Next Generation Adaptive Optics System

Launch Telescope Installation Plan (Draft) (Draft)

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VersionV1.0

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REVISION HISTORY

Revision	Date	Author (s)	Reason for revision / remarks
1.0	March 06, 2009	JC	Initial release

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1 INTRODUCTION

A launch telescope will be delivered to the Keck Observatory in TBD. This telescope is part of the K2 Centrally Projected Launch System Project for a central launch projected laser. The launch telescope will be mounted in the K2 f/15 module in TBD. This document provides the plan for installation of the launch telescope onto the f/15 module. The task is expected to take 2 days; the first for preparation and the second to install the unit.

2 PRIMARY CONSIDERATIONS

For installation of the LTA, the following items should be considered at all times:

- Minimize the impact on telescope resources
- There should not be any down time for observing.
- Assure there are no foreign objects that can fall onto the primary mirror.

3 PREPARATION

Prior to delivery to the WMKO observatory, the launch telescope completed acceptance testing at the contractor premises and re-verification of performance at Subaru Observatory. Subaru Observatory provided the optics bench and test equipment to measure the performance.

3.1 Unpacking

Once at the observatory dome floor, the unit should be allowed to acclimatize overnight in the dome. The launch telescope will be packed in a heavy duty enclosure with accelerometers. Personnel should inspect the unit prior to opening and verify accelerometer readings.

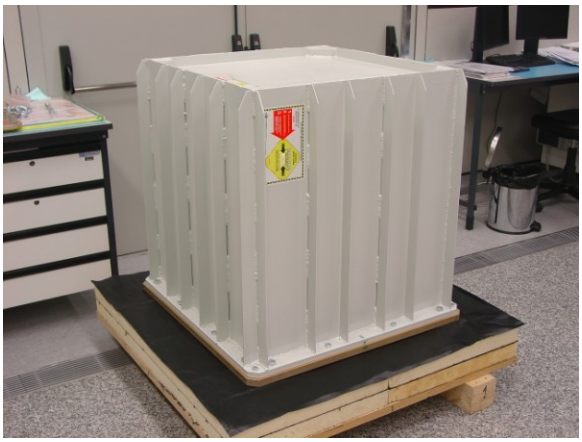

Figure 1: LTA Enclosure

The external enclosure can be lifted with eye bolts. Within this enclosure, the LT sits on a spring supported base as shown in Figure 4. Prior to any further activities, the LT should be inspected by the optics engineer.

3.2 Tooling

All tooling should be located and available on the Nasmyth Deck the day prior to installation. Tooling shall include rigging to ensure the f/15 module is balanced after the LT installation. Weight estimates shall be calculated for balancing of the module. The weight of the LT is 120 Kg.

Possible tooling needed: rigging for f/15 module; rigging to lift LT and LT enclosure, 10mm bolts (12) length TBD, shims stock, and torque wrenches.

3.3 Pressure compensators

The LT will arrive with pressure compensators. These units will need to be attached to the f/15 module to provide pressure compensation for the LT. The gallon size bags will expand or contract based on atmospheric pressure. Determine a location on the f/15 module to install these compensators.

3.4 Telescope and f/15 module

The f/15 shall be undefined and placed back onto its storage location on the Nasmyth Deck. The counterweight should be swung out of the way for the LT to be installed. Normal procedures for f/15 module removal shall be followed including tagging out of telescope.

