SOUTHWEST RESEARCH INSTITUTE ASSISTANCE TO NASA IN BIOMEDICAL AREAS OF THE TECHNOLOGY UTILIZATION PROGRAM

MONTHLY REPORT

Contract No. NASW-1867
SwRI Project No. 13-2538

Chief, Dissemination Branch, Code (UT)
Technology Utilization Division
Office of Technology Utilization
NASA
Washington, D. C. 20546

December 1972

SOUTHWEST RESEARCH INSTITUTE ASSISTANCE TO NASA IN BIOMEDICAL AREAS OF THE TECHNOLOGY UTILIZATION PROGRAM

MONTHLY REPORT

1 December 1972 - 31 December 1972

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SwRI Project No. 13-2538

Prepared for

Chief, Dissemination Branch, Code (UT)
Technology Utilization Division
Office of Technology Utilization
NASA
Washington, D.C. 20546

Approved:

C. William Hall, M.D.
Director
Department of Bioengineering

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

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SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

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SPECIAL ACTIVITIES REPORT

RECORD OF INVENTION

Docket No.

Date Rec'd

1. **Title:** Proximity Sensor for NASA developed Patient Assist Control Unit

2. **Object:** To provide a low profile, reliable switching control to replace some of the less desirable mechanical switching configurations.

3. **Date first constructed or formulated (if applicable):**

   1 December 1972

4. **Other references of record (if any):** Techanical Support Package HSR-7 Patient assist control device - R. L. Wilbur 12 October 1972

5. **I - We, the undersigned, certify that I - We first conceived the within invention on** 31 August 1972 **and that it is fully described in the attached disclosure on pages numbered consecutively 1 thru** 2

   Signature in full Robert Leighton Wilbur **Date** 13 December 72

   Signature in full _____ **Date** _____

   Signature in full _____ **Date** _____

6. **We, the undersigned, certify that the invention described in the attached disclosure was explained to us on** 13 December 1972 **and that we understand the same.**

   Signature in full [illegible] **Date** 13 December 1972

   Signature in full [illegible] **Date** 13 December 1972

For Department Director Only

7. **The within invention was - ~~not~~ conceived as the result of work on a sponsored research project. Project No.** 13-2538 **Contract No.** NASW-1867
   Sponsor Technology Utilization Division, NASA, Washington, D.C.

8. **Summary recommendation to Patent Advisory Committee:**
   Reference to NASA Form 1162 (June 1966), the investion becomes the property of the U.S. Government. This disclosure is for information and documentation purposes.

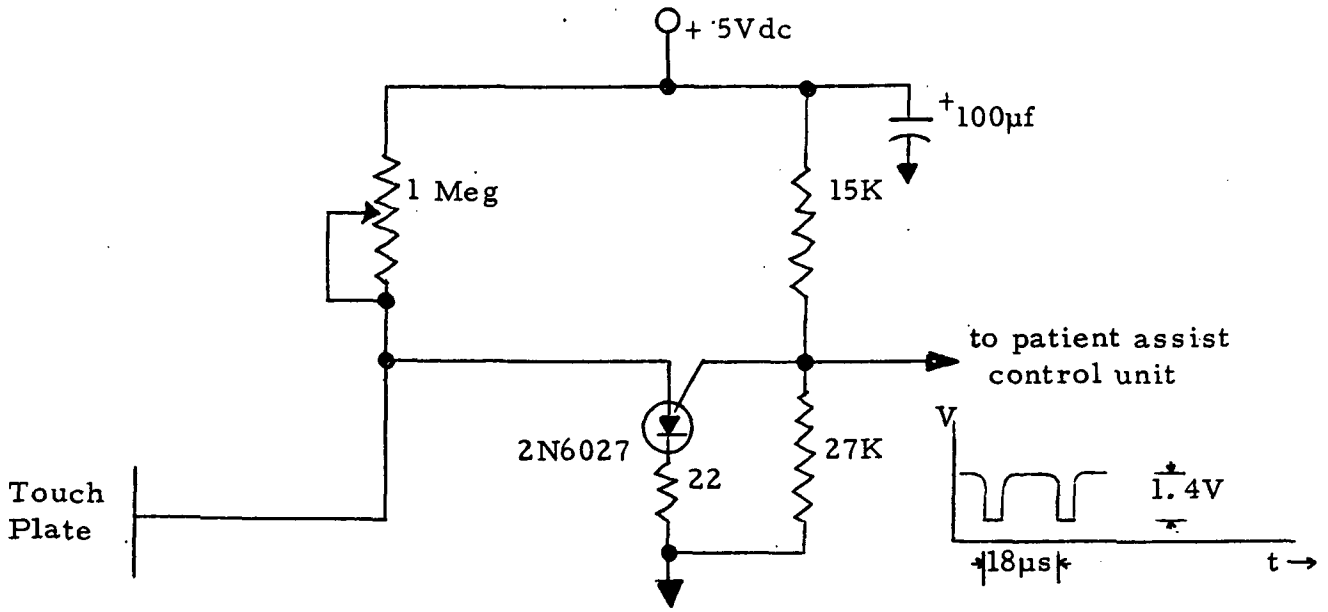
[signature] **Date** Dec. 12, 1972
Department Director

(See Instructions on Reverse)

Form OP - 2
Rev. 7/66

INVENTION DISCLOSURE DESCRIPTION

Page No. 2 of 2



Body capacitance to ground triggers the relaxation oscillator.

A programmable unijunction transistor is utilized as shown above which provides the necessary input to the existing one shot multivibrator in the unit. This is a low voltage device and patient need not be grounded for proper operation or safety.

INVENTORS: -

Robert Leighton Wilbur — 13 Dec 72
Signature — Date

Signature — Date

Signature — Date

WITNESSES: -

[signature] — 13 December 1972
Signature — Date

[signature] — 13 December 1972
Signature — Date

Form OP-2A
Rev. 7/66

STATE OF LOUISIANA
DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL REHABILITATION
CATHOLIC DEAF CENTER
2824 DAUPHINE STREET
NEW ORLEANS, LOUISIANA 70117

December 5, 1972

Miss Jean Carter
Assistant, Biomedical Applications Team
NASA Biomedical Applications Program
Southwest Research Institute
8500 Culebra Road
Post Office Drawer 28510
San Antonio, Texas 78284

Dear Miss Carter:

I have received the amplifier which was developed by your biomedical applications team.

I have not yet had the opportunity to formally test this amplifier in a speaking situation, but in talking to a person standing 40 feet away in a large room it worked very well. I am highly optimistic that this instrument will prove to be just what I need.

I will report to you again at a later date after I have had the opportunity to use the instrument in need situations.

I thank you, Dr. Culclasure, and the biomedical applications team for your continued efforts in my behalf.

Sincerely,

David W. Myers, Counselor
Services for the Deaf

DWM/dd

Ref: TCD-9 (special desk-top unit) Portable Amplifier System for Patient with Partially Inactivated Vocal Chords

THE UNIVERSITY OF TEXAS MEDICAL SCHOOL AT SAN ANTONIO
7703 Floyd Curl Drive • San Antonio, Texas • 78229

Department of
Obstetrics-Gynecology

DEC 12 1972

December 11, 1972

Mr. Robert L. Wilbur
Biomedical Research Engineer
NASA Biomedical Applications Program
Southwest Research Institute
Post Office Drawer 28510
San Antonio, Texas 78284

Dear Mr. Wilbur:

I am sorry that I did not answer more promptly, but I just found out that the cassette recorder was in our department for evaluation. As soon as the testing is completed, I'll let you know how it worked out.

Thanks so much for sending the technical support package as well as the recorder.

Sincerely,

Marvin L. Chatkoff, Ph.D.
Assistant Professor

MLC/ew

Ref: SNM-26 "Monitoring of Pelvic Pressure of Women During Labor

SPECIAL ACTIVITIES SECTION.....December, 1972

Informal Report To: Dr. David F. Culclasure, Ph.D.
Southwest Research Institute

From: Col. Frank O. DeSautels, USA, Ret.

Subject: NASA Exhibit at ASSOCIATION OF MILITARY SURGEONS, 10-13 December, 1972, Convention Center, San Antonio, Texas

Approximately 4,000 Registered Delegates

Exhibit well received by delegates. Most were surprised at amount of material available to general public and amount of NASA research already applied to various areas of medicine.

Most took copy of "NASA Contributions in the Field of Rehabilitation" to digest information and comtemplate areas in which they could use source information in their respective areas.

By comparison, Surgeons over Internists, exhibited keener interest in potential application of resources.

Army Surgeon General, Hal B. Jennings, M.D., took several booklets and directed his aide, Major Thomas Jackson, MSC, to return to the exhibit and seek more information from the undersigned on the program. Believe this contact will be fruitful insofar as directing efforts of Medical Research and Development towards NASA information sources.

Brigadier General Manley Morrison, MSC Chief of Medical Service Corps also spent considerable time in discussing potential applications to paramedical areas. He promised to direct the attentions of personnel in Research and Development OTSG on the "golden opportunity" of all this untapped material for the Army Medical Services.

Other notables who viewed exhibit:

Admiral George Davis, M.D., USN
Vice Admiral Victor Hernandez, M.D., USN, Ret.
Major General James McGiboney, M.D., Ret., Director, Medical Services and Hospitals, Jacksonville, Florida
Professor of Surgery, W. Clayton Davis, M.D., FACS, University of Omaha
Brigadier General Marshall McCabe, M.D., Chief, Prof. Soc., OTSG.

On 13 December, last afternoon of exhibit, many of the other exhibitors visited the NASA booth. Most took booklet and expressed amazement as to the contributions already made to medicine.

SPECIAL ACTIVITIES SECTION...December, 1972

In discussion with Dr. Zimmerman, M.D., USAF, Consultant to USAF Surgeon General on Psychiatry, that two weeks previous, Smithsonian Institute had contacted him to seek information on availability of information on contributions made by NASA to medicine. Smithsonian was interested in making an exhibit on subject. Information has been forwarded.

Lt. Colonel Howard Gutin, MSC and his Chief of TV Production, Brooke Army Medical Center, San Antonio, stated that they had received similar call for NASA exhibit potential from Institute of Texan Culture Museum, HemisFair pavillion, San Antonio, Texas.

Although convention considered small by many exhibitors in comparison to that held in Washington earlier, I think exhibit did achieve its purpose.

