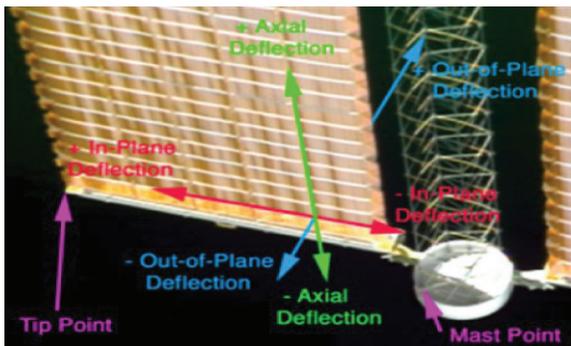




Image Science and Analysis Laboratory

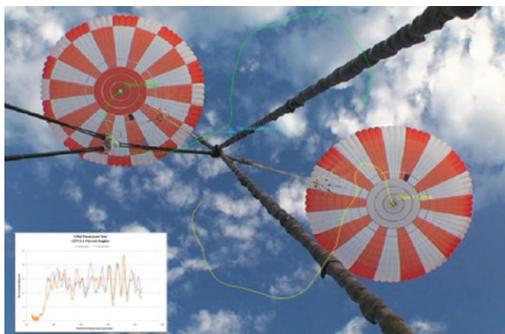
The Image Science and Analysis Laboratory (ISAL) provides expertise in scientific and engineering analysis of photographic and video imagery to assess space vehicle performance, dynamic events, and anomalies. Specialty areas include photogrammetry, high-precision motion tracking, data visualization, inspection and surveys, enhancement and restoration, and imagery acquisition planning.



Photogrammetry

Photogrammetry is the practice of determining the geometric properties of objects from photographic images. ISAL expertise in photogrammetry is used for 3-D measurements, clearance analyses, motion, vibration, and dynamic analyses (position and trajectory, velocity, and acceleration). ISAL tools for analyses include Cardinal VrTwo stereo and VrCr close-range photogrammetry systems, FotoG, PhotoModeler, and Australis.

International Space Station solar array and radiator motion analysis for structural loads models



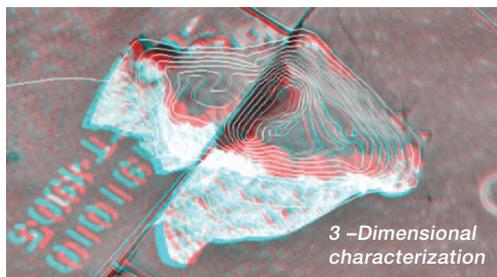
High-Precision Motion Tracking

High-precision motion tracking involves tracking the motion of objects in imagery by finding the 2-D coordinates of pixels on an image sequence. Motion tracking can be used to analyze component motion for structural loads analysis, jettison trajectories, and performance analysis. Lab tools for analysis include Trackeye, NanoTrack, and WinAnalyze.

