

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
COMMUNICATIONS CARRIER ASSEMBLY (CCA), ITEM 101 ----- 0101-10001-06 (1)	2/2	101FM05 Fails to remain fastened, neck or chin strap. Material: Defective snap socket or stud.	END ITEM: Loose skull cap. GFE INTERFACE: Communications inhibited/lost due to shifting of earphones and microphones. MISSION: Terminate EVA. CREW/VEHICLE: None. TIME TO EFFECT /ACTIONS: Seconds. TIME AVAILABLE: N/A TIME REQUIRED: N/A REDUNDANCY SCREENS: A-N/A B-N/A C-N/A	A. Design - The CCA was designed with a chin or neck strap for personal comfort and to prevent the assembly from shifting during normal operations. The chin and neck straps are secured with a "pull the dot" snap fastener added during the shuttle program that will only open when pressure is applied at the dot. A Nylon/Spandex fabric is used on the cap to ensure a conformal fit due to its elongation/recovery properties. B. Test - Acceptance: Lot acceptance testing and vendor certification of all materials is performed prior to manufacturing. PDA: Snap lot acceptance testing is performed. Certification: The CCA was successfully tested during SSA certification to duplicate operational life. (Ref. ILC EM 84-1042). The following usage reflecting requirements of significance to the CCA was documented during certification. Requirement S/AD Actual ----- ---- ----- Don/Doffs 98 400 Neck/Chin Strap 196 432 C. Inspection - The following MIP's are performed during the Communications Carrier Assembly manufacturing process to assure the failure cause is precluded from the fabricated item: Verification of material and pattern layout. In addition, each CCA is visually inspected for quality of workmanship, damage, wear, fabric degradation and cleanliness at PDA per ILC Document 0111-70028. D. Failure History - I-EMU-101-001 (07/08/80). Chin strap came loose. Weak snap. PIA changed to include subjective snap engagement force. J-EMU-101-C001 (01/16/81). Chin strap came loose. See (1) above. F-EMU-101-4B01 (02/22/84). Neck strap came loose. Changed CCA to incorporate a directional snap ("pull the dot"). J-EMU-101-001 (10/02/84). Chin strap came up over chin. Added caution to crewman briefing prior to EMU vacuum chamber runs. B-EMU-101-A005 (12/30/88). The chin/neck strap snap stud and piece of fabric tore from CCA softgoods due to excessive force applied outside of the "Pull-the-Dot" snap range. ECO 901-0233 clarifies the Maintenance Manual procedure for the "Pull-the-Dot" snaps by cautioning that the unfastening force must be applied at the dimple (dot) to preclude snap overloading. Also, CCBD G6179 revises the FEMU-R-001 to delete the snap verification test to reduce the unnecessary repeated snap loadings. B-EMU-101-A006 (4/27/89). Loose CCA neck strap caused by incorrect neck strap threading through tension adjustment buckle. ECO 891-0314 verifies proper threading of the neck and chin straps and adds two additional stitched-through folds at the strap ends to prevent the strap from slipping through the buckle.

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101FM05

This will preclude future buckle removal and possible improper strap re-threading.
B-EMU-101-A007 (8/24/89). Tracked by B-101-A005.
B-EMU-101-A009 (1/29/93). B-EMU-101-A010 (1/17/93), B-EMU-101-A011 (2/13/93)- Snaps on CCA pulled out of teflon fabric due to improper loading of pull strap during doffing. ECO 931-0318 incorporates a new chin/neck strap with pull tabs rotated 90 degrees to align with the neck strap's normal load path to minimize the possibility of misapplying force to the chin/neck strap and skull cap.
B-EMU-101-A013 (12/12/93). CCA softgoods pulled away from snap. Corrective action is tracked by I-EMU-101-C002.
B-EMU-101-F001 (12/09/93). CCA softgoods pulled away from snap during STS-61. Corrective action is tracked by I-EMU-101-C002.
I-EMU-101-C002 (10/08/93). The left male snap on the CCA tore away from the Teflon fabric during cycle certification testing of the new chin/neck strap which incorporates the pull tab oriented with the normal load path and a pull tab at the right side snap. The cause of the snap stud pullout is insufficient strength of the material surrounding the male stud during loading. Per EC 931-0354, additional Teflon material has been added around the male portion of the snap to reinforce the area.

E. Ground Turnaround -
Pre-Flight external visual inspection per FEMU-R-001.

F. Operational Use -
Operational Use Crew Response -
Pre-EVA : Troubleshoot problem, if no success use spare CCA if available.
Otherwise secure CCA with tape, continue EVA prep.
EVA : No response if RF comm is still possible. For loss of minimum comm, terminate EVA.
Special Training -
Standard EMU training covers this failure mode.
Operational Considerations -
Flight rules define loss of EMU for loss of minimum comm. EVA checklist procedures verify hardware integrity and systems operational integrity prior to EVA.

EXTRAVEHICULAR MOBILITY UNIT
SYSTEMS SAFETY REVIEW PANEL REVIEW
FOR THE
I-101 COMMUNICATIONS CARRIER ASSEMBLY (CCA)
CRITICAL ITEM LIST (CIL)

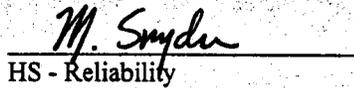
EMU CONTRACT NO. NAS 9-97150

Prepared by:

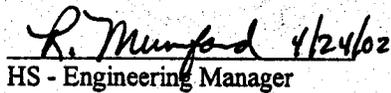

HS - Project Engineering

Approved by:

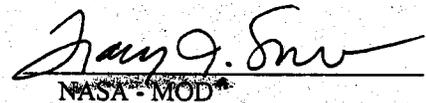

NASA - SSA/SSM

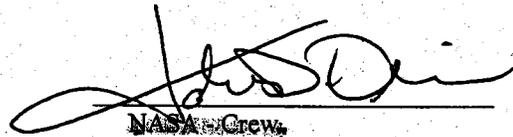

HS - Reliability

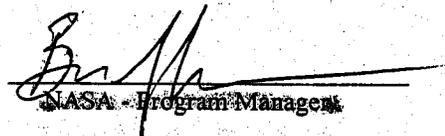

NASA - EMU/SSM

 4/24/02
HS - Engineering Manager


NASA - S & MA


NASA - MOD


NASA - Crew


NASA - Program Manager