

CONCERT

Orbiter antenna Strength Load test

Antenna Centrifuge Test REPORT

1. INTRODUCTION

This document describes the procedure used for the Strength Load qualification test of the orbiter antenna and E-box of the CONCERT instrument on the Rosetta project. The Strength Load test was carried out in a centrifuge.

2. APPLICABLE DOCUMENTS

EID-A Issue 1 Rev 1 Dated 15/6/1998 Ref: RO-EST-RS-3001/EID-A

3. DESCRIPTION OF THE ANTENNA

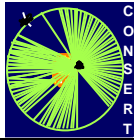
The CONCERT orbiter antenna is composed of two half wave dipoles placed perpendicular to each other and with corresponding reflectors. In the folded condition the dipole elements, the reflector elements, and the two supporting masts, are collapsed parallel to each other, placed against three supports, and secured by a wire to the center support.

The total antenna mass is 1.45 kg

The figure shows the folded antenna.

FIGURE (e.g. figure 8 in TV procedure)

The antenna coordinate system is given in Figure 2.2-2a in the EID-B.



4. TEST CONDITIONS

Cleanliness	100000
Temperature	20 degrees C
Humidity	< 50%

5. TEST GOALS

It is to be verified that the antenna can withstand a force equivalent to 55g along each one of the X-, Y-, and Z-axis in both the positive and negative directions. The 55g is derived from 'Figure 2.2.5.2 (Design load)' of EID-A for the given mass of the antenna.

6. TEST FACILITY

The force required for the Strength Load test will be provided in a centrifuge. A picture of the centrifuge with key parameter values, is attached.

The antenna will be placed with the corresponding axis ('+' or '-') lined up such that the resulting force, which is the combination of the Earth's gravitational field and the centrifuge field, is parallel to that axis.

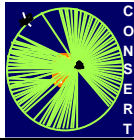
A description of the centrifuge that will be used in these tests is attached.

Centrifuge key parameters:

Maximum pay load	2	ton
Maximum radial acceleration	250	g
Model area	125x125	cm
Maximum model height	180	cm
Effective radius	412.5	cm

The facility allows video taping of the antenna during the test runs. Furthermore, a recording of acceleration versus time will be provided. The video tape will have time imprinted, so that a relationship between acceleration and visible deformations of the antenna can be made.

During each test run the total acceleration will be slowly increased over several minutes to the maximum wanted acceleration. Then the



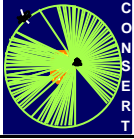
acceleration will be kept at the maximum value for about 30 seconds, before it again is slowly reduced.

MPAe will provide the test-fixtures for placing the antenna in the centrifuge.

The Centrifuge will be operated by the centrifuge-team of the University of Bochum.

7. TEST STEPS

		Test OK? Y/N	Video OK? Y/N	G vs Time OK? Y/N
1.	Unpack, and visual inspection of the antenna	Y	Y	Y
2.	Mount antenna for acceleration in the +Y direction	Y	Y	Y
2a	Picture of mounted antenna	Y	Y	Y
3.	Run test to 55 g	Y	Y	Y
4.	Mount antenna for acceleration in the -Y direction	Y	Y	Y
4a	Picture of mounted antenna	Y	Y	Y
5.	Run test to 55 g	Y	Y	Y
6.	Mount antenna for acceleration in the +Z direction	Y	Y	Y
6a	Picture of mounted antenna	Y	Y	Y
7.	Run test to 55 g	Y	Y	Y
8.	Mount antenna for acceleration in the -Y direction	Y	Y	Y
8a	Picture of mounted antenna	Y	Y	Y
9.	Run test to 55 g	Y	Y	Y
10.	Mount antenna for acceleration in the +X direction	Y	Y	Y
10a	Picture of mounted antenna	Y	Y	Y
11.	Run test to 55 g	Y	Y	Y
12.	Mount antenna for acceleration in the -X direction	Y	Y	Y
12a	Picture of mounted antenna	Y	Y	Y
13.	Run test to 55 g	Y	Y	Y
14.	Visual inspection - no change	Y	Y	Y
15.	End of Test	Y	Y	Y