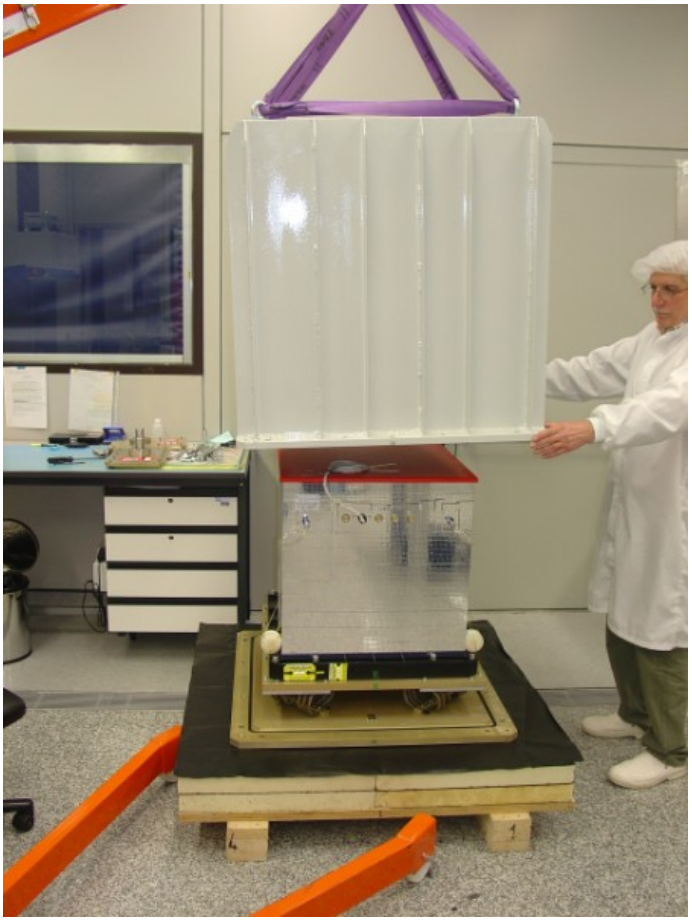

Figure 2: Removal of External Enclosure

4 INSTALLATION

4.1 Handler Installation

The LT will be delivered with a handling fixture (30Kg). There are two plates that will attach to the LT with 8 bolts on each side. The yellow spreader bar then attaches to these plates.

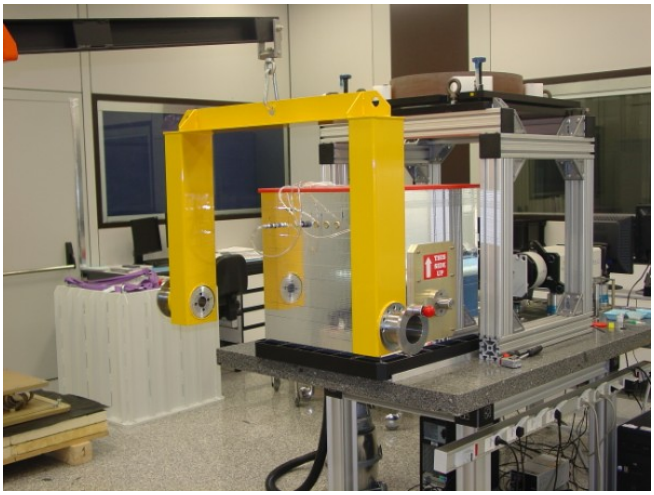

Figure 3: Lifing Bar

Secure the jib crane to the handler and remove the screws securing the LT at its base. The LT should be free of the base at this point. Lift the LT off of its base. The LT will be balance and locked into a vertical position with the red spring loaded pins on each side of the spreader bar.

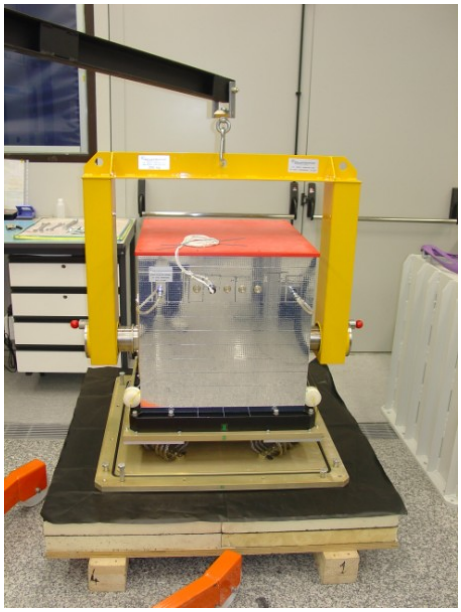

Figure 4: Lifting of LT

4.2 F/15 Installation

Using the jib crane, lift LT onto the Nasmyth Deck area near the f/15 module. Once in position, pull the spring loaded pins and rotate the LT to the 90 degrees position. After the rotation, the entrance window shall be visible at the top of LT. The entrance window will be denoted by defining points on its face as well as a black triangular alignment fixture.

