STEREO
IMPACT

FM1 IDPU Magnetics Test Report

IMPACT-IDPU-FM1-Magnetics-Report.doc
Version A – 2005-Feb-28

David Curtis, UCB IMPACT Project Manager

Document Revision Record

Rev.	Date	Description of Change	Approved By
A	2005-Feb-28	Preliminary Draft	-

Distribution List

Dave Curtis, UCB
Lil Richenthal, GSFC

Table of Contents

1. Overview

1.1. *Introduction*

The Instrument Data Processing Unit (IDPU) is the part of the STEREO IMPACT instrument suite. It resides inside the spacecraft, hard-mounted (conductively coupled) to the deck.

This document describes the results of the magnetics testing performed on the FM1 IDPU unit. 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)

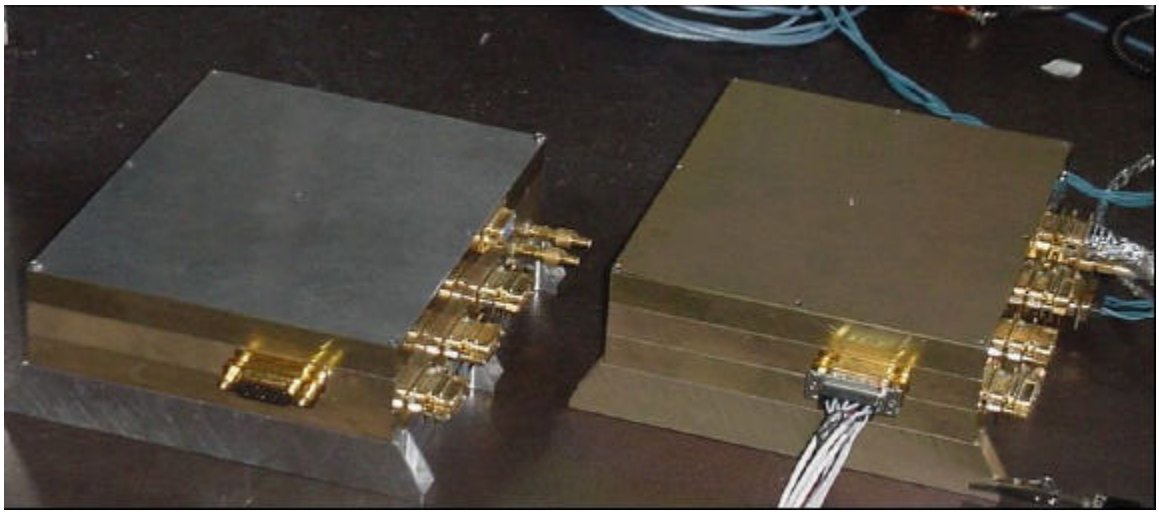


Fig 1. FM1 and FM2 IDPU

2. Test Setup

The IDPU was tested on the THEMIS magnetic test facility consisting of a test stand capable of rotating the instrument a fixed distance from a Meda FVM-400 tri-axial magnetometer sensor. The test stand is non-magnetic, which was demonstrated by spinning the stand with no instrument attached (~2nT response at 30cm).

The facility background included occasional drifts of up to tens of nT. This background was avoided by spinning the instrument several times at ~0.5Hz, so that the peak to peak field measurement stood out clearly from the background.

