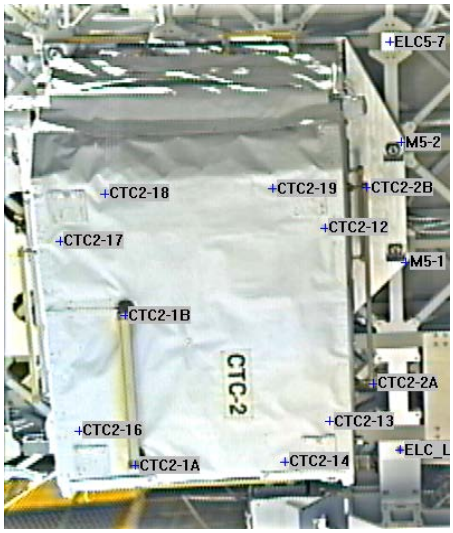

Figure 5.– Point measured on the inboard face of CTC2.

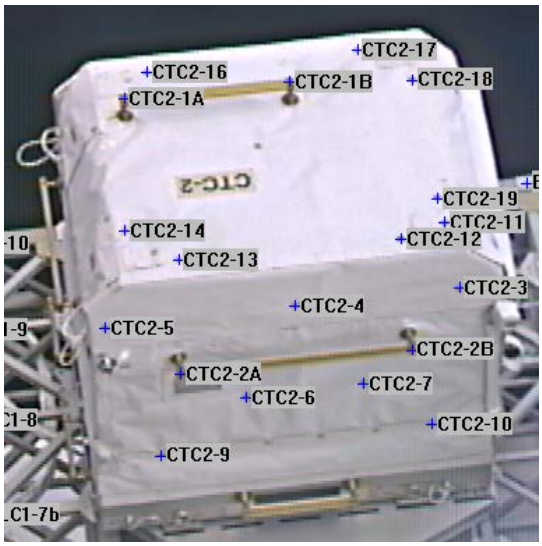

Figure 6.– Point measured on the forward face of CTC2.

The image-based measurement techniques employed by ISAG provided measurements of the as-assembled, on-orbit hardware configuration, which verified positive clearance both in static and dynamic modes. This measurement capability reduces the overall risk of ISS operation for both NASA and its partner nations.

Analyzing an Aging ISS

R. Scharf

The ISS External Survey integrates the requirements for photographic and video imagery of the International Space Station (ISS) for the engineering, operations, and science communities. An extensive photographic survey was performed on all Space Shuttle flights to the ISS and continues to be performed daily, though on a level much reduced by the limited available imagery. The acquired video and photo imagery is used for both qualitative and quantitative assessments of external deposition and contamination, surface degradation, dynamic events, and MMOD strikes. Many of these assessments provide important information about ISS surfaces and structural integrity as the ISS ages. The imagery is also used to assess and verify the physical configuration of ISS structure, appendages, and components.

During the Space Shuttle Program, a general survey of the ISS with shuttle imagery assets could be performed during approach, while docked, and during the departure Shuttle fly-around. Shuttle images of the ISS comprised most of the imagery used to observe the condition of the ISS exterior. With the retirement of the Space Shuttle, many external surfaces of ISS became blind spots that cannot be easily viewed with ISS imaging assets alone. ISS assets include external video cameras

that can be ground controlled and crew handheld imagery taken from ISS windows or during extravehicular activity (EVA).

The Image Science and Analysis Group has mapped the areas of ISS that can be imaged with external fixed video cameras and crew handheld imagery taken from ISS windows. The images in figure 1 show the ISS external surfaces with imagery coverage in white, while areas in maroon cannot be imaged from external or crew handheld cameras.

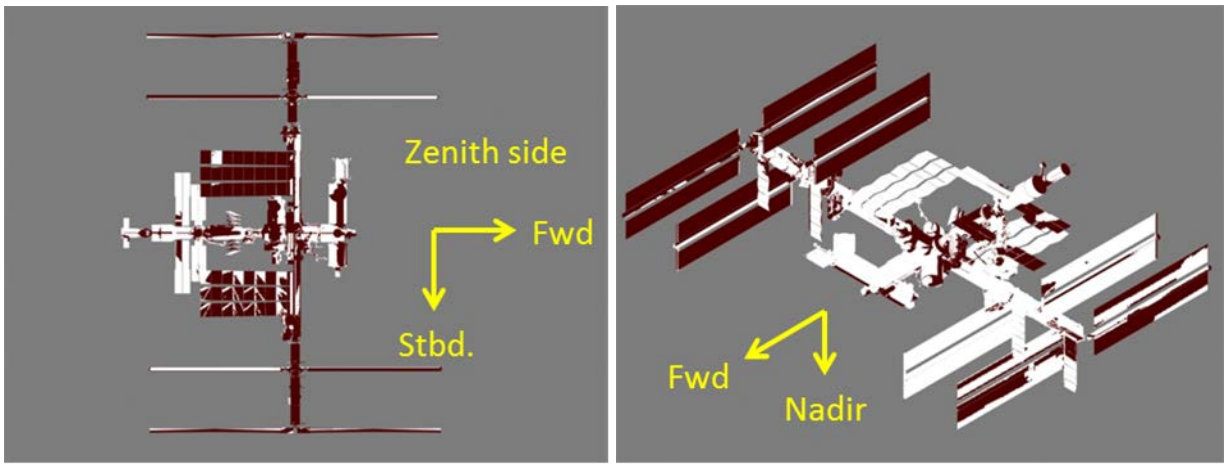

Figure 1 – Areas in white on the zenith and nadir/port/aft views are visible with external fixed video cameras and/or crew handheld imagery.

