

An automated cross cal fitting tool for XMM-Newton

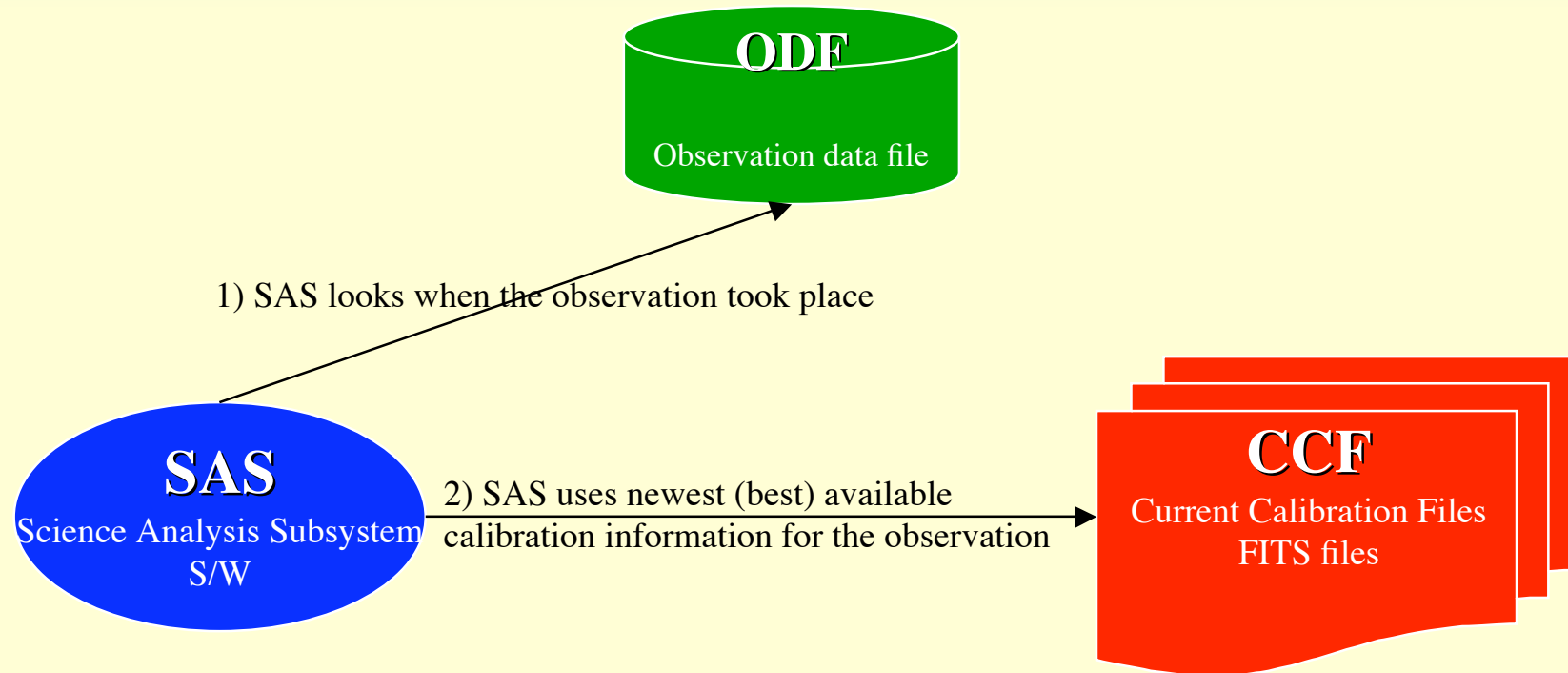
1) calibration archive processing

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overview

- introduction on calibration
- the calibration archive
- software to automate and track calibration archive updates
- structure of calibration archive
- future possibilities

