STEREO
IMPACT

FM1 STE-U Magnetics Test Report

IMPACT-FM1-STEU-Magnetics-Report.doc
Version A – 2005-Mar-24

David Curtis, UCB IMPACT Project Manager

Document Revision Record

Rev.	Date	Description of Change	Approved By
A	2005-Mar-24	Preliminary Draft	-

Distribution List

Dave Curtis, UCB
Lil Richenthal, GSFC
Mario Acuna, GSFC

Table of Contents

1. Overview

1.1. *Introduction*

Supra-Thermal Electron instrument, Upstream (STE-U) is part of the IMPACT Boom suite of instruments. It is mounted to the boom at the stationary end, ~4m from the magnetometer sensor when the boom is deployed.

This document describes the results of the magnetics testing performed on the FM1 STE-U. This testing was performed at U.C. Berkeley. .

1.2. *Applicable Documents*

The following documents are closely interrelated with this specification. All documents can be found on the Berkeley STEREO/IMPACT FTP site unless otherwise indicated:

http://sprg.ssl.berkeley.edu/impact/dwc/

1. APL Document APL 7381-9003 Rev A – STEREO Environment Definition, Observatory and Instrument (on APL web site)

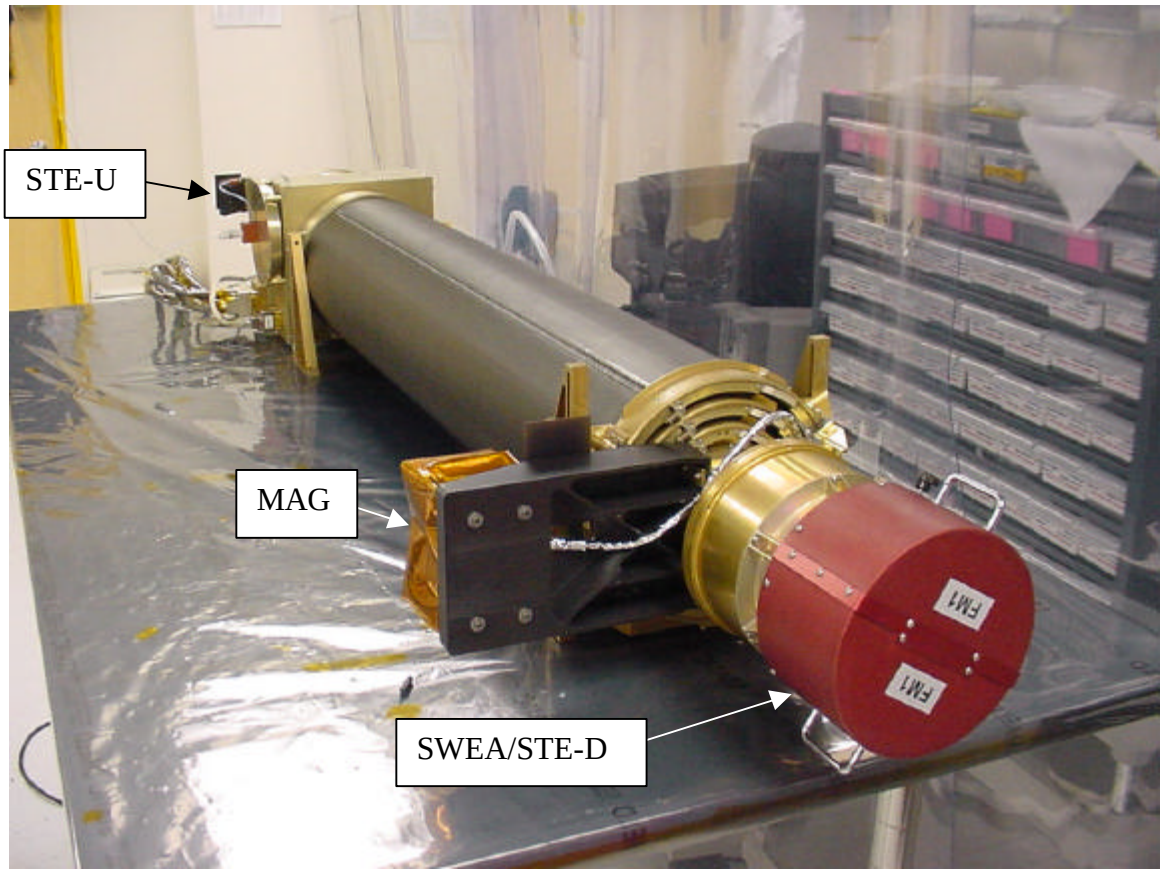


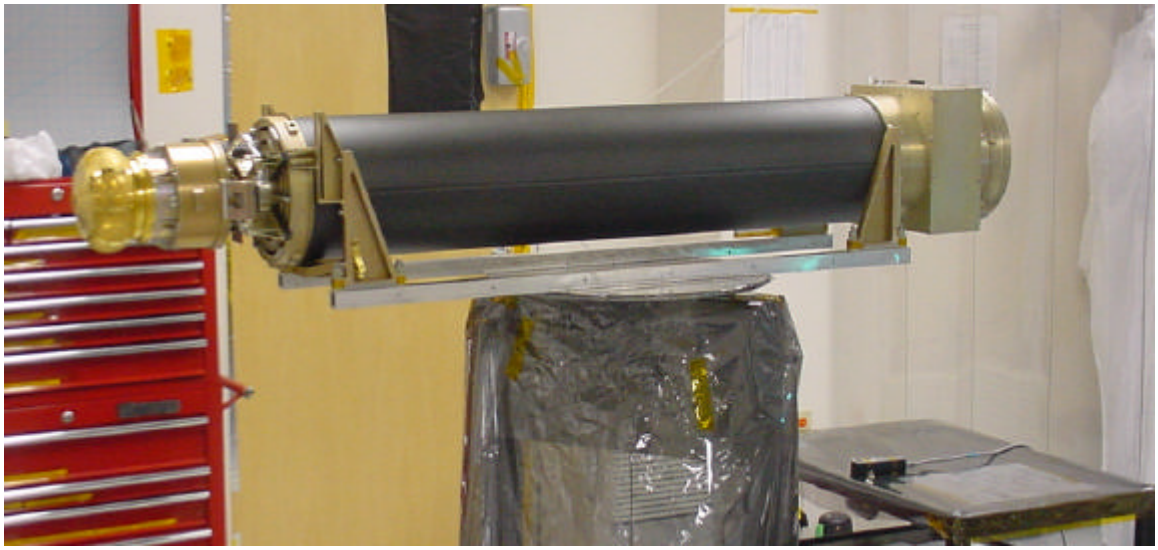
Fig 1. FM1 IMPACT Boom (stowed)

