

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NOTES:



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

VIII. Behavioral

Sensory

Vision

Depth Perception

Brightness Threshold

Visual Field

Critical Flicker Fusion

Phorias

Acuity

Dark Adaptation

Photo Stress

Color Perception

Auditory

Pitch Discrimination

Auditory Absolute Threshold

Auditory Temporal Acuity

Speech Intelligibility

Cutaneous

Pressure Thresholds

EMG

EOG

Agravic Perception

Ocular Counterrolling

Oculogyral Illusion

Angular Accel Threshold

Visual Task w/Head Rotation

Coriolis (Motion) Sickness Susceptibility

Psychomotor

Fine Motor Abilities - Steadiness

Complex Motor Abilities

Gross Body Coordination

Continuous Control - Tracking

Reaction Time (Simple & Complex)

NOTES:



X. Laboratory Analysis (Cont'd)

Blood (cont'd)

RBC Fragility

RBC Mass

Bleeding Time

Clotting Time

RBC Survival

RBC Morphology

Clot Retraction

 pO_2

Plasma

Sodium

Potassium

Chloride

Calcium

Proteins

Glucose

Phosphate

Plasma Volume

SGOT

SGPT

Alkaline Phosphatase

Bilirubin

NOTES:



NUMBER _____

TOP HORIZONTAL

TOP VERTICAL

X. Laboratory Analysis
(Cont'd)

Urine

Color
Volume
Specific Gravity
Glucose
Protein
Bile
pH
Blood
Microscopic
Calcium
Phosphate
Sodium
Potassium
Chloride
Acetone Bodies

Miscellaneous

Total Body Water

XI. Environment

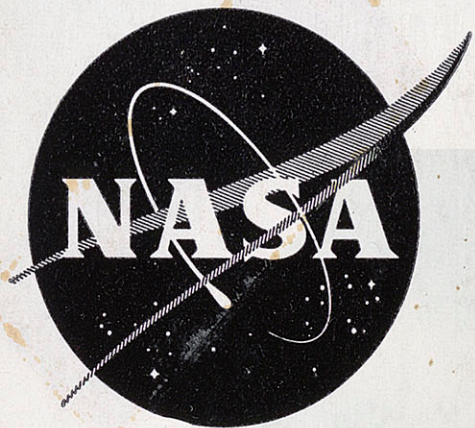
Pressure
Atmospheric Composition
Temperature, Humidity
Spacecraft Motion
Noise
Radiation

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION



NOTES:

Vertical lines for notes.



TOP HORIZONTAL

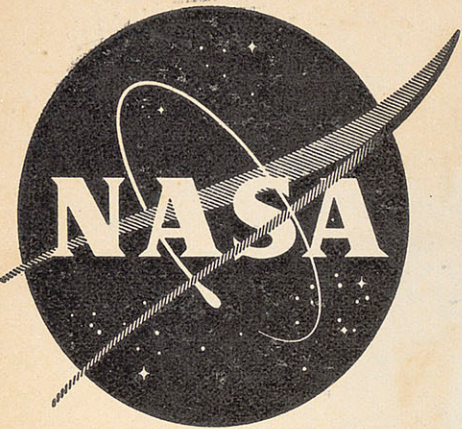
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NOTES:

AREAS OF INVESTIGATION

- NEUROPHYSIOLOGY
- CARDIOVASCULAR FUNCTION
- PULMONARY FUNCTION & ENERGY METABOLISM
- NUTRITION & MUSCULOSKELETAL FUNCTION
- ENDOCRINOLOGY
- HEMATOLOGY & IMMUNOLOGY
- MICROBIOLOGY
- BEHAVIORAL RESPONSE