Figure 5: LT rotated 90 degrees

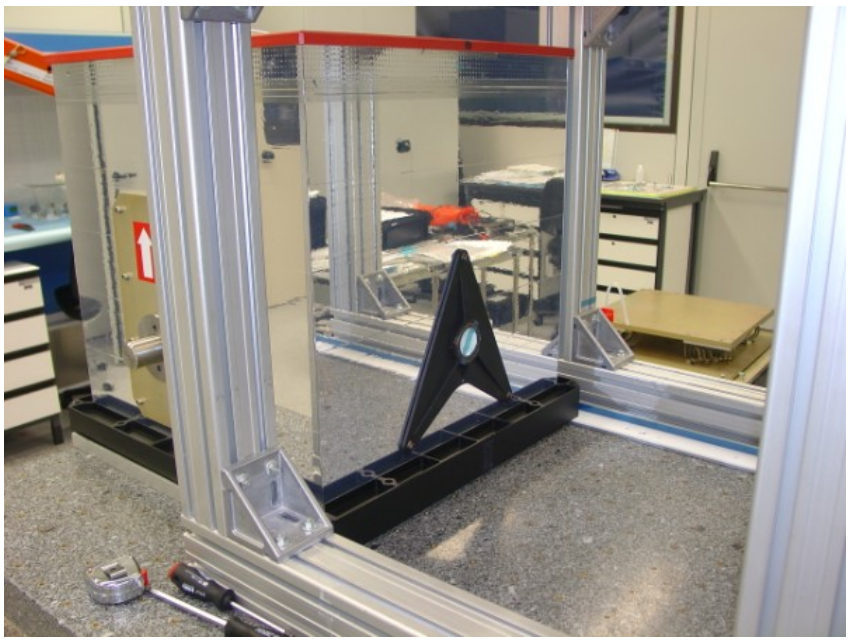

Figure 6: Entrance Window Location

Move LT onto the f/15 module lining up the base plate against the support structure. Holes should already be in place on the mounting structure to receive the LT. The bolt holes are for 10mm screws (quantity 12); the thickness of the plate is 58.5mm. It is critical that the base plate is not stress by the mating of these two surfaces. Prior to screwing in the bolts with a torque wrench, the mating flatness shall be checked around the edge of the unit. If necessary, install shims to assure flatness. Figure 9 shows the drawing of the reference plate.

Figure 7: Rear of LT base plate

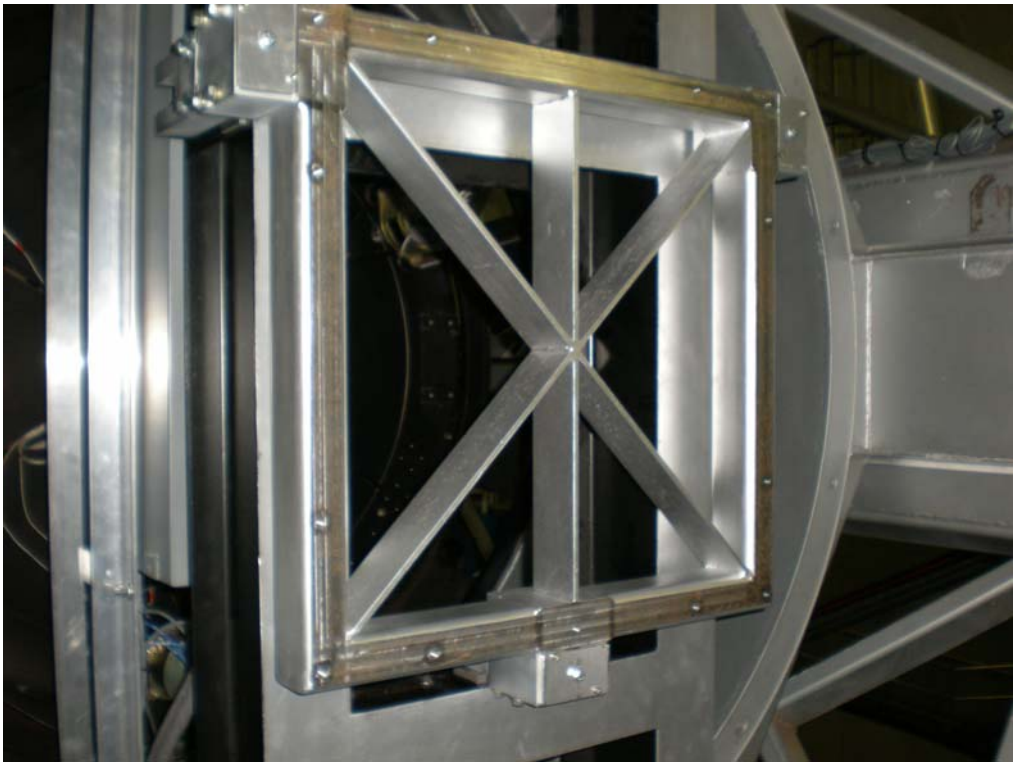

Figure 8: Mating Surface for base plate

Remove the handler and supporting plates attached to the LT in the reverse order that it was installed. The LT will come with pressure compensators. Install the pressure compensators in pre-arranged location.