F. O. DeSautels

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

I. PROBLEMS

A. NEW PROBLEMS ACCEPTED

The following is a list of new Biomedical Problems accepted during the period covered by this report:

Problem Number	Problem Title	Health Area	Probable Solution Requirements
CRH-1	Differentially Inflated Segmented Seat Cushion	03	F
CRH-2	Low-Friction Porus Material for Orthopedic Collar	03	E
CRH-3	Means to Minimize Venous Pooling	03	F
CRH-4	Portable, Compact Breathing Machine	05	B
CRH-5	Improved Clamp for Urine Collection Device	03	D
CRH-6	Urine Collection Device for Incontinence in Female	05	D
GLM-51	Pressure Telemetry Alarm for Hydrocephalics	14	B
MSC- 1	Portable Scalp Cooling Device	08	B
SLU- 1	Elimination of Motion Artifact from EEG Leads in Pedestal Equipped Animals	18	G

Health Area Impact

01 - Communicable Disease
02 - Multiphasic Health Screening
03 - Rehabilitation Medicine
04 - Artificial Organs
05 - Organ Assist Devices
06 - Mental Health
07 - Heart Disease Treatment
08 - Cancer
09 - Ecology
10 - Health Care Cost Reduction
11 - Remote Health Services
12 - Medical Personnel
13 - Kidney Disease
14 - Infant Mortality
15 - Respiratory Disease
16 - Surgical Procedures
17 - Dental Medicine
18 - Basic Medical Research
19 - Other

Requirement Code

A - Analytic Instrument Systems
B - System Components
C - Computer Programs
D - Prosthetic Devices
E - Materials/Chemicals
F - Therapeutic Equipment
G - Other

HEALTH AREA IMPACT CATEGORIES	Analytic Inst. Systems	System Components (Equipt.)	Computer Programs	Prosthetic Devices	Materials/Chemicals	Therapeutic Equipment	Other	TOTAL
Communicable Disease								
Multiphasic Health Screening								
Rehabilitation Medicine				1	1	2		4
Artificial Organs								
Organ Assist Devices		1		1				2
Mental Health								
Heart Disease Treatment								
Cancer		1						1
Ecology								
Health Care Cost Reduction								
Remote Health Services								
Medical Personnel								
Kidney Disease								
Infant Mortality		1						1
Respiratory Disease								
Surgical Procedures								
Dental Medicine								
Basic Medical Research							1	1
Other								
TOTAL								9

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

I. PROBLEMS
IMPACT AREA/REQUIREMENT MATRIX

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

I. PROBLEMS
B. PROBLEMS REJECTED

Listed below are the Biomedical Problems which were rejected during the period covered by this report. Brief descriptions of each Problem and specific reason(s) for rejection are on the following pages:

Problem Number	Problem Title	Rejection Code

None during this report period.

Rejection Code:
A-Apparent solution commercially available.
B-Apparent solution not expected in present or foreseeable NASA technology.
C-Problem not biomedically oriented.
D-Problem not amenable to problem-solving oriented goals.
E-Problem too broadly stated; not sufficiently defined.
F-Problem "Priority" too low.
G-Other

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

I. PROBLEMS
C. PROBLEMS INACTIVATED

The following is a list of Biomedical Problems inactivated during the period covered by this report:

Problem No.	Prof. Effort	Time Elapsed Since Accepted	Inactivation Code
CPT-1	37.5 Hours	3 Months	C
FTZ-2	51.5 Hours	25 Months	B
GLM-46	20.5 Hours	5 Months	F
GLM-47	21.0 Hours	5 Months	F
GLM-48	20.0 Hours	5 Months	F
GLM-49	19.5 Hours	5 Months	C
HSR-1	218.0 Hours	32 Months	C
HSR-2	63.5 Hours	23 Months	C
RNV-32	28.0 Hours	33 Months	D
ROS-1	35.0 Hours	25 Months	F
RRC-9	57.0 Hours	18 Months	E
TVA-2	127.0 Hours	9 Months	A
UFM-7	28.5 Hours	32 Months	B
UTM-1	125.0 Hours	34 Months	B
UTM-27	59.0 Hours	25 Months	E
UTM-30	49.5 Hours	21 Months	B
UTM-33	28.5 Hours	21 Months	F
UTM-34	59.0 Hours	21 Months	F
WLH-3	27.5 Hours	13 Months	F
WLH-4	39.0 Hours	13 Months	E

Inactivation Code:
A - Technology Application Accomplished
B - Investigator Has No Further Interest
C - Investigator Has Found His Own Solution
D - Investigator Has Left Institution
E - No Applicable NASA Technology Was Found
F - Other

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

I. PROBLEMS
D. PROBLEMS REACTIVATED

The following is a list of Biomedical Problems reactivated during the period covered by this report:

Problem No.	Reason(s) for Reactivation
RNV-39	New NASA technology documentation now available that may be applicable.
TCM-3	Additional NASA technology documentation now available that would implement progress.

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

II. PROBLEM STATEMENTS

A. PRELIMINARY PROBLEM STATEMENTS PREPARED

Listed below are the Preliminary Problem Statements which were prepared during the period covered by this report. The following pages present copies of these statements.

Problem No.	Problem Title
CRH-1	Differentially Inflated Segmented Seat Cushion
CRH-2	Low-Friction Porus Material for Orthopedic Collar
CRH-3	Means to Minimize Venous Pooling
CRH-4	Portable, Compact Breathing Machine
CRH-5	Improved Clamp for Urine Collection Device
CRH-6	Urine Collection Device for Incontinence in Female
GLM-51	Pressure Telemetry Alarm for Hydrocephalics
MSC-1	Portable Scalp Cooling Device
SLU-1	Elimination of Motion Artifact from EEG Leads in Pedestal Equipped Animals

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

PRELIMINARY PROBLEM STATEMENT

IDENTIFICATION

Problem No: CRH-1 Date of Preparation: 5 Dec., 1972
Problem Title: Differentially Inflated Segmented Seat Cushion
Date of Acceptance: 5 Dec. 1972
Institution: Craig Rehabilitation Hospital, Denver, Colorado
Department:
Investigator:
Consultant/Coordinator (if any):
BATeam Personnel: Sam McFarland

WHAT IS NEEDED: A seat cushion, divided into inflatable cells, capable of air bleed between cells to "move" a support segment around for shifting seating position of a quadriplegic.

MEDICAL SPECIALTY: 03 REQUIREMENT: F

BACKGROUND: For the sake of circulation and prevention of tissue damage to sitting areas of the buttocks, a wheelchair patient must occasionally shift his position and weight around in the chair. For quadriplegic patients, this movement is a high-energy expense maneuver, sometimes even impossible.

CONSTRAINTS AND SPECIFICATIONS: If, by a control console, or automatically, a patient could be shifted by the segmented cushion, a great savings in energy and attendance could be realized.

OTHER COMMENTS: Search terms: Inflatable cushion, air cells, automatic air valves.

PROBLEM STATUS: A search of NASA aerospace technology has been initiated.

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

PRELIMINARY PROBLEM STATEMENT

IDENTIFICATION

Problem No: CRH-2 Date of Preparation: 5 Dec. 1972
Problem Title: Low-Friction Porus Material for Orthopedic Collar Date of Acceptance: 5 Dec. 1972
Institution: Craig Rehabilitation Hospital, Denver Colorado
Department:
Investigator: Judy Priestly
Consultant/Coordinator (if any):
BATeam Personnel: Sam McFarland

WHAT IS NEEDED: A low-friction surface, porus (for ventilation), lining material for skin contact on orthopedic collar.

MEDICAL SPECIALTY: 03 REQUIREMENT: E

BACKGROUND: Orthopedic collars are used to support neck regions in cases of spinal injury and for paralysis. Materials presently used for the skin contact lining are abrasive and irritating, and also tend to be hot due to insulating effect.

CONSTRAINTS AND SPECIFICATIONS: Must have low skin contact toxicity, should be easy to attach to leather and/or metal collar. Would be helpful if it were washable.

OTHER COMMENTS:

PROBLEM STATUS: A search of NASA aerospace technology has been initiated.

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

PRELIMINARY PROBLEM STATEMENT

IDENTIFICATION

Problem No: CRH-3 Date of Preparation: 5 Dec. 1972
Problem Title: Means to Minimize Venous Pooling
Date of Acceptance:
Institution: Craig Rehabilitation Hospital, Denver, Colorado
Department:
Investigator: Mrs. Margaret Kersenbrock
Consultant/Coordinator (if any):
BATeam Personnel: Sam McFarland

WHAT IS NEEDED: An artificial means of replacing muscle tone to prevent pooling of venous blood flow in areas of muscle paralysis, particularly in trunk region.

MEDICAL SPECIALTY: 03 REQUIREMENT: F

BACKGROUND: Quadriplegic patients have lost muscle control in the body trunk, thus incapacitating muscular functions such as movement, breathing, bladder and rectal control, etc. A common problem in these cases also is flacid muscular tissue. Venous movement in many cases is enhanced by skeletal muscular movement, thus "squeezing" the blood flow along. Without this help and backpressure, the heart decreases its capacity and general circulatory health declines.

CONSTRAINTS AND SPECIFICATIONS: Presently, corsets are used to support the trunk and provide venous pressure. The corset, however, causes other problems, such as pressure spots and skin irritation.

OTHER COMMENTS: Search terms: venous pressure assist, pressure suits, muscle tone.

PROBLEM STATUS: A search of NASA aerospace technology has been initiated.

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

PRELIMINARY PROBLEM STATEMENT

IDENTIFICATION

Problem No: CRH-4 Date of Preparation: 5 Dec. 1972
Problem Title: Portable, Compact Breathing Machine
Date of Acceptance: 5 Dec. 1972
Institution: Craig Rehabilitation Hospital, Denver, Colorado
Department:
Investigator: Mrs. Margaret Kersenbrock, Director of Nursing
Consultant/Coordinator (if any):
BATeam Personnel: Sam McFarland

WHAT IS NEEDED: Light-weight, small size, portable device to perform breathing function for paraplegic who has lost use of the diaphragm.

MEDICAL SPECIALTY: 05 REQUIREMENT: B

BACKGROUND: Paraplegics who have suffered paralysis of the diaphragm cannot inhale and exhale by themselves. Breathing machines are now built which inflate the lungs through a tube placed into a surgical opening in the trachea below the larynx (tracheostomy). Existing units are bulky and must be adapted to wheel chair mobility through complex mounting brackets.

