# SMEX FAST
# MECHANICAL INTEGRATION PROCEDURES FOR MAGNETIC CONTAMINATION CONTROL

FAST-PROC-027

July 22, 1993

CM#: FAST-PROC-027

# SMEX FAST MECHANICAL INTEGRATION PROCEDURES FOR MAGNETIC CONTAMINATION CONTROL

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## SCOPE

This document describes the procedures necessary to prevent magnetization of the FAST spacecraft structure during assembly. These procedures are based on the SMEX FAST I&T MAGNETIC CLEANLINESS REQUIREMENTS (FAST-SPEC-023); please read it--it is only 1½ pages long. Procedures similar to these will be followed during flight I&T, but the test equipment will be different.

## WORK AREA

The structure shall be assembled in a magnetically clean area. A magnetically clean area is an area where no magnetic fields exceed 3 Gauss. This level is low enough that any magnetic materials present will not be excessively magnetized. The gaussmeter shall be used to screen the test area. A normal room will generally be magnetically clean as long as all permanent magnets are removed.

All tools brought into the work area shall be screened and degaussed using the gaussmeter and degausser.

Any metal objects brought into the work area, including paper clips, jewelry, belt buckles, and other personal metal objects, shall be screened using the gaussmeter. Be sure to check your pockets!

All flight hardware shall be kept at least 3 meters away from the degaussing station. The degausser generates very large magnetic fields.

Under NO circumstance shall ANY MAGNET be brought near flight hardware, tools, or the work area. If any tools are exposed to a magnet, that tool and any tools near it shall be screened and degaussed. If any flight hardware is exposed to a magnet, the FAST Electrical System Engineer and the Flight Assurance Representative shall be notified immediately.

## SCREENING PROCEDURE

Screening is performed with the RFL Industries Model 902 Gaussmeter. The following procedure shall be followed.

Zero the meter:

STEP 1: Plug the PT-70 probe into the gaussmeter.

STEP 2: Turn FINE control to mid-rotation position.

STEP 3: Press ON/20K button. Allow 15 second warmup.

STEP 4: Place probe in zero-field chamber. The end of the probe should be at least 3 cm into the chamber, but not touching any walls. The probe can rest on the opening of the chamber.

STEP 5: Adjust OFFSET knob until reading is within ±0.05.

STEP 6: Press 2K button.

STEP 7: Zero the display using the COARSE control.

STEP 8: Press the 200 button.

STEP 9: Zero the display using the FINE control.

The gaussmeter is now zeroed and ready to measure. The display is in Gauss with resolution to 0.1 Gauss.

STEP 10: Remove the probe from the chamber and move it around slowly. The reading on the meter should vary between about -0.5 and +0.5 Gauss (corresponding to the magnetic field of the earth).

STEP 11: Lay the flat side of the probe on the surface of the item being tested. The probe measures fields perpendicular to the flat surface, and the most sensitive part is within 2 mm of the end. Move the probe to different places on the item. Pay particular attention to parts which will interface directly to flight hardware (such as the tips of screwdrivers). Avoid applying pressure to the probe tip, and avoid scraping it. If any regions show more than 1 Gauss, spend a little extra time looking for a higher reading on the tool.

STEP 12: If any reading on an item exceeds 2.9 Gauss (3 Gauss specification minus meter accuracy), degauss the item and screen it again.

STEP 13: After each item, place the probe in the zero chamber and zero the reading using the FINE control. Then continue with STEP 10.

DEGAUSSING PROCEDURE

STEP 1: With the coil off and the item in your hand, move the tool through the coil to the far side.

STEP 2: Turn on the coil. The strongest magnetic field is inside the coil, aligned along its axis. This is a 60 Hz magnetic field.

STEP 3: Slowly draw the item into the center of the coil. Rotate the tool to expose different directions to the field.

STEP 4: Slowly move the item away from the coil until it is as far

away as you can reach.

STEP 5: Turn off the coil.

WAIVERS

All waivers require the approval of the FAST Electrical System Engineer and the Flight Assurance Representative.