TOP VERTICAL

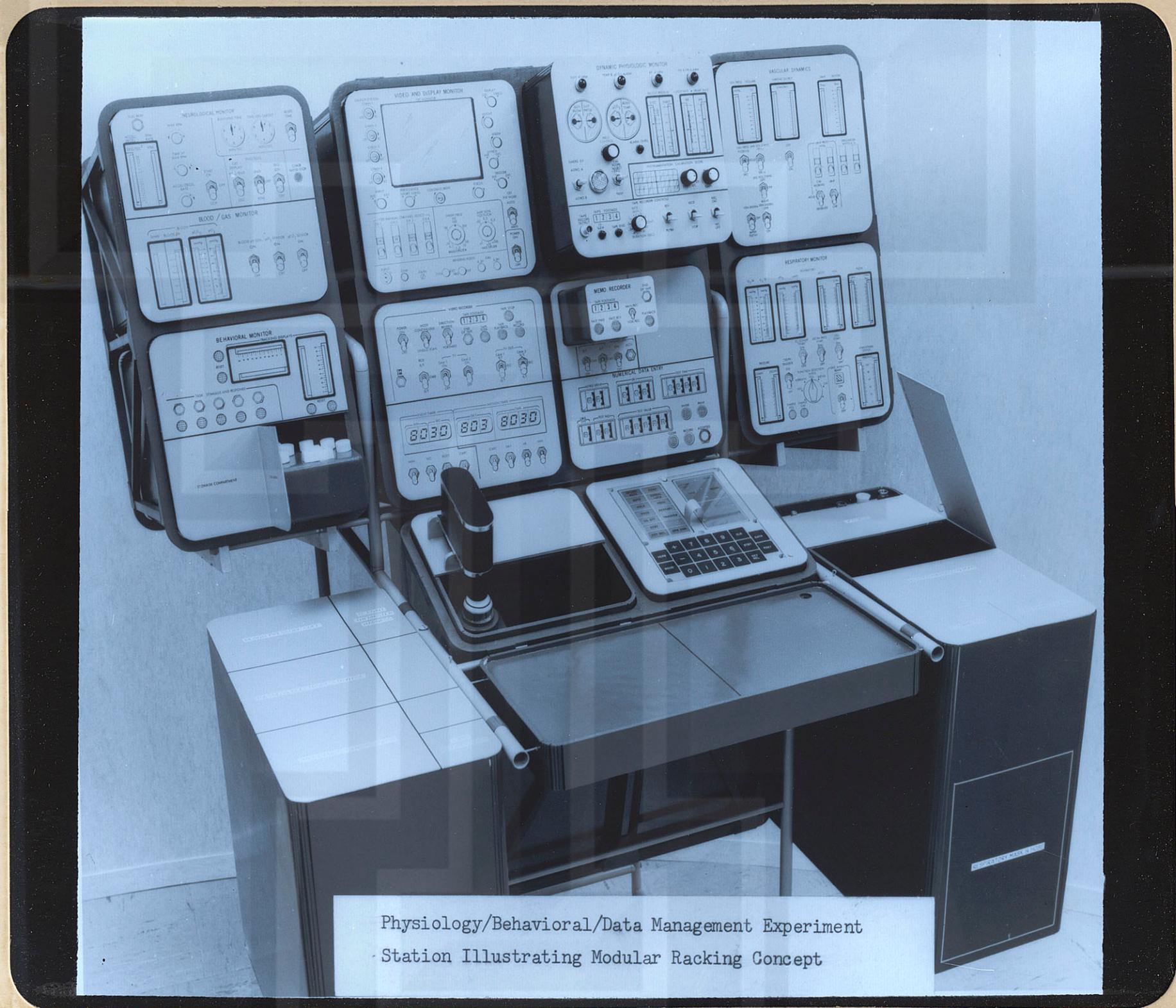


TOP HORIZONTAL

47A
23

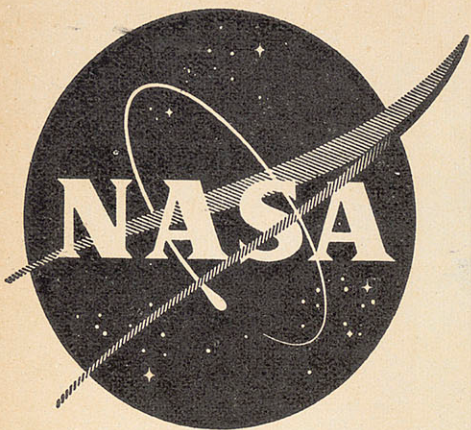
NUMBER 14

NOTES:



Physiology/Behavioral/Data Management Experiment
Station Illustrating Modular Racking Concept