CONSTRAINTS AND SPECIFICATIONS:

1. 12 volt DC or 110 AC power
2. Long Life
3. High Reliability
4. Variable Rate

OTHER COMMENTS: The problem originator wonders if portable life-support systems from the Apollo program might be adapted to this function.

PROBLEM STATUS: A NASA search of aerospace technology has been initiated. Problem will also be disseminated to NASA Centers for input.

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

PRELIMINARY PROBLEM STATEMENT

IDENTIFICATION

Problem No: CRH-5 Date of Preparation: 5 Dec. 1972
Problem Title: Improved Clamp for Urine Collection Device
Date of Acceptance: 5 Dec. 1972
Institution: Craig Rehabilitation Hospital, Denver, Colorado
Department:
Investigator: Nena Robbins, Occupational Therapist
Consultant/Coordinator (if any):
BATeam Personnel: Sam McFarland

WHAT IS NEEDED: Positive closing, easy opening, miniaturized tubing occussive clamp to be used inline before the urine collection bag during emptying of the bag.

MEDICAL SPECIALTY: 03 REQUIREMENT: D

BACKGROUND: Paraplegics suffering incontinence wear a urine collection bag strapped to the inside of the leg, usually below the knee. Existing clamp devices are bulky and abrasive and tend to leak during emptying of the bag.

CONSTRAINTS AND SPECIFICATIONS: Since the device is commonly worn under trouser legs, it should be near flat for minimal bulge and non-abrasive for tissue comfort.

OTHER COMMENTS: Search terms: Tubing clamp, plastic tubing valves, tubing pincher

PROBLEM STATUS: A search of NASA aerospace technology has been initiated.

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

PRELIMINARY PROBLEM STATEMENT

IDENTIFICATION

Problem No: CRH-6 Date of Preparation: 5 Dec. 1972
Problem Title: Urine Collection Device for Incontinence in Female Paraplegic Date of Acceptance: 5 Dec. 1972
Institution: Craig Rehabilitation Hospital, Denver, Colorado
Department:
Investigator: Mrs. Nancy Thistle, R, N.
Consultant/Coordinator (if any):
BATeam Personnel: Sam McFarland

WHAT IS NEEDED: Information on techniques for urine collection used by Russian female cosmonaut.

MEDICAL SPECIALTY: 05 REQUIREMENT: D

BACKGROUND: Incontinence (inability to voluntarily control urination) is a common problem among patients with brain or spinal cord damage. At present, a catheter is used to drain the bladder directly to a bag attached to the leg. Catheter or any mode of long-term attachment to the urethral region presents complications in leakage, discomfort, and tissue irritation.

CONSTRAINTS AND SPECIFICATIONS: The practitioner seeks unique or innovative means of attachment of the urethral catheter and assumes the problem has been attacked by Russian and U.S. Life Support Teams

OTHER COMMENTS: Search terms: Urine collection, urinary catheters, female astronauts.

PROBLEM STATUS: A search of NASA aerospace technology has been initiated.

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

PRELIMINARY PROBLEM STATEMENT

IDENTIFICATION

Problem No: GLM-51 **Date of Preparation:** Dec. 1, 1972
Problem Title: Pressure Telemetry Alarm for Hydrocephalics
Date of Acceptance: Dec. 1, 1972
Institution: University of Texas Medical Branch at Galveston
Department: Physiology
Investigator: Pat McGraw, Ph. D.
Consultant/Coordinator (if any):
BATeam Personnel: R. L. Wilbur

WHAT IS NEEDED: A telemetry system that would become energized when pressure in the brain rises to a danger point indicating a clotting of the implanted shunt.

MEDICAL SPECIALTY: 14 **REQUIREMENT:** B

BACKGROUND: Infants with hydrocephalus lack the ability to shunt cerebrospinal fluid back into the vascular system. Fluid accumulates as a result and severe pressures cause brain damage. The present "state-of-the-art" involves inserting a shunt to drain this fluid. Many reasons cause these shunts to fail by clotting. If the child is an outpatient, this pressure may rise to disastrous levels before proper treatment can be undertaken.

CONSTRAINTS AND SPECIFICATIONS: Since shunts must be replaced from three to six months on the average, a telemetry system including batteries that have six month shelf life are sufficient. Range is not critical, but biocompatibility and size are critical factors.

OTHER COMMENTS: A NASA aerospace technology search has been initiated.

PROBLEM STATUS:

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

PRELIMINARY PROBLEM STATEMENT

IDENTIFICATION

Problem No: MSC-1 **Date of Preparation:** 26 Dec 1972
Problem Title: Portable Scalp Cooling Device
Date of Acceptance: TBA
Institution: Louisiana State Univ. Medical Center, New Orleans, La.
Department: Gynecologic Oncology Chemotherapy
Investigator: Dr. Jose E. Torres, M.D.
Consultant/Coordinator (if any): Dr. Sam Pool, M.D., MSC, Houston
BATeam Personnel: Sam McFarland & Charles Laenger at SwRI and John Sigmon at MSC, Houston

WHAT IS NEEDED: A light weight, portable device to cool the scalp of the patient during chemotherapy.

MEDICAL SPECIALTY: 08 **REQUIREMENT:** B

BACKGROUND: Patients with neuroblastomas are currently being treated with cytotoxic drugs as a means of controlling the cancer. An undesirable side effect of the chemotherapy is the temporary but total loss of hair. Current medical theory proposes that a lowering of the metabolic activity in the scalp area will preclude the hair loss. This theory has proven currect with crude apparatus. A more efficient, clean, and comfortable scalp cooling unit must be developed.

CONSTRAINTS AND SPECIFICATIONS:

1. Use of freon as a water coolant
2. Accurate temperature control
3. Easy portability

OTHER COMMENTS: The astronaut liquid cooling garment may possibly be used as the basis of the cooling cap. The problem originator would like to eventually use the technology developed with the scalp cooling unit to develop liquie cooled vests and girdles to protect the bone marrow during chemotherapy.

PROBLEM STATUS:
Current astronaut liquid cooling systems are now being studied.

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

PRELIMINARY PROBLEM STATEMENT

IDENTIFICATION

Problem No: SLU-1 Date of Preparation: Dec. 1, 1972
Problem Title: Elimination of Motion Artifact from EEG Leads in Pedestal Equipped Animals. Date of Acceptance: Dec. 1, 1972
Institution: VA Hospital, Salt Lake City, Utah
Department: Neuropsychological Research
Investigator: Dr. Edward C. Beck, Director
Consultant/Coordinator (if any):
BATeam Personnel: Sam McFarland

WHAT IS NEEDED: A material or technique to help eliminate motion artifact from EEG leads from animal brain pedestal to electronic processing equipment (distances up to 8 feet).

MEDICAL SPECIALTY: 18 REQUIREMENT: G

BACKGROUND: The researcher has tried numerous brands of coaxial shielded leads to help eliminate electrical noise associated with cable motion. Pedestal equipped animals are connected through 8' to 10' cable leads to electronic monitoring equipment. Researcher is involved with evaluating neuropsychological effects of halucinogenic drugs.

CONSTRAINTS AND SPECIFICATIONS:

OTHER COMMENTS: Search terms: Electronic noises, coaxial cables, signal strengthening, motion artifact.

PROBLEM STATUS: A NASA computer search of aerospace technology has been initiated. Problem will also be reviewed by SwRI electronics engineers familiar with this type of equipment, primarily through Mr. Bob Wilbur of the biomedical applications team.

II. PROBLEM STATEMENTS

B. PROBLEM STATEMENT DRAFTS SUBMITTED FOR REVIEW

Listed below are the Problem Statement drafts for the Biomedical Problems which were submitted for review during the period covered by this report. Copies of these Problem Statements are found on the following pages.

Problem No.	Problem Title

None during this report period.

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

II. PROBLEM STATEMENTS
C. PROBLEM STATEMENTS DISSEMINATED

Listed below are Problem Statements for the Biomedical Problems which were disseminated during the period covered by this report. Copies of these Problem Statements if different from those previously submitted for review, are presented on the following pages.

Problem No.	Distribution	Date Sent

None during this report period.

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

II. PROBLEM STATEMENTS

D. RESPONSES TO PROBLEM STATEMENTS RECEIVED

On the following pages are copies of responses to Problem Statements for the Biomedical Problems listed below which were received during the period covered by this report.

Problem Number	Distribution Date	Date of Receipt	Field Center	Initial Team Evaluation of Applicability/Utility of Response
LVA-8	2 Oct 1972	27 Dec 1972	Lewis	Documentation on suggested materials will be gathered and forwarded to Problem Originator for evaluation.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LEWIS RESEARCH CENTER
CLEVELAND, OHIO 44135

REPLY TO
ATTN OF: 1012

December 22, 1972

Dr. David F. Culclasure, Manager
Biomedical Applications Program
Southwest Research Institute
8500 Culebra Road
San Antonio, TX 78284

Dear Dave:

This is in response to your transmitted request by Dr. David Milne, Veterans Administration Hospital, Long Beach, California, for assistance in identifying a material suitable for fabricating mixing bowls for use in a trace element research problem. Our materials experts suggest the following materials be investigated:

Teflon linings
High density polyethylene
Glassy carbon
Pyrolytic graphite
Boron nitride

We hope that these suggestions will be useful.

Sincerely,

DEC 27 1972

Paul Foster
Technology Utilization Officer

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

III. SEARCHES

A. RDC COMPUTER SEARCHES INITIATED

On the following pages are copies of RDC Computer Search forms for the Biomedical Problems listed below, for which searches were initiated during the period covered by this report.