# SMALL EXPLORER (SMEX) DOCUMENTATION CONTROL FORM

| ACTION CODE | NAME | MAIL CODE |
|---|---|---|
| | R. ALEMAN | 740.4 |
| | M. ANDERSON | 745.2 |
| | D. BAKER | 690 |
| | D. BERRY | 512.1 |
| | D. BETZ | 740.4 |
| | M. BLAU | 743.3 |
| | T. BUDNEY | 745 |
| | J. BYRD | 740.4 |
| | J. CATENA | 740.4 |
| | G. CHIN | 693.1 |
| | C. CLAGETT | 745.1 |
| | SMEX CM | 740.4 |
| | G. COOPER | 743.1 |
| | T. CORRELL | 745.2 |
| | B. DEDALIS | 302 |
| ✓ | D. EVERETT | 743.1 |
| | B. FAFAUL | 311.1 |
| | L. FANTANO | 724.1 |
| | O. FIGUEROA | 740.4 |
| | J. FIORA | 740.4 |
| | J. GALLEHER/HEI | 740.4 |
| | D. GATES/ATSC | 740.4 |
| ✓ | T. GEHRINGER | 740.4 |
| | D. GILMAN/NASA HQ | SZD |
| | T. GRUNER | 745.2 |
| | K. HERSEY | 737.1 |
| | L. HILLIARD | 740.4 |
| | T. HUBER | 700 |
| | F. HUEGEL | 743.3 |
| | T. JACOBS | 743.2 |
| | B. JOYCE | 301 |
| | K. KEADLE-CALVERT | 743.2 |
| | J. KELLOGG | 741.1 |
| ✓ | R. KOLECKI | 740.4 |
| | T. LAFOURCADE | 743.1 |
| | S. LUCKERT/STX | 740.4 |
| | J. LYONS | 734.4 |
| | H. MALDONADO | 737.3 |
| | S. MANNING/PARAMAX | 740.4 |
| | L. MATAOSKY | 470 |
| | R. MENCIA/SWALES | 724 |
| | S. MEYERS | 741 |
| | T. MICHAELIS | 745.1 |
| | P. MULE | 750.2 |
| | Y. NGAN | 737.3 |
| | Q. NGUYEN | 743.2 |
| | D. OLNEY | 745.1 |
| | D. OLSEN/STX | 740.4 |
| | K. PARRISH | 724.1 |
| | R. PATSCHKE | 743.1 |
| | S. PATTON | 741.1 |
| | C. PETRUZZO | 745 |
| | R. PFAFF | 696 |
| | W. POWELL | 822 |
| | G. RAKOW | 743.3 |
| | M. REID | 512.2 |
| | M. RODRIQUEZ/MDAC | 724.4 |
| ✓ | G. ROSANOVA | 741.3 |
| | P. SALERNO | 743.1 |
| | R. SCHNURR | 745.2 |
| | B. SETTLES | 743.3 |
| | A. SHERMAN | 700 |
| | D. SHREWSBERRY | 740 |
| | D. SILVA | 470 |
| | SMEXFOT/ATSC | 740.4 |
| | G. SNEIDERMAN | 741.3 |
| | T. SPITZER | 734.1 |
| | M. STEINER | 743.1 |
| ✓ | R. STONE | 743 |
| | S. STRAKA | 724.4 |
| | T. TRENKLE/MMS | 743.1 |
| | M. WALKER | 745.1 |
| ✓ | J. WATZIN | 740.4 |
| | R. WEAVER | 740 |
| | N. WILKINSON | 740.4 |
| | J. ZEMBOWER/INTER | 740.4 |
| ✓ | C. Carlson | |

NUMBER OF ENCLOSURES OR ATTACHMENTS INCLUDED 1.

SUBJECT: Mechanical Integration Procedures for Magnetic Contamination Control (FAST-PROC-027)

COMMENTS: Please review the following document. Submit any redlines to the CM Office by August 6, 1993. CDB. Thank You

Distributed by: Smex/cm Date: 7/26/93