CONSERT - Antenna

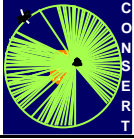
Reference: RO-OCN-TR-3005

Issue: 1

Rev.: -

Date: 03.08.1999

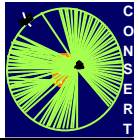
Page: 4



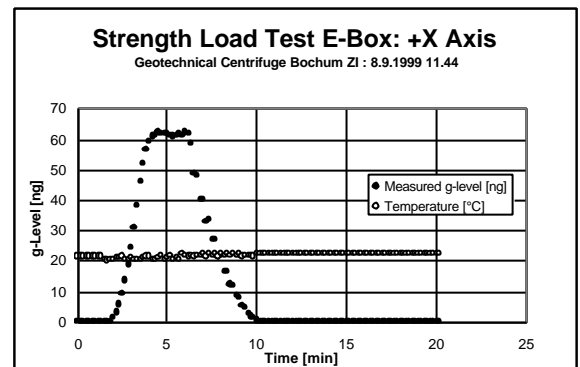
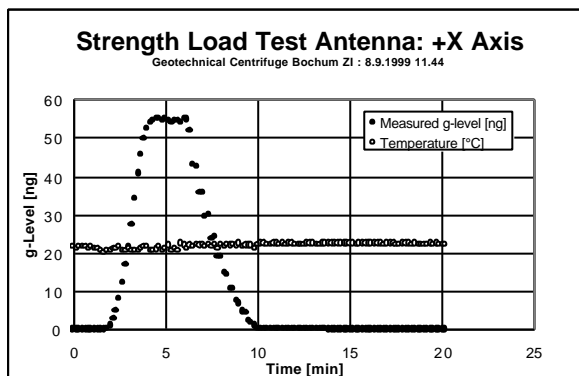
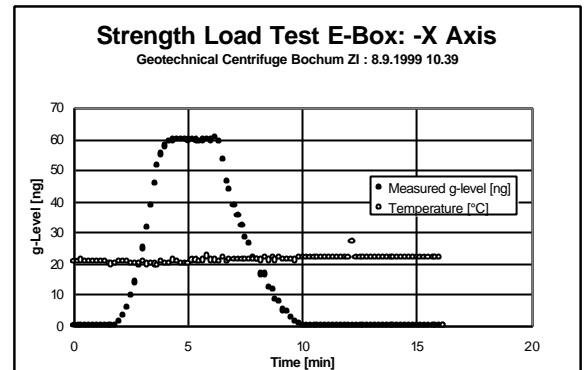
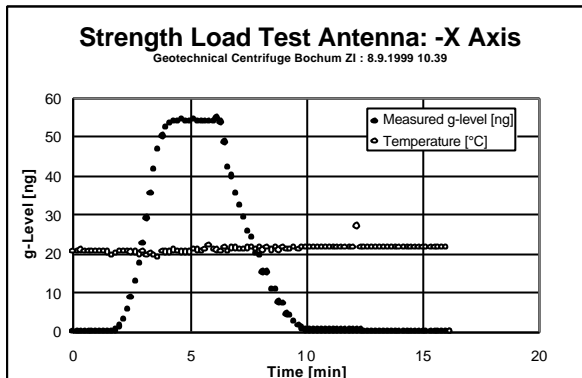
8. Test RESULTS

Visual inspection during the tests and after the tests revealed no damage to the antenna and the E-box.

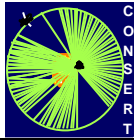
Enclosed are the 'strength Load' versus time for each of the test runs, together with a picture demonstrating the mounting of the antenna in the centrifuge platform.



