


# OMPS PROCESSING AUTOMATION AT STAR

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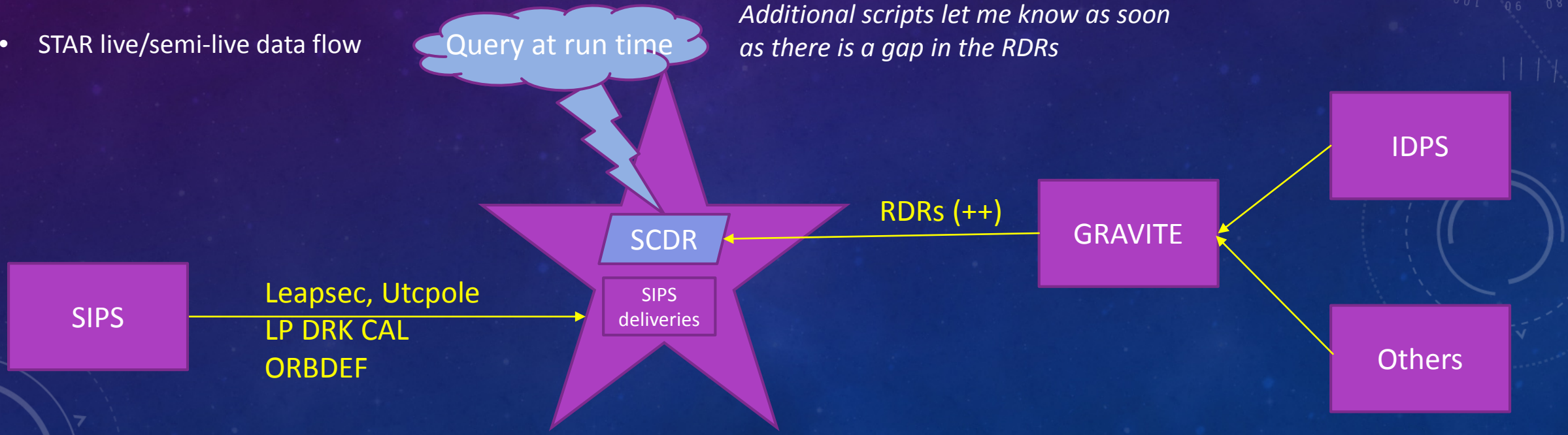
# TALK OVERVIEW

- Background
  - OMPS Processing
  - STAR live/semi-live data flow
- AutoCAL
  - Description
  - Results and validation
- OMPS on demand
  - Description
  - Results and validation

# BACKGROUND

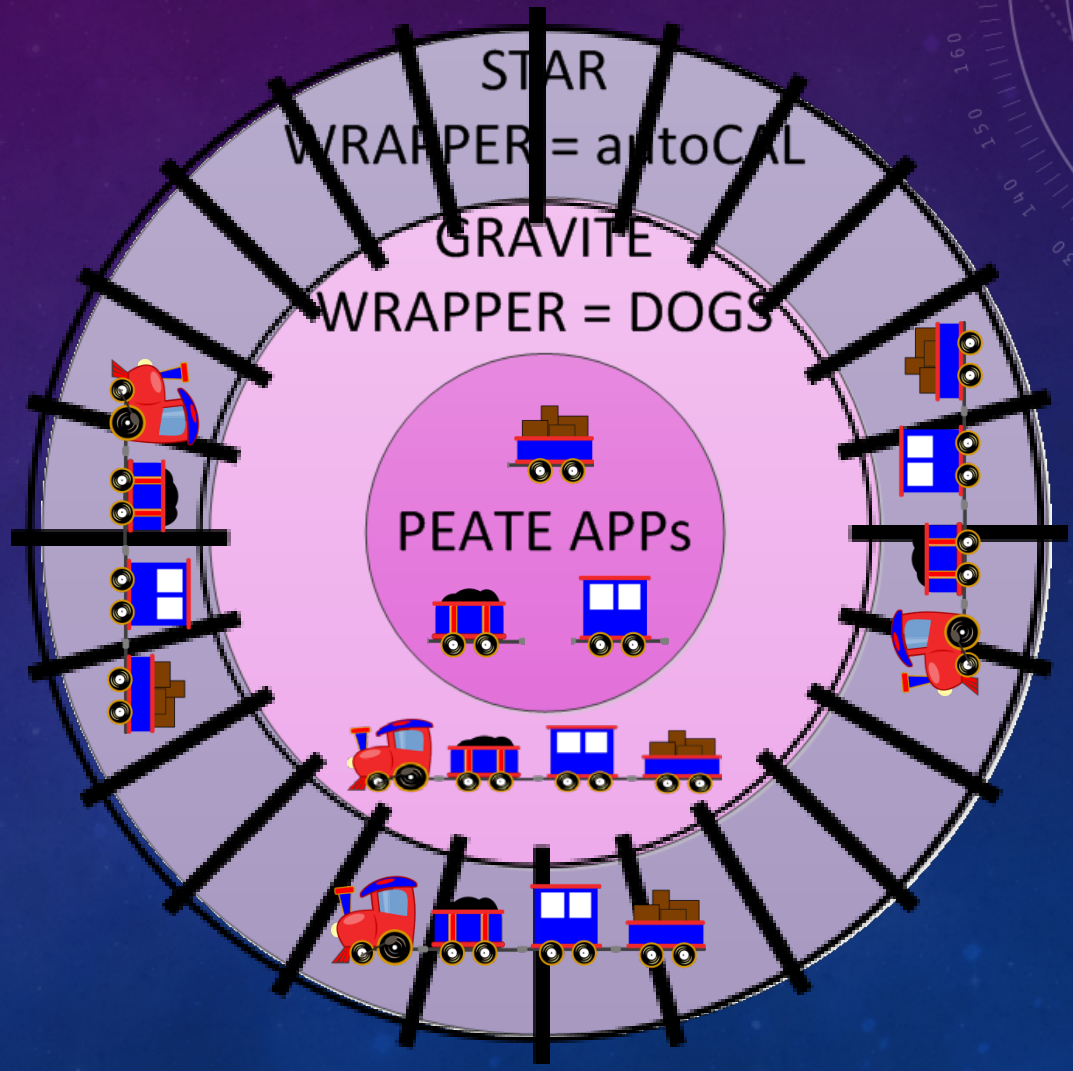
- OMPS Processing from SIPS
  - NASA SIPS developed the various pieces of the science code. We will refer to them as “APP”
  - Each APP from SIPS can be seen as a “black-box” and is responsible for a specific step (such as L1A/RDR)