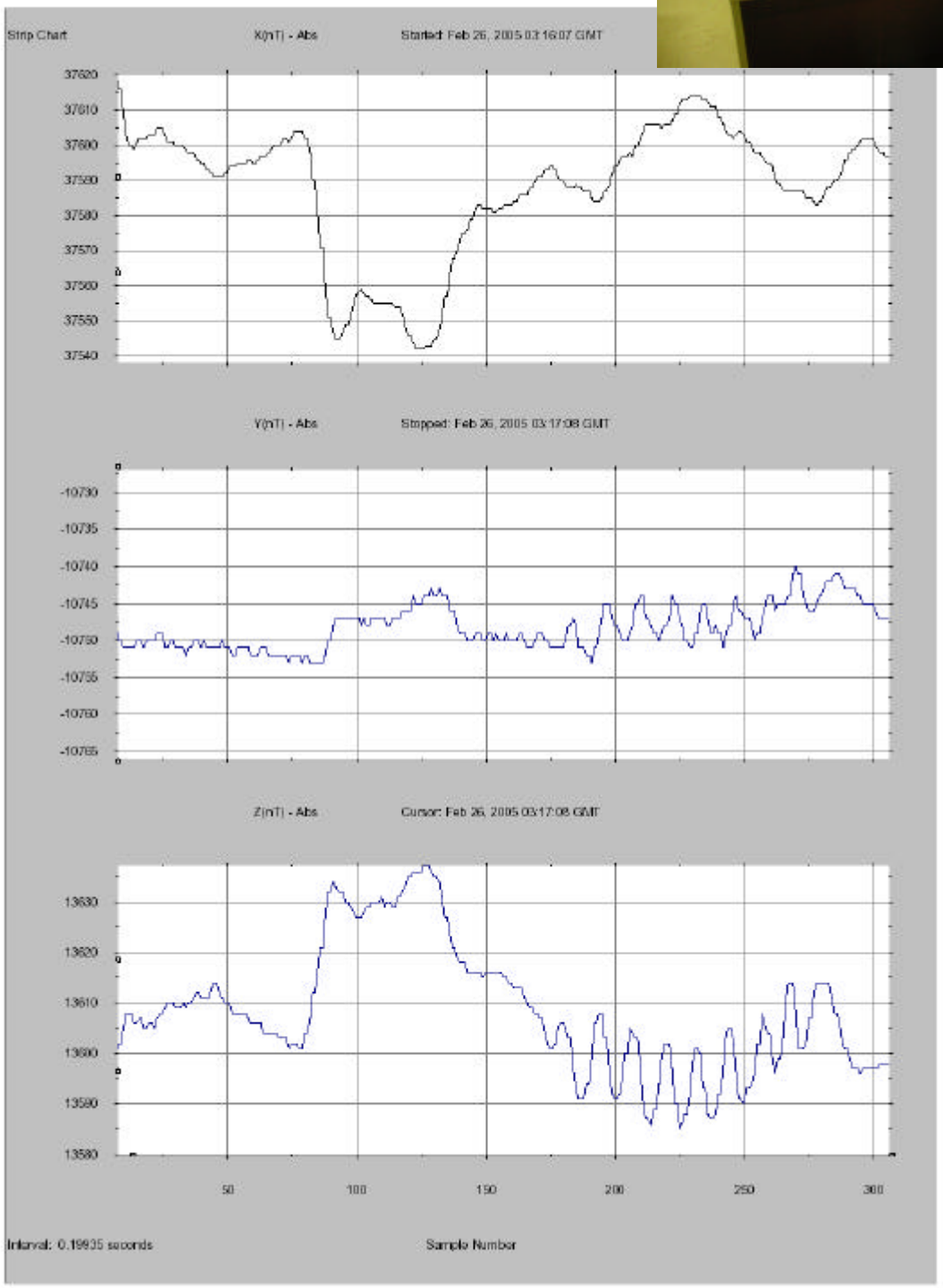
Measurements were taken at both 30cm and 60cm. The rule of thumb is to measure at least 3x the long dimension of the unit under test (20cm for the IDPU). The 30cm measurement was a consistency check.

Field Samples were taken at 5Hz and recorded on a PC.