TOP VERTICAL



TOP HORIZONTAL

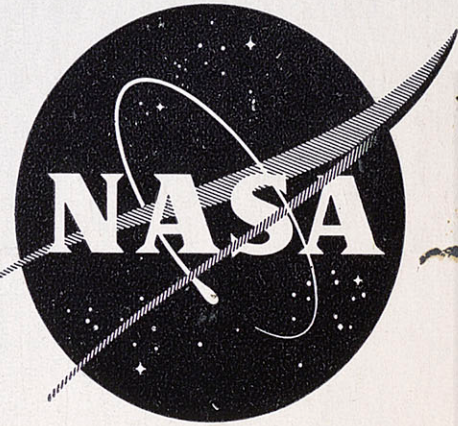
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24

NOTES:



TOP VERTICAL



TOP HORIZONTAL

NUMBER _____

NOTES:

PHASE A - EARLY DEFINITION

AUG. 1964 - NASA'S FOUR STUDIES COMPLETED

FEB. 1965 - TECHNICAL ADVISORY COMMITTEE (DR. SEAMAN'S STUDY)

OCT. 1965 - MOCK-UP AND TIME LINE STUDY (LMSC)

to

FEB. 1966

PHASE B - FINAL DEFINITION

MAR. 1966 - PHASE B1 WORK STATEMENT WRITTEN AND COORDINATED;

to

PROCUREMENT PLAN APPROVED; SEB ESTABLISHED; AND

DEC. 1966 - RFP RELEASED

FEB. 1967 - PROPOSALS RECEIVED AND EVALUATED; SELECTION

to

OF TWO COMPETING CONTRACTORS (GE AND LMSC)

APR. 1967 - BY MR. WEBB

JUN. 1967 - PHASE B1 CONTRACTS

to

OCT. 1967

DEC. 1967 - PHASE B2 CONTRACTS

to

FEB. 1968

DEC. 1968 - PHASE B3 CONTRACTS INITIATED

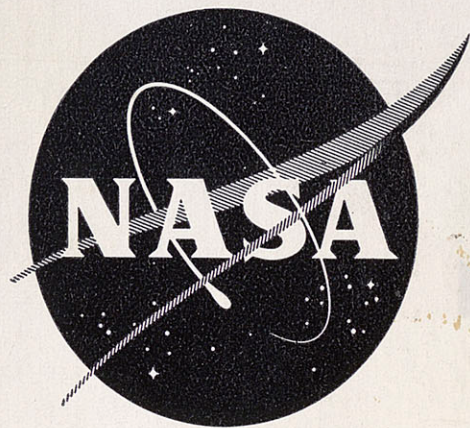
FEB. 1969 - TRANSFER OF CONTRACTS FROM HQS. TO

IMBLMS PROJECT OFFICE, MSC, MR&O

FEB. 1970 - PHASE B3 COMPLETED

TOP VERTICAL

CHANGE
FEB. 1971
DATE
CONTRACT
OTHER



TOP HORIZONTAL

NUMBER 4

NOTES:

IMBLMS - HIGHLY FLEXIBLE
& SOPHISTICATED

ONBOARD CAPABILITY

IMBLMS - Rack & Module

MEDICAL/BEHAVIORAL EXPERIMENTS PROGRAM
IMBLMS

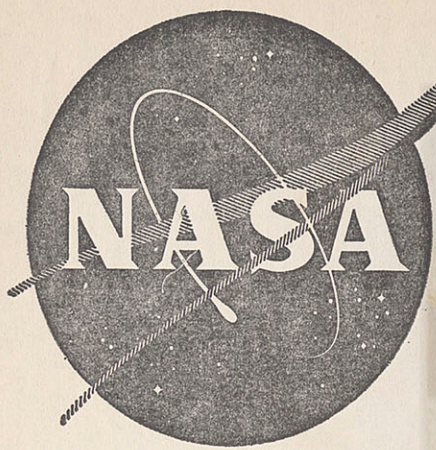
AIMS

1. PROVIDE INFIGHT MEASUREMENT CAPABILITY TO ACCOMMODATE ALL MEDICAL/BEHAVIORAL EXPERIMENTS
2. PROVIDE MAXIMUM FLEXIBILITY FOR:
 - a. ADAPTABILITY TO LATE CHANGES IN MISSION EXPERIMENT PLANS
 - b. EASE OF INFIGHT MAINTENANCE
 - c. EASE AND ECONOMY OF INCORPORATION OF UPDATED TECHNIQUES AND EQUIPMENT