- STAR live/semi-live data flow

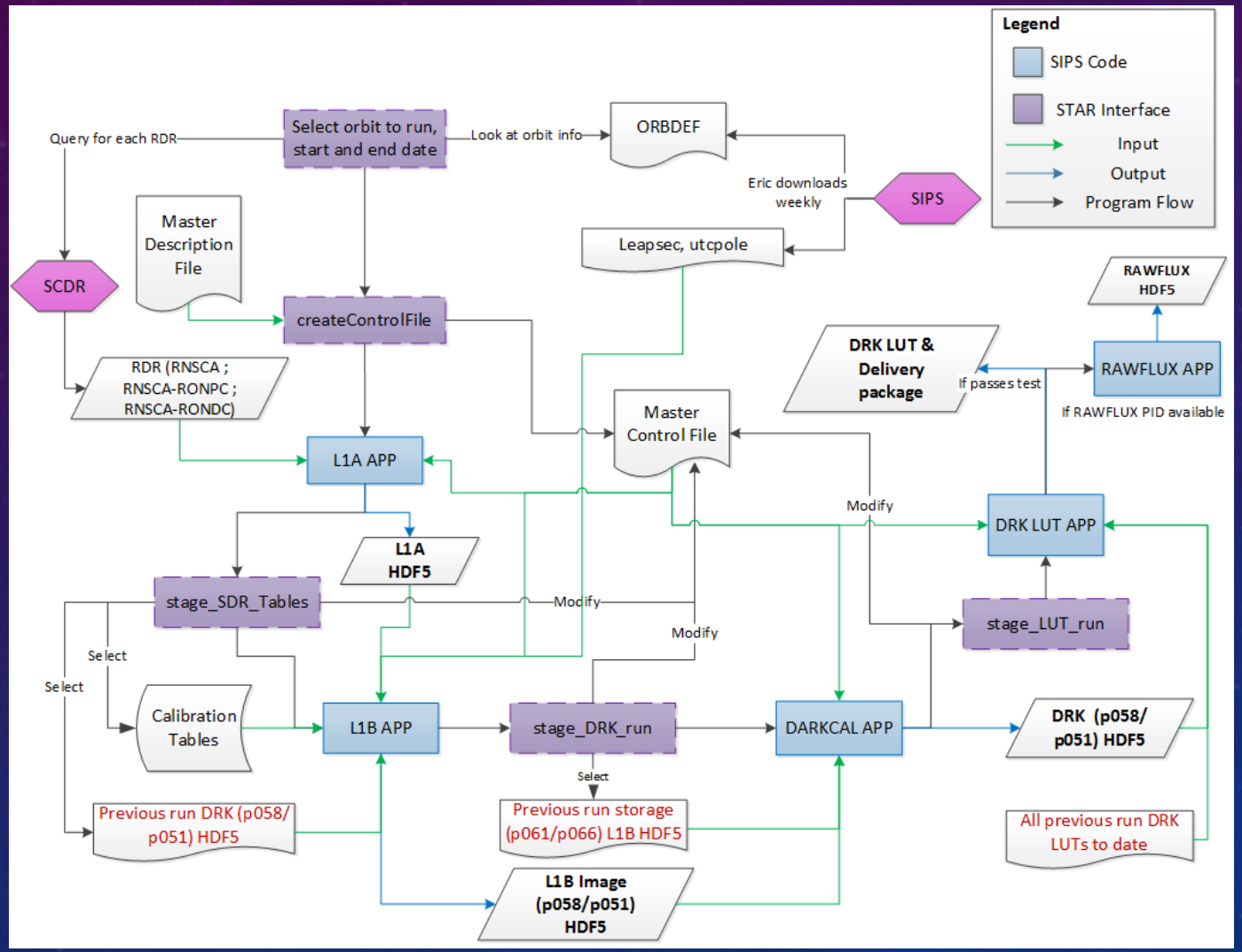


# AUTOCAL

- What is AutoCAL?
  - AutoCAL is the STAR OMPS automated system for running the PEATE/SIPS Calibrations for L1A, L1B, the Darks (DARKCAL and LUT processing) and RAWFLUX.

