types.





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The re plan

Lots of work has gone in to the new DM plan

| REPLAN 17-03.02C.00 DM Level 2 Milestones | | 01-Jun-2016 | 01-Jun-2022 | 1524 |
|---|--|--------------|-------------|------------------|
| F16 | F16 Start | 01-Jun-2016* | | 0 |
| S17 | S17 Start | 01-Dec-2011 | | 0 |
| DM-ReplanM5-0000-0160 | calibration products design document | 01-Jun-2017 | | SQ-MGT, SQ-QC-E |
| DM-ReplanM5-0000-0490 | Prototype DAC-SOSS | 01-Jun-2017 | | 0 F17 |
| DM-ReplanM5-0000-0500 | Prototype DAC-WISE | 01-Jun-2017 | | 0 F17 |
| DM-ReplanM5-0000-0510 | Universe model update | 01-Jun-2017 | | 0 F17 |
| DM-ReplanM5-0000-1150 | Pipeline QA functions definition | 01-Jun-2017 | | 0 F17 |
| F17 | F17 Start | 01-Jun-2017* | | 0 |
| DM-ReplanM5-0000-0350 | Prototype L1 for Aux Tel | 01-Dec-2017 | | SQ-QC-S-2, SQ-Qr |
| DM-ReplanM5-0000-0360 | Prototype L1 through Diffim | 01-Dec-2017 | | S18 |
| DM-ReplanM5-0000-0800 | Dispatch QA pipelines from SUIT/Firefly interface | 01-Dec-2017 | | S18 |
| DM-ReplanM5-0000-0950 | Private user storage space setup/process | 01-Dec-2017 | | S18 |
| S18 | S18 Start | 01-Dec-2011 | | 0 |
| DM-ReplanM5-0000-0040 | Buffer access to bi-temporal calibration products database | 01-Jun-2018 | | SQ-DS-J-1, SQ-D5 |
| DM-ReplanM5-0000-0370 | Production L1 for Aux Tel | 01-Jun-2018 | | 0 F18 AP-000 |
| DM-ReplanM5-0000-0380 | Prototype L1 through AlertGen | 01-Jun-2018 | | 0 F18 |
| F18 | F18 Start | 01-Jun-2018* | | 0 |
| DM-ReplanM5-0000-0120 | Orbit database schema | 03-Dec-2018 | | SQ-QC-V-1, SQ-DE |
| DM-ReplanM5-0000-0390 | Prototype L1 through Alert Broker | 03-Dec-2018 | | 0 S19 |
| DM-ReplanM5-0000-0430 | Prototype L2 through Coadd | 03-Dec-2018 | | 0 S19 |
| DM-ReplanM5-0000-0480 | Prototype QA/Commissioning Environment | 03-Dec-2018 | | 0 S19 |
| DM-ReplanM5-0000-1050 | API to get image at a given resolution and size | 03-Dec-2018 | | 0 S19 |
| S19 | S19 Start | 03-Dec-2011 | | 0 |
| DM-ReplanM5-0000-0030 | Alert database schema | 03-Jun-2019 | | SQ-QC-A-1, SQ-Dt |
| DM-ReplanM5-0000-0100 | L1 database schema | 03-Jun-2019 | | 0 F19 |
| DM-ReplanM5-0000-0810 | Full specification of postprocessing requirements | 03-Jun-2019 | | 0 F19 |
| DM-ReplanM5-0000-1040 | LSST all-sky image (mock version) | 03-Jun-2019 | | 0 F19 |
| F19 | F19 Start | 03-Jun-2019* | | 0 |
| DM-ReplanM5-0000-0400 | Production L1 for ComCam | 02-Dec-2019 | | SQ-QC-S-3, SQ-Dt |
| DM-ReplanM5-0000-0440 | Production L2 for ComCam | 02-Dec-2019 | | 0 S20 |
| DM-ReplanM5-0000-0460 | Prototype L2 through MultiF | 02-Dec-2019 | | 0 S20 |
| DM-ReplanM5-0000-0750 | Detailed requirements for postprocessing pipelines | 02-Dec-2019 | | 0 S20 |
| S20 | S20 Start | 02-Dec-2011 | | 0 |
| DM-ReplanM5-0000-0420 | Production L1 for Camera | 01-Jun-2020 | | SQ-QC-S-4, SQ-Qr |
| DM-ReplanM5-0000-0470 | Production L2 for Camera | 01-Jun-2020 | | 0 F20 |
| F20 | F20 Start | 01-Jun-2020* | | 0 |
| DM-ReplanM5-0000-0410 | Production L1 for Science Verification | 01-Dec-2020 | | SQ-DS-P-1, DRP-C |
| DM-ReplanM5-0000-0460 | Production L2 for Science Verification | 01-Dec-2020 | | 0 S21 |
| S21 | S21 Start | 01-Dec-2020 | | 0 |
| F21 | F21 Start | 01-Jun-2021* | | 0 |
| S22 | S22 Start | 01-Dec-2022 | | 0 |
| F22 | F22 Start | 01-Jun-2022* | | 0 |