IMBLMS FUNCTIONAL ELEMENTS

1. PHYSIOLOGICAL MEASUREMENT
2. BEHAVIORAL MEASUREMENT
3. BIOCHEMICAL
4. MICROBIOLOGICAL
5. DATA MANAGEMENT

TOP VERTICAL



23

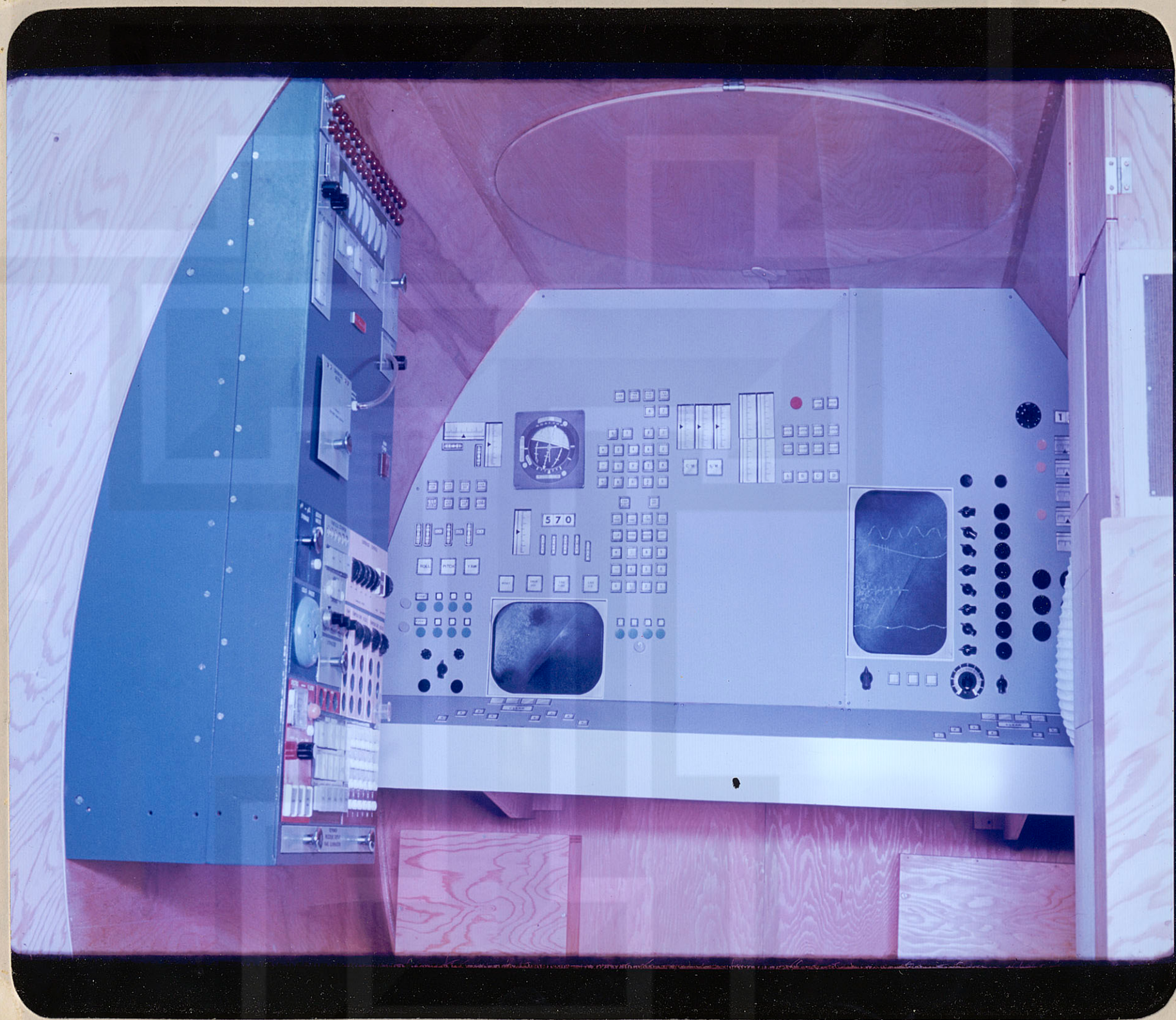
TOP HORIZONTAL

17
21

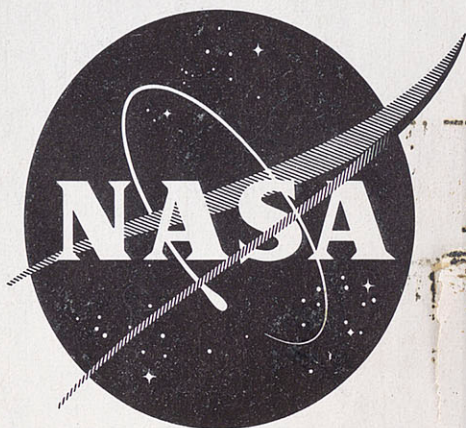
17
NUMBER mm6-5491

NOTES:

Lined area for notes.



