SECTION N - Storage Locker System
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FOREWORD
Concurrent access to hygience compartment throughout entire
carriage location which is readily accessible to space couches.

Physical access provided which ability to maintain visual contact
with flight deck personnel.

Physical orientation of space couches.
Reorientation of crew compartment component to improve
emergency hatch.

Provisions for adequate escape aisle (passageway) from couches to

in the mock-up for this configuration were as follows:
The design recommendations which were developed and incorporated
and full compartment model.

X-Axis docking crew compartment configurations were reviewed and

X-Axis docking crew compartment / X-Axis Docking

Shuttle orientation / Crew Component / X-Axis Docking

DESCRIPTION

TASK

SECTION
deck area with much more versatile hardware.
We illustrate that to accomplish this goal would require a larger flight

mean of separate leisure and sleep facilities in the area.
area we were requested to look into with the objective being the establish-
The isolation of the flight deck from the crew compartments was another

convenience during launch, reentry and zero-G flights.
and into space coach related activities.
With the knowledge that future space flights may include the elderly, it was

during the various flight modes.

in developing concepts aimed at solving the problems of space coach access
In the passenger compartment study, layout/usage was primarily interested

Shuttle Orbiter Passenger Compartment and Flight Deck Flexibility

DESCRIPTION

TASK

SECTION
might make voluntary use of a restraint device unrealistic.

for a lap belt were considered mandatory since abnormal pain from cramps
of bodily contact were necessary to achieve adequate restraint. Provisions
possibilities to be explored in Phase II. It was determined that these points
Figurization was recognized. Although an elbow restraint showed interesting

The design of various restraint systems was pursued after the figurine con-

less space was utilized and component replacement was simplified.

By placing the rectal/urinal collector and hand wash units on adjacent walls,

ranging in stature from a 95% male to 7% female.

the adjustments in the layout were required to accommodate cremlask
preliminary analysis of the MC component restraint configurations shown,
the relative merits of various restraint concepts under identical conditions.

It is important to first base line a hygienic component design to determine

To obtain useful data from a restraint study, low severity, high, considered

3

SECTION

TASK

DESCRIPTION

Restraint System for Hygiene Facility (Phase I)
The primary screen is in place. All are located within arm's length of the crewman and obtainable whilemental controls and emergency equipment are organized for quick retrieval. Immediate access items, such as personal gear, enviro-technology, climate control, and other tools designed to be used in the event of an emergency. The small passenger coach body support planes ride on top of the structural launch.

If adjusted from their seated position, to upright, for in-flight leisure and

than the larger coach.

maneuvers into the same orientation, and contains more storage space

limited to 7", 5/" X 37", X 14", D. It performs the same functions and
couch helped establish the design direction for the smaller one which was

Expediency and knowledge gained from the development of a large passenger

Small Passenger Coach
concepts as explained in the final report. Further, we achieved by incorporating specialized packaging and graphic design elements, the desired goal. Reductions in food retrieval and pre-mixing/processing of food resulted in reduced space and reduced the overall volume to less than the previous layout. The recommended single flat work facade be used rather than the U-shaped facade as in the MSC system. The modification of food retrieval processes, two-dimensional sketch and layout studies conducted a reduction in overall volume and simplification of the food retrieval process. The MSC requested that Raymond Loewy/William Snell, Inc. review the Order Food System and Catalogue.
and eases of access.

The clothing restorers were organized for maximum special efficiency.

In the development of the overall storage unit, emphasis was

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and disposable tissue interfaces between the belt structure and the user's skin.

Concepts presented included the use of non-porous, easily cleaned belts.

Physical access and minimum body contact were established and emphasized as placed on minimizing the surface parameters for an efficient seal belt to be used in the hygiene facility.

The system which was maximum simplicity was an adjustable restraint device which we felt defined the objective of variances in their elbow and shoulder which necessitated the design of a system was to accommodate a full range of body sizes. The dimensional study demonstrated that the concept was unrealistic if the 95% made crew personal when a seat belt restraint was not required, an elbow and shoulder restraint usable by 5% female through and including female belt restraint was developed in investigating as a result of the phase I study, interest was developed in investigating

DESCRIPTION

TASK

SECTION

13
recognizable

...used to their fullest extent because of present requirements placed on

...are relationship between compartments, special volumes have not been

...lowey/Smith does not feel that this solution adequately produces a work-

...obtained, it prevents effective use of the available space/center volume.

