JSC/EC5 U.S. Spacesuit Knowledge Capture (KC) Series Synopsis

All KC events will be approved for public using NASA Form 1676.

This synopsis provides information about the Knowledge Capture event below.

Topic: Lessons Learned From a Ship-and-Shoot Philosophy

Date: April 16, 2012 **Time:** Unknown **Location:** JSC/B5S/R3102

DAA 1676 Form #: 29385

This Word document and a PDF of the presentation are also attached to the DAA 1676 and this is a link to all lecture material and video: \\js-ea-fs-01\pd01\EC\Knowledge-Capture\FY12 Knowledge Capture\20120419 Woods_Ship-Shoot\For 1676 Review and Public Release

*A copy of the video will be provided to NASA Center for AeroSpace Information (CASI) via the Agency's Large File Transfer (LFT), or by DVD using the USPS when the DAA 1676 review is complete.

Assessment of Export Control Applicability:

This Knowledge Capture event has been reviewed by the EC5 Spacesuit Knowledge Capture Manager in collaboration with the author and is assessed to not contain any technical content that is export controlled. It is requested to be publicly released to the JSC Engineering Academy, as well as to CASI for distribution through NTRS or NA&SD (public or non-public) and with video through DVD request or YouTube viewing with download of any presentation material.

Presenter: Ron Woods

Synopsis: Ron Woods shared incredibly valuable insights gained during his 28 years at the Kennedy Space Center (KSC) packaging Flight Crew Equipment for shuttle and ISS missions. In particular, Woods shared anecdotes and photos from various processing events. The moral of these stories and the main focus of this discussion were the additional processing efforts and effects related to a "ship-and-shoot" philosophy toward flight hardware.

Biography: Ron Woods' career at NASA began at JSC, Crew Systems Division, as a survival technician and suit subject for the Apollo suits. Woods then supported the training and pre-flight suiting activities for Apollo, Skylab, and ASTP at KSC. During this time, he was assigned to the teams that supported the crews of Apollo 8, 11, 15, all three Skylabs, and ASTP. Post-ASTP, Woods returned to JSC to support shuttle flight crew equipment. This included the launch entry suit (ejection seat equipment) and crew-worn equipment. Woods supported the first two shuttle missions as a suit technician at KSC and three additional missions at primary and back-up landing sites, White Sands, and Dryden Flight Research Center. From 1982 to 2011, Woods worked at KSC as the JSC flight crew equipment representative for each shuttle mission and the early ISS missions. Woods' primary career and his already developing artistic skills merged into a portfolio of spacesuit paintings. As of 2012, Woods was back at JSC working launch and entry suits and crew protection systems for future human space exploration.

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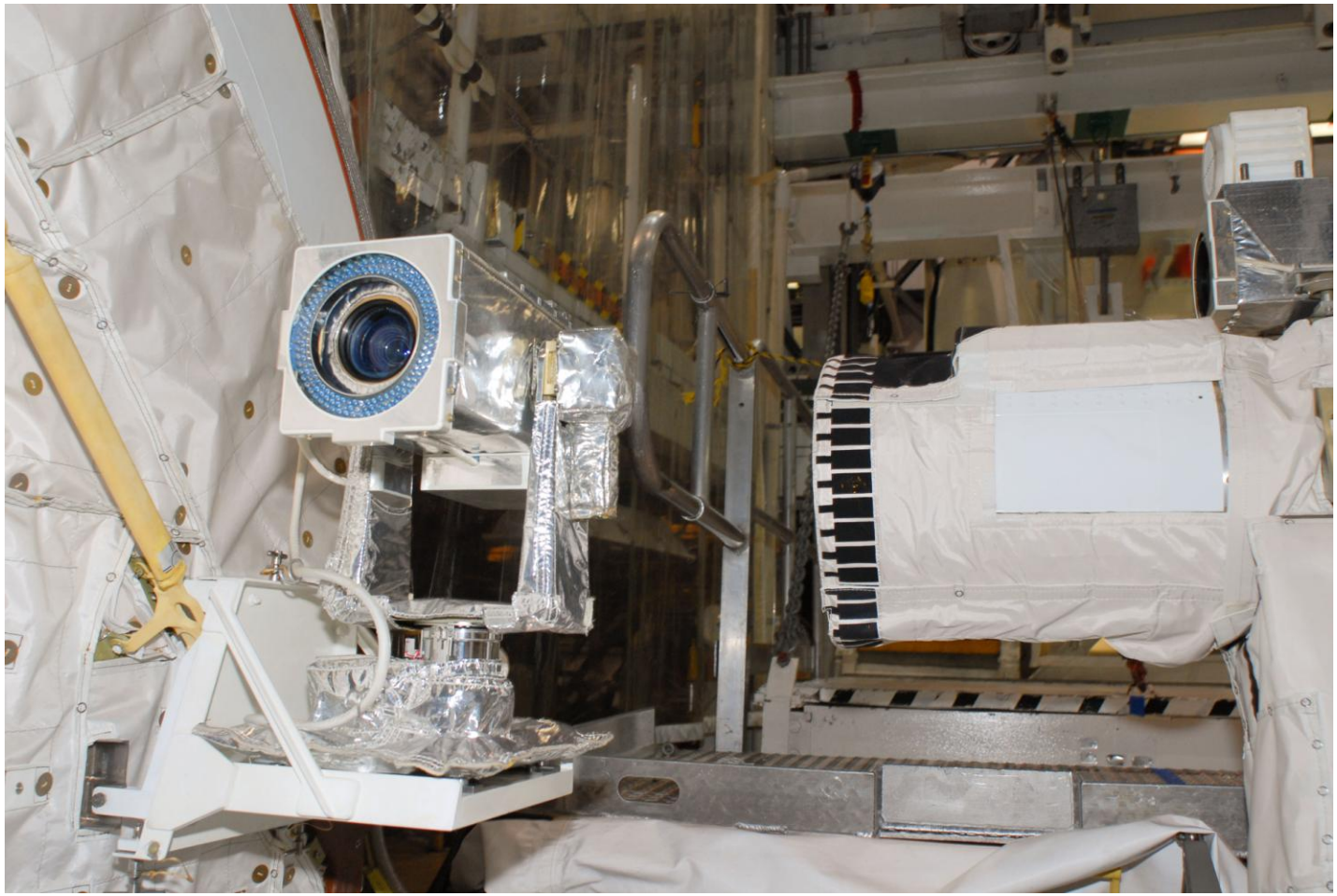
SHIP & SHOOT