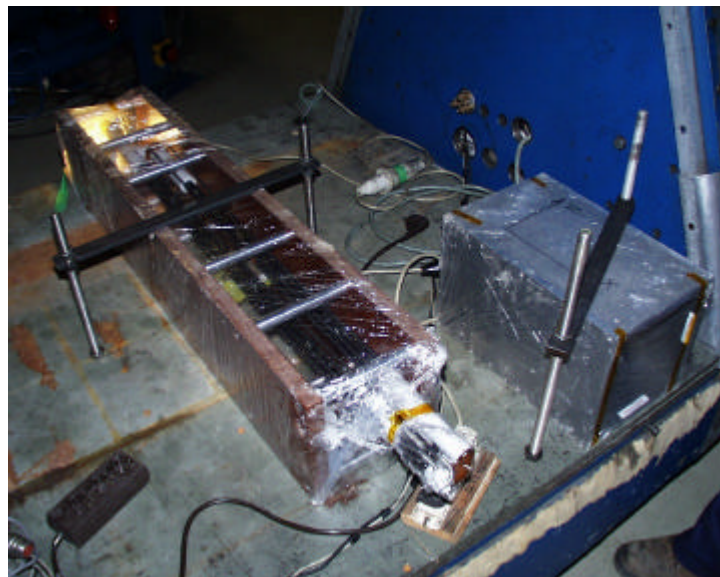
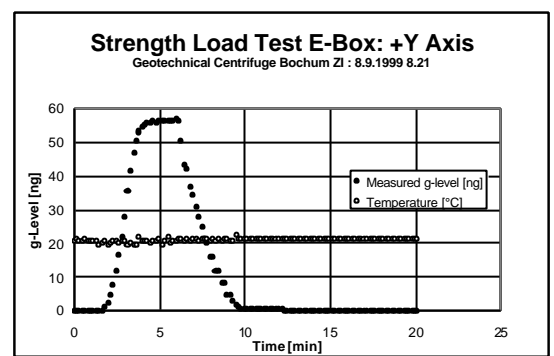
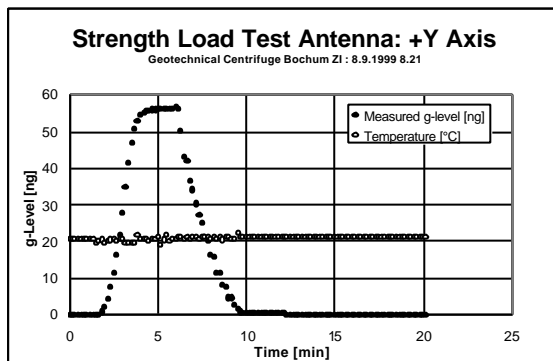
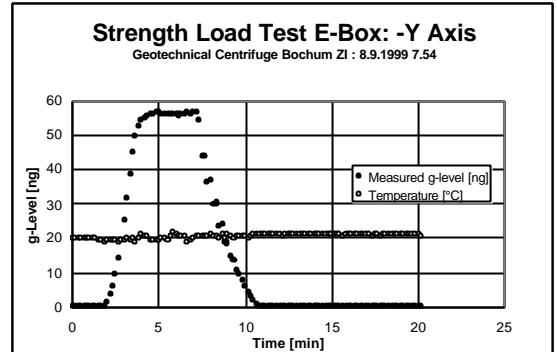
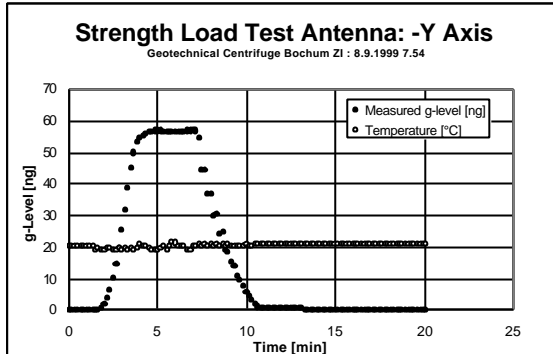
X-Axis Test Acceleration Levels



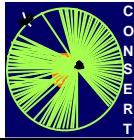
Mounting Antenna and E-Box on Centrifuge-Platform for +X-Axis