Parachute fly-out angles and chute diameters

Data Visualization

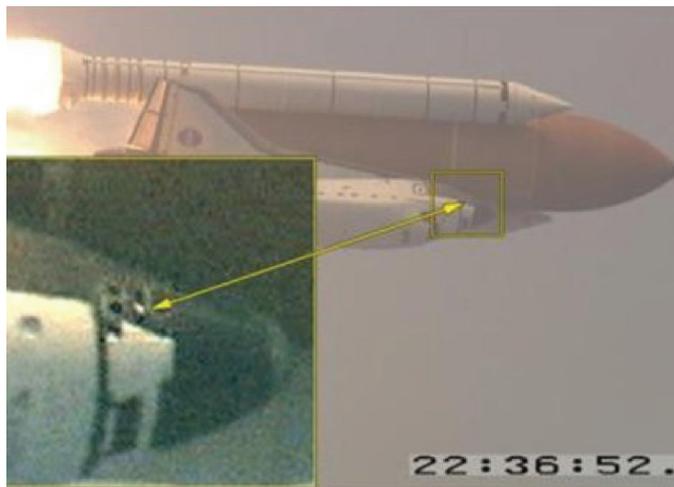
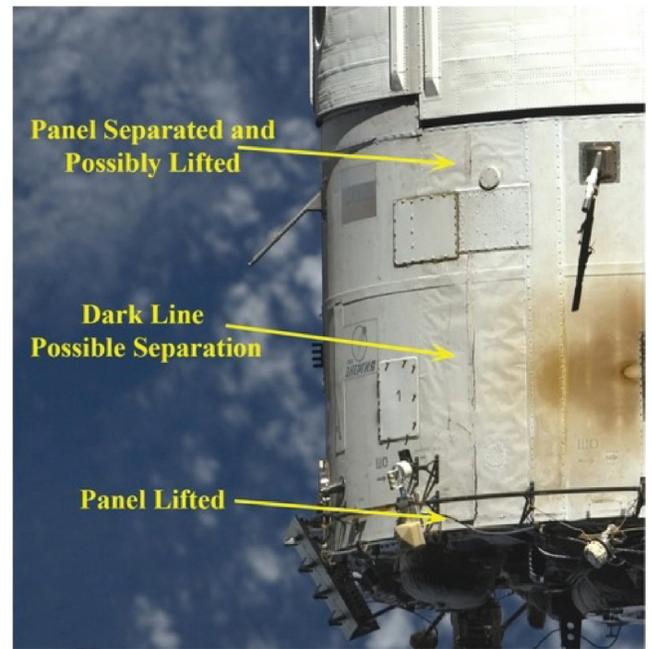
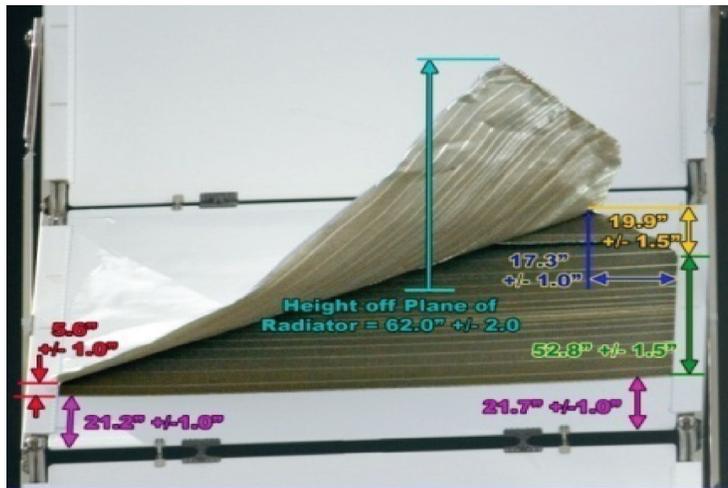
ISAL uses tools such as Polyworks, 3ds Max, and VrTwo for display of 3-D imagery, data, and computer-aided design models to enhance engineering or scientific understanding.



3 -Dimensional characterization

Imagery Inspection and Surveys

ISAL uses imagery from robotic, fixed, or handheld cameras to detect and characterize damage or other anomalies.



Enhancement of suspect area on Space Shuttle to see if a thruster cover has come off as designed

Imagery Acquisition Planning

Imagery planning encompasses the application of ISAL modeling tools, analysis tools and expertise to define camera locations, fields of view, lighting needs, camera lenses, and camera settings to fulfill engineering imagery needs and to ensure an imagery set that can successfully undergo analysis.

Imagery Enhancements and Restoration

Image enhancement involves changing the image brightness and contrast to bring out features not readily visible. Restoration involves using image processing methods to correct for image degradation caused by issues such as motion blur or camera focus.



Ground-based camera view modeling



For the benefit of all

For more information:
<http://ares.jsc.nasa.gov/ares/exploration/isag/index.cfm>

Point of contact:

JSC Astromaterials Research and
 Exploration Science Directorate
 281-483-7316
JSC-KXCustServ@mail.nasa.gov