

Title: Factory Acceptance Testing of the Visible Broadband Imager for the Daniel K. Inouye Solar Telescope.

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Abstract:

The Visible Broadband Imager (VBI) is an instrument that will be used by scientists at the Daniel K. Inouye Solar Telescope (DKIST) on Haleakalā volcano in Maui. It utilizes a dual channel optical system consisting of many different interference filters which allow for simultaneous viewing of the sun's chromosphere and photosphere. It is a first light instrument for DKIST, which means it should be one of the first components installed at the summit once the Coudé room, where it will be situated, is ready. In preparation for installation, at the end of the review process, Factory Acceptance Testing (FAT) is done to ensure the instrument has been thoroughly tested and reviewed, and it's used as a way of verifying that the requirements from the Design Requirements Document (DRD) are met. FAT incorporates many different verification methods such as design review, analysis, inspection, and test (both manual and automated). FAT is done to verify all guidelines and specifications are being followed before the VBI is shipped off. Throughout my 10 week internship I completed many different kinds of tests including thermal tests using an infrared camera, tests to assess that movements are completed in the allotted time, and robustness tests which were meant to push the limits of the motors and then analyze their response to stress. The thermal tests I ran showed that the breaks on each of the stages were dissipating a surprisingly high amount of heat, thus we made the decision to remove them entirely. The movement completion times I gathered were analyzed using Python code I wrote and showed that we actually succeeded in completing all movements well within the allowed time per the DRD. The robustness tests also provided some positive feedback on the reliability of the VBI. Throughout this 10-week internship, we have been able to complete about 80% of the FAT procedures, which is reflected in the test results document that I have been generating. The remaining 20% is scheduled to be completed by the VBI instrumentation team by October, after which it will be shipped to Maui for the beginning of integration testing.