

# AO40 Feasibility Study

## Focal Region Mapping Experiment Observation Plan

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26 April 2010 ver. 3  
5 May 2010 ver.4

Edited by  
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12 May 2010

### Experiment Objectives

1. Produce a map of the peak sensitivity of 19 element formed phased array feed (PAF) beams as a function of x-y position in the AO focal plane over roughly a 1.6m diameter region.
2. Determine boresight beam peak sensitivity as a function of z offset (focus)
3. Map formed beam pattern shape and sidelobes for a subset of PAF positions over the focal plane.
4. Map the beam sensitivity over frequency for all or a subset of the PAF positions.
5. Measure system gain stability, aperture efficiency, and beam equivalent system noise temperature.

### Pre-Experiment Schedule for AO staff only (added by Ganesh)

**May 31**      **Remove and lower the C-hi and 800 MHz receivers and associated filters & chassis.**  
**June 1**      **Remove and replace the ¼" Aluminum sector plate on the rotary floor**  
June 2      Make available power, cable, fiber, network installations and test  
June 3      Continue installation and testing  
June 4      Reserve day for solving any unforeseen problems

### Experiment Schedule

May 28      BYU equipment ships  
June 6      BYU students arrive (Michael Elmer, Vikas Asthana, David Carter)  
June 7 Mon.      Safety orientation  
                  BYU equipment arrives at Arecibo  
                  Unpack equipment, begin ground assembly  
June 8      Finish ground assembly and system test  
                  Test telescope-DAQ software interface  
**June 9**      **PAF installation**  
                  **Lift racks into place, secure on platform**  
                  Run cables  
                  David Smith arrives (June 9-16)  
June 10      PAF system installation  
                  Positioner ground assembly and test  
**June 11**      **PAF system installation**

**Positioner lift and installation**  
**(Saturday maintenance day)**

June 12 On-platform test of telescope-DAQ software interface  
On-platform test of positioner control interface  
Test receivers, cables, connections  
Test signal integrity with empty field, no tracking (day)

June 13 (Observation day, no platform access)

June 14 Mon. Preliminary observations (night) and system test  
Locate center element beam peak for each of 13 PAF positions  
Daytime run of course core grid at each array position, process and verify data  
z focus scan at center PAF position – boresight (repeat to assess focus error)  
PAF center position frequency sweep

June 15 430 radar (Platform not accessible)

June 16 430 radar (Platform not accessible) Warnick, Jeffs arrive

June 17 430 radar (Platform not accessible)

June 18 Taylor Webb arrives  
Preliminary observations (night) and system test  
Locate center element beam peak for each of 13 PAF positions  
Course core grid at each array position, process and verify data  
z focus scan at center PAF position - grid

June 19 Precision observations (night)

June 20 (Observation day)

June 21 Mon. Precision observations (night)

June 22 Precision observations (night)

June 23 Precision observations (night)

June 24 Precision observations (night)

June 25 Precision observations (night)

June 26 Precision observations (night)

June 27 (Observation day)

**June 28 Mon. Lower equipment**

June 29 Disassemble, pack and ship equipment

June 30 Disassemble, pack and ship equipment

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Note to Felipe / Anibal from Ganesh:

Dear Felipe y Anibal,

I have marked **in blue** the dates when we need to lift / lower equipment to the dome and also replace the sector plate on the rotary floor for the BYU Focal Plane study. I will ask Hector to designate these days as Electronics maintenance days.

Please let me know asap, if you have any concerns / conflicts with other tasks already planned.

Thanks,

- Ganesh