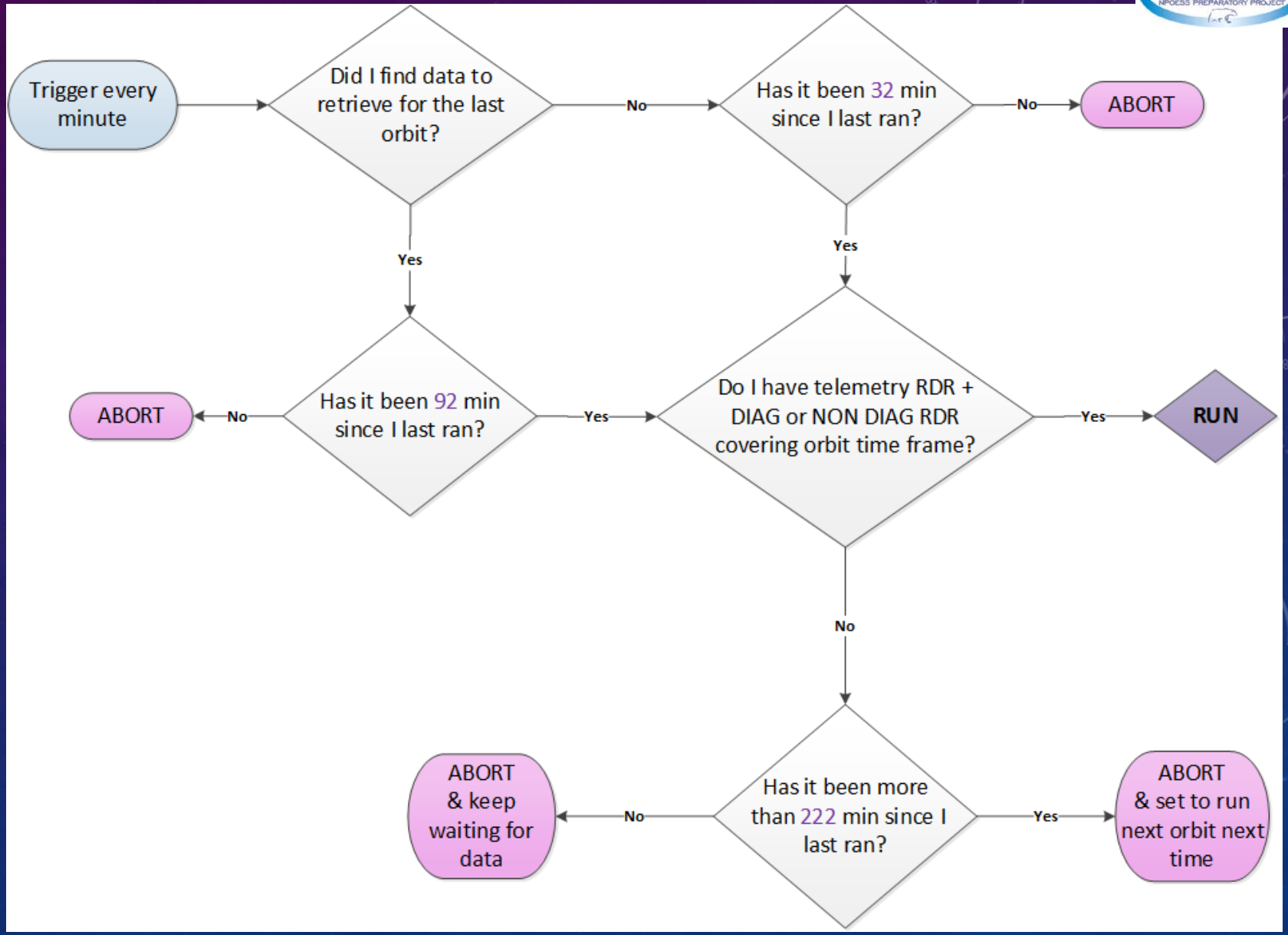


# DATA FLOW AND CODE ORGANIZATION

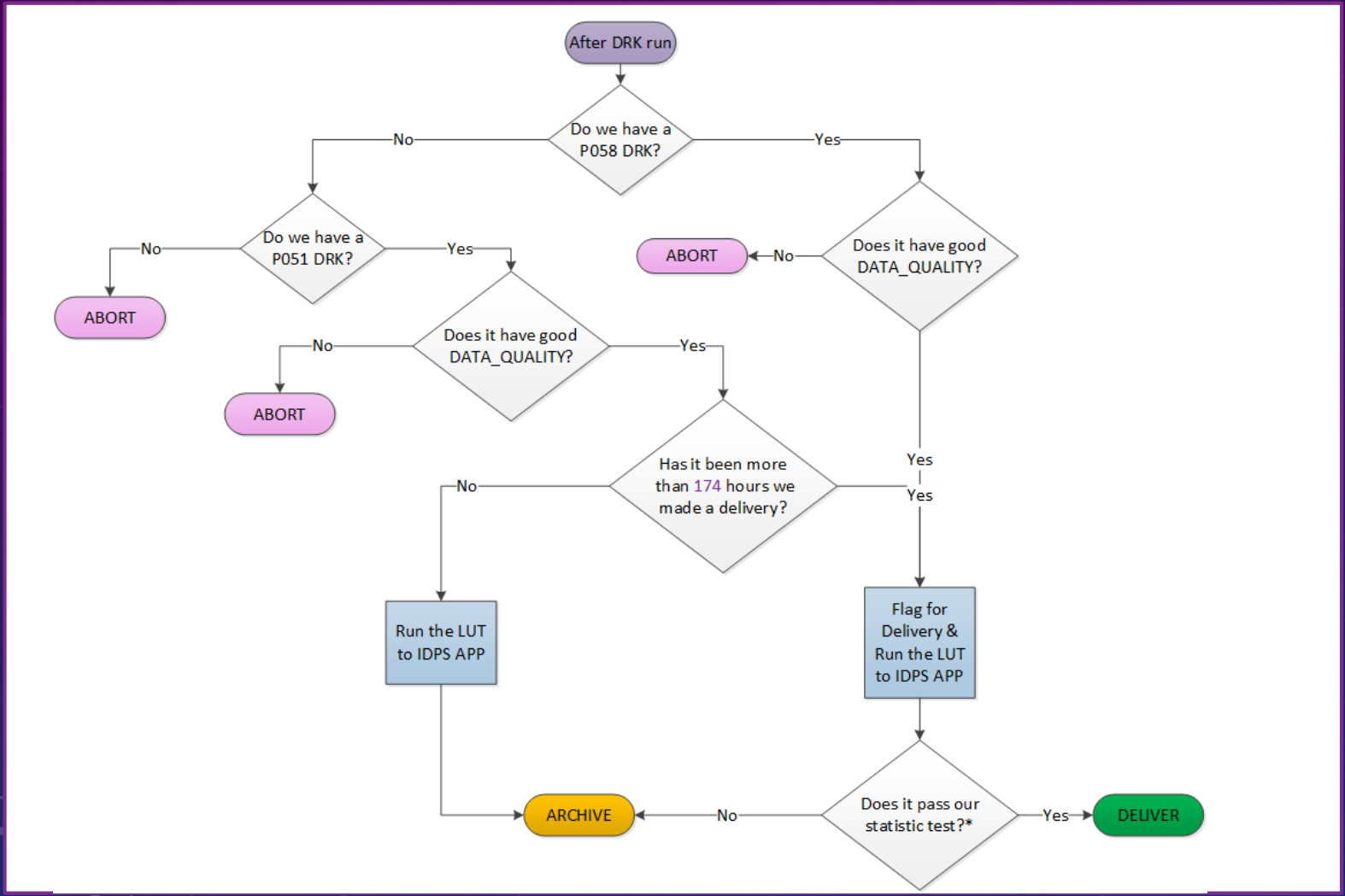


# WHEN TO RUN?

- The main perl script is auto_CAL_OMPS.pl. It is triggered every minute from the cron and follows the following logic. All parameters can easily be modified in the setup file.



# DARK DELIVERY LOGIC




Statistic Test :

Statistic test criteria set for approval :

