

## SOFIA observatory performance and characterization

Temì, Pasquale NASA Ames Research Center United States [pasquale.temì@nasa.gov](mailto:pasquale.temì@nasa.gov)  
Miller, Walter Orbital Science Corp. United States [Walter.E.Miller@nasa.gov](mailto:Walter.E.Miller@nasa.gov)  
Dunham, Edward Lowell Observatory United States [dunham@lowell.edu](mailto:dunham@lowell.edu)  
McLean, Ian University of California, Los Angeles United States [mclean@astro.ucla.edu](mailto:mclean@astro.ucla.edu)  
Wolf, Jurgen Deutsches SOFIA Institut Germany [jwolf@sofia.usra.edu](mailto:jwolf@sofia.usra.edu)  
Becklin, Eric USRA – SOFIA Science Center United States [ebecklin@sofia.usra.edu](mailto:ebecklin@sofia.usra.edu)  
Bida, Tom Lowell Observatory United States [tbida@lowell.edu](mailto:tbida@lowell.edu)  
Brewster, Rick Orbital Science Corp. United States [rick.brewster@nasa.gov](mailto:rick.brewster@nasa.gov)  
Casey, Sean USRA – SOFIA Science Center United States [scasey@sofia.usra.edu](mailto:scasey@sofia.usra.edu)  
Collins, Peter Lowell Observatory United States [plc@lowell.edu](mailto:plc@lowell.edu)  
Horner, Scott NASA Ames research Center United States [scott.horner@nasa.gov](mailto:scott.horner@nasa.gov)  
Jakob, Holger DSI Deutsches SOFIA Institut Germany [jakob@dsi.uni-stuttgart.de](mailto:jakob@dsi.uni-stuttgart.de)  
Jensen, Stephen NASA Dryden Flight Research Center United States [stephen.c.jensen@nasa.gov](mailto:stephen.c.jensen@nasa.gov)  
Killebrew, Jana NASA – MSFC / Ames Research Center United States [jana.l.killebrew@nasa.gov](mailto:jana.l.killebrew@nasa.gov)  
Lampater, Ulrich DSI Deutsches SOFIA Institut Germany [lampater@dsi.uni-stuttgart.de](mailto:lampater@dsi.uni-stuttgart.de)  
Mandushev, Georgi Lowell Observatory United States [gmand@lowell.edu](mailto:gmand@lowell.edu)  
Marcum, Pamela NASA Ames Research Center United States [pamela.m.marcum@nasa.gov](mailto:pamela.m.marcum@nasa.gov)  
Meyer, Allan USRA – SOFIA Science Center United States [ameyer@sofia.usra.edu](mailto:ameyer@sofia.usra.edu)  
Pfueller, Enrico Deutsches SOFIA Institut United States [epfueller@sofia.usra.edu](mailto:epfueller@sofia.usra.edu)  
Reinacher, Andreas [reinacher@dsi.uni-stuttgart.de](mailto:reinacher@dsi.uni-stuttgart.de)  
Roeser, Hans-Peter DSI Deutsches SOFIA Institut Germany [roeser@irs.uni-stuttgart.de](mailto:roeser@irs.uni-stuttgart.de)  
Savage, Maureen USRA – SOFIA Science center United States [msavage@sofia.usra.edu](mailto:msavage@sofia.usra.edu)  
Smith, Erin NASA Ames Research Center United States [erin.c.smith@nasa.gov](mailto:erin.c.smith@nasa.gov)  
Teufel, Stefan SOFIA Airborne System Operation Center United States [teufel@dsi.uni-stuttgart.de](mailto:teufel@dsi.uni-stuttgart.de)  
Wiedemann, Manuel SOFIA Deutsches SOFIA Institut United States [mwiedemann@sofia.usra.edu](mailto:mwiedemann@sofia.usra.edu)

### ABSTRACT

The Stratospheric Observatory for Infrared Astronomy (SOFIA) has recently concluded a set of engineering flights for Observatory performance evaluation. These in-flight opportunities have been viewed as a first comprehensive assessment of the Observatory's performance and will be used to address the development activity that is planned for 2012, as well as to identify additional Observatory upgrades. A series of 8 SOFIA Characterization And Integration (SCAI) flights have been conducted from June to December 2011. The HIPO science instrument in conjunction with the DSI Super Fast Diagnostic Camera (SFDC) have been used to evaluate pointing stability, including the image motion due to rigid-body and flexible-body telescope modes as well as possible aero-optical image motion. We report on recent improvements in pointing stability by using an Active Mass Damper system installed on Telescope Assembly. Measurements and characterization of the shear layer and cavity seeing, as well as image quality evaluation as a function of wavelength have been performed using the HIPO+FLITECAM Science Instrument configuration (FLIPO). A number of additional tests and measurements have targeted basic Observatory capabilities and requirements including, but not limited to, pointing accuracy, chopper evaluation and imager sensitivity. SCAI activities included in-flight partial Science Instrument commissioning prior to the use of the instruments as measuring engines. This paper reports on the data collected during the SCAI flights and presents current SOFIA Observatory performance and characterization.