organization of calibration software and files

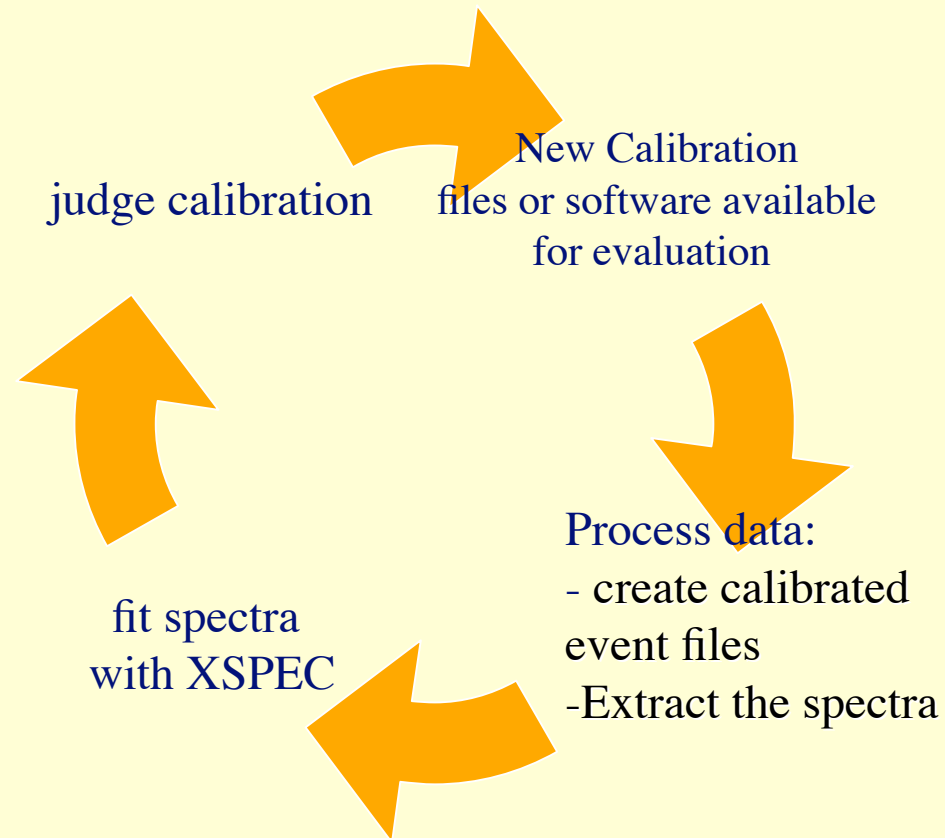


- calibration algorithms
- various versions as of launch
- currently 1 version per year