TOP VERTICAL



TOP HORIZONTAL

NUMBER _____

NOTES:

AREAS OF BODY FUNCTION TO BE INVESTIGATED AAP MEDICAL-BEHAVIORAL EXPERIMENTS

1. NEUROLOGICAL
2. CARDIOVASCULAR
3. RESPIRATORY
4. METABOLIC & NUTRITIONAL
5. ENDOCRINE
6. HEMATOLOGICAL
7. MICROBIOLOGICAL & IMMUNOLOGICAL
8. BEHAVIORAL

Fig. 4

NASA MM66-6112
6-8-66

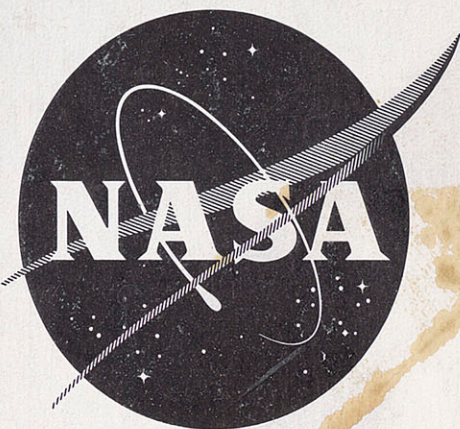
TOP VERTICAL



NUMBER

Fig. 10
NM 69-6274

NASA MM66-6111
6-8-66



TOP HORIZONTAL

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NOTES:

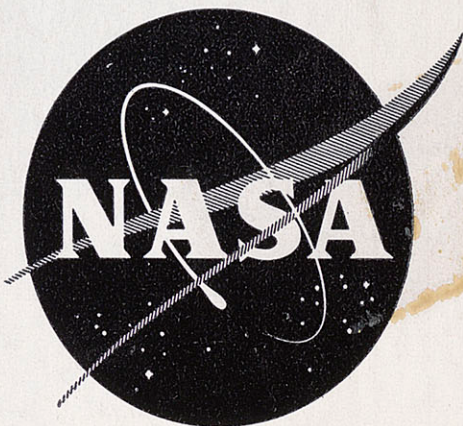
I. MEDICAL/BEHAVIORAL EXPERIMENTS

- A. DETERMINATION OF REQUIREMENTS AND MAINTAINING RELATIONSHIPS, SUPPORT, AND PARTICIPATION OF THE SCIENTIFIC COMMUNITY.
- B. REVIEW OF EXPERIMENT PROPOSALS FOR SCIENTIFIC MERIT.
- C. SUPPORT OF EXPERIMENTS IN DEFINITION.
- D. SELECTION, CONVERSION, AND SUPPORT OF EXPERIMENTS FOR DEVELOPMENT PHASE.
- E. SUPPORT AND GUIDANCE DURING OPERATIONAL DATA GATHERING, AND POST MISSION DATA REDUCTION AND REPORTING PHASES.
- F. APPLICATION OF DATA TO THE MEDICAL/BEHAVIORAL EXPERIMENTS PROGRAM, MANNED SPACE FLIGHT, AND THE CIVILIAN COMMUNITY AS INDICATED.

II. R&D SUPPORT OF MEDICAL/BEHAVIORAL EXPERIMENTS PROGRAM

- A. IMBIMS (INTEGRATED MEDICAL AND BEHAVIORAL LABORATORY MEASUREMENT SYSTEM).
- B. PARALLEL DEVELOPMENT EFFORTS TO ADVANCE STATES OF THE ART IN MEASUREMENT TECHNIQUES AND EQUIPMENT TO ENHANCE THE CAPABILITIES OF IMBIMS AND PROPOSED EXPERIMENTS.
- C. SIMULATIONS AND GROUND BASED DATA, I.E., THE SUPPORT OF GROUND BASED SIMULATION AND OTHER STUDIES IN ORDER TO OBTAIN A BODY OF PERTINENT DATA AS A NORMATIVE OR CONTROL BASE TO PERMIT THE EXTRACTION OF VALID CONCLUSIONS FROM FLIGHT DATA.