PROBLEM No.	RDC SEARCH No.
CRH-1	RECON
CRH-3	RECON
CRH-5	RECON
CRH-6	RECON
MDA-1	RECON
MSC-1	RECON
SLU-1	RECON
UTM-39	RECON

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM
COMPUTER SEARCH REPORT

IDENTIFICATION

Problem No. and Title: CRH-1 "Differentially Inflated Segmented Seat Cushion"
RDC: RECON Search Title: See terms
Search No. _____

INITIATION

Date Search Initiated: 12-21-72 Search Terms: Inflatable cushion, air cells, automatic air valves

TEAM EVALUATION

Date Search Results Received: _____ No. Citations: _____
Date Evaluation Completed: _____ No. Relevant Citations: _____
Team Evaluation: _____
Date Relevant Citations Sent to Researcher: _____

RESEARCHER EVALUATION

Date Evaluation Received from Researcher: _____
Researcher Evaluation: _____
No. Documents Requested by Researcher: _____

DOCUMENTS

Date Documents Ordered: _____ Date Received: _____
Date Documents Sent to Researcher: _____
Researcher Evaluation: _____
No. Hits: _____

HITS: _____ _____ _____ _____ _____
_____ _____ _____ _____ _____

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM
COMPUTER SEARCH REPORT

IDENTIFICATION

Problem No. and Title: CRH-3 "Means to Minimize Venous Pooling"

RDC: RECON Search Title: See Terms

Search No.

INITIATION

Date Search Initiated: 12-21-72 Search Terms:
Venous pressure assist, pressure suits, muscle tone

TEAM EVALUATION

Date Search Results Received: No. Citations:

Date Evaluation Completed: No. Relevant Citations:

Team Evaluation:

Date Relevant Citations Sent to Researcher:

RESEARCHER EVALUATION

Date Evaluation Received from Researcher:

Researcher Evaluation:

No. Documents Requested by Researcher:

DOCUMENTS

Date Documents Ordered: Date Received:

Date Documents Sent to Researcher:

Researcher Evaluation:

No. Hits:

HITS:

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM
COMPUTER SEARCH REPORT

IDENTIFICATION

Problem No. and Title: CRH-5 "Improved Clamp for Urine Collection Device"
RDC: RECON Search Title: See Terms
Search No.

INITIATION

Date Search Initiated: 12-21-72 Search Terms:
Tubing clamp, plastic tubing valves, tubing pincher

TEAM EVALUATION

Date Search Results Received: No. Citations:
Date Evaluation Completed: No. Relevant Citations:
Team Evaluation:
Date Relevant Citations Sent to Researcher:

RESEARCHER EVALUATION

Date Evaluation Received from Researcher:
Researcher Evaluation:
No. Documents Requested by Researcher:

DOCUMENTS

Date Documents Ordered: Date Received:
Date Documents Sent to Researcher:
Researcher Evaluation:
No. Hits:

HITS:

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM
COMPUTER SEARCH REPORT

IDENTIFICATION

Problem No. and Title: CRH-6 "Urine Collection Device for Incontinence in Female"
RDC: RECON Search Title: See Terms
Search No. _____

INITIATION

Date Search Initiated: 12-21-72 Search Terms:
Urine collection, urinary catheters, female astromauts

TEAM EVALUATION

Date Search Results Received: _____ No. Citations: _____
Date Evaluation Completed: _____ No. Relevant Citations: _____
Team Evaluation: _____
Date Relevant Citations Sent to Researcher: _____

RESEARCHER EVALUATION

Date Evaluation Received from Researcher: _____
Researcher Evaluation: _____
No. Documents Requested by Researcher: _____

DOCUMENTS

Date Documents Ordered: _____ Date Received: _____
Date Documents Sent to Researcher: _____
Researcher Evaluation: _____
No. Hits: _____

HITS: _____ _____ _____ _____ _____
_____ _____ _____ _____ _____

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM
COMPUTER SEARCH REPORT

IDENTIFICATION

Problem No. and Title: MDA-1 "Radiation Resistant Tilt Table for use in Radiotherapy"
RDC: RECON Search Title: See terms
Search No.

INITIATION

Date Search Initiated: 12-21-72 Search Terms: radiotherapy equipment, radiation resistant metals and/or other structural composite materials

TEAM EVALUATION

Date Search Results Received: No. Citations:
Date Evaluation Completed: No. Relevant Citations:
Team Evaluation:
Date Relevant Citations Sent to Researcher:

RESEARCHER EVALUATION

Date Evaluation Received from Researcher:
Researcher Evaluation:
No. Documents Requested by Researcher:

DOCUMENTS

Date Documents Ordered: Date Received:
Date Documents Sent to Researcher:
Researcher Evaluation:
No. Hits:

HITS:

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM
COMPUTER SEARCH REPORT

IDENTIFICATION

Problem No. and Title: MSC-1 "Portable Scalp Cooling Device"

RDC: RECON Search Title: See terms

Search No.

INITIATION

Date Search Initiated: 12-21-72 Search Terms:

Low temperature effect on chromosomes, frostbite injury, low temperature influence on localized metabolism, heat conduction in skin, metabolic effects of localized sub-normal temperature applications, radiation disease prevention utilizing localized cooling techniques. hair loss, skin cooling, scalp cooling, portable coolers, chilled water supply.

TEAM EVALUATION

Date Search Results Received: No. Citations:

Date Evaluation Completed: No. Relevant Citations:

Team Evaluation:

Date Relevant Citations Sent to Researcher:

RESEARCHER EVALUATION

Date Evaluation Received from Researcher:

Researcher Evaluation:

No. Documents Requested by Researcher:

DOCUMENTS

Date Documents Ordered: Date Received:

Date Documents Sent to Researcher:

Researcher Evaluation:

No. Hits:

HITS:

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM
COMPUTER SEARCH REPORT

IDENTIFICATION

Problem No. and Title: SLU-1 "Elimination of Motion Artifact from EEG Leads in Pedestal Equipped Animals"
RDC: RECON Search Title:
Search No.

INITIATION

Date Search Initiated: 12-21-72 Search Terms:
Electronic noises, coaxial cables, signal strengthening, motion artifacts

TEAM EVALUATION

Date Search Results Received: No. Citations:
Date Evaluation Completed: No. Relevant Citations:
Team Evaluation:
Date Relevant Citations Sent to Researcher:

RESEARCHER EVALUATION

Date Evaluation Received from Researcher:
Researcher Evaluation:
No. Documents Requested by Researcher:

DOCUMENTS

Date Documents Ordered: Date Received:
Date Documents Sent to Researcher:
Researcher Evaluation:
No. Hits:

HITS:

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM
COMPUTER SEARCH REPORT

IDENTIFICATION

Problem No. and Title: UTM-39 "Multi-Channeled Hypothermia Blanket for Heart Surgery"
RDC: RECON Search Title: See Terms
Search No. _____

Note: This was an additional search.

INITIATION

Date Search Initiated: 12-21-72 Search Terms:
Cardiac hypothermia, hypothermic cardiac arrest.

TEAM EVALUATION

Date Search Results Received: _____ No. Citations: _____
Date Evaluation Completed: _____ No. Relevant Citations: _____
Team Evaluation: _____

Date Relevant Citations Sent to Researcher: _____

RESEARCHER EVALUATION

Date Evaluation Received from Researcher: _____
Researcher Evaluation: _____

No. Documents Requested by Researcher: _____

DOCUMENTS

Date Documents Ordered: _____ Date Received: _____
Date Documents Sent to Researcher: _____
Researcher Evaluation: _____
_____ No. Hits: _____

HITS: _____ _____ _____ _____ _____
_____ _____ _____ _____ _____

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

III. SEARCHES
B. OTHER SEARCHES INITIATED

The following is a list of Biomedical Problems for which searches other than RDC Computer searches were conducted during the period covered by this report:

Problem No.	Description of Search and Search Results
	Mini-manual searches conducted on several current problems with no applicable yield at this point; however, useful references were obtained. No further action implemented by report time. Specific questions were sent out on current problems to other BATeams and specific NASA Centers. See appropriate contact reports.

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

III. SEARCHES
C. SEARCHES EVALUATED BY TEAM PERSONNEL

On the following pages are copies of RDC Computer Search forms for the Biomedical Problems listed below for which searches have been evaluated by the Team personnel during the period covered by this report.

Problem No.	Search No.	No. Citations	No. Relevant
LSU-2	T613	250	8
UTM-40	T618	463	TBA by P. O.
WMC-2	T617	114	7

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM
COMPUTER SEARCH REPORT

IDENTIFICATION

Problem No. and Title: LSU-2 "Whole Body Radiation Measurement"

RDC: RECON Search Title: Same
Search No. T613

INITIATION

Date Search Initiated: 11-6-72 Search Terms:
Radiation measurement, fallout, animal radiation measurement/effects, radiation studies, radiation meters, indicators, human radiation measurement/effects,

TEAM EVALUATION

Date Search Results Received: 11-20-72 No. Citations: 250
Date Evaluation Completed: 12-27-72 No. Relevant Citations: 81
Team Evaluation: Few references, but those cited are specific and should be helpful.
Date Relevant Citations Sent to Researcher:

RESEARCHER EVALUATION

Date Evaluation Received from Researcher:
Researcher Evaluation:
No. Documents Requested by Researcher:

DOCUMENTS

Date Documents Ordered: Date Received:
Date Documents Sent to Researcher:
Researcher Evaluation:
No. Hits:

HITS:

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM
COMPUTER SEARCH REPORT

IDENTIFICATION

Problem No. and Title: UTM-40 "Detecting Oxygen Toxicity in the Lung"
RDC: RECON Search Title: Same
Search No. T0618

INITIATION

Date Search Initiated: 11-15-72 Search Terms: Hyalin Membrane Disease, oxygen environmental studies, artificial heart surgery, recovery, lungs, circulatory system.

TEAM EVALUATION

Date Search Results Received: 11-21-72 No. Citations: 463
Date Evaluation Completed: 12-21-72 No. Relevant Citations: TBA
Team Evaluation: Discussed length and technicality of search results with P. O. who has decided to perform his own eval. for clarification.
Date Relevant Citations Sent to Researcher: 12-21-72

RESEARCHER EVALUATION

Date Evaluation Received from Researcher:
Researcher Evaluation:
No. Documents Requested by Researcher:

DOCUMENTS

Date Documents Ordered: Date Received:
Date Documents Sent to Researcher:
Researcher Evaluation:
No. Hits:

HITS:

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM
COMPUTER SEARCH REPORT

IDENTIFICATION

Problem No. and Title: WMC-2 "Identification of Korotkoff Diastolic Point"

RDC: RECON Search Title: Same

Search No. T617

INITIATION

Date Search Initiated: 11-6-72 Search Terms: Bioinstrumentation, blood pressure, systolic, diastolic, computer methods, techniques, phase detection, waveforms, monitors.