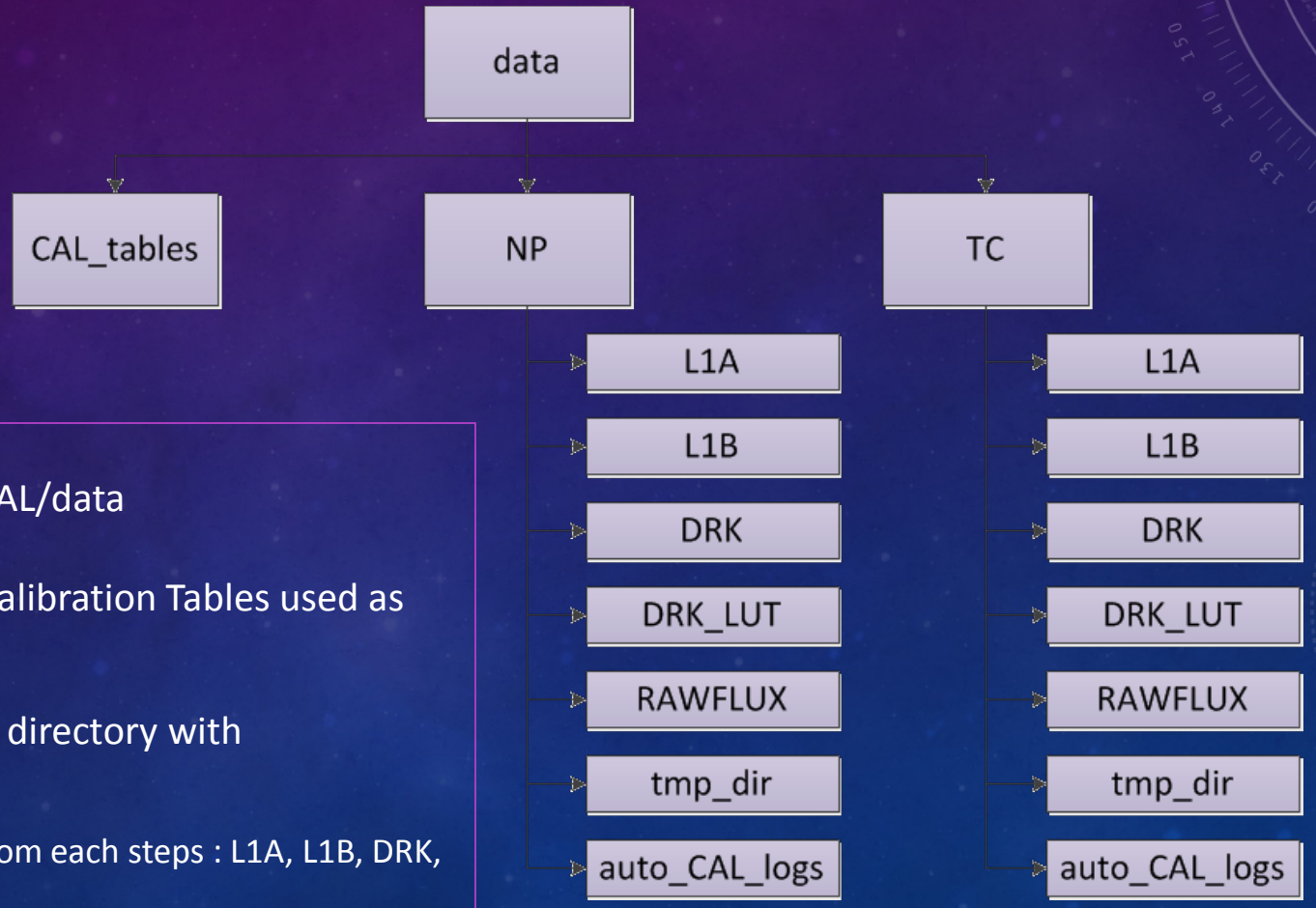
CurrentWeekMean >= LowerLimit and CurrentWeekMean <= UpperLimit with:

LowerLimit = (IDPS_Temporal_Mean_Diff - 3.0*IDPS_STD)

UpperLimit = (IDPS_Temporal_Mean_Diff + 3.0*IDPS_STD)

The mean difference and Standard deviation are calculated over the past delivered LUT that were delivered within a week of each other

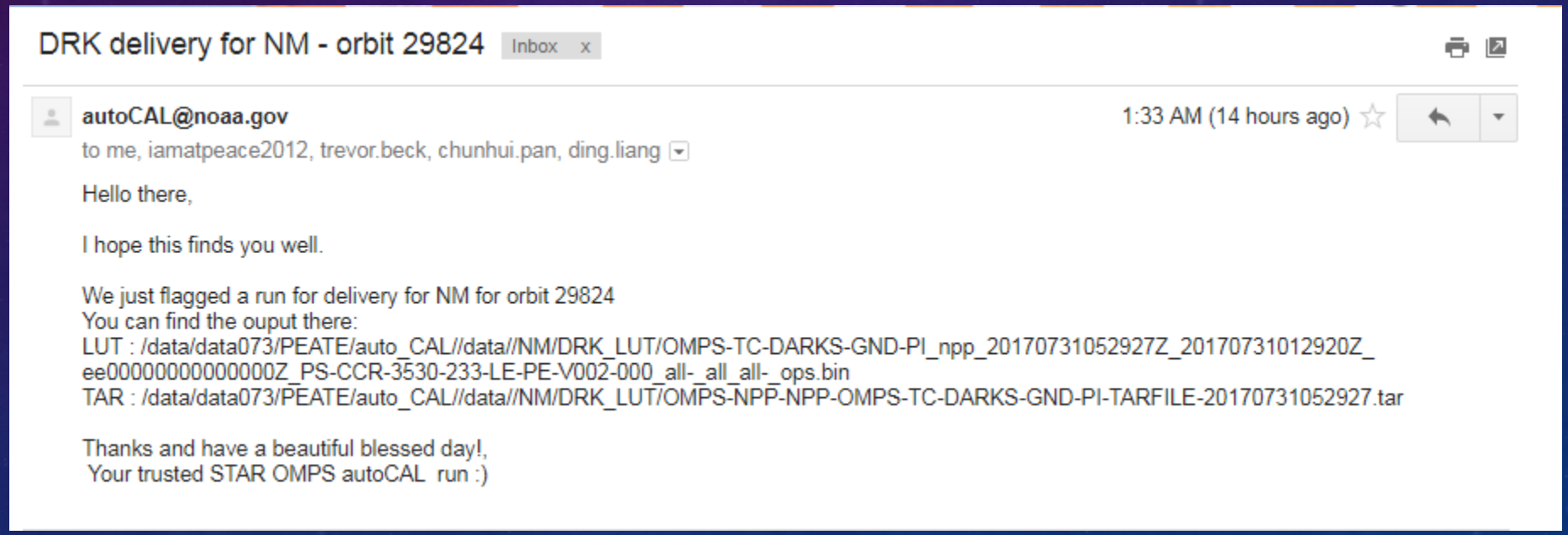
# DATA DIRECTORIES




- Data top directory: /data/data073/PEATE/auto_CAL/data
- CAL_Tables holds the static Calibration Tables used as inputs
- Each sensor then has its own directory with
  - its logs : auto_CAL_logs
  - its run directory : tmp_dir
  - and the various outputs from each steps : L1A, L1B, DRK, DRK_LUT and RAWFLUX

# HOW DO I KNOW WHEN A DRK IS READY?

- autoCAL will send an email each time a DRK has been flagged for delivery with the path to the LUT:



DRK delivery for NM - orbit 29824 Inbox x

autoCAL@noaa.gov 1:33 AM (14 hours ago)

to me, iamatpeace2012, trevor.beck, chunhui.pan, ding.liang

Hello there,

I hope this finds you well.