TOP VERTICAL



TOP HORIZONTAL

NUMBER _____

NOTES:

MEDICAL/BEHAVIORAL EXPERIMENTS PROGRAM
IMBLMS PROGRAM MILESTONES (CONT'D)

MAR. 1970 - INITIATE PHASE B4 CONTRACTS .

DEC. 1970 - PHASE B4 COMPLETE; SINGLE CONTRACTOR SELECTED

PHASE C - DESIGN

JAN. 1971 - INITIATE PHASE C

PHASE D - DEVELOPMENT

OCT. 1972 - PHASE C COMPLETE; OVERLAPPING INITIATION OF PHASE D

AUG. 1973 - S V WS11 MODULES FABRICATED AND FLIGHT QUALIFIED

JULY 1974
to - IMBLS FABRICATED AND FLIGHT QUALIFIED FOR SPACE STATION
JULY 1975

TOP VERTICAL



TOP HORIZONTAL

NUMBER _____

NOTES:

IMBLMS FUNDING

<u>FISCAL YEAR</u>	<u>FUNDING SOURCE</u>	<u>AMOUNT (M)</u>
1966 - 1968	949	.37
1969	945	2.35
1970	908	3.80 (2.6) *
1971	---	12.0
1972	---	29.6
1973	---	26.3
	TOTAL	<u>73.22</u>

* Actual Funding

NASA FORM 682 (MAY 62)

★ GPO : 1966 OF—208-861

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

TOP VERTICAL



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NUMBER

6

PROCUREMENT PLAN

ALL STUDIES CY 63 - 66

.37 *

B 1 CONCEPT DEFINITION

.10

B 2 REFINE MEASUREMENT AND TECHNIQUE REQUIREMENTS

. 20

B 3 FUNCTIONAL BREADBOARD (FBB)

2.35

B 4 FINAL PROJECT DEFINITION

2.6

PHASE C -- DESIGN

31.6

PHASE D -- DEVELOPMENT

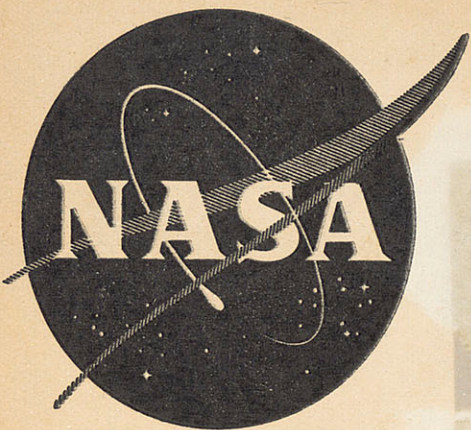
36.3

TOTAL

73.52

(* .3 M of this amount preceded IMBLMS procurement.)

TOP VERTICAL



NOTES:

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FY 70 IMBLMS BUDGET

. IMBLMS PHASE B4 CONTRACTS		
(LMSC)	1.2 M	
(GE)	1.2 M	
		2.4 M
. IMBLMS FBB TESTING AT MSC		
(BOEING)		.15
. IMBLMS FBB TESTING EQUIPMENT AT MSC		
		.05
. PARALLEL DEVELOPMENT		<u>0.0</u>
	TOTAL	2.6 M

TOP VERTICAL

NUMBER

TOP VERTICAL

15

TOP HORIZONTAL

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PHYSIOLOGY SUPPORT EQUIPMENT STORAGE

PHYSIOLOGY SUPPORT EQUIPMENT STORAGE

PHYSIOLOGY SUPPORT EQUIPMENT STORAGE

DYNAMIC PHYSIOLOGIC MONITOR

VIDEO AND DISPLAY MONITOR

BEHAVIORAL MONITOR A

VASCULAR DYNAMICS

DATA MANAGEMENT CONTROL

NUMERICAL DATA ENTRY AND PRINTER

RESPIRATORY GAS/BLOOD MONITOR

PROCESSOR

REVS MONITOR



NOTES:

NASA FORM 682 (MAY 62)

* GPO : 1966 OF-208-661