TEAM EVALUATION

Date Search Results Received: 11-20-72 No. Citations: 114

Date Evaluation Completed: 12-27-72 No. Relevant Citations: 7

Team Evaluation: References cited at this point would be most useful for reference implementation.

Date Relevant Citations Sent to Researcher:

RESEARCHER EVALUATION

Date Evaluation Received from Researcher:

Researcher Evaluation:

No. Documents Requested by Researcher:

DOCUMENTS

Date Documents Ordered: Date Received:

Date Documents Sent to Researcher:

Researcher Evaluation:

No. Hits:

HITS:

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

III. SEARCHES

D. SEARCHES EVALUATED BY THE INVESTIGATOR

On the following pages are copies of RDC Computer Search forms for the Biomedical Problems listed below for which documents have been reviewed by the problem originator during the period covered by this report.

Problem No.	Search No.	No. Citations	No. Relevant	No. Hits
UTM-39	T620	120	5	2

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM
COMPUTER SEARCH REPORT

IDENTIFICATION

Problem No. and Title: UTM-39 "Multi-Channeled Hypothermia Blanket for Heart Surgery:"
RDC: RECON Search Title: Liquid cooling enclosure
Search No. T620 for heart surgery

INITIATION

Date Search Initiated: 11-15-72 Search Terms: Cooling systems, liquids, jackets, envelopes, coverings, hypothermia, surgery, channel flow, protective clothing.

TEAM EVALUATION

Date Search Results Received: 11-27-72 No. Citations: 120.
Date Evaluation Completed: 11-27-72 No. Relevant Citations: 5
Team Evaluation: References indirect, may need to redefine with new search terms and re-search the problem.
Date Relevant Citations Sent to Researcher: 11-28-72

RESEARCHER EVALUATION

Date Evaluation Received from Researcher: 12-13-72
Researcher Evaluation: Subject is difficult to search. Two chosen hits might prove helpful. New search terms received. Will initiate search with new terms.
No. Documents Requested by Researcher: 2
N65-86231, N66-26921

DOCUMENTS

Date Documents Ordered: 12-18-72 Date Received:
Date Documents Sent to Researcher:
Researcher Evaluation:
No. Hits:

HITS:

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

IV. APPLICATIONS ENGINEERING
A. NEW CANDIDATES

Applicable NASA Technology and Source	Problem Number	A.E. Start Date	Current Status
NASA Tech Brief B72-10032	AEB-4		Work can begin upon approval as candidate

BIOMEDICAL APPLICATIONS TEAM
SOUTHWEST RESEARCH INSTITUTE

DATA CONCERNING APPLICATIONS ENGINEERING NOMINATION

Problem # AEB-4

Title: Apparatus for Measuring Tactile Spatial Separation

Description of technological requirement not commercially satisfied:
Present technique for assessing fingertip point discrimination is strictly manual and accuracy is difficult to achieve. The proposed low cost, instrument would be more reliable and time-saving.

Medical Significance: Development of such an instrument would provide much greater degree of accuracy and reliability in determining fingertip point discrimination vital to vocational rehabilitation. Equally important is portability, low cost, non-invasive factors, simplistic design and operation.
Contribution of Aerospace Technology: NASA Tech Brief B72-10032 for an "Improved Aethesiometer" developed by NASA (MSC) by General Electric.

Resources Required:

$672.75 Parts and Labor

Delivery Schedule:

45 Days Upon Approval

Does the problem originator appear to have sufficient expertise/understanding and/or technical support to successfully utilize the innovation? Describe:
The Problem Originators at Arkansas Enterprises for the Blind have a fully qualified and staffed rehabilitation and vocational training center. Present staff personnel performing tactile measurement assessment by hand could easily handle this proposed instrument.

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

IV. APPLICATIONS ENGINEERING
B. EFFORTS IN PROGRESS

Applicable NASA Technology and Source	Problem Number	A.E. Start Date	Current Status
NASA TB69-10301	AEB-1		Work on prototype to be initiated in near future.
NASA TB68-10363	BVA-1		Electrode material sent to problem originator for evaluation. Awaiting response.
Response to disseminated problem statements from Naval Weapons Center.	OVA-2		Awaiting approval as AE candidate.
NASA's advanced miniaturization technology at MSFC	SWC-2		MSFC expects completion of this project in early 1973.
Design developed by Mr. Husson & Mr. Nichols at Langley	TCD-2, 3		Work in progress at Langley Research Center.
NASA Digital Thermometer(under contract NAS9-7852)applied to Skylab Project.	UAD-3		Awaiting approval as AE candidate.
NASA microminiature biopotential transmitter developed at Ames	UAD-7		Awaiting approval as AE candidate.
IEEE Transactions on Biomedical Engineering, Oct.1970, Capacitative Type Electrode.	UAM-1		Work in progress at SwRI.

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

IV. APPLICATIONS ENGINEERING
C. PROJECTS INACTIVATED

Applicable NASA Technology and Source	Problem Number	A. E. Start Date	Current Status
New Technology Report, MSFC, MFS-20418 "Low Frequency Tachometer"(Heart Rate)	TVA-2		Delivered to Problem Originator. Awaiting Evaluation.

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

V. TECHNOLOGY APPLICATIONS
A. POTENTIAL TECHNOLOGY APPLICATIONS DEVELOPED

On the following pages are descriptions of the Biomedical Problems listed below which have attained the status of Potential Technology Applications during the period covered by this report:

Problem No.	Problem Title

None during this report period.

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

V. TECHNOLOGY APPLICATIONS
B. TECHNOLOGY APPLICATIONS CLAIMED

Below is a list of Biomedical Technology Applications claimed during the period covered by this report. On the following pages are Technology Applications Reports for those claimed.

Problem No.	Problem Title
TVA-2	Portable Heart Rate Indicator for Active Patients

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

TECHNOLOGY APPLICATION REPORT

IDENTIFICATION

Application No: TVA-2 Date of Report: 31 Dec 1972
Application Title: Portable Heart Rate Indicator for Active Patients
Application Date: 31 Dec 1972
Institution: Veterans Administration Center, Temple, Texas
Department: Corrective Therapy
Investigator: Ralph H. Hooker, Chief Corrective Therapy
Consultant/Coordinator (if any):
BATeam Personnel: R. L. Wilbur and David F. Culclasure
Professional Hours Spent: 30 Hrs. Medical Specialty: 03
Solution Requirement: Portable Cardiotachometer

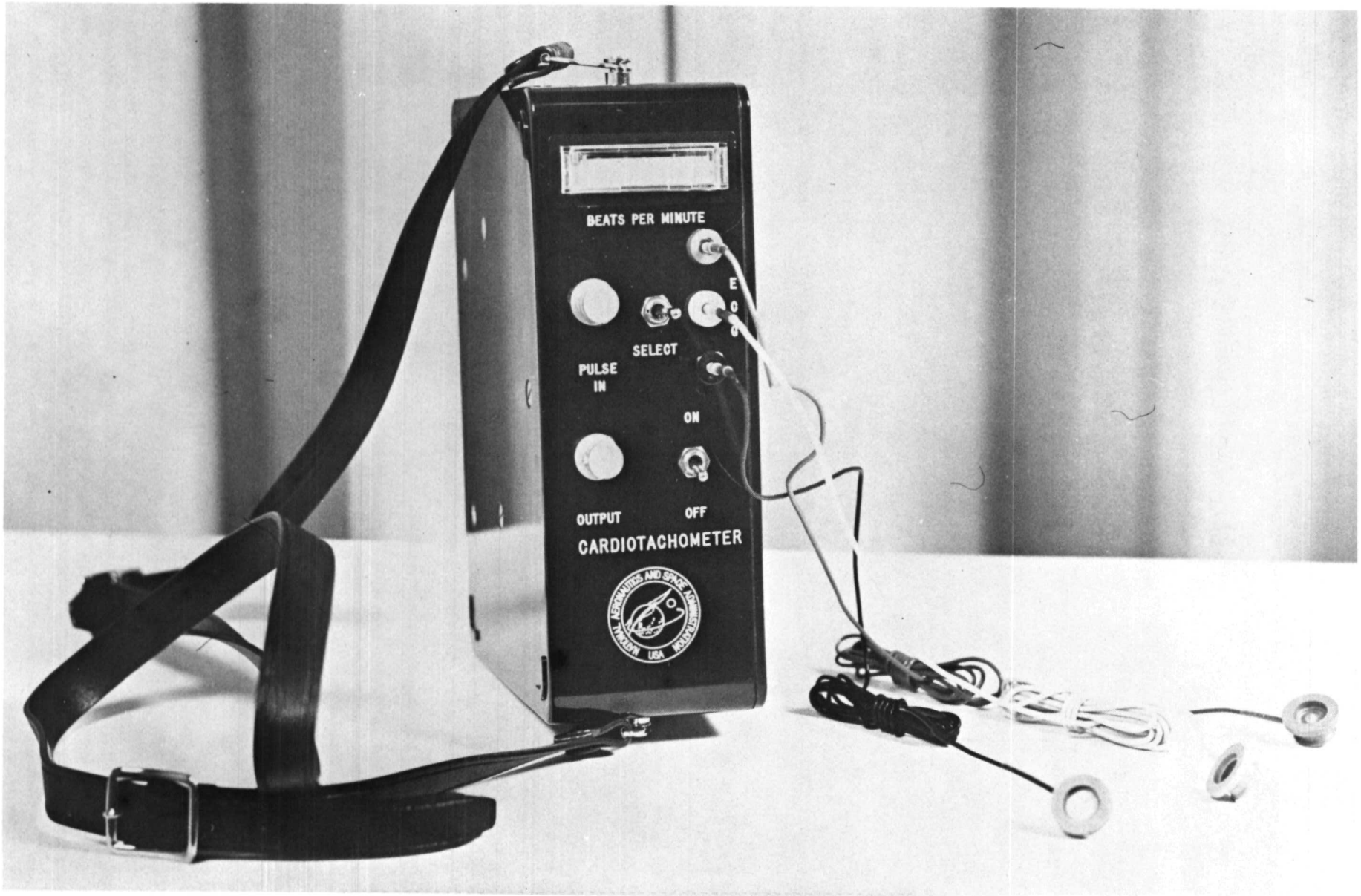
Ward physicians determine the adjusted heart rate for cardiovascular patients (e.g., 60%-70%-100%), and also state the heart rate to which patients can be safely increased during exercise. Therapists presently are manually recording pulse rates before any exercise is taken, immediately after the exercise, and after rest periods of 3 and 5 minutes. These data are considered in determining the optimum exercise and progress for the individual patient.