- parameters for calibration algorithms
- update possible every day

Very flexible system for calibration updates

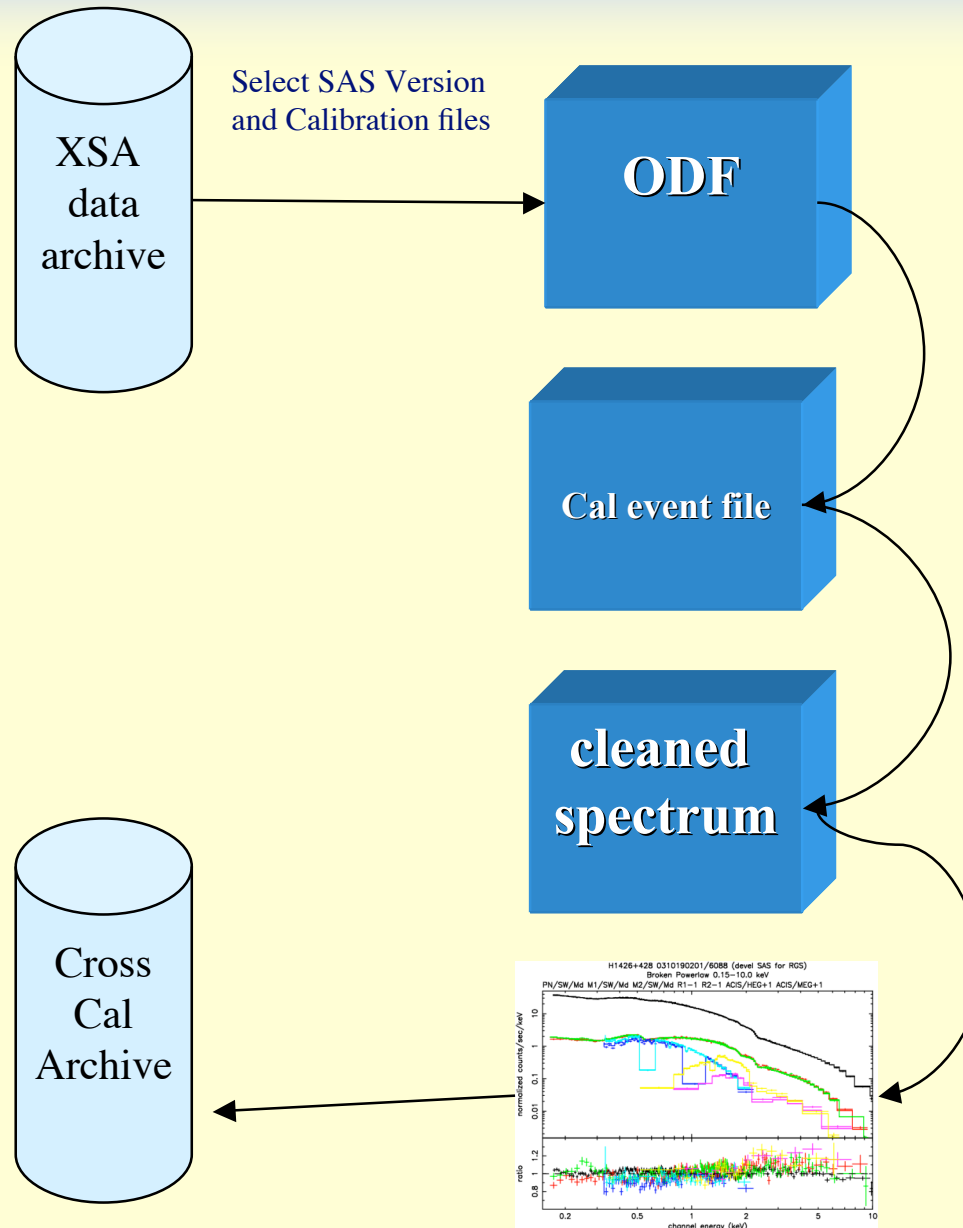
verification of calibration updates



history

- -2004: all checks on individual cases “by hand”
 - 2004-2005: development of semi automatic SW
 - 225 observations to be checked
 - Data processing automatic
 - Fitting semi automatic
- time consuming process for full evaluation

Work flow until now



Processing → *proc.csh*

**Extraction → *extract.csh*
 flarescreenig
 source and bg extraction
 spectra/arf/rmf generation**

xspec

'proc' and 'extract'

- cifbuild – to get calibration files
- odfinger – creates the SAS ODF summary file
- emchain – creates a calibrated event list for MOS
- epproc – creates a calibrated eventlist for pn
- RGS - rgsproc
- evselect
- especget - rmf, arf

retrieve Data from XSA data archive



- **Get Calibration Files**
- **CTE Correction etc.**

calibrated event list



- **Flarescreening**
- **source an background extraction**
- **spectra generation**

cleaned spectrum

response matrices

Structure of the calibration archive

- The calibration archive contains observations of targets used for calibration
- The calibration archive can be found on
/xdata/xcaldata/XMM/{OBSID}
- Every {OBSID} contains subfolders /regions with region files (for source and background)
- Many {OBSID} already contain a subfolder /model, with the model needed to fit the data (work in progress)

```
t 0065940101
  t model
    regions
t 0080940101
  t model
    regions
t 0080940301
  t model
    regions
t 0080940401
  t model
    regions
t 0080940501
  t model
    regions
```

```
/xdata/xcaldata/XMM/0080940101
```

```
[xcaldata@xmmw136 0084020601]$
```


Disadvantages and missing bits

- only basic archiving
 - Every time the observations are processed with new calibration files old data is overwritten.
- no version control
 - difficult to compare different calibration states easily
- logfile generation and error handling of the batch processing need to be improved

My task

- Create a **single application** that in an automated way can
 - process data
 - Extract the spectra
 - Fit the spectra
 - keep track of all the version information

```

t 0032341301
  t regions
    xmmsas_20050815_1803-6.5.0_ccf_pub
t 0032342001
  t regions
  t xmmsas_20050815_1803-6.5.0_ccf_pub
  t xmmsas_20060628_1801-7.0.0_ccf_pub
    xmmsas_20060628_1801-7.0.0_ccf_test
t 0032342201