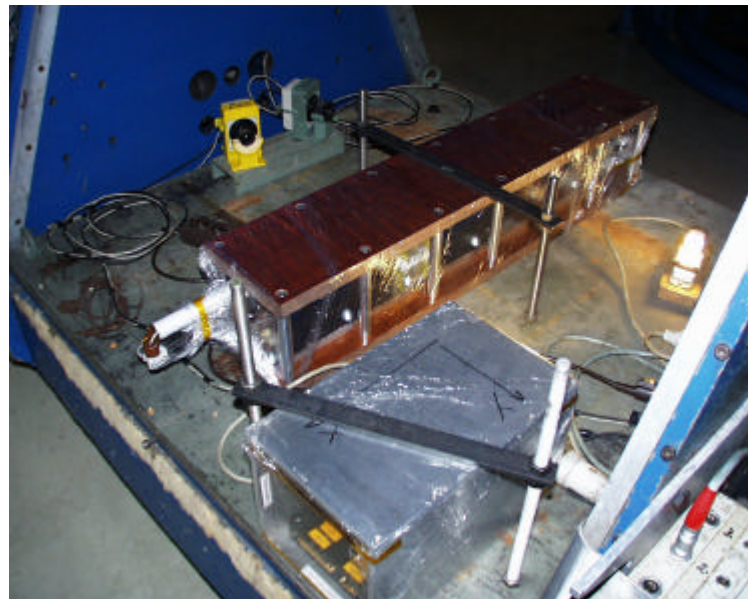
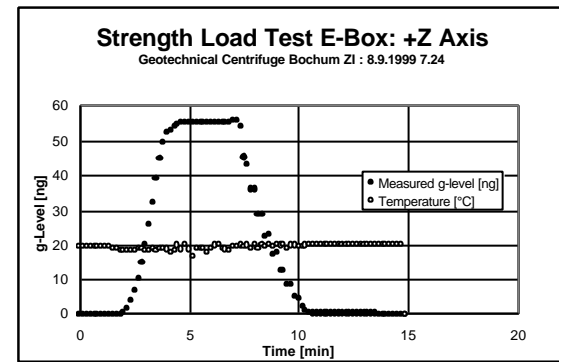
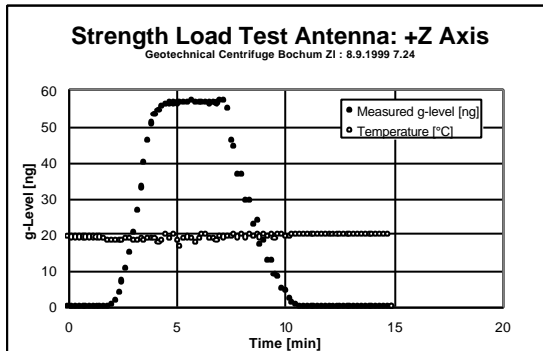
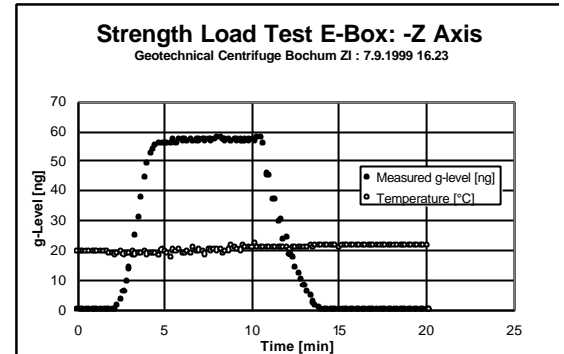
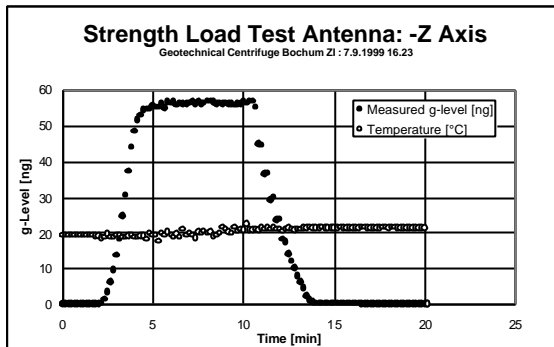
Y-Axis Test Acceleration Levels