To improve the accuracy of measurements and make the program more efficient, a hand held cardiotachometer is needed to monitor heart rates from 50 to 140 BPM.

Technology developed at Marshall Space Flight Center was modified to provide a small beat-to-beat cardiotachometer calibrated from 50 to 140 BPM. The device operates directly from ECG electrodes and any other pulse source which facilitates calibration and allows for use with other acquisition devices.

A photograph of the device illustrates the compactness of the device. Further miniaturization of the unit can be made at minimal cost.

The unit is being made available for evaluation with the problem originator and the technical support package for the unit will appear in the January 1973 monthly report.



TVA-2 - Portable Heart Rate Indicator for Active Patients

VI. CONTACTS

A. CONTACTS WITH CURRENT USER INSTITUTIONS

On the following pages are described contacts with currently active user institutions that occurred during the period covered by this report.

4 December 1972 Robert Wilbur, SwRI, forwarded computer program on Kubicek method to J. J. Smith, M. D., University of Wisconsin - also discussed progress on WMC-2, Computerization of Korotkoff Sound-Diastole, and WMC-3, Cardiovascular Analysis of Stressed Patients.

4 December 1972 Robert Wilbur, SwRI, telephoned P. McGraw, The University of Texas Medical School at Galveston, to inform him that we are unable to acquire a new demodulator design from Ames. Also discussed proposed steps to increase stability and ease of calibration.

4 December 1972 Robert Wilbur, SwRI, advised Marvin L. Chatkoff, The University of Texas Medical School at San Antonio, that his pressure recorder was ready for pick up. (SNM-26)

5 December 1972 Robert Wilbur, SwRI, requested evaluation information on x-ray transparent electrodes from Thomas M. Dunn, M. D., Bay Pines Veterans Administration. (BVA-1)

6 December 1972 Robert Wilbur, SwRI, forwarded IMBLMS Kubicek method and ergometer stress tests to J. J. Smith, M. D., The University of Wisconsin, for evaluation. (WMC-3)

7 December 1972 Robert Wilbur, SwRI, informed Hermann Rudenberg, The University of Texas Medical Branch at Galveston, of the problems remaining in the ICP telemetry system. He was also advised that NASA Ames is no longer in a position to help because of personnel changes.

7 December 1972 Robert Wilbur, SwRI, forwarded Impedance Measurement protocol from IMBLMS to J. J. Smith, M. D., University of Wisconsin.

7 December 1972 John Ross, Private Practioner, telephoned R. L. Wilbur, SwRI to ask about progress on development of patient reminder cassette recorder. The timing circuit is under development.

7 December 1972 Claude K. Leeper, Col., Vice Commander of Wilford Hall USAF Medical Center, in a letter to C. William Hall, M. D., SwRI, requested information about the latest developments for effective shielding from excessive electromagnetic noise interference of cardiac pacemakers.

7 December 1972 Jean Carter, SwRI, telephoned Jim Caylor, Criss Cole Rehabilitation Center, Austin, to verify that canes for the blind had been forwarded as samples to coat with reflective glass bead/enamel presently in mix at SwRI Automotive Research Depart. (TCB-18)

8 December 1972 John Sigmon, SwRI-MSC, and Charles Laenger, SwRI, talked to José E. Torres, M. D., LSU Medical Center, about scalp cooling cap to be developed by MSC.

8 December 1972 Robert Wilbur, SwRI, requested an evaluation of ultra low frequency bandpass amplifier for documentation purposes from R. B. Shepard, M. D., University of Alabama Medical School. (UAM-1)

8 December 1972 Robert Wilbur, SwRI, informed Paul Johnson, The University of Arizona, of new NASA developments in the fields of peak readers. Inquired if problem should be kept active and if AE approval should be sought. (TCM-3)

8 December 1972 Robert Wilbur, SwRI, requested evaluation of computerized ECG program from Dr. Mario Ariet, University of Florida College of Medicine. With the completion of their new computer center, this would be a boon to both clinical and research departments. (UFM-7)

8 December 1972 Robert Wilbur, SwRI, inquired from Richard Gordon, M. D., University of Florida Medical College, if new search is needed to determine if problem should be kept active. (UFM-6)

8 December 1972 P. McGraw, The University of Texas Medical Branch at Galveston, telephoned Robert Wilbur, SwRI, to discuss receiver specifications necessary to improve reception and increase range on pressure telemetry. (GLM-5)

9 December 1972 Robert Wilbur, SwRI, visited Col. E. G. O'Brien, Wilford Hall Hospital, regarding WLH-4. He prefers to inactivate the problem after evaluating search results.

9 December 1972 Robert Wilbur, SwRI, visited D. Pfeifer, M. D., Wilford Hall Hospital, regarding WLH-3. The problem will be inactivated until a new problem originator becomes available. Present problem originator is suffering from extreme poor health and cannot continue.

11 December 1972 Robert Wilbur, SwRI, returned modified transmitter to P. McGraw, The University of Texas Medical Branch at Galveston. (GLM-5)

12 December 1972 Sam McFarland, SwRI, telephoned F. Hermann Rudenberg, The University of Texas Medical School at Galveston, to notify of impending visit to Mickie Spence on 13 December 1972.

12 December 1972 Sam McFarland, SwRI, telephoned Mickie Spence, Physical Therapy Department, The University of Texas Medical School at Galveston, to set up appointment for visit.

12 December 1972 Marvin Chatkoff, The University of Texas Medical School at San Antonio, acknowledged receipt of the pressure monitor. It will soon be undergoing evaluation. (SNM-26)

13 December 1972 Sam McFarland, SwRI, and John Sigmon, SwRI/MSC, visited Miss Mickie Spence, The University of Texas Medical School at Galveston, to discuss and better define problems GLM-43 through -50.

13 December 1972 Sam McFarland, SwRI, and John Sigmon, SwRI/MSC, visited Robert Sine, M. D., Rosewood Memorial Hospital, Houston, and discussed new ideas and current problem originators' attitude toward problems RRC-1, -2, -6, -8, and -9.

14 December 1972 Sam McFarland, SwRI, visited Miss Nancy Joyce Newsom, Texas Institute for Rehabilitation and Research, to consult relative to the impact of a potential problem related to driving assists for the quadriplegic.

14 December 1972 Robert Wilbur, SwRI, telephoned Lt. Col. F. Fite, Wilford Hall Hospital, to discuss WLH-2. Sensitivity problems persist in the device delivered in that Dr. Fite is attempting to use the system in pre-and post-operative surgery. These are definitely not normals. Additional work may be necessary.

18 December 1972 Mario Ariet, Ph. D., University of Florida Medical College, wrote Robert Wilbur, SwRI, to say that the initial search on UFM-7 was sufficient for his needs. He ordered his own copies of reprints and needs no further assistance on this problem.

21 December 1972 Sam McFarland, SwRI, telephoned Donald Olsen, D. V. M., University of Utah Medical School, to acquire better definition of his problem UTM-40.

21 December 1972 Jean Carter, SwRI, forwarded search results T0618 from NASA RECON on problem UTM-40, Detecting Oxygen Toxicity in the Lung, to Dr. Donald Olsen, University of Utah Medical School. He will do extensive evaluation himself because of technical familiarity with the subject.

22 December 1972 John Sigmon, SwRI/MSC, visited Dr. Sine, Rosewood General Hospital, to pick up telemetry device which Dr. Sine could not operate and left information on rotating litter chair.

22 December 1972 Sam McFarland, SwRI, visited Dr. Jose E. Torres, Louisiana State University Medical School, to lay groundwork for possible AE agreement for MSC on scalp cooling.

26 December 1972 Jean Carter, SwRI, forwarded detailed information on MIT BRAILLEMBOSS—description, applications, availability, etc. — to TIRR, State Commission for the Blind, and the University of Houston.

27 December 1972 Sam McFarland, SwRI, forwarded updated status of problems CRH-1 thru CRH-6 to Margaret Kersenbrock, Craig Rehabilitation Hospital, Colorado, and also made preliminary plans for a return visit in late January.

27 December 1972 Sam McFarland, SwRI, telephoned Lazar Greenfield, M. D., VA Hospital, Oklahoma City, to see if his interest in OVA-2 proposed solution is still current. It is, and he requested we promote it as an AE candidate.

27 December 1972 Don Lyman, Ph. D., University of Utah, telephoned Sam McFarland, SwRI, to say he received searches for UTM-42 and UTM-43; needs information on techniques for starch molds used in filament wound composite forming in place of metal or ethylene derivitive.

28 December 1972 Jean Carter, SwRI, forwarded Jim Caylor, State Commission for the Blind, Austin, samples of two canes for the blind coated with segmented samples of epoxy base and plain enamel bead reflective coatings for evaluation. (TCB-18)

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

VI. CONTACTS
B. CONTACTS WITH POTENTIAL USER INSTITUTIONS

On the following pages are described contacts with potential user institutions that occurred during the period covered by this report.

4 December 1972 Anne Kohler, Texas Commission for the Aging, advised their staff will visit SwRI BATeam for consultation on problems pertaining to the aging.

5 December 1972 James Dawson, Oklahoma Foundation For Research and Education, telephoned David Culclasure, SwRI, to request use of a sight switch for evaluation. Item provided.

6 December 1972 Anne Kohler and four of the committee members of the Texas Governor's Committee on Aging visited SwRI. They viewed the instrumentation apparatus and viewed theBAT film. Also discussed aerospace solutions to possible problem areas they deal with in their committee work including marketing of geriatric assist devices, state and government funding of their work and areas of approach that the SwRI Team could help solve problems with prototype development instrumentation.

6 December 1972 David Culclasure, SwRI, forwarded the TSP on the patient assist device to J. P. Dawson, Oklahoma Foundation For Research and Development.

8 December 1972 Sam McFarland, SwRI, responded to R. N. Witt, Gonzales Warm Springs Hospital, letter regarding our leg brace. Sent him description of BAT program.

12 December 1972 Robert Wilbur, SwRI, forwarded J. P. Dawson, Oklahoma Foundation for Research and Education, information on patient assist device and initiated problem on new eye switch.