We just flagged a run for delivery for NM for orbit 29824
You can find the ouput there:
LUT : /data/data073/PEATE/auto_CAL//data//NM/DRK_LUT/OMPS-TC-DARKS-GND-PI_npp_20170731052927Z_20170731012920Z_
ee00000000000000Z_PS-CCR-3530-233-LE-PE-V002-000_all-_all_all-_ops.bin
TAR : /data/data073/PEATE/auto_CAL//data//NM/DRK_LUT/OMPS-NPP-NPP-OMPS-TC-DARKS-GND-PI-TARFILE-20170731052927.tar

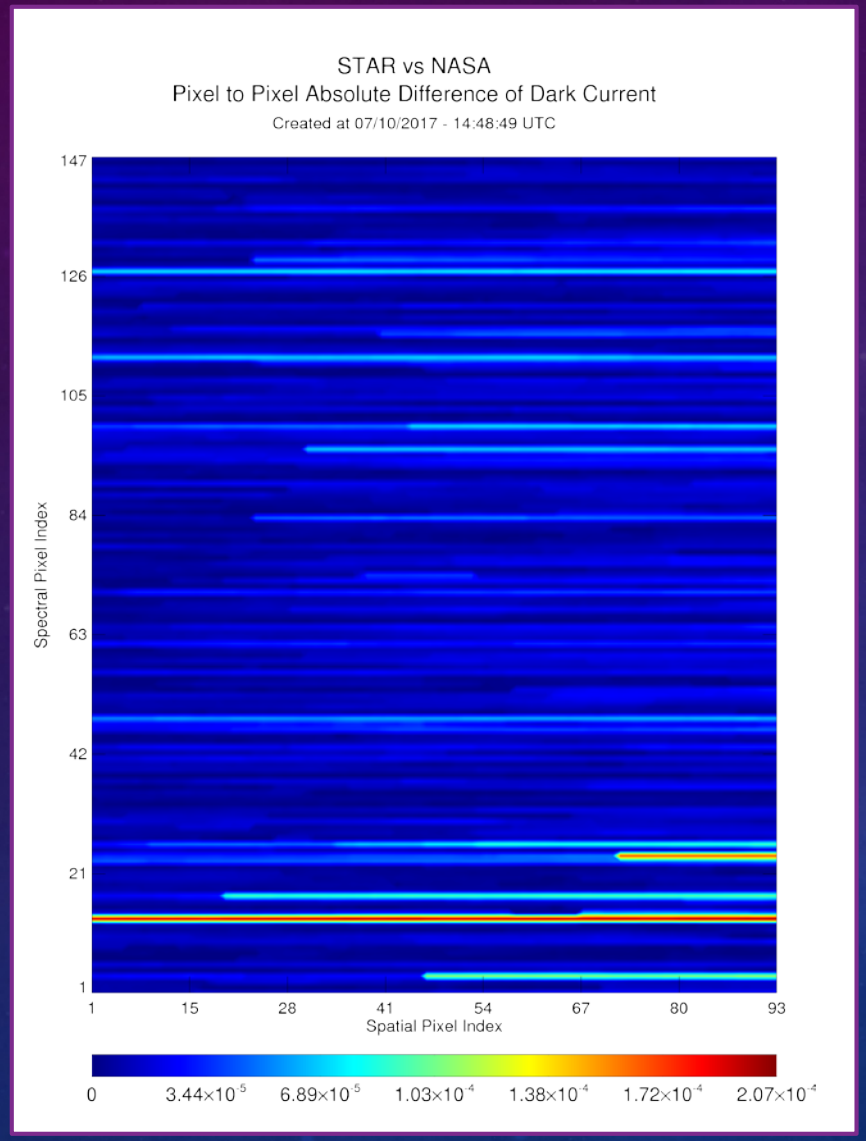
Thanks and have a beautiful blessed day!,
Your trusted STAR OMPS autoCAL run :)

# VALIDATION

- We have been comparing the delivered LUT for about 8 months for NP and 6 months for TC (one a week)
- The only differences we have noticed beyond machine differences were related to using a different storage file or to hot pixels
- This sometimes happen because :
  - Our RDRs come from a different source, we sometimes have not enough data which results in a data_quality flag that is set to be ignored
  - The PEATE is often running the DRK after the next orbit is processed for L1B and ends up choosing the next orbit storage file while we choose the previous one