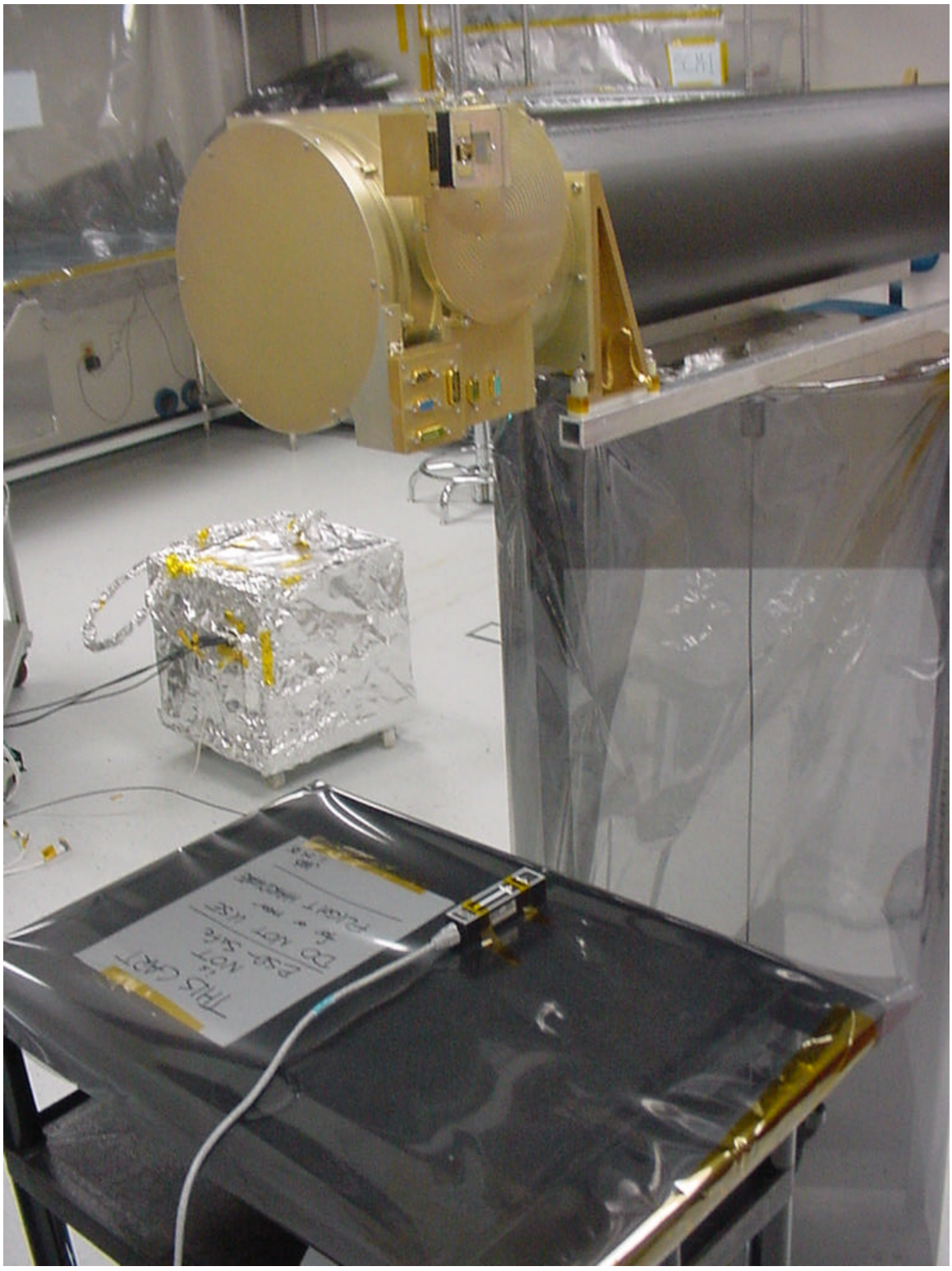
2. Test Description

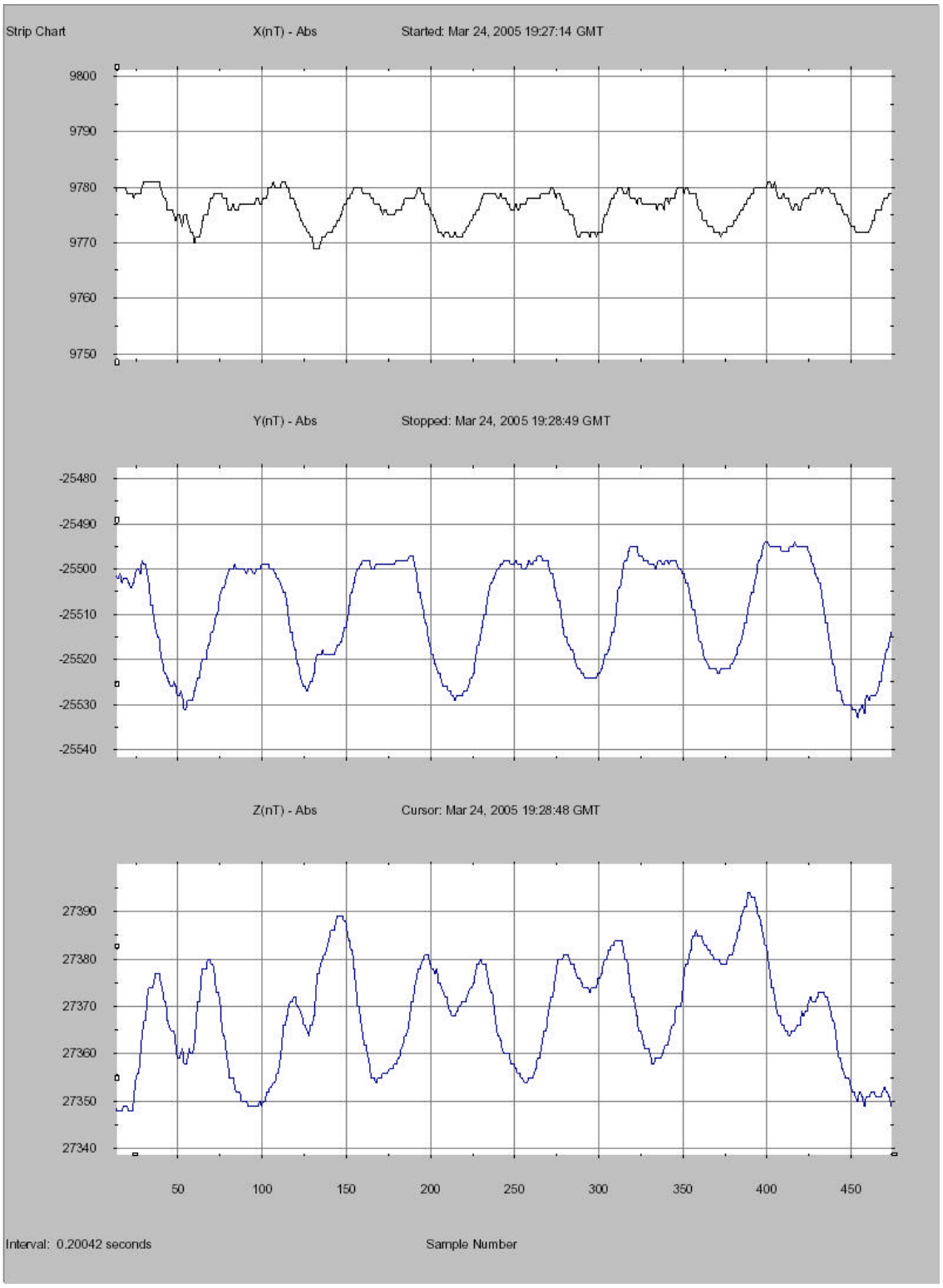
The STE-U Units was attached to the IMPACT Boom unit prior to magnetics testing being performed on it, and to avoid voiding subsequent vibration testing of the boom assembly, the STE-U magnetics test was done on the whole boom. STE-U is far from the deployed boom, so accurate knowledge is not needed. The STE-U end of the boom includes the deployment mechanism that is known to be slightly magnetic (see boom magnetics test report); this test will result in a measurement of the combines STE-U and deployment mechanism, so we will only get an upper limit on the STE-U field.

The test was combined with the boom moment of inertia measurement. During that test the boom is swung back and forth about an axis through the middle of the boom. A magnetometer sensor was placed such that the STE-U end of the boom swung past the sensor. The boom is both changing orientation with respect to the sensor and getting further and closer from the sensor. This test was repeated in two orientations of the boom (rotating about the Y and Z axes). The closest the center of STE-U came to the sensor was ~50cm, swinging up to 50% further away, and rotating through ~90 degrees. Measurements taken of the test system with the boom missing showed no significant field.