```

```

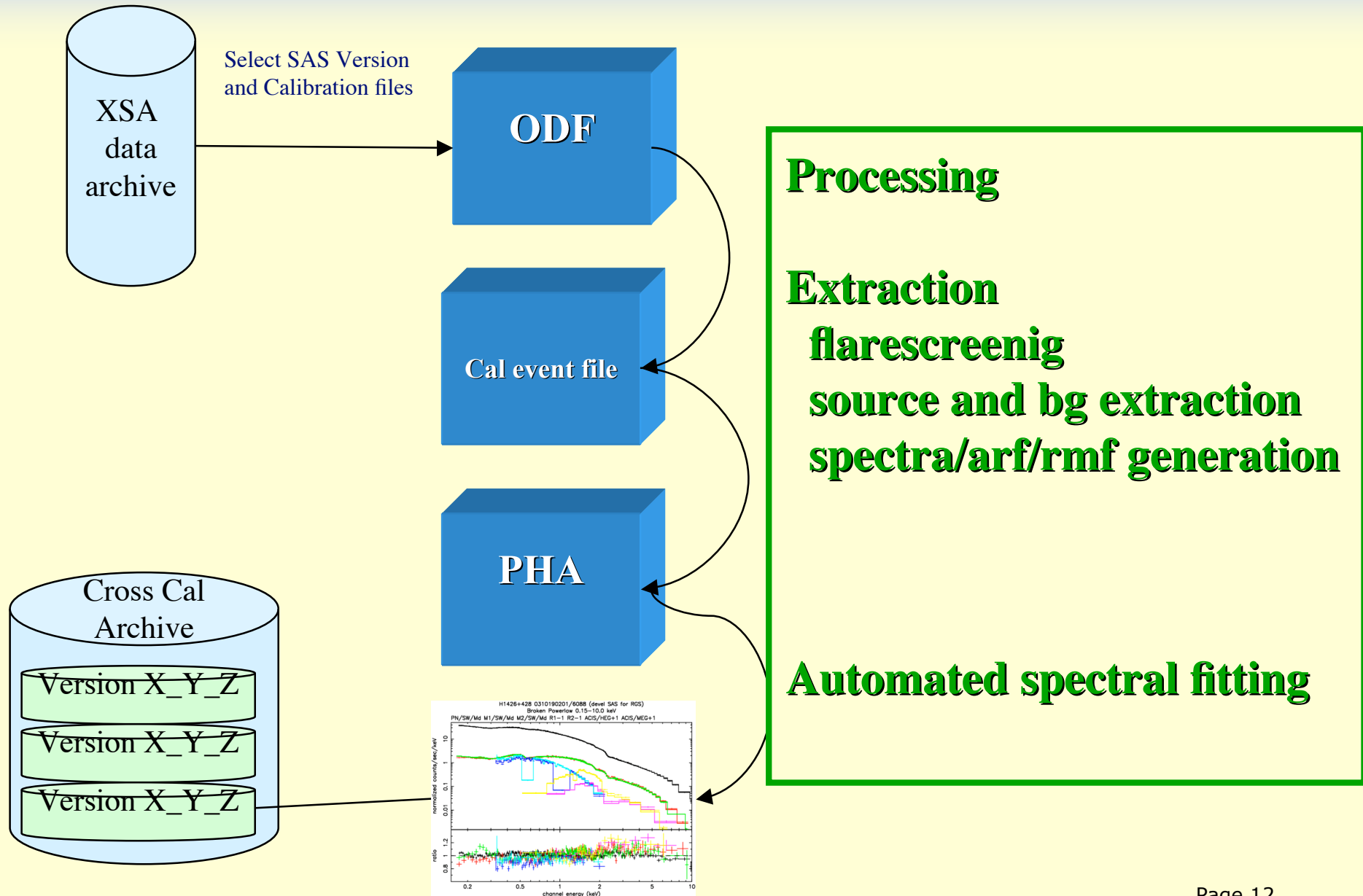
/xdata/xcaldata/XMM/00323420~20050815_1803-6.5.0_ccf_pub

