OGIP Calibration Memo CAL/GEN/03-001

Automated Delivery of Calibration Data to the CALDB

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SUMMARY

This documents how to deliver CALDB data files into the CALDB staging area for automatic release to the public CALDB
Intended audience: General users, Data producers, OGIP programmers and authors of data analysis s/w.

LOG OF SIGNIFICANT CHANGES

Release Date	Sections Changed	Brief Notes
2003 Sep 10	All	First version
2003 Sep 23	All	some clarifications
2004 Jun	Sec 1	some more clarifications after the first ingest test

Contents

1 Overview: Delivering Data to the CALDB at the HEASARC

This document provides a guide for delivering data to the CALDB staging area for automated release into the public CALDB. This automated mechanism was first used by the SWIFT mission starting in 2003. Any project/mission which wishes to use this automated release should identify a responsible party (the "Project Calibration Team") to provide calibration files into an appropriate directory in the CALDB staging area. This directory will have to be set up by the CALDB] manager who can be identified from the CALDB home page,

`http://heasarc.gsfc.nasa.gov/docs/heasarc/caldb/caldb_intro.html`

The CALDB staging directory structure needs to be a mirror of the directory structure of the mission's CALDB data directories. The CALDB manager can help set this up for you if necessary.

Each delivery consists in the following :

- One or more Calibration data files copied to the CALDB staging area in the appropriate subdirectory

- A Calibration Index File

- An email sent to the `caldbingest@olegacy.gsfc.nasa.gov` address.

This document describes what the project should do to deliver one or more calibration files for one or more particular instruments, and how to signal to the CALDB manager that the delivery is available in the staging area for automated release to the public CALDB.

Some general notes:

- To ensure consistency with different flavors of unix and other supported operating systems, the CALDB requires that missions, instruments and file names are in **lower case**.

- Mission and instrument names should not contain special characters and should be consistent with the specifications of OGIP/93-013: "Standard Strings for Mission, Instrument, Filter, Detector & Grating Names for OGIP FITS files".

- File names can consist of letters, numbers and underscores.

- to write to the CALDB staging area at the HEASARC the user must be added to the `caldb_stage` group. Contact the CALDB manager for instructions.

2 Calibration Data File Requirements

Unless the data files are "Primary Calibration Files" (pcf) which are to be stored for historical purposes (but which are not meant to be used by analysis software), the data files are expected to be stored in subdirectories in the "Basic Calibration File" (bcf) or the "Calibration Products File" (cpf) directories (see "BCF & CPF Calibration File Guidelines" for CPF/BCF information and guidelines).

For bcf or cpf data, these data

1. must be in FITS format and include all required keywords (see
   `http://heasarc.gsfc.nasa.gov/docs/heasarc/caldb/caldb_keywords.html` for a list
   of required keywords);

2. the data files must be verified as valid FITS files (using a routine like the `fverify` tool
   which is part of the HEASOFT package)

3. must contain valid calibration data;

4. the FITS data must contain valid CHECKSUM and DATASUM keywords in each FITS
   header;

5. each file should be associated with only 1 CALDB subdirectory.

The above 5 steps are the responsibility of the Project Calibration Team.

3 Delivery to the CALDB Staging Area

3.1 Organization of the Staging Area

The CALDB staging area for a given mission and for a given instrument is organized following
standard CALDB usage as follows:
`$CALDB_STAGE/data/<mission>/<instrument>/`

where `$CALDB_STAGE` is a system environment variable which points to the location on disk of
the CALDB staging area, `<mission>` is the string which has been adopted to name the mission,
and `<instrument>` is a string which has been adopted to describe a given element associated
with this mission. Each mission will have one or more instruments. An instrument can include
common elements such as the entire spacecraft platform (`<instrument>=spacecraft`) or an
X-ray telescope (`<instrument>=xrt`). Calibration data releases need to be on an instrument-
by-instrument basis.

3.2   Staging

After verifying a calibration file (or calibration files) for release to the CALDB, the Project Calibration Team data copies calibration data files for each instrument to the appropriate `<instrument>` subdirectory in the CALDB staging area.

For each `<instrument>` for which new calibration data are being staged, the project calibration team needs to supply a valid **Calibration Index File** (CIF). This CIF needs to include not only the new calibration data being staged, but also needs to include any other valid calibration data for that mission and instrument. It is strongly encouraged that all calibration data (valid and invalid) which may have been released for that particular mission and instrument be included in the CIF. All calibration files included in the CIF must include appropriate CALDB header keywords, including the `CAL_QUAL` which is used to distinguish valid from invalid calibration data included in the CALDB.