Ron Woods
EC5

What is ship and shoot?

- It is a processing philosophy where hardware is certified for flight by the vendor, shipped to the launch location, with no additional processing required prior to integration into the launch vehicle.
- Is it related to faster, better, cheaper?
- Or is it a failure to use lessons learned?
- Golden Opportunities (GOs)

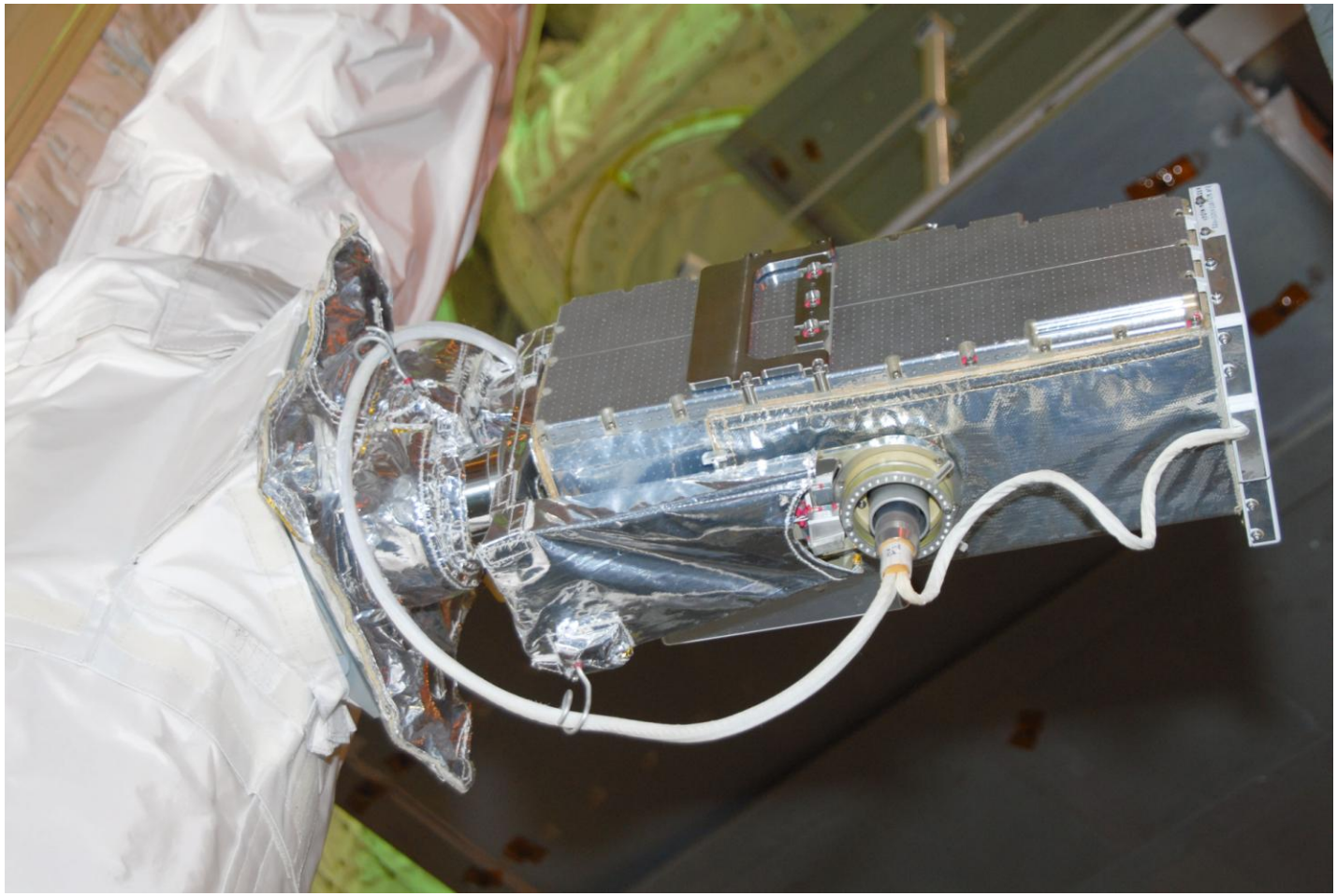
“B” Camera & RMS Wrist



“B” Camera

- Build up in FCS on match drilled shelves.
- Installed for CEIT and IVT.
- PTU screw torque problem found post CEIT.
- Corrective action for “B”, “C”, Elbow, & prime board for “A” & “C”.
- Prime board process changes due to KSC engineering disposition of GFE and deferral problem reports.

“RMS Elbow Camera”



Elbow Installation Problem

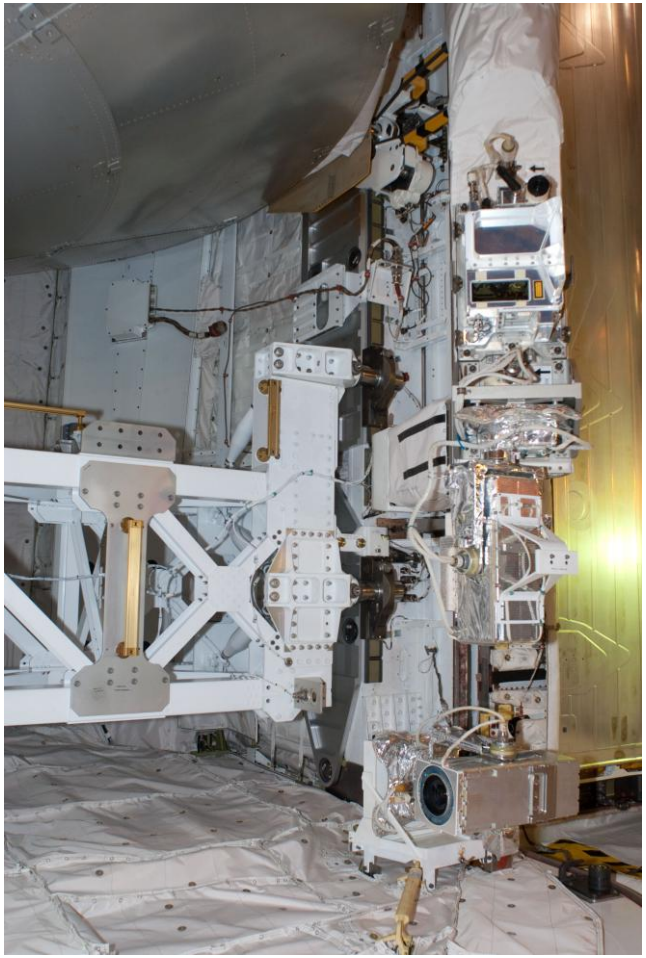
- All PTU mounting hardware was changed post Columbia due to stress analysis.
- Installation problems were found once the flight PTUs were delivered to KSC.
- A two piece wedge was designed and built at KSC using the JSC drawing system.
- This was a low cost project and meeting the return to flight critical schedule.

“Sensor Packages 1 & 2”

Post Delivery Work at KSC

- Removal of captive bolt configuration.
- Bolt marking and cycle information added.
- Build up and pre-flight in lab.
- Additional GSE containers and internal configuration of the containers.
- GSE container exterior caution and warning labels.

Sensor Packages 1 & 2



Other Flight Hardware Issues

- Hardware received in Flight Kits, VAB.
- Payload Bay side wall panels were found to have numerous scratches and loose paint.
- Latch interface mechanisms were painted and had loose paint.

GSE Panel on MLP

- Panel on the Mobile Launch Platform only supported Crew at TCDT (S0017) with O2.
- GSE on MLP was down for service. High cost replacement was in the works.
- Panels replaced by ARAP Emergency Bottles normally kept on the 195 level.
- Performed manned suit testing to cert. ARAP for use at S0017.