

(NNH11ZDA001N)  
**ASTROPHYSICS RESEARCH AND ANALYSIS**  
(APRA11)  
**PANEL EVALUATION**

**Proposal No.: 11-APRA11-0095**

**PI/Institution: Christopher Walker / University of Arizona**

**Proposal Title: Reflight of the Stratospheric TeraHertz Observatory: STO-2**

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ALL PROPOSALS AND REVIEWS ARE PROPRIETARY AND SHOULD BE HANDLED BY THE REVIEWER IN A CONFIDENTIAL MANNER.  
COMMENTS ON THIS PAGE MAY BE TRANSMITTED ANONYMOUSLY TO THE PROPOSER.

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**Brief Summary of Research Objectives:**

This proposal aims to support a reflight of the Stratospheric TeraHertz Observatory (STO), which flew in the Austral summer of 2011/2012. STO-2 would include an upgraded, more robust cryogenic/receiver system. Over the course of a 2-4 week flight from Antarctica, STO-2 would map  $\frac{1}{4}$  of the sky in [CII] at 158 micron and [NII] at 205 micron. These lines cannot be measured from the ground. The angular resolution of the telescope is  $\sim 1$  arcmin while the velocity resolution of the receiver system is better than 1 km/s. The result of this endeavor would be a large data set that would be combined with CO and HI data to create 3-D images of the structure and dynamics of the Interstellar Medium. STO-2 would use a new, more powerful LO and beam-splitter (rather than an FP), but the same HEB mixers, low-noise amplifiers, and spectrometers as STO-1.

**Overall Summary of Evaluation:**

This is a continuation of a previously supported program that has considerable scientific merit. Moreover, given their experience with STO, the team should be in a strong position to pursue the proposed effort. However, the lessons learned from the recent flight, and the steps taken to mitigate the risks associated with a future flight of STO, were not discussed in adequate detail in the proposal. The proposal also lacked a sufficiently clear plan for testing the individual components of the system; overall, the text focused too heavily on the science goals of the mission, and not enough on the recent performance of STO.

## **DETAILED FINDINGS**

### **Major Strengths:**

- The science objectives are clear and are of considerable merit. The science proposed fills a gap in the data needed to characterize the ISM. Also, these measurements (except for [CI]) cannot be done from the ground.
- The proposers are well equipped to reduce and interpret the data from STO, and – given their recent experience with STO - should be in a good position to pursue the proposed reflight from Antarctica.

### **Major Weaknesses:**

- Risk assessment from the recent flight, and the steps taken to mitigate the risks associated with a future STO-2 flight, were not properly accounted for in the proposal.
- The proposal lacked a sufficiently clear plan for testing the individual components of the system.
- The proposal lacked proper reference to the teams initial impression of the basic science results from the January 2012 flight of STO. The overall performance of STO in terms of science return was not adequately described.

### **Minor Strengths:**

- None noted

### **Minor Weaknesses:**

- The proposal focused too heavily on the science goals of STO, and did not cover in sufficient depth the lessons learned from the first flight of STO.
- The GUSSTO project, and the affect it would have on the STO-2 work, was not adequately described in this proposal.

### **Relevance to NASA's Objectives**

The proposed research is directly relevant to the objectives of the Astrophysics Research & Analysis as described in Appendix D.3 of the 2011 Research Opportunities in Space and Earth Sciences NRA.

### **Cost Realism**

The proposed costs are based on experienced gained with the STO mission. The projected costs for STO-2 are comparable to STO and should therefore be reasonable.

**OVERALL ADJECTIVAL RATING: G/F**

**COMMENTS OR SUGGESTIONS FOR THE PROPOSER (Optional):**