↑ S17 Start

- ◆ calibration products design document
- ◆ Prototype DAC-SOSS
- ◆ Prototype DAC-WISE
- ◆ Universe model update
- ◆ Pipeline QA functions definition

↑ F17 Start

- ◆ Prototype L1 for Aux Tel
- ◆ Prototype L1 through Diffim
- ◆ Dispatch QA pipelines from SUIT/Firefly interface
- ◆ Private user storage space setup/process

↑ S18 Start

- ◆ Buffer access to bi-temporal calibration products database
- ◆ Production L1 for Aux Tel
- ◆ Prototype L1 through AlertGen

↑ F18 Start

- ◆ Orbit database schema
- ◆ Prototype L1 through Alert Broker
- ◆ Prototype L2 through Coadd
- ◆ Prototype QA/Commissioning Environment
- ◆ API to get image at a given resolution px

↑ S19 Start

- ◆ Alert database schema
- ◆ L1 database schema
- ◆ Full specification
- ◆ LSST all-sky image

↑ F19 Start



- June 2017 - Prototype Data Access Centre - with WISE Data+
- Dec 2017 - Private databases/User tables .. Notebooks
- 2018 - Prototypes for various processes and databases - Minimum Viable System
 - 2018 - Mountain base network up
 - 2018 - Prototype alerts through broker
- Dec 2019 - Com Cam L1,L2 Production
- Jun 2020 - Camera L1,L2 Production
- ...

*Test plans which show milestones have been met are needed.
Longer term working with Mario on which data products will come out
when ..*



- Reviews are inevitable and necessary in large project
- Next DM Review **July 25-27**
- Review should confirm we are on the correct track and may indicate areas of improvement
- Docs updated in each cycle concentration before review on docs for that review. **May be a bit more work this time**
- Latest released version of documents could be pulled from docushare and handed over - *no particular extra work iff the work is done properly anyway*
- Of course some presentations will be needed also ..



- Looking forward to working with a great set of people in DM and LSST
- LSST has potential for huge impact in Astronomy
- I will use my experience and training to help get DM delivered
- I also have a lot to learn from LSST people so I hope you will all help me - intend to visit all the DM sites soon
- I have an open door policy
- Looking forward to the first LSST images !

Questions ??



The following table has been generated from the on-line Gaia acronym list:

| Acronym | Description |
|---------|-----------------------------------|
| DM | Data Model |
| DMLT | DM Leadership Team |
| ESA | European Space Agency |
| ESAC | European Space Astronomy Centre |
| FOP | Flight Operations Procedure |
| HIP | Hipparcos |
| HTM | Hierarchical Triangular Mesh |
| LSST | Large Synoptic Survey Telescope |
| MOC | Mission operations Centre |
| PM | Project Manager |
| SDSS | Sloan Digitized Sky Survey |
| TCAMS | Technical Control Account Manager |

References



O'Mullane, W., Li, N., Nieto-Santisteban, M., et al., 2005, In: International Conference on Web Services,
Also MS technote <http://arxiv.org/pdf/cs.DC/0502072>