```

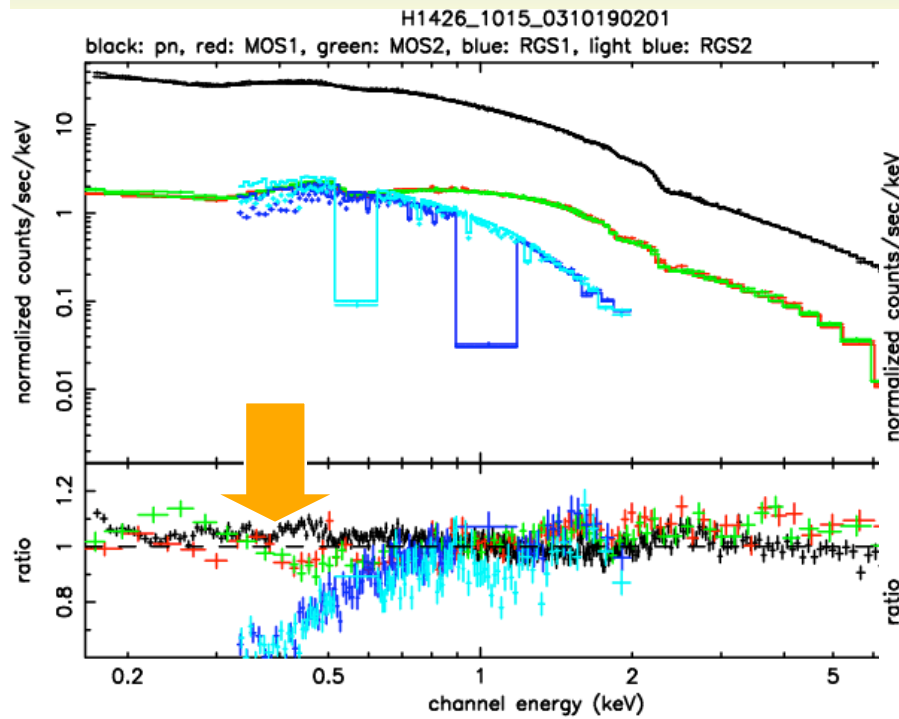
Advantages of this Solution

- Calibration scientist is able to process all data with upcoming SAS versions and / or future calibration files with a single script that also fits the data.
- Consistent and easy workflow.
- As the data is archived different versions of the calibration can be compared easily by the calibration scientists

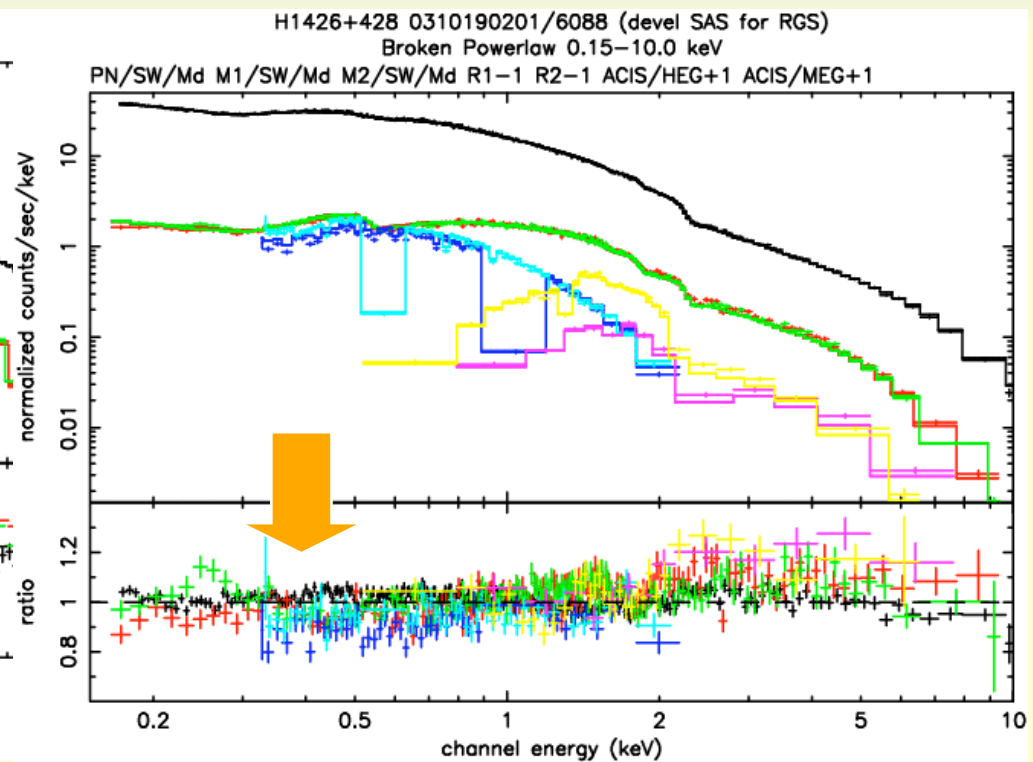
Work flow now



Example (H1426 with SAS devel)



- SAS 6.5



- SAS 7.0 (Update on RGS)

Future work- Calibration preview tool

- Provide user not only with current status of calibration but allow to see work in progress
- Answer the question: Should I wait to publish my data for the next cal update or not?

Tool

- Application: Calibration Preview Tool

