5.6.2.1.3.7 **HRC_dose** **mta**

HRC_dose

Description: This tool creates and monitors HRC DOSE filesNominal use is to be run on a weekly basis, using recent L1 data and archival dose data. Stand-alone, can run on stack of L1 HRC data.

Open Issues:

1. Detect HRC/ACIS hot spots and dead spots are set to -1 (TBR)

Inputs:

- Level 1 event Files. SEE HRC Level 1 ICD
- Level 1 bad pixel file. SEE HRC Level 1 ICD

Outputs:

- HRC-I and HRC-S dose event–like lists (to archive)
- HRC-I and HRC-S dose images (to web site)

Control Parameters:

- Time: start day, stop day
- Instrument: HRC-I, HRC-S
- Coordinates: raw, chip

Algorithm:

This tool has two purposes:
1) Monitor the total dose of the HRC plates;
2) Create cumulative dose maps from time A to time B.
General algorithim is to prepare a weekly dose image from archival L1 data. This image is added to other weekly dose files or the existing total dose file to create either Cumulative dose or total dose. The tool creates a fits compatable binary table containing 6 columns, (or 2, 3 column files) RawX, RawY, Raw_counts ChipX, ChipY and Chip_counts, where: Raw_counts and Chip_counts and the number of events at location (RawX, RawY) and (ChipX, ChipY) respectivly. This is called an event-like list (ELL).

1. **Cumulative Dose**: This is a generic form of the tool called by the user.

   - For chosen detecter
   - Identify all weekly dose event-like lists in the archive between start_day and stop_day.
   - Merge all event-like lists:- Call COADD
   - Correct dates in header DATE_OBS = start_day of first weekly, DATE_END_day= stop_day of last weekly : see header at bottom of spec.
   - print final DATE_OBS and DATE_END to STDOUT
   - return COADD+header as an event–like list fits file.
   - return a bin by 16 fits image file (4kx4k) or (4Kx1K).

2. **Total Dose**: This is a form of the tool which handles L1 event files as well as ELLs. Called weekly by ASCDSops (MTA).

   - For each detecter
   - Identify date_stop of last total_dose_hrc_xxx.fits file. Call that date last_total_dose
   - extract from archive all hrcXXX_evt1.fits between last_total_dose and today.
   - From those files extract: rawx,rawy or chipx & chipy
   - Create an ELL- called WEEKLY - Based on the L1 data.
   - For chip coodinates: open XXXXbpix1.fits appropriate for the time selected (if more than one file exists in the time range, use the latest.)
   - For chip coordinate: bin bad pixel data by 4x4.
   - For chip coordinate: set counts for all bad pixels in WEEKLY to -1.
   - Merge WEEKLY to LAST_TOTAL_DOSE - call TOTAL_DOSE.
   - Correct dates in header Date_OBS = start_day of first weekly, DATE_END= stop_day of last weekly : see header at bottom of spec.

- return a bin by 16 fits image files (4kx4k) or (4Kx1K). for each detector and coordinate system.
- return a bin by 64 gif image files (1kx1k) or (1Kx.25K). for each detector and coordinate system. (color at bottom of spec).
- In TOTAL_DOSE identify all pixel with greater than 1000 events and less than 10,000 – call endangered .
- in TOTAL_DOSE identify all pixel with greater than 10,000 events – call damaged
- via notifier send to HRC scientist MTA scientist and problem tracker:

```
System ID HRC
Problem ID 331
Priority 3A

Total dose report For Week ending DD-MMM-YYYY

The following (Raw) locations are endangered (9999> counts >999) on (Detname)
pixelx * 4, pixely*4, counts per 4x4 pore region
...
The following (Raw) locations are damaged (counts >10,000) (Detname)
pixelx * 4, pixely*4, counts per 4x4 pore region

If There is no complaint above this line all is well
```

To Web page: The HRC region of the trends page should look like this:

```
HRC
     HRC Temperatures                  Weekly Monthly Yearly Mission
     HRC Electronics                   Weekly Monthly Yearly Mission
     HRC Veto Counting Rates           Weekly Monthly Yearly Mission
     HRC Source Counting Rates         Weekly Monthly Yearly Mission
     HRC Background Counting Rates     Weekly Monthly Yearly Mission
     HRC PSF                           Weekly Monthly Yearly Mission
```

```
        HRC Houskeeping                 Weekly Monthly Yearly Mission
        HRC DOSE                        Weekly Monthly Yearly Mission
```