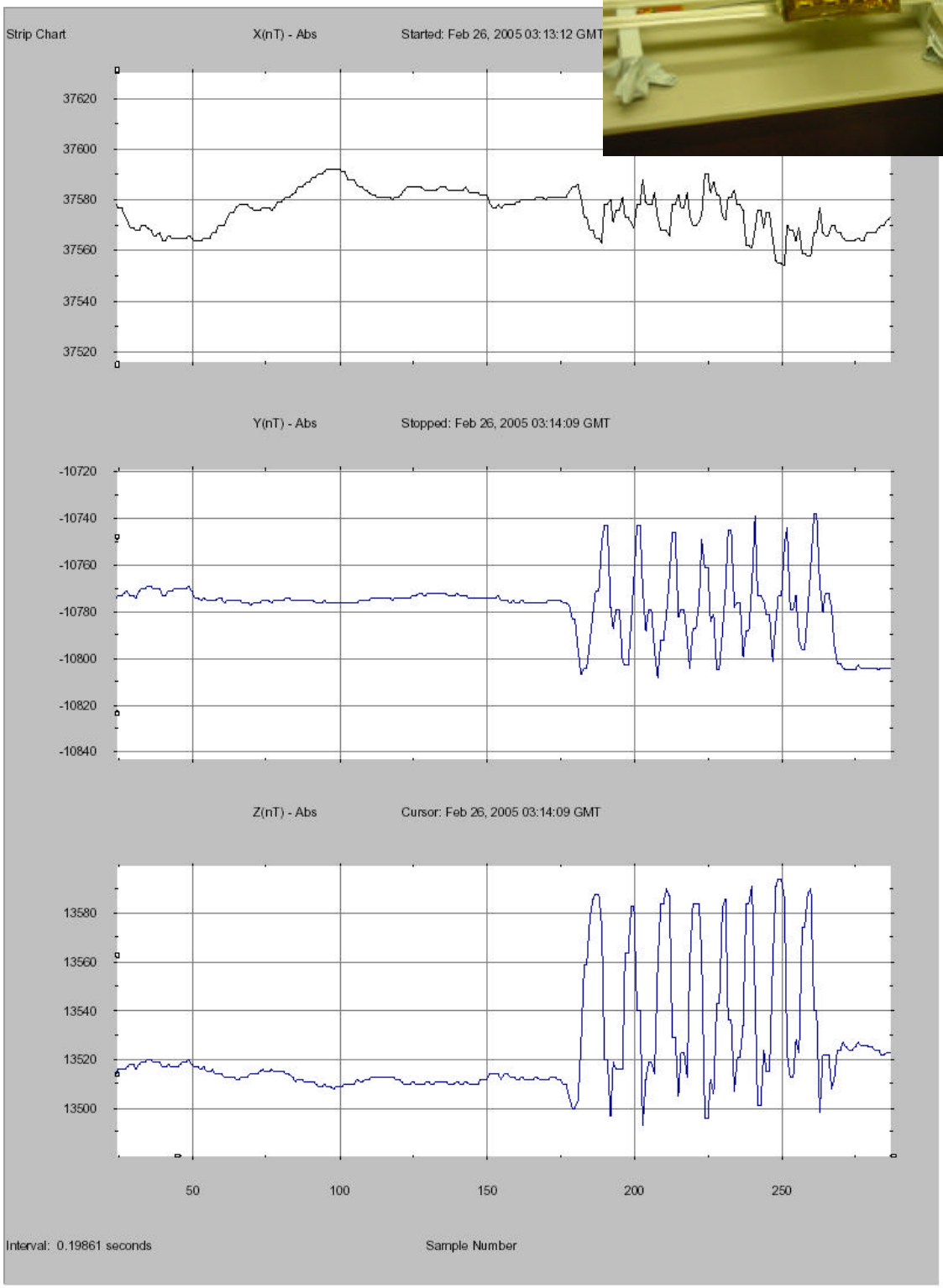
The instrument was bagged in lumalloy to avoid contamination, and the connector savers were not removed.

