Monthly Progress Report

SPIRE Test Facility and Scientific Support

Contract Number: 9F007-020251/001/SR
Prepared By: Peter Davis

Date: January 5, 2005
Period: December 2004

Part 1

The launch of Herschel was delayed by the European Space Agency by half a year until August 2007. First data from the SPIRE imaging FTS will not be available until January 2005. This will cause serious problems since two key Canadian staff are funded only through December 2004. The proposal to extend the current contract and keep Trevor Fulton, the software engineer, and Peter Davis, the project manager employed for 9 months to complete Canada's work packages, was accepted at the JCSA meeting in Winnipeg, June 2004. CSA requested an updated statement of work and budget which was supplied. The respective implementation of contract amendment #4 has yet to be completed.

In addition, the JCSA has also agreed to long-term funding in order to host the SPIRE Imaging FTS Data Processing and Science Analysis Software (DAPSAS) centre. Funding at a rate of $500,000 p.a. will be provided from October 2005 on. The details of the contractual implementation have not yet been spelled out.

1. Is the project within budget? **Yes.**

2. Is the project free of any areas of concern in which the assistance or guidance of Canada may be required? **No (see above).**

Part 2

Task 3.1: Provide SPIRE Test Facility FTS

- The Test Facility FTS has been delivered to the Rutherford Appleton Laboratory (RAL) in August 2003.
- A small format visible imaging FTS is currently under development to allow us to test the data analysis pipeline. The hardware design has been completed and the system assembled. The next step is to integrate the available control software to be able to efficiently operate the instrument.
- Bruce Swinyard, SPIRE Instrument Scientist, summarized the measurements of the spectral response taken with the Test Facility FTS in a report that was presented to the SPIRE Data Analysis Group, led by the SPIRE Principal Investigator Matt Griffin. The short wavelength edge of the response is shifted probably due to a manufacturing error. The measurements at long wavelengths appear to derive from the test setup and are therefore most likely not indicative of performance problems of the detector array.

Task 3.2: Provide SPIRE Data Analysis Software

- The University of Lethbridge is responsible for three work packages: Deglitching, Fourier Transformation, and Spectral Response.
- After the meeting with our partners in Marseille, France, a number of improvements to the data processing software were made. Andres Rebolledo, a computer science coop student from the University of Lethbridge has implemented several changes in the task Fourier Transformation: The format of the data products was changed; names for the classes were changed to adhere to naming conventions; a bad-pixel mask was included; an effective deglitching was implemented for ground-testing; a bridge was built to ingest data products into IDL for easy and fast manipulation. An updated version of the task will be released together with updated documentation as soon as possible.
- Trevor Fulton, the SPIRE software engineer, has worked with Pasquale Panuzzo, Genova, Italy, to create a seamless interface between the task Engineering Data Processing and the task Fourier Transformation. He prepared a routine to deconvolve the spectrometer detector timeline with a one-pole filter which will be necessary with the large velocity error expected for the flight environment. Further improvements on this deconvolution will be necessary. In addition, Trevor implemented an alternative interpolation routine, based on the FFT and a zero-padded inverse FFT, which will be compared against other interpolation routines and qualified for its performance. Finally, processing software must be prepared to produce the required calibration products.

Task 3.3: Canadian SPIRE Team Support

- Nothing to report.

Task 3.4: SPIRE ITT and ICC Support

- Asier Abreu, the Canadian member of the SPIRE instrument control team at RAL, is involved in the Instrument System Level testing of the SPIRE instrument that was delivered to the European Space Agency and is now tested in Ottobrunn, Germany.
- Samuel Ronayette, the Canadian member of the SPIRE test team at RAL, is analyzing and interpreting data from the post-vibration test campaign (beam scans, beam peak up, pupil scans). Samuel will leave the project by the end of March 2005. A replacement will be needed and we currently explore options to resolve this situation that will benefit the SPIRE project as well as the Canadian astronomical community.
- Asier and Samuel are both involved in preparing the Proto-Flight Model 1 testing, currently scheduled to start in early February.

Task 3.6: Public Outreach Program

- The Science Alberta Foundation launched its newly developed Space Exploration Crate for grade 9 at the Lethbridge Collegiate Institute on December 10. Peter Davis and Locke Spencer from the SPIRE project participated in the opening. The event was covered by the local newspaper and all three local TV stations (Global, CTV, Shaw), including interviews with Peter Davis. Bob Cooney, the communications officer at the University of Lethbridge, estimates that more than 250,000 people were reached in Southern Alberta and beyond and that the activity generated an equivalent advertising value of more than $8,000.
- Mark Huff, an applied study student from the University of Lethbridge, is completing a stand-alone trifold on the Canadian contribution to Herschel/SPIRE and two programs for the Nature Centre in Lethbridge. He will give a respective presentation in late January.