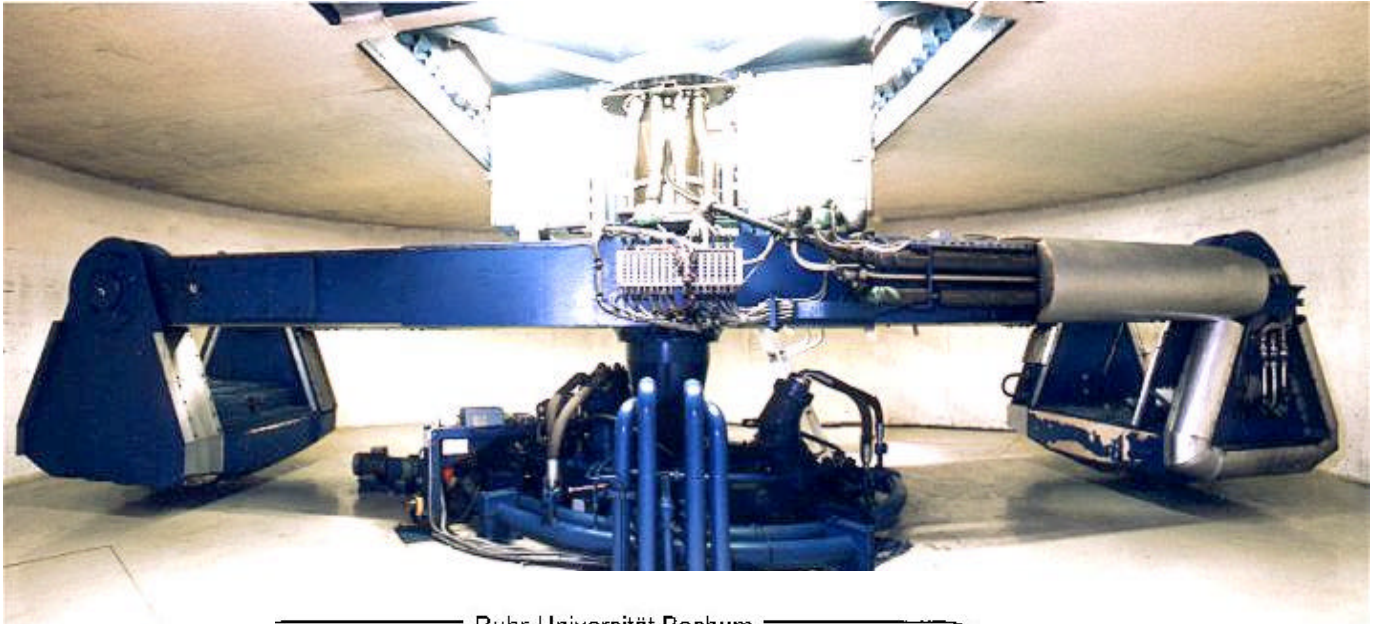
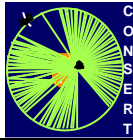
Mounting Antenna and E-Box on Centrifuge-Platform for Y - Axis



Z-Axis Test Acceleration Levels



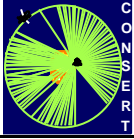
Mounting Antenna and E-Box on Centrifuge-Platform for Z - Axis



Ruhr-Universität Bochum

BOCHUM GEOTECHNICAL CENTRIFUGE Z I

EFFECTIVE RADIUS	4.125 m
CAPACITY	500 gt
MAX. WEIGHT OF THE MODEL	2 t
MAX. ACCELERATION	250 g
MAX. ROTATION SPEED	232.8 U/min
DIMENSION OF THE PLATFORM	1.25 x 1.25 m
POWER FOR RUN UP (MAX.)	600 KW
SLIPRINGS FOR TRANSFER TO THE MODEL OF :	
ELECTRICAL POWER (2 x 5)	220 V, 20 A 24 V, 2.5 A
MEASUREMENT SIGNALS (110)	10 V, 2 A
VIDEO SIGNALS (2)	
AIR, WATER (3)	10 bar
COOLING / HEATING LIQUID (2)	-60 °C 200 °C
LIQUID NITROGEN (1)	-196 °C
OIL (3)	300 bar



9. SIGNATURES

	Date	Signature
Test Conductor:		
Quality Assurance:		
Instrument Manager:		