



# A High Performance Onboard Multicore Intelligent Payload Module for Orbital and Suborbital Remote Sensing Missions

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## Objective

- Dramatically improve onboard processing (OBP) capability for high data rate missions, in particular, HypSIIRI concept
  - Utilize onboard multicore and field programmable array processors; and intelligent onboard data reduction
- Demonstrate the Intelligent Payload Module (IPM) end-to-end operations concept for low latency custom data products from airborne platforms
- Demonstrate multi-tiered onboard data processing chain
- Demonstrate direct download of Level 2 (L2) data products with atmospheric correction and geocorrection based on user selected location, parameters, and algorithms
- Demonstrate rapid delivery of data products in near real time

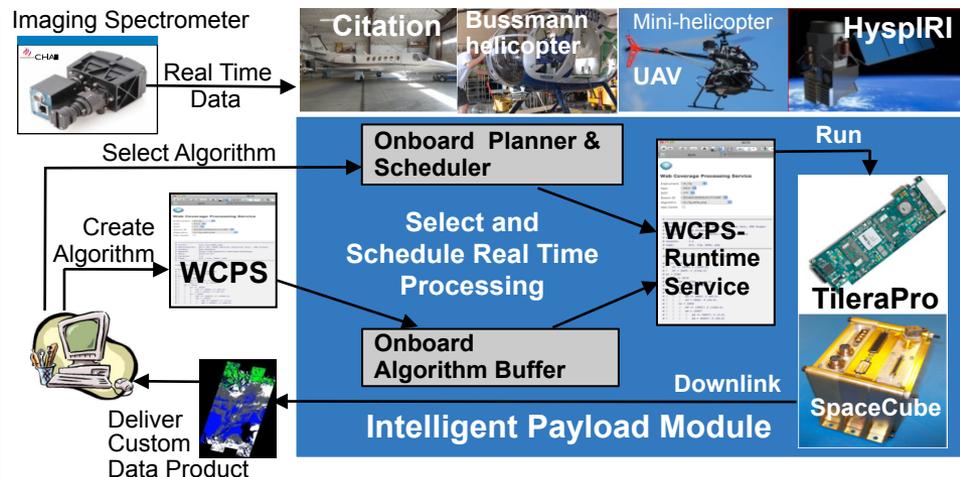


Diagram shows the IPM operations concept for the high-speed multicore onboard processor featuring validation using various airborne platforms.

## Approach

- Design, fabricate and configure IPM flight package for airborne vehicles such as the B200, Bussman helicopter and mini-helicopter
- Exercise onboard processing software functions in a similar manner as would occur for satellite use
  - Freewave transponder for uplink and downlink
  - Core Flight Executive (cFE) for software bus
  - CASPER (Continuous Activity Scheduling, Planning, and Re-planning) for planning and scheduling
  - Web Coverage Processing Service (WCPS) for custom onboard algorithms

## Co-Is/Partners

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## Key Milestones

- Initial IPM flight package complete 10/12
- Functional Exp. 1, USFS Citation aircraft 06/13
  - cFE, WCPS, and L2 processing (stream data to OBP)
- Functional Exp. 2, target helicopter with CHAI V-640 12/13
  - Demo dynamic algorithm upload and data product downlink with Freewave transceivers
- Functional Exp. 3, target UAV mini-helicopter with CHAI V-640 sensor 12/14
  - Demo a mini-IPM which interacts and directs flight computer
- Functional Exp. 4, target helicopter with CHAI V-640 12/14
  - Stretch goal - demo complete data pipeline processing
- IPM recommendations to HypSIIRI Science Study Group 04/15

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