



Optical Coherence Tomography (OCT) in Microgravity

Problem Statement

- NASA needs advanced medical diagnosis technology for inflight monitoring of Visual Impairment / Intracranial Pressure (VIIP) problems
- Requested flights will allow OCT hardware, procedures, and scientific development in a relevant microgravity environment
- End users: Medical Operations, Life Science Research (HRP), ISS and future exploration programs

Technology Development Team

- PI: Douglas Ebert, Ph.D., Wyle Science, Technology and Engineering Group
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- Funding support: NASA Medical Operations and Hardware, operational VIIP (through the Bioastronautics contract to Wyle)
- Technology partner: Heidelberg Engineering (manufacturer of COTS OCT device)

Proposed Flight Experiment

Experiment Readiness:

- Ready for flight Q3 2013.

Test Vehicle:

- parabolic aircraft

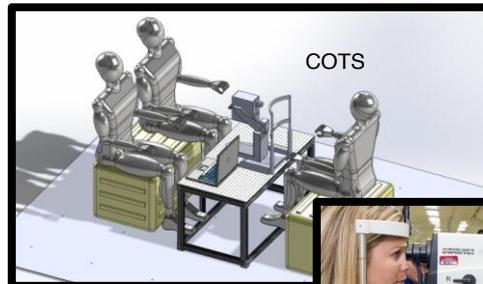
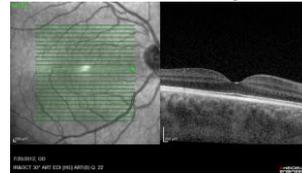
Test Environment:

- Previously flown in parabolic flight
- Additional parabolic flights requested

Test Apparatus Description:

- Prime and secondary operators and a subject (rotated during flight for maximal evaluation)

IR and OCT images



COTS

freehand



Alternate XYZ stage



Technology Maturation

- Optimal hardware configuration and procedures (including training) must be determined; scans must be consistent and reliably obtained in microgravity in order to advance the technology beyond TRL 6.
- Evaluate multiple hardware configurations and procedures; optimize software settings; collect physiological data (simultaneous in one flight week)
- Deadline for maturity is pending flight hardware development; COTS unit may fly to ISS as early as April 2013 but will need substantial additional development before it can be effectively used on orbit.

Objective of Proposed Experiment

- Specific objectives: 1) Evaluate hardware configurations, 2) human factors, 3) procedures, and 4) software setting and physiological data
- Results of these flight tests will provide ranked acceptable hardware configurations and procedures, optimized software settings, and physiological insight to the VIIP problem