12 December 1972 J. P. Dawson, Oklahoma Foundation for Research and Education, telephoned Robert Wilbur, SwRI, to advise that the evaluation of the Hayes Eye Switch proved to be unacceptable as a switching mechanism due to heat conditions existing which is normal. Mr. Dawson urged the acceptance of this as a problem and to bring the technology up to present state-of-the-art.

26 December 1972 Donna Johnson, Texas Commission on Aging, requested interaction on behalf of her agency with the BATeam.

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

VI. CONTACTS
C. CONTACTS WITH NASA CENTERS

On the following pages are described contacts with NASA Field Centers that occurred during the month covered by this report. The contacts are divided into two groups: problem-related contacts and non-problem related contacts.

1 December 1972 Charles Laenger, SwRI, telephoned Wayne Chen, Goddard, to inform him of the status of the Patient Assist Device - as far as manufacture is concerned.

4 December 1972 Robert Wilbur, SwRI, telephoned Jack Pope, NASA/Ames, to inquire about further developments to the basic pressure telemetry demodulator described in TB66-10624. Mr. Pope has been transferred and had nothing new to offer. (GLM-5).

4 December 1972 John Sigmon, SwRI/MSC, visited M. A. Carson, NASA/MSC to acquire information about previous testing of scalp cooling cap on Dr. Lupin's son with Dr. Torres.

4 December 1972 Jean Carter, SwRI, telephoned Donald Friedman, Goddard, to tell him we had received go-ahead from T. Wakefield to contact Mr. Weekly in New Orleans about setting up manufacture of Patient Assist Device for a Louisiana minority group and that Charles Laenger was going to see Mr. Weekly this week in New Orleans.

7 December 1972 John Samos, TUO/Langley, telephoned David Culclasure, SwRI, to discuss status of pending AE candidates at Langley.

8 December 1972 Sam McFarland, SwRI, telephoned John Samos, TUO/Langley, to acquire information regarding cooperation on RRC-8 and UTM-38.

8 December 1972 John Samos, TUO/Langley, returned detailed information needed by NASA researcher for RRC-8.

11 December 1972 John Samos, TUO/Langley, forwarded correspondence copies relating to work for RRC-8.

12 December 1972 Sam McFarland, SwRI, telephoned John Sigmon, SwRI/MSC, to arrange for visiting problem originators in Houston area on 13 December.

12 December 1972 John Sigmon, SwRI/MSC, telephoned Robert Wilbur, SwRI, to get information on workings of R-wave respiratory monitor.

12 December 1972 Jean Carter, SwRI, sent request to TUO, Ames, for further information TSP72-10300, Polymide Foams Provide Thermal Insulation and Fire Protection, in regard to SwRI Problem HSR-2 and related problems.

12 December 1972 Jean Carter, SwRI, requested TSP72-10235, High Strength, Medium Density Molded Foam, for SwRI problem HSR-2, Resilient Breathing Contour Material, from Glen Ellis, Atomic Energy Commission.

14 December 1972 John Sigmon, SwRI/MSC, visited M. D. Carson/ E. C. Stutesman, Crew Systems Division, MSC, to discuss scalp cooling cap and CRH-4 - was referred to Pat McLaughlan regarding CRH-4.

14 December 1972 John Sigmon, SwRI/MSC, telephoned Pat McLaughlan, MSC Crew Systems Division, to discuss the possible applications of a prototype fireman's recusitator to CRH-4.

14 December 1972 John Sigmon, SwRI/MSC, telephoned Charles Laenger, SwRI, to get information about requirements on CRH-4.

15 December 1972 Charles Laenger, SwRI, telephoned Don Friedman, TUO/Goddard, to report on status of patient assist device and informed him that we will obtain one from MSFC, check it out and send it to him on 22 December.

15 December 1972 Charles Laenger, SwRI, telephoned Tom Wakefield, NASA/TAD and reported on our visit to New Orleans - minority manufacturers; discussed status of radiation catheter proposal to NINDS - Mr. Wakefield gave name of AEC TU Office to contact. Mr. Wakefield also told us to obtain patient assist device from NASA/ MSFC and forward to Wayne Chen at Goddard.

15 December 1972 Jean Carter, SwRI, requested further information from Jim Wiggins, TUO/Marshall, on Tech Brief B72-10294, Graphite and Boron Reinforced Composite Materials Data Summary.

18 December 1972 Jean Carter, SwRI, telephoned Bradford Evans, TUO/Ames, to request additional technical support on Visual Examination Apparatus device developed at Ames by Richard F. Haines. They will forward TB 72-10203 and TND-6190 and a film done on the device. Request developed for possible new problem under discussion.

18 December 1972 Robert Wilbur, telephoned Juan Pizarro, MSFC, to request return of patient assist device, request a status report on EEG audiometric helmet and inquire about documentation on cassette recorder.

18 December 1972 Robert Wilbur, SwRI, forwarded Juan Pizarro, MSFC, the BAT film for use in promotional work.

18 December 1972 Jean Carter, SwRI, telephoned Glen Ellis, Atomic Energy Commission, to verify possible contract that AEC might have with the EEG Research Institute in Oslo, Norway. They are working on an improved model of a beta radiation detector. We need additional technical support from the AEC on current status of work to implement our work on beta radiation probes (GLM-35).

18 December 1972 John Sigmon, SwRI/MSC, visited Jim Evans, MSC, to get information for Dr. Sine, Rosewood Hospital, on rotating litter chair.

18 December 1972 John Sigmon, SwRI/MSC, forwarded copy of information on rotating litter chair for Dr. Sine to Sam McFarland, SwRI.

18 December 1972 John Sigmon, SwRI/MSC, visited Gene Wendler, MSC Crow System, to get material samples for possible use in stretchers at John Sealy Hospital.

19 December 1972 Sam McFarland, SwRI, telephoned John Sigmon, SwRI/MSC, seeking MSC input for problems GLM-45 and CRH-4.

19 December 1972 Jean Carter, SwRI, telephoned John Sigmon, SwRI/MSC, to request followup help on-site to contact John Wheeler, TUO/MSC, to obtain either model or just housing of the "Improved Aethesiometer" for use on Problem AEB-4. Device was built by General Electric under contract to MSC.

20 December 1972 Juan Pizarro, MSFC, provided David Culclasure, SwRI, information on status of AE projects at MSFC.

20 December 1972 John Sigmon, SwRI/MSC, telephoned Jack Wheeler, TUO/MSC, about acquiring either prototype or housing for asethesiometer for AEB-4.

20 December 1972 John Sigmon, SwRI/MSC, contacted Pat McLaughlan, MSC-Crew Systems Division, about market survey on resusitators and breathing machines for CRH-4.

20 December 1972 John Sigmon, SwRI/MSC, telephoned Jim McQueen, DVM, MSC, to obtain name of Dick Graves who has knowledge of sterilization of electronics hardware. Mr. Graves will call C. Pierce, SBA-Dallas (Tech. Utilization Officer).

21 December 1972 Jack Wheeler, TUO/MSC, telephoned Jean Carter, SwRI, to inform us Charles Laenger's name will be given to Thomas Rowen in Van Nuys who is applying for exclusive license rights to manufacture the NASA developed aethesiometer.

21 December 1972 Charles Laenger, telephoned Dr. Hodge R. Wasson, AEC Washington regarding GLM-35, availability of Beta detector. We were informed that Dr. S. Jacobsen does not have a contract with the U.S. AEC for development of a new beta detector element. Dr. Wasson suggested we contact the following for the latest results in this area: Katzenstein, UCLA Brain Institute, G. C. Huth, Laboratory for Nuclear Research in Radiobiology and John Ewins, UCLA.

21 December 1972 John Sigmon, SwRI/MSC, telephoned Charles Laenger, SwRI, about getting SwRI to work on scalp cooling cap and patient assist unit for Dr. Pool. Also informed him that asethesiometer housing for ACB-4 no longer exists and tech drawings were mailed instead.

22 December 1972 John Sigmon, SwRI/MSC, visited James Waligord, MSC, Biomedical Research Division, and obtained information on research which was being done on cooling garmets and also obtained on loan a liquid cooling garmet assembly.

22 December 1972 Jean Carter, SwRI, requested further technological progress input from Bradford Evans, TUO/Ames, on development of microminiature implantable pressure telemetry unit originally done at Ames in regard to problem GLM-51, Pressure Telemetry Alarm for Hydrocephalics.

22 December 1972 David Culclasure, SwRI, requested TSP for Quartz Crystal Microbalance Used in Biological Studies, from John C. Drane, TUO/Pasadena

23 December 1972 David Culclasure, SwRI, requested TSP for B72-10232, Improved Intensifying Screen Reduces X-Ray Exposure, from Charles Eastwood, AST, TU Office, NASA/Washington.

23 December 1972 David Culclasure, SwRI, requested TSP for Implanted Telemeter for Electrocardiogram and Body Temperature, from Bradford Evans, TUO/Ames.

26 December 1972 James Wiggins, Marshall, forwarded additional information per request on NASA TB72-10294, Graphite and Boron-Reinforced Composite Materials Data Summery, for use in development of problem SWC-1.

26 December 1972 David Culclasure, SwRI, requested TSP for TB72-10575, An Improved Learning Decoder, from William Chmylak, Houston.

26 December 1972 David Culclasure, SwRI, requested TSP for TB72-10298, Real-Time Pair-Feeding of Animals, from Bradford Evans, TUO/Ames.

26 December 1972 David Culclasure, SwRI, requested TSP for TB72-10482, A Magnetic Mouse Activity Meter, from Charles Eastwood, AST, NASA Headquarters.

27 December 1972 David Culclasure, SwRI, requested TSP for Indexing Film with a Fluidic Se nsor, from William Chmylak, Houston.

27 December 1972 Paul Foster, NASA/LRC, provided response to the circulated problem statement on diet mixing bowls for trace mineral study.

28 December 1972 Bradford Evans, TUO/Ames, forwarded TSP on NASA TB72-10300, Polymide Foams, for problem HSR-2.

29 December 1972 David Culclasure, SwRI, requested updated information on bone densitometer described in Tech Brief B72-10450, asked for possible use of prototype unit for evaluation in regard to DLM-14 from Juan Pizarro, MSFC.

29 December 1972 David Culclasure, enclosed an advertisement from PARAPLEGIA NEWS, Dec. 1972, to Tom Wakefield, NASA Headquarters, showing a Boston firm named Ali-Med marketing their product called T-Foam developed for Astronauts. Purpose of letter was information on technology capitalization for further reference.