3. Test Data

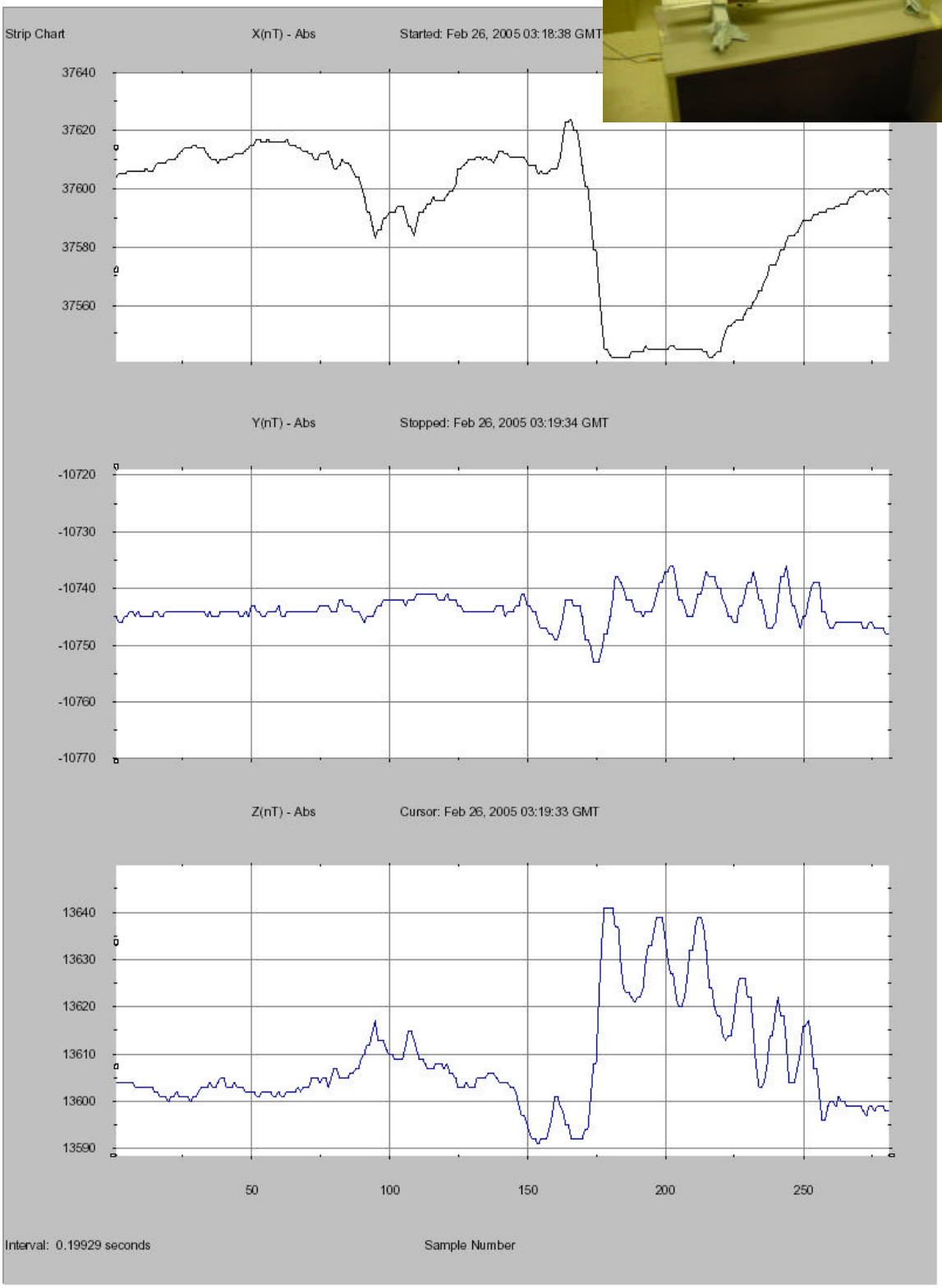
3.1. *Axis 1, 60cm*



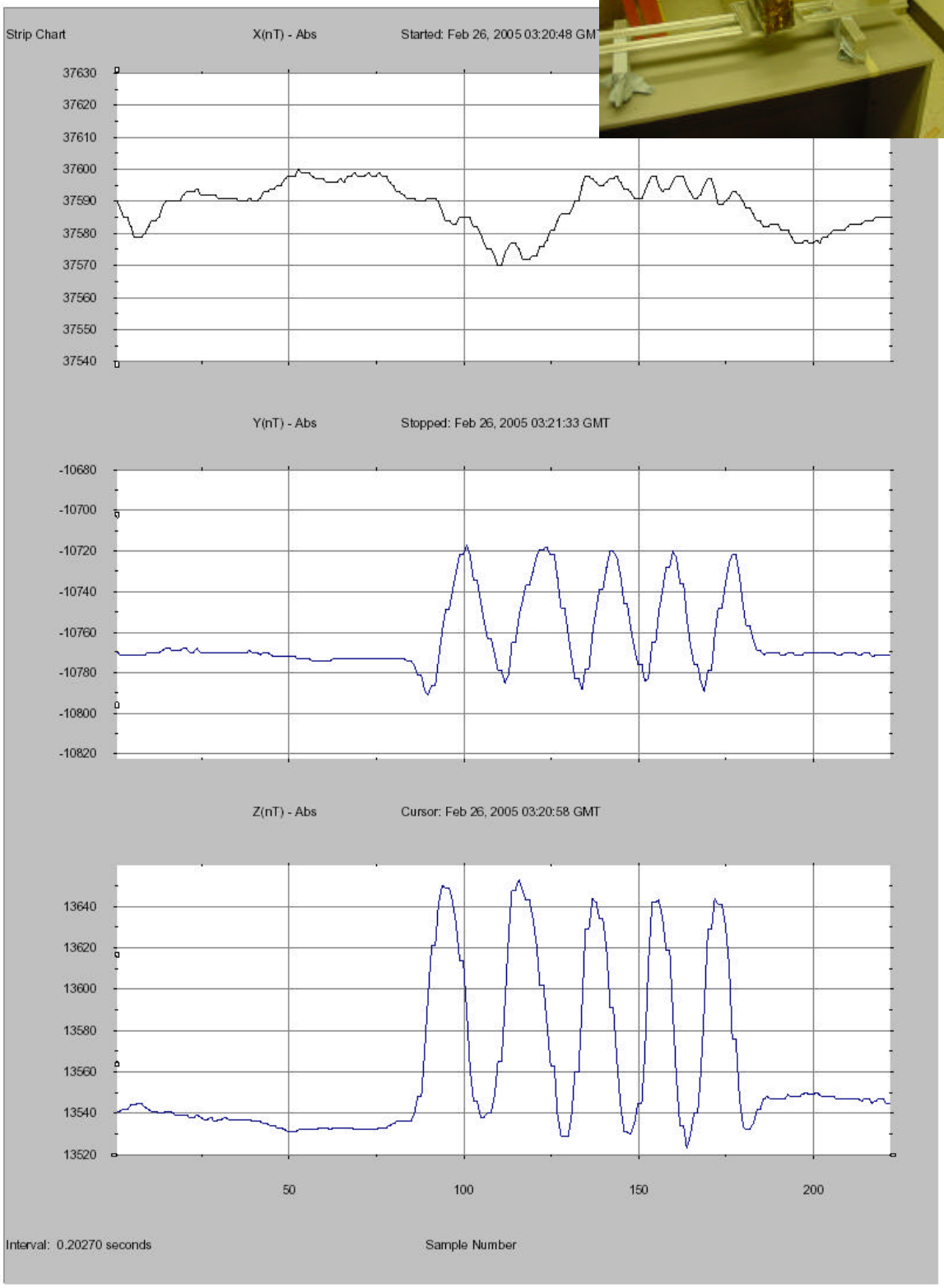
3.2. ***Axis 1, 30cm***



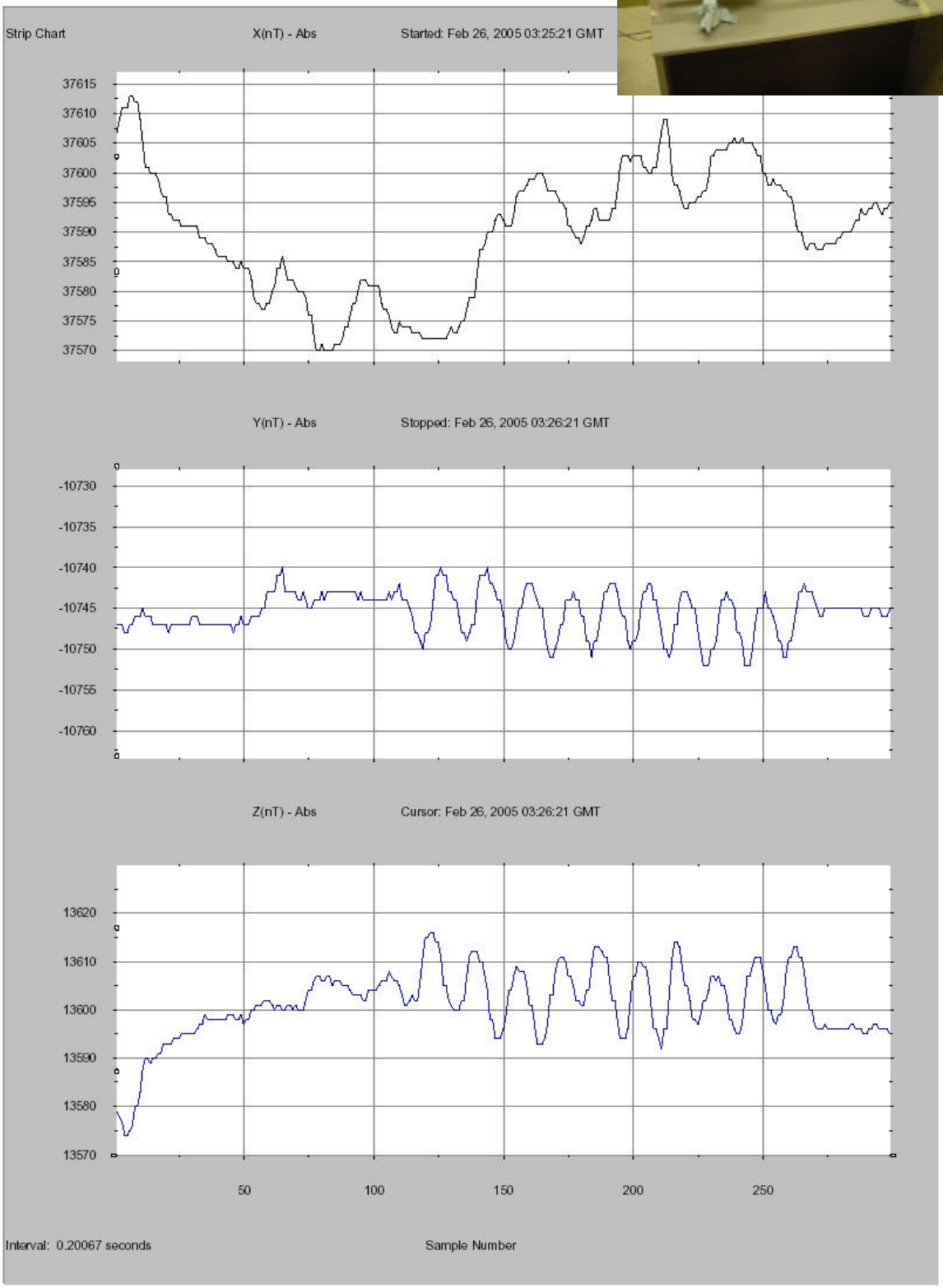
3.3. ***Axis 2 60cm***



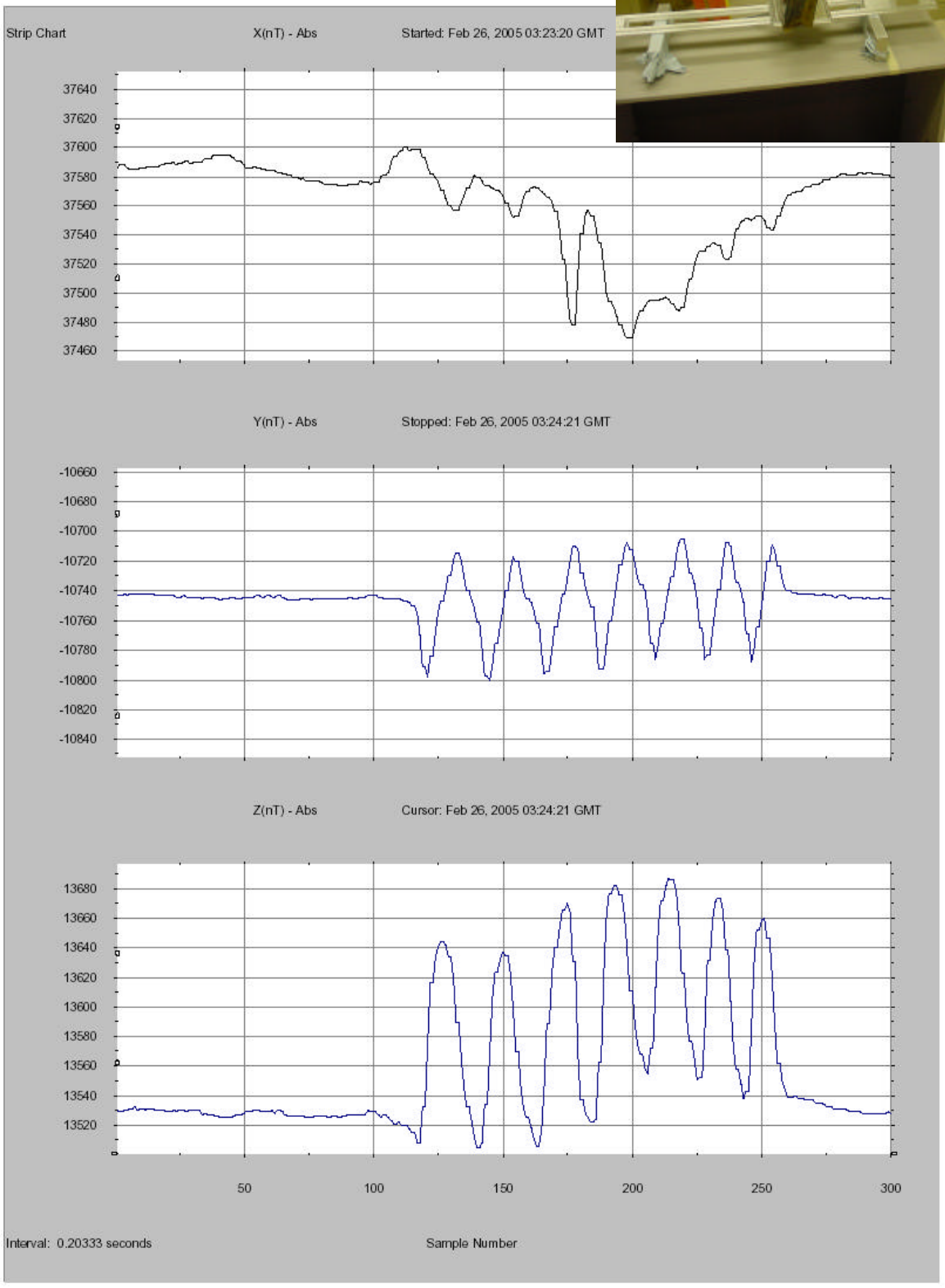