As a final step, assure all parts of the LT are secured including its cover. Cover the entrance window to protect it from debris.

4.3 Balance and f/15 module installation

Remove proper amount of weight from the f/15 module counterweights. Lift module and assure proper balance. Note weight of the f/15 module.

Install module back into the telescope and remove proper weights to ensure the telescope is balance.

The handler should be properly stored. If possible, store handler on Nasmyth Deck for future use.

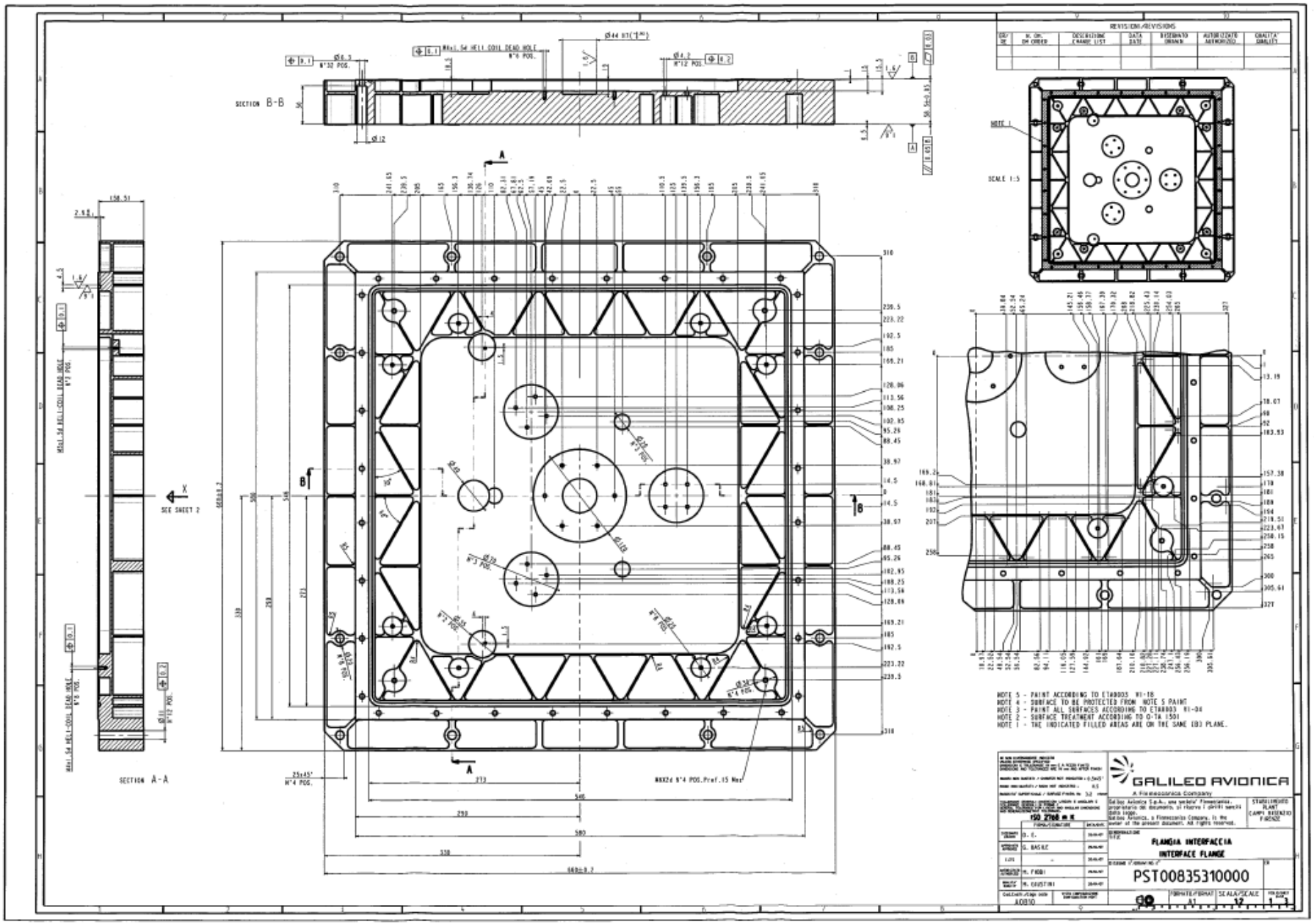

Figure 9: Mounting Plate