To track ISS surfaces as they age, the ISAG developed the ISS Imagery Inspection Management System (IIIMS) as a Web page based database for the ISS community. In addition to tracking external deposition, contamination, and surface degradation, the IIIMS database tracks potential sharp edge sources on the ISS truss and elements in response to the risk identified by the ISS Program. Most of the potential sharp edge risks are believed to be caused by MMOD strikes.

The IIIMS database uses an expanded view of the ISS as a visual drill down to search database findings. The home page for IIIMS is shown in figure 2, below. After clicking on an ISS component, a page for that component is shown with a CAD view of it along with a list of all the findings for that component. Alternate screens provide a table of all database findings and tables that show potential sharp edge risks by specific planned EVAs.

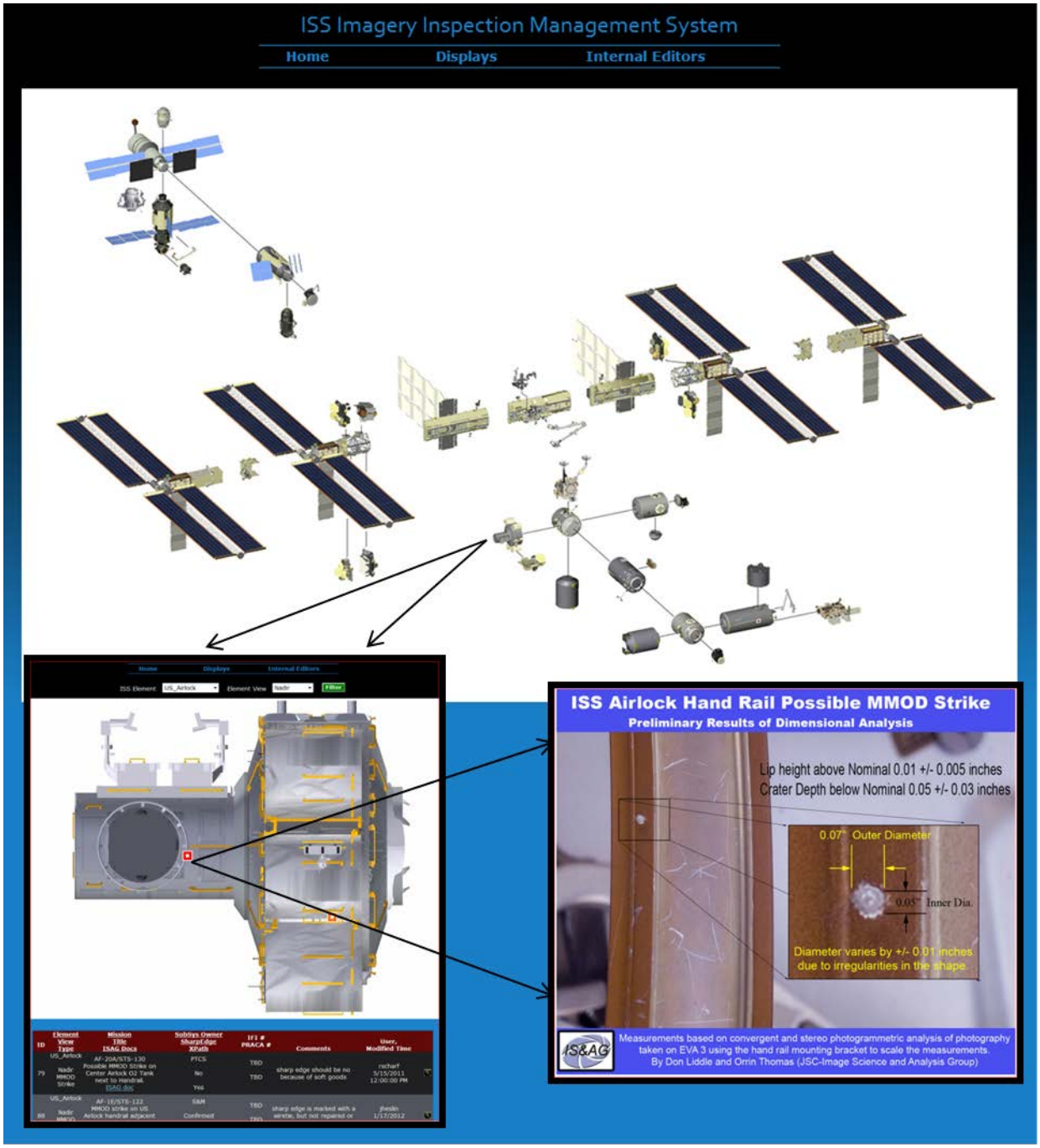

Figure 2.– IIIMS homepage with expanded view of the ISS for visual drill down to ISS surface findings.