GIMP Requirements Modifications
to DM-03B Appendix B Sect 5.5

The current document lists numerically the requirements for the Housekeeping processor. The changes in this document due to the additional requirements for GIMP corrections will be #23 of this list as follows:

23. When GIMP correction is enabled, the processor shall check for a new table load of polynomial coefficients. If a new table exists, the processor shall copy the new coefficients to an array of current coefficients. If a new table does not exist, a time domain counter will be incremented. If the time domain counter falls outside of the valid time domain for the current coefficients the GIMP correction will be disabled with an error. If the time domain is valid, the processor will compute both X and Y deflection corrections in FOS Deflection DAC units. If during this calculation a computational error occurs or the resultant deflections fall outside of a predetermined bound, the GIMP correction will be disabled with an error. If the corrections are valid and the commanding of corrections is enabled, the processor will build two FOS serial magnitude commands YXDGIMP and YYDGIMP with the computed X and Y deflection corrections into an FOS unique RTCS and request activation of that sequence through the NSSC-I flight executive.

The time domain of the polynomials, and the frequency of the corrections shall be computed such that FOS deflection errors due to Geomagnetically Induced Motion shall be maintained at less than 2 FOS X-Base units and 4 FOS Y-Base units (approximately 3.125 microns).

Any errors in the GIMP correction processing shall result in the issuing of a Status Buffer message, the disabling of GIMP corrections, and the setting of a bit in the FOS SHP indicating that GIMP corrections were disable with an error.

Comments? by 10/31

If no object in the field was brighter than the minimum count specified to the FOS, the processor shall calculate a lower minimum count, insert the new value into FOS stored command sequence 2 (write access required), and request the executive to issue FOS sequence 2. FOS sequence 2 shall re-load the minimum and maximum counts, and command the FOS to re-process the science data already in FOS memory.

If the only object(s) in the field were brighter than the maximum count specified to the FOS, the processor shall calculate a higher maximum count, insert the new value into FOS stored command sequence 2, and request the executive to issue FOS sequence 2.

If a valid object is present, the processor shall convert the X and Y centering information from the ED (in X- and Y-BASE DAC values) into X and Y offsets in scaled microns (at the photocathode). The ground shall also load an X and Y offset which shall account for aperture changes and the process of offsetting from a bright object. The offsets shall be in units of scaled microns (at the photocathode). The processor shall add these offsets to the offsets derived from the ED.

The processor shall call a module which will invoke an NSSC-I macro to perform a coordinate transformation upon the offsets above from the demagnified FOS X, Y system to the ST V2, V3 system. The results will be scaled so that the low-order bit represents .0015 arc-seconds, 2 - 27 radius as specified at page 3-101, reference 6. The macro will also request a ST SAM via an executive request. This module shall also be used by Science Data Processing (see section 5.7).

If a target is located or the telescope is being re-pointed via YLKELS, the processor shall set FOS Event Flag 4. If the telescope is being repointed as a result of the YLKELS call, then EF6 will also be set. If the FOS is to acquire additional TA data, the operations command sequence shall be responsible for commanding any changes in the FOS's configuration, and for commanding the FOS to acquire the additional data.

If, as the result of a call to YLKELS, the current data is not the last set desired, the processor shall increment a counter. The processor shall then set a completion flag in the ED and disable itself via an executive request.

5.3.1 Deleted

5.4 DELETED

5.5 HOUSEKEEPING

This processor may be invoked by the scheduler, by ground command, or by another application processor. This processor shall be a periodic processor, and shall execute whenever the NSSC-1 is running, unless external power has been removed from both FOS RIUs. In certain instances, other FOS-unique application processors may inhibit execution of this processor

for periods of time ranging up to a few minutes, in order to prevent unnecessary Status Buffer messages at a time when key controlling parameters of this processor are undergoing change, and the required functions can be adequately monitored by the other processor.

During periods when the FOS CEA is not powered on, this processor shall be required to perform its limit checking function, in order to monitor and/or control FOS environmental health and safety. All other functions shall be inhibited during such periods. Most other functions shall be performed during all times when the FOS CEA is powered on. The function of outputting SHPs shall be restricted.

Requirements for this processor include the following:

1. When keep-alive sending is enabled, the processor shall request the executive to activate the FOS keep-alive command sequence.

2. The processor shall monitor the FOS microprocessor keep-alive/ YENGSYNC response in the serial engineering data stream.

3. If keep-alive/YENGSYNC response is incorrect two or more times in a row, then the processor shall request the executive to start the Autonomous Safing processor.

4. The processor shall monitor the autonomous going safe word from the FOS serial engineering data stream and shall request the executive to start the Autonomous Safing processor in the event the FOS has entered the autonomous going safe state for two or more major frames in a row.

5. The processor shall monitor the FOS reset interrupt bit from the serial engineering data stream and request the executive to execute the Autonomous Safing processor in the event that it has been set.

6. The processor shall monitor the overlight sum value from the FOS serial engineering data stream and invoke autonomous safing in the event that the limit has been exceeded more than one time in a row.

7. The processor shall monitor the FOS self check outputs and request the executive to execute the Autonomous Safing processor in the event of a test failure more than one time in a row.

8. This section intentionally left blank.

9. This section intentionally left blank.

10. This section intentionally left blank.

11. This section intentionally left blank.

12. This section intentionally left blank.

13. The processor shall monitor FOS science data acquisition and request the executive to output a SHP each time an astronomer-selected number of MFs pass during data acquisition.

14. The processor shall provide appropriate entries in the NSSC-1 Status Buffer in order to flag anomalous conditions.

15. If speed check checking enabled, the processor shall monitor the FOS speed check results in the serial engineering data stream for anomalies.

16. The processor shall monitor the FOS Serial Magnitude Command error report in the serial engineering data stream for anomalies.

17. The processor shall monitor the FOS Discrete Command Error Log in the serial engineering data stream for anomalies.

18. The processor shall test all fail-safe RPIs in the ED each time a ground-selected number of MFs elapse. If any fail-safe device is armed and the FOS Autonomous Safing processor is not activated, the processor shall activate a stored, relative time command sequence via executive request. The command sequence shall disarm all fail-safe devices.

19. The processor shall monitor the FOS firmware version in the serial engineering data stream for anomalies.

20. The processor shall monitor the FOS error check results in the serial engineering data stream for anomalies.

21. This section intentionally left blank.

22. A requirement exists to monitor the "ST OK to take data" GEF while the FOS is taking data. Note: This monitoring has been moved to an RTCS to be used when needed.

5.6 SCIENCE DATA STORAGE

This processor shall perform all functions required in order to bring FOS science data into the NSSC-1 in cooperation with the executive, the CU/SDF, and the FOS. This processor shall operate in accordance with ICD section 3.13.2.3. The requirements for this processor are largely outlined in section 5.4.1 of the core document. The buffer into which FOS science data shall be stored shall be the 4200 word scratch-pad memory as defined in section 10 of the core document.

This processor shall be executed on command from the ground (via command sequence), and from Science Data Processing. The processor shall always be executed for the first time from a stored command sequence. The command