The delivery should include a CALDB index named `caldb.indxYYYYMMDD` where `YYYYMMDD` is the staging date. This file should be placed in a subdirectory of the `$CALDB_STAGE/data/<mission>/<instrument>/` directory named `index`. For example

`$CALDB_STAGE/data/swift/uvot/index/caldb.indx20040617`

In the public CALDB this file will be placed in a subdirectory named `index` within the appropriate `instrument` directory. A symbolic link to this file is created as
`$CALDB_STAGE/data/<mission>/<instrument>/caldb.indx`,
which is the file used by software to access calibration data from the CALDB. Previous versions of the `caldb.indexYYYYMMDD` files are kept within the `index` subdirectory so that previous versions of the CALDB can be accessed by software simply by re-assigning the symbolic link to a previous version of the `<index>/caldb.indxYYYYMMDD` file.

To keep record within the file of a specific caldb version, all `caldb.indx` files provided by the project should include a new keyword `CALDBVER`. The content of the keyword should match the string defining the staging date, e.g. `CALDBVER='19931220'`.

4   Email Notification of the CALDB Manager

After the calibration data and the index file (one per instrument) have been copied to the CALDB staging area an email should be sent to `caldbingest@olegacy.gsfc.nasa.gov`. The subject of the e-mail must contain the string "caldb update" followed by a space, followed by the mission name, followed by a space, followed by the staging date in YYYYMMDD format.

For example :

```
        To: caldbingest@olegacy.gsfc.nasa.gov
```

```
 Subject: caldb update asca 19931220
```

indicates that the ASCA calibration data file were staged on December 20 1993.

The staging date in the subject must be the same date as given in the `CALDBVER` and as appended to the end of the `caldb.indx` filename.

The body of the email should be text defining the calibration files for each instrument included in the delivery. The `instrument block` is defined as follows.

1. The `instrument block` begins with the line `instrument=` followed by the string designating the instrument, for example `instrument=gis`. There should be no spaces in this line

2. the next line starts with `caldbindexfile=`, which gives the name of the CIF appropriate for the particular data delivery. For example `caldbindexfile=caldb.indx19931220`

3. The next line contains the tag `newfile`.

4. After the `newfile` tag comes a list of calibration files, one per line. The calibration file names must include the directory path starting from the appropriate subdirectory (the `cpf` or `bcf`) of the `<instrument>` directory. For example `cpf/95mar06/gis2v4_0_256.rmf`

5. The `endnewfile` tag follows the last calibration file included in this particular delivery for this particular instrument and marks the end of the instrument block.

There should be no blank lines within an `instrument block`. A release can include more than one `instrument blocks`.

For example the email notification for a release of ASCA data for the SIS and GIS instruments might look like the following:

```
From: ASCA calibration team
To: caldbingest@olegacy.gsfc.nasa.gov
Subject:  caldb update asca 19931220

    instrument=gis
    caldbindexfile=caldb.indx931220
    newfile
    cpf/95mar06/gis2v4_0_256.rmf
    bcf/bgd/94may/blanksky_g2_10cor12_v2.evt
    endnewfile
    instrument=sis
    caldbindexfile= caldb.indx931220
    newfile
```

```
cpf/94nov9/s1c3g0234p40e1_512_1av0_8i.rsp
cpf/94nov9/s0c2g0234p40e0_1024v0_8i.rmf
bcf/bgd/94nov/s1bgd_10i.evt
endnewfile
```

5   Changes to the Index file

The caldb index file appropriate for that instrument should reflect what is changed in caldb :

- Delivery of a new calibration file: The caldb index file should include entries which document the new files.

- Delivery of an updated file: The caldb index file should include new entries documenting the updated file. The `CAL_QUAL` value for the old file should be set to a higher value (usually changed from `CAL_QUAL=0` to `CAL_QUAL=5`, while the update should have `CAL_QUAL=0`.

6   Release to the Public CALDB

After the data have been staged and notification has been received by the CALDB manager, the CALDB manager will:

1. Copy the data files to the appropriate subdirectory of the HEASARC (public) CALDB

2. Verify the data files which have been copied using the `CHECKSUM/DATASUM` keywords

3. Send a confirmation e-mail to the Project Calibration Team that the data have been copied. The body of this e-mail will consist of a list of the copied files in the same format as used in the notification e-mail. The subject line of this e-mail will include the name of the CALDB update, as in:

   ```
   Subject: COPIED caldb update asca 19931220 files
   ```

4. The privileges on the copied files in the HEASARC CALDB will be changed to allow world read access.