GLAST Calibration Unit Beam Test

Positioning Table
Design
Description

- Positioning table for the beam tests of the GLAST Calibration Unit
  - 3 degrees of freedom: 2 translations and 1 rotation
  - Strokes allow full scanning of the CU
  - Motorized displacements
    - Local control attached to the table to operate it while in the test area
    - Computer remote control to operate from the control room during data acquisition
  - CU support plate is bolted to top structure of the table
General Specifications

- **Maximum payload**
  - 1000 kg – Weight of the CU with support plate is 900 Kg

- **X-axis translation (horizontal)**
  - Stroke 1500 mm
  - Precision +/- 1 mm TBC
  - Speed 25 mm/s – Full stoke in 60 s

- **Z-axis translation (vertical)**
  - Stroke 400 mm
  - Precision +/- 1 mm
  - Speed 0.5 mm/s – Full stroke in 80 s

- **Z-axis rotation**
  - Stroke -90°/+180° TBD – needs to be limited to avoid problems with the cable
  - Precision +/- 2.5°
  - Speed ~10 rpm

- **Dimensions**
  - L 2500 mm – length of the rails
  - W 800 mm
  - H 900 mm when table is in lower position
Design: X-axis Translation

Horizontal translation
- Stroke 1500 mm / speed 25 mm/s
- Stepper motor to drive displacement
- Limit switches for security

Linear Module
(TLH 20 or WB 60 TBC)

Carriage Welded Structure
Steel square hollow beams

Roller Guides
(FRANKE FDA 25)
2 Rails 2500 mm long
4 Aluminum cassettes

Base Welded Structure
Steel square hollow beams

Stepper Drive
STOGRA SM107.2.18 (TBC)
Driving torque 3 Nm
Design: Z-axis Translation

Vertical translation

- Stroke 400 mm / speed 0.5 mm/s
- Stepper motor to drive displacement
- Limit switches for security
- Security brake on motor

Alignment and transverse load
4 Flanged roller bearing assemblies
Precision shafts
SKF LVCD-25

4 Worm Gear Screw jacks
ZIMM MSV-10-S 10KN
Bevel gear boxes and connecting shafts
1 Stepper motor to drive the set
Motor STOGRA SM168.2.18 (TBC)
Driving torque 10 Nm

Carriage Structure
Welded steel beams
square hollow 50x50

Roller Guides
FRANKE FDA 25
4 Aluminum cassettes
Design: Z-axis Rotation

Rotation

Stroke needs to be limited because of cables
Speed 10 rpm

Bearing assembly
FRANKE LDV 400

Drive to be designed
Gear assembly below rotation plate connected to stepper motor
Design: Table Drive

• Electrical design developed for ILC-CALICE moving table will be adapted to GLAST-CU table
  – Contact already made with designers D. Jehanno and G. GUILHEM from LAL Institute
    • Table is designed for a 400 Kg payload, strokes are 300 mm horizontal, 200 mm vertical
    • Complete documentation is available and ready to be used: list of components and suppliers, cabling diagrams...
    • Design include local and remote control of the table
    • Security elements are implemented: limit switches, brake for vertical displacement

• Modification to design include
  – Additional motor to drive rotation of the table
  – Bigger motors for 1000 Kg payload instead of 400 Kg
  – Drive modules adapted to motors
  – Power supply module adapted to motors
### Planning

- **Detailed planning of the table still needs to be prepared.** The main elements required to have the table ready for the beam test are listed here:

<table>
<thead>
<tr>
<th>Task</th>
<th>End Date</th>
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<tbody>
<tr>
<td><strong>Mechanical design</strong></td>
<td></td>
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<tr>
<td>- Finalize mechanical design</td>
<td>03/31/06</td>
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<tr>
<td>- Release engineering drawings</td>
<td>2 weeks</td>
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<tr>
<td>- Components selections</td>
<td>3 weeks</td>
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<tr>
<td><strong>Electrical design</strong></td>
<td></td>
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<tr>
<td>- Design</td>
<td>2 weeks</td>
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<tr>
<td>- Components selections</td>
<td>2 weeks</td>
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<tr>
<td><strong>Procurements – fabrication</strong></td>
<td>05/15/06</td>
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<tr>
<td>- Procurements of mech. and elec. Components</td>
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<tr>
<td>- Start fabrication of mechanical parts</td>
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<tr>
<td>- Received parts and components</td>
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<tr>
<td><strong>Assembly</strong></td>
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<td>- Cabling of control box</td>
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<tr>
<td>- Mechanical assembly</td>
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<tr>
<td><strong>Integration and test</strong></td>
<td>07/07/06</td>
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<tr>
<td>- Test table</td>
<td>3 weeks</td>
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