2.1. ***Rotating about boom Y axis***

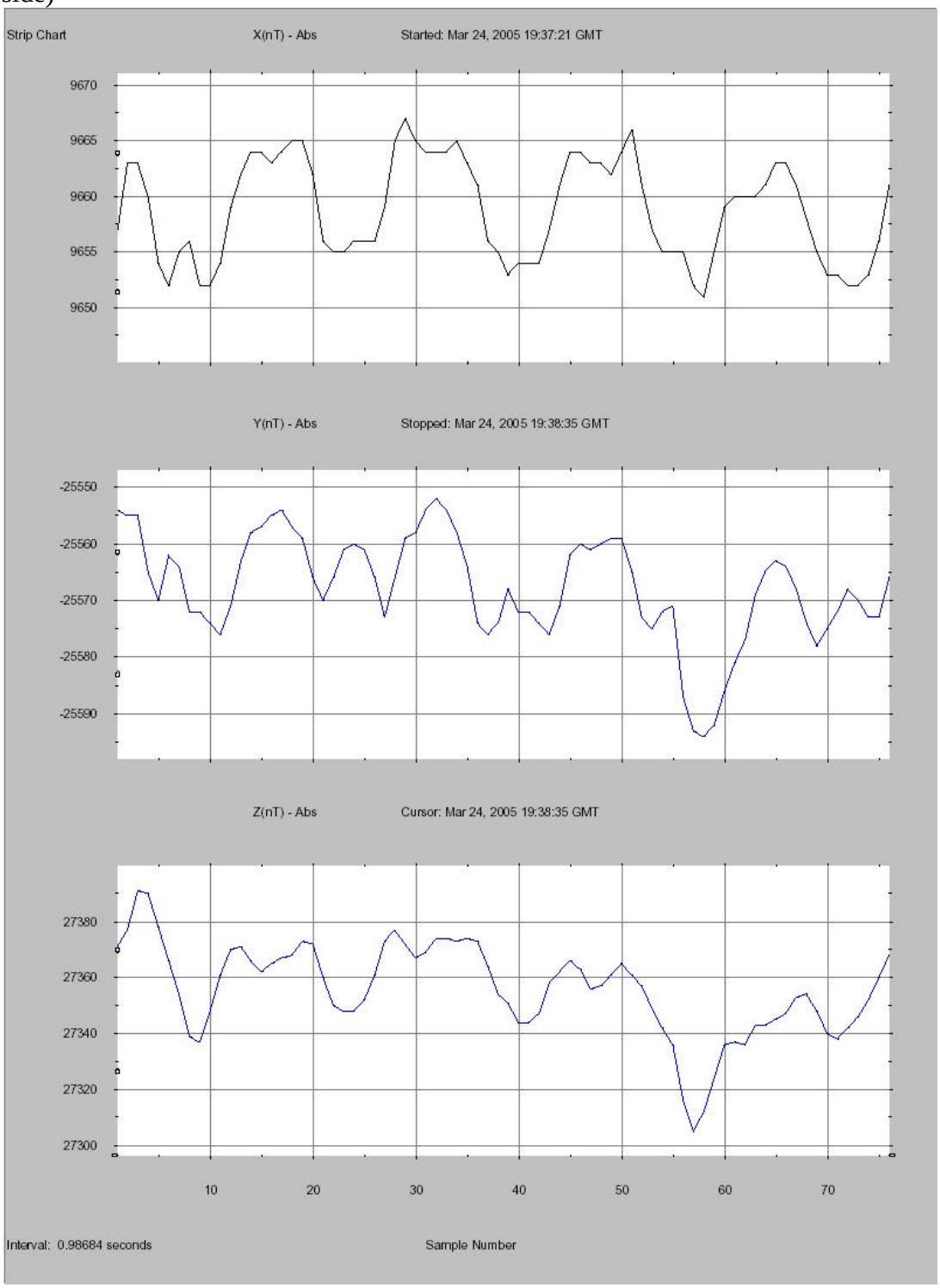





Strip Chart
X(nT) - Abs
Started: Mar 24, 2005 19:27:14 GMT
9800
9790
9780
9770
9760
9750
Y(nT) - Abs
Stopped: Mar 24, 2005 19:28:49 GMT
-25480
-25490
-25500
-25510
-25520
-25530
-25540
Z(nT) - Abs
Cursor: Mar 24, 2005 19:28:48 GMT
27390
27380
27370
27360
27350
27340
50
100
150
200
250
300
350
400
450
Interval: 0.20042 seconds
Sample Number

2.2. ***Rotating about boom Z axis***

(No pictures; boom rotated 90 degrees about the X axis such that STE-U is on the upper side)



3. Analysis

The amplitude of the oscillations is ~20nT. This means the measured field at 50cm must be ~20nT. That corresponds to a magnetic field at the Magnetometer sensor, ~4m away, of ~0.04nT. The spacecraft-level goal is 1nT DC, so we significantly below that level. Note this is a combined field for the boom deployment system and STE-U.

The MAG team has declared this an acceptable level.