3.4. ***Axis 2, 30cm***



3.5. ***Axis 3, 60cm***

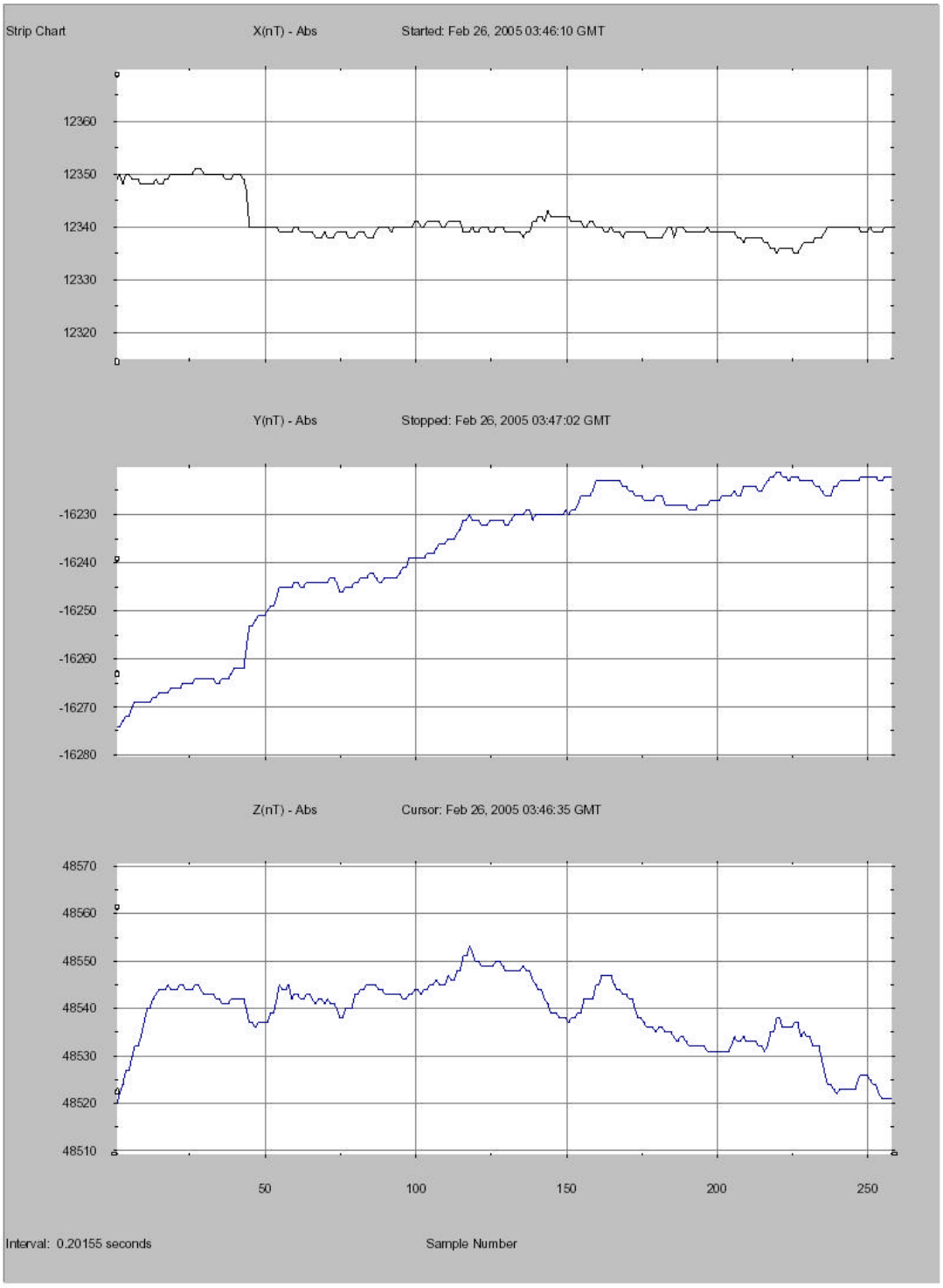


3.6. ***Axis 3, 30cm***



3.7. ***Dynamic Data***

In addition to static measurements a test was run to look for low frequency AC fields from the instrument when powered. The sensor was placed 30cm from the instrument, which was then powered on and off every 10 seconds (5 seconds on, 5 seconds off).



4. Analysis

The static data at 60cm shows peak-to-peak variations of 20nT at the spin period, about the same in all 3 axes. That corresponds to a magnetic moment of 5-10nT-m^3, and a field at the Magnetometer sensor, ~3m away, of 0.08nT. The spacecraft-level goal is 1nT DC.

The dynamic data shows no correlation to the switching frequency, indicating a dynamic field less than 5nT, corresponding to an AC field at the MAG sensor of less than 0.005nT, well within the spacecraft level requirement of 0.05nT AC.

The MAG PI has declared this a typical and acceptable level.