The four links after HRC Dose should link to the appropriate version of the following:

```
HRC Weekly DOSE for the week ending 18-Mar-1999

6 {dose gifs}: 2 1kx1k 3 1k x0.25k  1 1Kx.75K

-------------------------------------------------------------------

HRC I Dose

                #  'Raw'x 'Raw'y Count (Note -all pairs over 1000
                                          + the next 10)
                1   3200    2300   10231  {in RED}
                2   4200    2300   9231   {in YELLOW}
                3   2700    2300   8231  {in YELLOW}
                4   2700    4300   6131   {in YELLOW}
                5   2700    2200   1031   {in YELLOW}
                6   5200    2300    931   {in Green}
                7   1200    2300    831   {in Green}
                8   4200    2300    531   {in Green}
                9   3200    1300    431   {in Green}
                10  3200    1200    231   {in Green}
                11  5200    2300    230   {in Green}
                12  1200    2300    229   {in Green}
                13  4200    2300    228   {in Green}
                14  3200    1300    227   {in Green}
                15  3200    1200    227   {in Green}
--------------------------------------------------------------------
HRC S1 Dose ....
```

- The "2 @ [1k x 1k]" are 1 for the Raw HRC I and one for the chip HRC I the "3 @ [1k x 0.25k]" are one for HRCS0, HRCS1 and

HRCS2 (CHIP) "1 @ [1kx 0.75k]" is the HRC-S (RAW)

- In addition, for each of the 6 dose gifs, we should do the "zoom thing" exactly like HRC in photon_mon. These zooms (24 total) should go as 4 below each of the six images specified above. Create the zooms as follows:

  - Grid the detector (whichever detector) into 64 regions.
  - Find the pixel/pore with the max counts in any region and assign this number to the region.
  - Create full scale zooms of the top four regions.
  - ENHANCEMENT 1 - when you click on the zoom you get an ELL of the zoomed region
  - ENHANCEMENT 2 - when you click on the zoom you get an event list of the zoomed region instead (this is lower priority)
- Colors for all dose images are:
  - $>$ 10,000 red
  - 2001 – 9999 yellow
  - 201 – 2000 green
  - 21 – 200 blue
  - $<$ 21 black

  To database:

  - Weekly dose event like lists. One list for each week of the mission.
  - Total dose event like lists. One kept for the mission.

3. Fits Header
   Standard pipeline fits headers should be used. The following keywords are suggested:

```
                   Primary Header
CREATOR = 'HRC_DOSE - Version 0.2'
INSTRUME= 'HRC    '              / HRC, ACIS, EPHIN, S/C subsystems
```

```
Detname = 'HRC-I   '           / HRC-I or HRC-S

                 Principal Header
EXTNAME = 'HRC_DOSE'           / EXTNAME, usually identical to HDUNAME
ORIGIN  = 'ASC     '
CREATOR = 'HRC_DOSE - Version 0.2'
HDUNAME = 'HRC_DOSE'           / Dataset name; usually identical to EXTNAME
HDUSPEC = 'MTA_HRC_DOSE specification Revision 0.1'
HDUDOC  = 'ASC-FITS-1.4: McDowell, Rots: ASC FITS File Designers Guide'
HDUVERS = '1.0.0   '
HDUCLASS= 'ASC   '
HDUCLAS1= 'SPACIALDATA'
HDUCLAS2= 'DOSE '
HDUCLAS3= 'TOTAL'         / Total, weekly or special
CONTENT=  'HRCI_DOSE'       / HRCI or HRCS
```

Release: 4

Group: SCIOPS

Analysis Domain: Spatial

DS Tool Class: 2

DS Tool Category: Monitoring

Spec Name: hrc_dose.tex

Spec Category: New

Code Type: ASCDS

Code Source: New

This Revison: 0.4 - by SJW

Change Control: 0.1 to 0.3 - Large changes to reflect conversation between JGP and SJW The Week of 3/7.

Change Control: 0.4 to 0.4 - Tried to clearify what images were desired on the web pages.

Last Edit: April 6, 1999