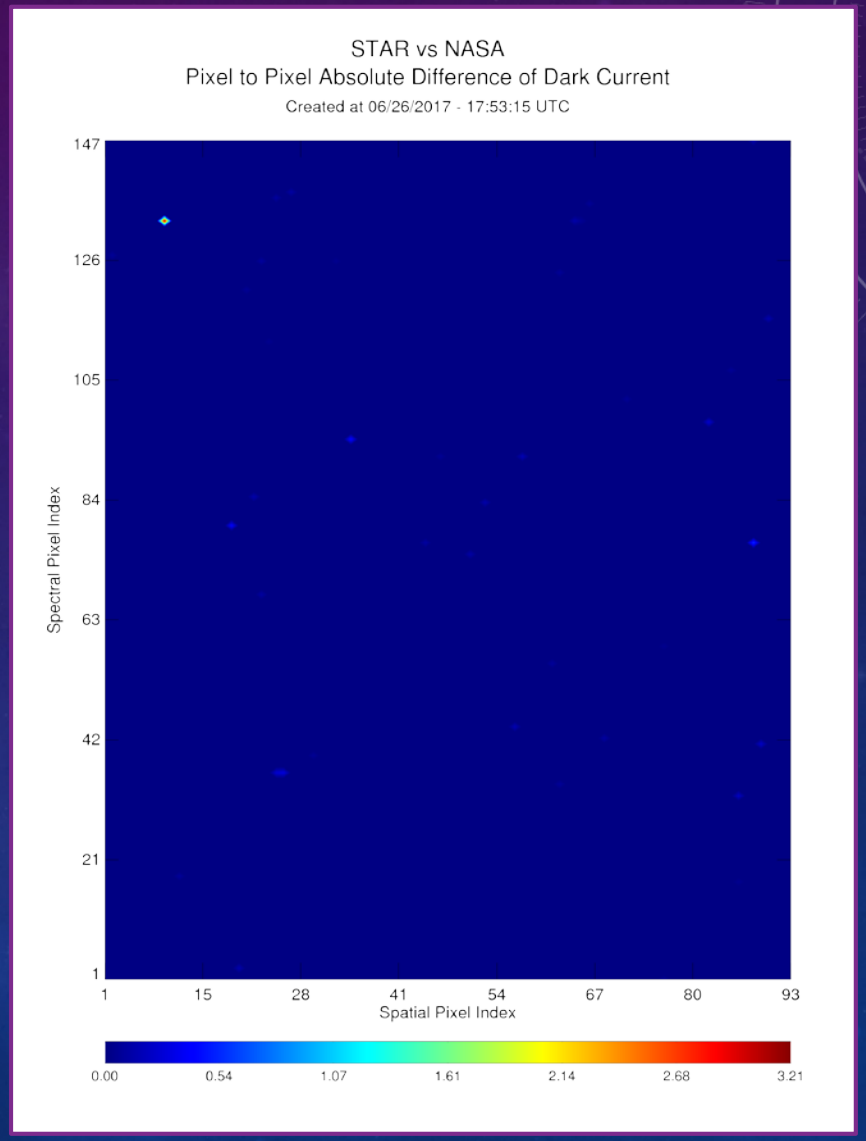
# DARKS VALIDATION EXAMPLES

NP Orbit 29531




Different Storage

NM Orbit 29332




Hot pixel case

# WHAT ELSE?

- It is possible to rerun for specific orbits – Details on how to as well as a lot of information about autoCAL can be found on Vlab under autoCAL: the what and hows?
- Some troubleshooting steps are available in detailed steps on Vlab under "How to Troubleshoot the OMPS autoCAL run? "
- autoCAL also sends me a daily summary
- We will start using our in house produced DRKs for the IDPS delivery next week.
- We will soon implement Solar Flux after the RAWFLUX processing
- We will implement the same DRK and RAWFLUX capabilities at STAR for J1
- The main issues we have encountered is when STAR is experiencing network issues
  - Web server down – autoCAL kept running but no notifications were sent
  - DNS server down – SCDR is not updating , without RDRs autoCAL can't run. It also can't send messages and I don't get notified

=> Each time this has happened over the week-end. In the second case we would have missed the delivery as it took some time for SCDR to catch up on about 48 hours of data for all sensors. I can "speed up" autoCAL in those cases to make up for lost time. Discussions of having a 7 day IT support at STAR. I am highly in favor as it would greatly help in those situations.

**Daily AutoCAL Summary** Trash x

**autoCAL@noaa.gov**
to me, evemariedevali.

Hello there,

I hope this finds you well.

This is your Daily AutoCAL Summary.
Here are the tails of the current summary files ...

```
**********************************************************************************
********************************** For NP ...  ***********************************
**********************************************************************************
29916   LUT     SUCCESS - Sun Aug  6 01:46:05 2017 (11 min)
29917   LUT     40.9 (bad DRK data quality) - Sun Aug  6 03:12:19 2017 (5 min)
29918   LUT     40.9 (bad DRK data quality) - Sun Aug  6 04:45:19 2017 (5 min)
29919   LUT     40.9 (bad DRK data quality) - Sun Aug  6 06:17:25 2017 (5 min)
29920   LUT     40.9 (bad DRK data quality) - Sun Aug  6 07:50:24 2017 (5 min)
29921   LUT     30.4 (no image L1B created) - Sun Aug  6 09:23:05 2017 (5 min)
29922   RAWFLUX         SUCCESS - Sun Aug  6 10:59:41 2017 (8 min)
29923   LUT     SUCCESS - Sun Aug  6 13:36:24 2017 (7 min) **DELIVERY**
29924   LUT     SUCCESS - Sun Aug  6 15:06:23 2017 (5 min)
29925   LUT     40.9 (bad DRK data quality) - Sun Aug  6 17:08:44 2017 (3 min)
**********************************************************************************

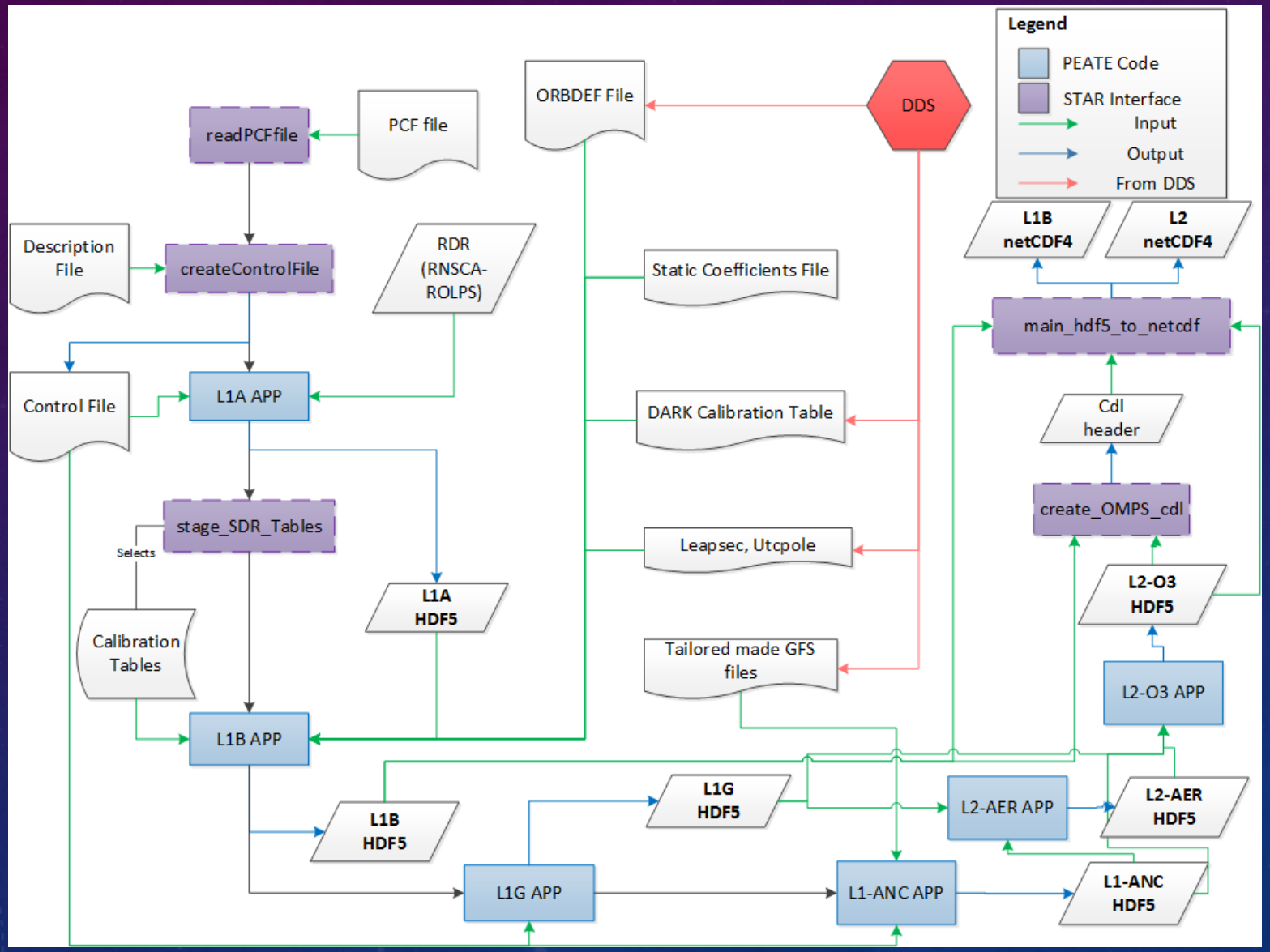
**********************************************************************************
********************************** For NM ...  ***********************************
**********************************************************************************
29916   LUT     SUCCESS - Sun Aug  6 02:12:37 2017 (19 min)
29917   LUT     40.9 (bad DRK data quality) - Sun Aug  6 03:37:18 2017 (11 min)
29918   LUT     40.9 (bad DRK data quality) - Sun Aug  6 05:10:13 2017 (11 min)
29919   LUT     40.9 (bad DRK data quality) - Sun Aug  6 06:43:12 2017 (11 min)
29920   LUT     40.9 (bad DRK data quality) - Sun Aug  6 08:16:13 2017 (11 min)
29921   RAWFLUX         SUCCESS - Sun Aug  6 09:48:10 2017 (10 min)
29922   RAWFLUX         SUCCESS - Sun Aug  6 11:31:41 2017 (20 min)
29923   RAWFLUX         SUCCESS - Sun Aug  6 13:47:28 2017 (24 min) **DELIVERY**
29924   LUT     SUCCESS - Sun Aug  6 15:12:01 2017 (12 min)
29925   LUT     40.9 (bad DRK data quality) - Sun Aug  6 17:09:55 2017 (6 min)
**********************************************************************************
```

