Requirements (from STOMS CCR 1402[HSPC CCR 3199])

- Calculate delta-x and delta-y deflection offsets to cover the whole computation time (nominally 30 minutes)
- Calculate one (x,y) point for every GIMP tick (nominally 15 seconds)
- Use least-squares algorithm to compute a third-order polynomial fit to the data
- 1 equation for the x-offset motion
- 1 equation for the y-offset motion
- Load 2 tables to the NSSC-1 OBC
- Table of 8 polynomial coefficients for x and y offsets
- Enable table (YFGMPFCE: if ENABLE keyword is specified in the SMS)
### SMS-STATEMENT SYNTAX

```
[label:] FOSGIMP, OPMODE(mnemonic)
    , ORIENT(decimal,decimal,decimal)
    [, TICK(integer)]
    [, COMPDUR(integer)]
    [, ENABLE]
    , TIME = absolute_time [:]
```

<table>
<thead>
<tr>
<th>R</th>
<th>KEYWORD</th>
<th>DESCRIPTION</th>
<th>TYPE</th>
<th>UNITS</th>
<th>RANGE</th>
<th>RESOLUTION</th>
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</thead>
<tbody>
<tr>
<td>*</td>
<td>OPMODE</td>
<td>Data acquisition mode</td>
<td>mnemonic</td>
<td>n/a</td>
<td>1-8 char</td>
<td>n/a</td>
</tr>
<tr>
<td>*</td>
<td>ORIENT</td>
<td>HST attitude</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>(ra,</td>
<td>right ascension</td>
<td>decimal</td>
<td>degrees</td>
<td>0-360</td>
<td>10**.7</td>
</tr>
<tr>
<td></td>
<td>dec,</td>
<td>declination</td>
<td>decimal</td>
<td>degrees</td>
<td>-90,90</td>
<td>10**.7</td>
</tr>
<tr>
<td></td>
<td>roll)</td>
<td>roll phase angle</td>
<td>decimal</td>
<td>degrees</td>
<td>0-360</td>
<td>10**.7</td>
</tr>
<tr>
<td>*</td>
<td>TICK</td>
<td>First GIMP tick for FOS use</td>
<td>integer</td>
<td>n/a</td>
<td>0-120 (default=0)</td>
<td>2</td>
</tr>
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</tr>
<tr>
<td></td>
<td>COMPDUR</td>
<td>Duration range of computation</td>
<td>integer</td>
<td>seconds</td>
<td>0-1800 (default=1800)</td>
<td>30 secs</td>
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</tr>
<tr>
<td></td>
<td>ENABLE</td>
<td>Enable GIMP computation in NSSC1</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
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<td></td>
</tr>
<tr>
<td>*</td>
<td>TIME</td>
<td>Reference time for table load and computation start</td>
<td>absolute time</td>
<td>UTC</td>
<td>n/a</td>
<td>n/a</td>
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</table>
Development History

- CCR 1402 - FOS GIMP Correction: in PASS Release 22.00

- DR 1177 - Radian trigonometric functions used and not degrees: delivered in PASS Release 23.00 (PDB workaround in place for Release 22.00)
Implementation

- CCR 1402 - FOS GIMP Correction, affected Mission Scheduler and Command Loader
Implementation (Cont'd)

- Mission Scheduler
  - 3 subroutines modified
    -- Recognize the FOSGIMP SMS-statement
    -- Time sort FOSGIMP SMS-statement

- Command Loader
  - 5 subroutines modified and 7 new subroutines
    -- Process the FOSGIMP SMS-statement
    -- Compute 8 polynomial coefficients for x and y offsets
    -- Generate 2 binary memory load tables
  - Used existing PASS software (subroutines):
    -- Determine next major frame pulse time
    -- Obtain s/c position vector
    -- Compute geomagnetic field vector
    -- Compute attitude matrix
    -- Compute least-squares polynomial fit
    -- Generate binary memory load tables
Testing

- Per SEAS System Development Methodology (SSDM)
  - Unit/Module test
  - Integration test
  - Acceptance test

- Calibration testing with NSSC-1 flight software group (Glenn Foley) 6/92

- Calibration testing with ST ScI (George Hartig and Don Neal) 7/92 - 8/92
  - ST ScI supplied PASS with input data and files
  - ST ScI verified output from PASS with expected results

- Supported FOSGIMP test-SMS testing between ST ScI and PASSOPS (Steve Sands) 9/92
Risk

- CCR 1402 - FOS GIMP Correction is completely driven by external interfaces via FOSGIMP SMS-statement

- Format of the 2 new tables are database driven (PDB)
  - table formats and parameters file (TFPF)
  - table library file (PLTD)

- If no FOSGIMP SMS-statement and/or no table format definition in the PDB, then no FOSGIMP correction tables generated

- Per CCR 1402, each computed deflection offset is range checked
Status/Dates

- PASS Release 22.00 (CCR 1402/FOS GIMP) operational 10/12/92

- PASS Release 22.00 Command Loader removed from operations due to unrelated problem (was available for FOS GIMP testing) 10/21/92

- PASS Release 22.03 Command Loader (CCR 1402/FOS GIMP) operational 11/30/92

- PASS Release 23.00 (DR 1177) was delivered December 11, 1992

Issues/Concerns

- None