High-Rate Data Input using the Tilera Multicore Processor

Completed Technology Project (2014 - 2015)

Project Introduction

Solve the existing problem of handling the on-board, real time, memory intensive processing of the Gb/s data stream of the scientific instrument. Investigate the COTS Tilera multicore embedded processing systems' methods of I/O focusing on the high rate Ethernet methods.

Define the software data processing methods needed to support the short-term and long-term development of the scientific instrument. This proposal will investigate standard Ethernet I/O methods to be compared with Tilera specific Ethernet methods of I/O, including the high rate Ethernet method that uses Tilera's multicore Programmable Intelligent Packet Engine (mPIPE) system.

Develop software to process data stream input over the Ethernet using standard TCP/IP protocols, Ethernet using Tilera's Zero Overhead Linux, and Ethernet using the Tilera mPIPE packet processing system. Develop and compare the different data input methods including data processing speed, level of programming effort, level of hardware or external setup, ease of understanding, and ease of execution.

Anticipated Benefits

The results from this IRAD will support the ongoing development of the scientific instrumentation.

Increase the capabilities of on-board data processing, including ingest and processing of high data rates that will be done on-board in the future.

This work can benefit any space-based instrument that would require high performance onboard data processing.

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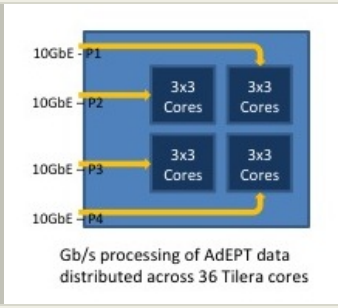

Gb/s Ethernet Input

Table of Contents

Project Introduction	1
Anticipated Benefits	1
Primary U.S. Work Locations and Key Partners	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Images	3
Links	3
Project Website:	3
Technology Areas	3

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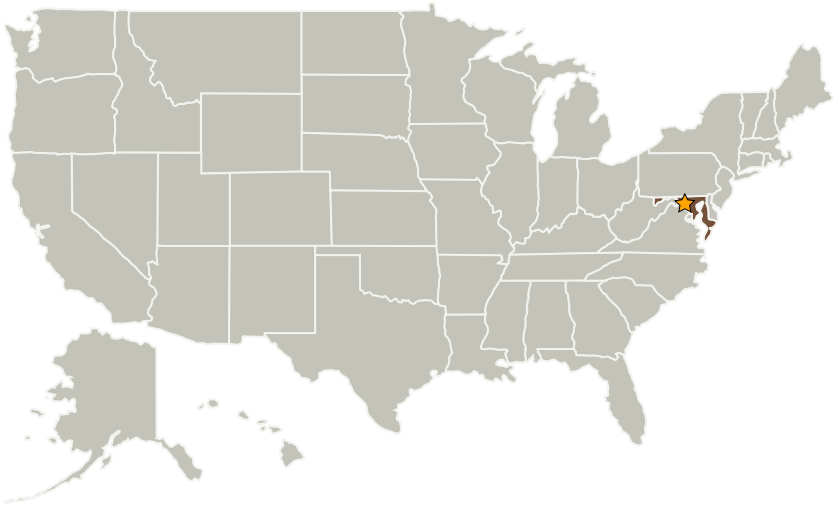
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations
Maryland

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Center Independent Research & Development: GSFC IRAD

Project Management

Program Manager:

Peter M Hughes

Project Manager:

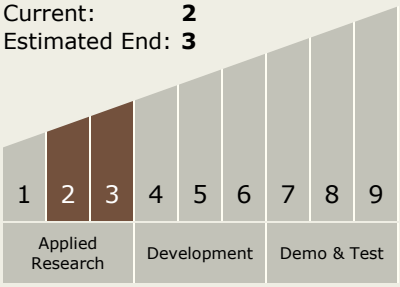
Jacqueline J Le Moigne-stewart

Principal Investigator:

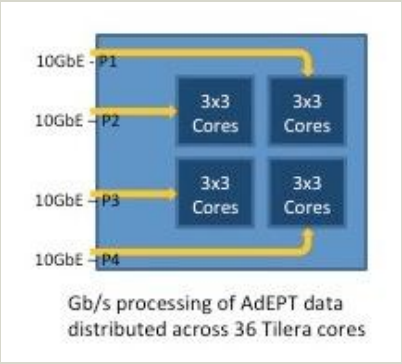
Teresa B Sheets

Technology Maturity (TRL)

Start: **2**
Current: **2**
Estimated End: **3**



Images



Gb/s Ethernet Input
Gb/s Ethernet Input
(https://techport.nasa.gov/image/4205)

Links

NTR 1437424478
(no url provided)

Project Website:

http://sciences.gsfc.nasa.gov/sed/

Technology Areas

Primary:

- TX02 Flight Computing and Avionics
  └ TX02.1 Avionics Component Technologies
    └ TX02.1.3 High Performance Processors