Thanks and have a beautiful blessed day!,
Your trusted STAR OMPS autoCAL run :)

# FUTURE PLAN AND IDEAS

- Create, and update as we go, a wiki with the potential issues that can arise, what they mean and how to solve them (if possible) - ongoing
- Develop a web interface to see the status of the run (build up on ICVS monitoring ?) ; we could also show the various input used, the data quality of each intermediary output… possibilities are endless!
- The Limb EV L2 processing in an “on demand” status which could also be made available to the team

# LIMB EV SDR AND EDR TO NDE



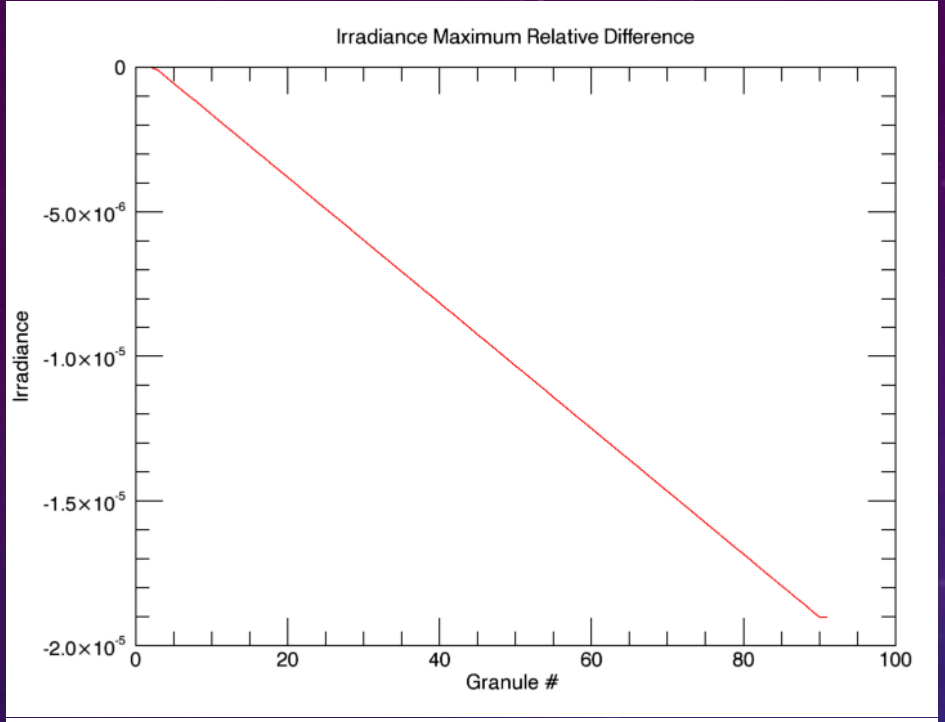
# WHAT IS OMPS ON DEMAND?

