NASA SBIR 2015 Phase I Solicitation

Z3.01 Wireless Cameras for Entry, Descent, and Landing Reconstruction

Lead Center: JPL

Participating Center(s): LaRC

This subtopic seeks innovative solutions for the collection of high resolution, high frame rate, and low distortion imagery of key events and hardware during entry, descent, and landing. This would enable the capture of valuable forensic images for spacecraft events such as the deployment and inflation of parachutes, vehicle touchdown dynamics, and plume-ground interactions.Â

Because the intended usage of the camera system is during EDL, a series spacecraft critical events, the camera system must operate on a non-interference basis with the rest of the spacecraft. Additionally, the use of wireless cameras allows the cameras to be optimally placed to capture imagery of key hardware that may be difficult to access with traditional wired cameras.

Camera Sensor Performance Targets:Â

- Format and Frame Rate Minimum: 1080p @ 30 fps (up to 100 fps).
- Array Format Minimum: 1920 x 1080 Pixels.
- Target Wavelength Range: 480nm - 800nm (TBR).
- Windowing: Yes.
- Color: Yes.
- Technology: CMOS or CCD.
- Temperature Range: -30 Â°C to +40 Â°C.

Camera Optical Performance Targets:Â

- Field of View: +/- 45 degrees off center-line.
- Focus: 0.5 m to infinity.Â

Supporting Avionics Functions:Â

- Ability to control the camera sensor.
- Ability to (near) real time, receive and store seconds to a few minutes of data at the above frame rates, then transmit the image data to the main entry vehicle computer.
- Distance from camera to storage device is between 0.5-10 meters.
- Unit volume no greater than 12.7 cm x 12.7 cm x 12.7 cm.Â

Phase I Deliverables- Include a camera system architecture design, and a testing and calibration plan. Constructing a breadboard unit would also be desired.Â

Phase II Deliverables - Include an engineering-level prototype system on which the testing and calibration from Phase I would have been completed, and a test/performance report.Â Â