...on the effect of the actual location on the three dimensions. The model illustrated that a negative habitability factor

...Orbiter was constructed to analyze the impact of the skewed-axes in

...1/20 scale model of an MSF layout of the Z-axis docking Airlock Shuttle

...Skewed Z-axis Docking/Airlock Shuttle Orbiter

DESCRIPTION

TASK

SECTION
The concepts developed were to allow the restrained individual to walk parallel to a work bench utilizing various moveable or random access points selected, therefore, were the waist and both feet. Natural bending and lifting the reach of a restrained individual. The reach and that any rigid restraining device above the waist would inhibit stability. It was decided that a three point restraint was necessary for stability. Both areas are required to adequately produce a positive restraint. Although individual restrictions centered on either the foot or waist area, it was necessary to complete a particular task.

It was necessary for the task to concentrate fully on this particular task, thus allowing him to concentrate fully on this task. A limited amount of controlled movement was permitted in order to allow a crewman to develop work station restraint which will allow a crewman to develop work station restraint (Phase I).
Adjustment

14 - Foot Restraint with Foam Pad and Tension

12 - Horizontally Adjustable Restraint Arm Which

Fastener on Belt

13 - Mating Position Devices on Sole of Shoe and

11 - Flexible Restraint Arm Which Adjusts to Bullet
slope configuration of the crewman's shoe.

and reverse movement along a track. The ... base of the unit allows forward

bench.

Length adjustment allows the crewman to adjust his distance from the

The track allows the arms to slide the length of the bench while the arm

In use, the arms fold out of a recess and couple into the crewman's shelf.

sliding track with couplers located on adjustable fold-away arms. When

from the bench. The front surface of the bench also incorporates a

free lateral movement with slack adjustment to enable movement away

beltsystem was located on the front surface of the bench which allowed

was constructed incorporating all of the selected concepts. A closed loop

To better evaluate the effectiveness of each system, a presentation model

selected location.

reversing track and an adjustable toe bar restraint to restrain feet in a

including a waist belt which incorporates with fold-away arms, continuous

Phase I, I lowered/shifted the practicality of several concepts

Description

Task

Section
1. Demonstration Model of Belt with Tension Adjustment

2. Demonstration Model of Center of Belt Fastener

3. Adjustable Arms on Guide Rail with Bullets

4. Fitting Fastening Points and Two "D" Ring Fastening Points

5. Continuous Revolving Belt with Tension Adjustment
out screen which folds away when not in use.

house garrets and personal effects. Privacy is provided for by a roll
visions, which are accessible while on the space couch are included to
support for crew members during launch and reentry. Storage pro-
during leisure, sleeping, eating periods in zero-g and provide proper

The couch is designed to provide all immediate needs of the crewman
neutral buoyancy testing.

The purpose of this model was to demonstrate and evaluate the features

Shuttle Orbiter Passenger Couch - Full Scale Mock-Up

DESCRIPTION

TASK

SECTION
It is Loewy/Shaith’s feeling that all answers should be brief, but allow explanations to personalize the responses. To prevent crew impatience with the card, the models developed stressed simplicity of format organization.
sent to MSC.

A light visual scale model of the selected concept was fabricated and pre-

rector mock-ups.

The design of the unit was developed with the aid of full scale humans.

Thus if a container becomes punctured, their use priorities, and are entirely enclosed to prevent dispersion of cleaning agents and wipes have been aligned according to their use priorities. Storage units within the caddy may be carried as one or separately. The caddy and vacuum unit were designed as two interlocking units which

activities.

The housekeeping equipment stored in the galley facility consists of

DESCRIPTION

TASK

SECTION
Threaded fittings are arranged in a matrix in the structure.

The methods of retrieval are interchangeable. The tray sizes are dependent on the size of the storage locker being used, however, the components on the trays are restricted using various techniques. The unit to a location within the space.

Single tray or several as a unit, if necessary, to transport that particular

This gives a convenient option in order to remove an entire locker, as a unit or individually.

Inside the storage lockers is a system of trays (slid into „C” shaped ex-

not designed as a single component.

The rational basis for the development of such a system is that a flexible storage system will reduce requirements for custom transportation a variety of equipment, equipment and mission supplies.

Moreover, a locker system must be developed which will lend itself to interlocking. Mission storage requirements may vary from one mission to another;
contain, may be removed as desired. System from which individual trays in total groups and the items they required. The end result of this system is that a totally flexible storage between horizontal trays allows one to substitute the case horizontally as a time-saving, sliding various which trays into the locker vertically as incremental into any propositions desired relative to mission storage re-
and interlock with each other in the same manner. Use these inserts which interlock with the extruded inside walls. The interior of the master storage locker is then divided up as required.
Report

Summarize each study which are more thoroughly covered in the final.

Special Report Center, Houston, Texas. Selected illustrations and copy briefly all tasks completed during the 1972 contract period for Hanford.

As required by NASA Contract #NASA-9-I2479, this report summarizes...