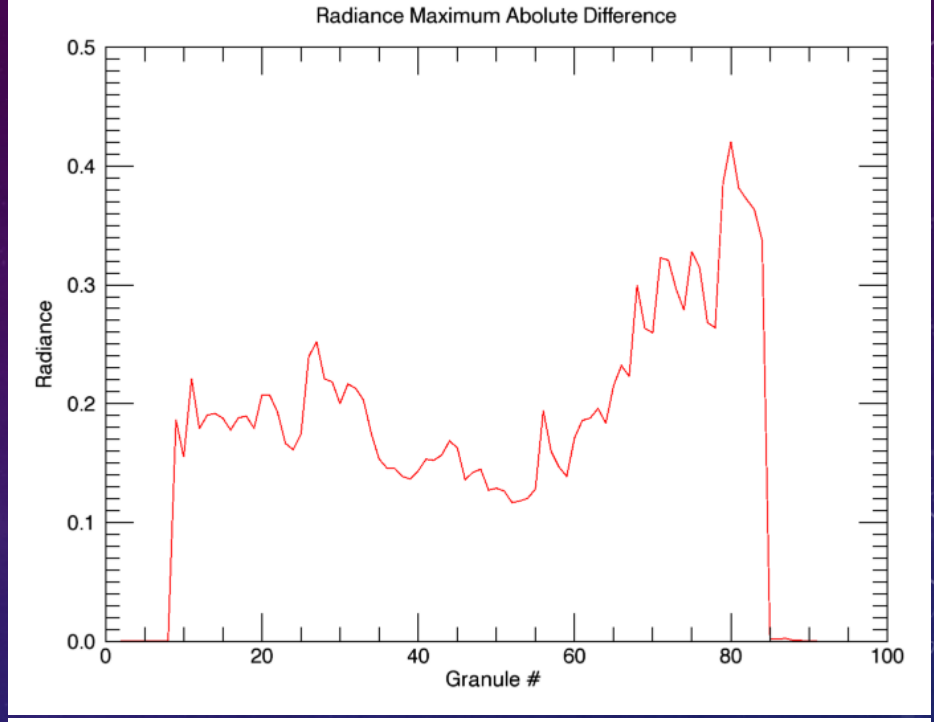
- SIPS runs EV data per orbit while NDE requested a granule based processing.
- “Omps On Demand” was born in order to conduct validations. It is the STAR capability that allow us to run Limb data in a few different way - for a day, for an orbit or for a granule.
- We are just finishing implementing the 64-bit versions of the APPs for OMPS V 2.5 processing.
- Processing an orbit worth of granules from RDR to EDR takes about 9 hours
- We did the comparison “pixel to pixel” and we show no difference at the SDR level for Radiances or any other “science” data types. The only differences we see are due to machine differences, below significance, for geolocation fields and Irradiance. The gridded SDR show some differences on Radiances and we are currently investigating why. Those differences propagate to the L2 level.
- Comparison of some SDR fields as well as the Ozone at the EDR level follow for orbit 14801. These graphs show the maximum pixel to pixel difference for each data type.

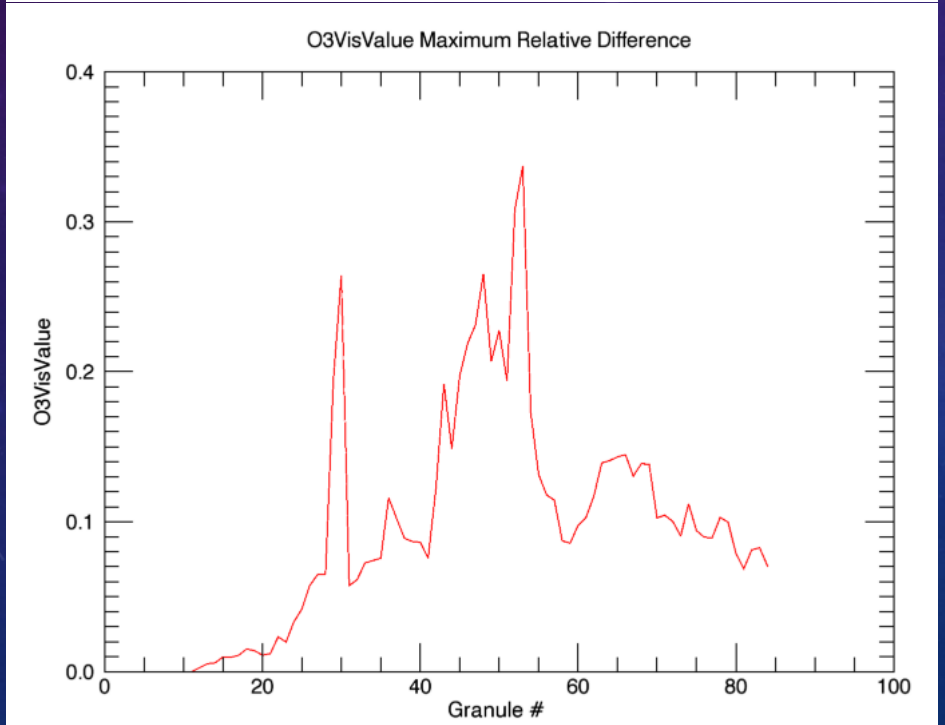
SDR

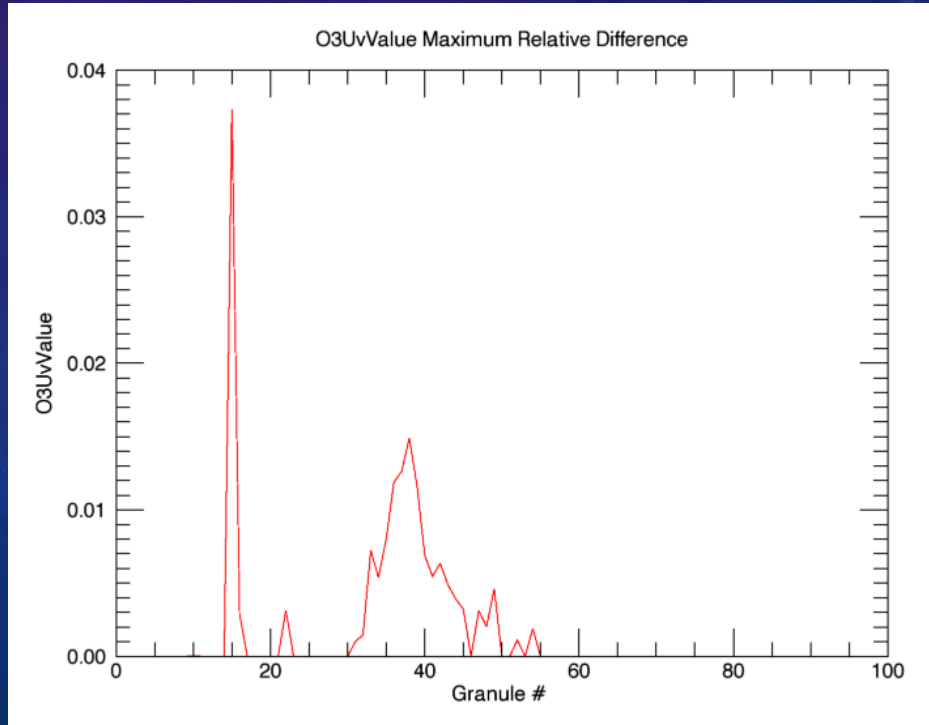
EDR

Gridded SDR



# SUMMARY AND CONCLUSION

- STAR has the capability to run DRK and RAWFLUX calibration for NPP for both the Nadir Mapper and the Nadir Profiler
- Validation has been ongoing for the past few months and has given successful results
- We will do a similar implementation for J1, with the DRK as our priority

- STAR also has the capability of running “on demand” for the EV Limb Profiler RDR to EDR processing for a granule, an orbit or a day worth of data
- Validation of the 64-bit V2.5 OMPS processing is ongoing. No difference, beyond machine precision, is found for L1B/SDR.