



NASA
Lyndon B. Johnson Space Center
**FLIGHT CREW
OPERATIONS
DIRECTORATE**

SUBJECT:

**EXTENDED DURATION OF SHUTTLE
CREW CONSIDERATIONS**

NAME:

CB/W. E. THORNTON

DATE:

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PROBLEMS -

- 1. INADEQUATE CREW SUPPORT SYSTEMS**
 - **HUMAN WASTE COLLECTION AND STORAGE**
 - **OPERATIONAL WASTE STORAGE**
- 2. ADAPTATION TO WEIGHTLESSNESS WILL COMPROMISE NORMAL FUNCTION ON RETURN TO 1 G - INCLUDING EMERGENCY ESCAPE**



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HUMAN WASTE COLLECTION

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- **PROBLEM**

- **CURRENT SYSTEM IS INADEQUATE FOR FECAL STORAGE ALONE - CANNOT HANDLE WIPES AND OTHER CLEANING MATERIAL**

- **SOLUTION**

- **AN EFFICIENT FECAL COMPACTION SYSTEM USING MINIMUM ADDITIONAL STORAGE MATERIAL (ONE 10 X 10 X .02" SHEET PER USE) HAS BEEN BUILT (WHITMORE) AND EXTENSIVELY TESTED.**
- **MEASURED STORAGE CAPACITY IS > 6 DEFECATIONS PER INCH OF STORAGE CONTAINER - i.e. 10" CONTAINER = 60 USAGES**
- **DEVICE HAS BEEN EXTENSIVELY TESTED IN 1G AND A MANUAL, FLIGHT QUALIFIED ITEM FOR MID DECK (OR SPACE STATION) USE IS IN STORAGE.**
- **A 1G PROTOTYPE OF AN AUTOMATED UNIT HAS BEEN BUILT, TESTED, AND IS IN STORAGE.**



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STATUS IVVCS OF WIPES AND FECES

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- **WORK TO BE DONE**
 - **BUILD AND FLIGHT TEST AUTOMATED UNIT, DTO**
 - **ADD URINE COLLECTOR AND INSTALL IN PLACE OF EXISTING UNIT**



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OPERATIONAL WASTE

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- **PROBLEM**

- **CURRENT CONSUMABLES ARE EXCESSIVELY WRAPPED AND THIS PLUS LACK OF COMPACTION AND LIMITED STORAGE RESULT IN INEFFICIENT HANDLING AND INTERFERENCE AND UNHYGENIC STORAGE.**

- **SOLUTION**

- **IMPROVED CONSUMABLE PACKAGING ESPECIALLY FOOD**
- **EFFICIENT COMPACTION - TEST SHOWS ~2/3 VOLUME REDUCTION OF TYPICAL (FLIGHT SAMPLE) WASTE WITH LOW PRESSURES**
- **WORK TO BE DONE - DESIGN, BUILD, AND FLIGHT TEST COMPACTER**