VI. CONTACTS
D. OTHER CONTACTS

On the following pages are described other Team contacts that occurred during the period covered by this report.

4 December 1972 Robert Wilbur, SwRI, returned computer material on Kubicek method for solution to WMC-1 to Dr. DeLucchi, Consultant.

4 December 1972 Charles Laenger, SwRI, telephoned Don Weekly, New Orleans, and discussed manufacture of medical related equipment and made an appointment for Friday, December 8.

5 December 1972 David Culclasure, SwRI, in a letter to Frank Allender, American Physical Therapy Association, agreed to make presentation at the 50th Annual Physical Therapy Association Conference.

5 December 1972 Mrs. Frances Silverstein, OTR, Good Samariton Hospital, Baltimore, requested information on the patient assist device.

6 December 1972 David Culclasure, SwRI, forwarded Robert M. Smith, Penn State University Park, a copy of "Medical Benefits From Space" per his request.

6 December 1972 Robert Wilbur, SwRI, returned IMBLMS Manual to Dr. DeLucchi for return to MSC. (WMC-3)

7 December 1972 Dr. M. DeLucchi, Consultant, Houston, telephoned Robert Wilbur, SwRI, to inquire about interface with problem originator on his efforts to transfer Kubicek computer program.

7 December 1972 Jean Carter, SwRI, forwarded Jack Johnson, Consultant, Little Rock, Arkansas, copies of all AEB problem statements, plus blank forms for his use. Also forwarded information on Tech Brief TSP72-10032, Improved Aethesiometer.

7 December 1972 Jean Carter, SwRI, forwarded Mrs. Frances Silverstein, Good Samaritan Hospital, Baltimore, information about HSR-7 Patient Assist Device and discussed possibilities of market availability in process.

7 December 1972 Dr. Knopf, Bucks County Psychological Center, Pennsylvania, telephoned David Culclasure, SwRI, to request information on the evoked response audiometric system.

7 December 1972 Robert Wilbur, SwRI, returned last IMBLMS manual to MSC. Information transferred to problem originator.

8 December 1972 Sam McFarland, SwRI, telephoned Dr. R. Sine, University of Texas Medical Branch at Galveston, to set up appointment for visit on 13 December.

8 December 1972 Bo Rybeck, Captain, M. C., Royal Swedish Navy, Stockholm, Sweden, visited SwRI; viewed BAT film and looked at available hardware. Significant technological advances discussed. Dr. Rybeck was particularly interested in possibility of obtaining more information about a blood gas analyzer. Discussed work on Beta Radiation Catheter Probes, a successful motor-driven ambulatory chair developed in Sweden for thalidomide children, prosthetic devices. His main interest is in setting up shipborad field hospitals.

9 December 1972 David W. Myers, Louisiana Department of Education, sent initial letter of evaluation of his desk-top voice amplifier (TCD-9). Expressed satisfaction of operation of equipment in a situation the equipment was designed for.

11 December 1972 Sam McFarland, SwRI, wrote Charles Lynn Purcell, Eagle Pass, Texas, thanking him for his offer to test one of our new leg braces. He was a polio victim and wears a brace. As the program progresses, we will remain in contact with him as a possible prototype test individual. He responded to Sam McFarland's television appearance/interview on the SWR-1 problem of graphite composite epoxy resin braces.

11 December 1972 H. T. Bergtholdt, USPHS Hospital, Carville, La., requested information regarding NASA Technology Utilization Program. He is particularly interested in the area of pressure transducers.

11 December 1972 Charles E. Marsh, M. D., Topeka VA Hospital, requested information regarding the NASA TUO program. He is interested in visual training apparatus for the blind using mini TV, using skin for the sensory organ.

11 December 1972 LTC Jon Daniels, USAIDR, WRAMC, Washington, D. C., requested information on the Technology Utilization Program. He is interested in dental research.

11 December 1972 Earl D. Raab, NARCO Scientific Industries, Inc. requested IMBLMS information-system.

12 December 1972 Cdr. A. R. Petoletti, MC, U. S. Navy, requested information on the Technology Utilization Program. He is interested in pharmacology and became acquainted with the program through the Military Surgeons Convention in San Antonio.

12 December 1972 Ronald Fletcher, M. D., Pittsburgh, Pennsylvania, requested information regarding NASA TU Program. He is interested in infectious diseases.

12 December 1972 Cdr. Dorsey J. Moore, Naval Graduate Dental School, Bethesda, requested information regarding the Technology Utilization Program. He is interested in maxillofacial prosthetics.

12 December 1972 Harold Gist, M. D. Hagerstown, Md., requested information on the TU Program.

12 December 1972 LTC P. M. Torrance, USN MC, requested information on TU Program. He is interested in aerospace medicine and hospital medicine.

12 December 1972 T. H. Parmley, Walter Reed General Hospital, requested information on the Technology Utilization Program. He is interested in obstetrics and became acquainted with the program at the Military Surgeon Association Convention.

12 December 1972 Sam McFarland, SwRI, wrote R. N. Witt, Chief Orthotist, Gonzales, Texas , in response to letter questioning our approach and techniques of the leg braces in regard to SWR-1. Mr. Witt's offer to help update our information on the practical aspects of orthotics was accepted. His hospital has experimented with different materials (plastic and magnesium).

12 December 1972 Jean Carter, SwRI, requested input on SwRI problems UTM-40 (theraputic treatment of Hyalin Membrane Disease) and UTM-38 (prosthetic valve for urinary tract) from F. Thomas Wooten, RTI. They have two similar problems and could possibly offer information.

12 December 1972 Sam McFarland, SwRI, asked Bio-Medical Systems, Inc., for latest description and price list of their VFI Immobilizer (vacuum plastic bag device for providing on-site rigid splint type support for broken limbs or post-operative support where immobilization is necessary).

14 December 1972 John Rétalfh, CBS News, telephoned David Culclasure, SwRI, to request information on technology applications brochures.

14 December 1972 Robert Wilbur, SwRI, returned Bob Galffne's call pertaining to possible manufacture of cassette recorder. Mr. Gaffne is with Becton-Dickinson and desires additional information on the device.

14 December 1972 David Culclasure, SwRI, telephoned John Retalfh, CBS News, to relate further information on technology applications.

14 December 1972 Robert Wilbur, SwRI, forwarded TSP on Biomedical Recording with Inexpensive Tape Recorders to Bob Gaffne, Becton Dickinson, per his request.

20 December 1972 Jean Carter, SwRI, requested latest catalog and pricing structure on the Piezoelectric line, asking in particular about the availability of "unimorphs" for incorporation into SwRI problem CPT-1, Head Conditioning for Athetoids.

20 December 1972 Sam McFarland, SwRI, requested technical support information on FLSS-2, Fireman's Life Support System, from Gerald Bay, IIT Research Institute, to implement work on CRH-4, development of portable compact breathing machine. Apparent relevancy in any area would be most helpful.

20 December 1972 Sam McFarland, SwRI, wrote letter of thanks for information on latch mechanism to H. A. Gilbert, McDonnell-Douglas Astronautics. Mechanism was too bulky, but information was retained for other relevant use. (RRC-9)

20 December 1972 Jean Carter, SwRI, forwarded Dr. Knopf, Bucks County Psychiatric Center, information on the Evoked Response Audiometric System, EEG Helmet for Infants and Children (SWC-1) at request of NASA/Washington.

20 December 1972 Dr. Robert Galambox, University of California at San Diego, requested information on the EEG helmet from David Culclasure, SwRI.

21 December 1972 Jean Carter, SwRI, initiated RECON searches on 8 subjects from William Tyler, NASA STIF.

21 December 1972 Tom Wooten, RTI, telephoned David Culclasure, SwRI, to discuss team activities in general and plans for the team's future in relation to the team member stationed at MSC.

21 December 1972 John Sigmon, SwRI/MSC, telephoned David Wright, General Electric, Valley Forge, trying to obtain housing or prototype of asethesiometer for AEB-4.

22 December 1972 Thomas Rowan, Van Nuys, California of Rowan Products, telephoned Charles Laenger, SwRI. He is negotiating to obtain the patent for the aesthesiometer. He was given the name of Elmo Knoch at Arkansas Enterprises for the Blind, whom he intends to call.

23 December 1972 Tom McKevitt, Medtronic, Inc., forwarded a study by Medtronics on "In Vitro Measurements of the Electromagnetic Susceptibility of Cardiac Pacemakers, to Jean Carter, SwRI. Information will be passed on to personnel at Wilford Hall Hospital, San Antonio.

26 December 1972 F. T. Wooten, RTI, forwarded requested information on RTI problems VAM-6, Negative Pressure Chamber for use in development of UTM-40, Detecting Oxygen Toxicity in the Lung, and RTI problem WF-3, Prosthetic Urethral Valve for development of UTM-38, Urinary Prosthetic Valve.

26 December 1972 Jean Carter, SwRI, forwarded Richard L. Jones, Hattiesburg, Miss., a booklet on "NASA Contributions in the Field of Rehabilitation." He is doing graduate work in this area and requested summary of our interest in same.

26 December 1972 Jean Carter, SwRI, forwarded Pinecrest State School, Louisiana, detailed information on MIT BRAILLEMBOSS... description, applications, availability, etc.

28 December 1973 Jack Dillon, W. C. Dillon & Company, Inc. requested information on the peroneal nerve stimulator.

28 December 1972 Sener Sancar, Huntsville Hospital, forwarded information to David Culclasure, SwRI, on the revision of the Huntsville patient assist system.

28 December 1972 Mr. Shenk, Essex Corporation, Alexandria, Virginia, telephoned Charles Laenger, SwRI, regarding telephone calls and contacts with various hospitals regarding patient assist Devices. Michael DiPompo, Castle Point VA Hospital, New York, reported they have a second generation conventional relay operated patient assist device. Puff and suck operated; it clicks and occasionally gets out of sync. Telephone Dialer - Hold switch, count while hold - returns like telephone when released; Kenneth LeBlanc, Orthotics Department, Bronx VA Hospital, reported they have a first generation, conventional relay patient assist device. Mr. Shenk also contacted VA Central Office, New York City, Dr. Gustav Rubin, Essex consultant. (GLM-35)

29 December 1972 David Culclasure, SwRI, provided information on the electronic peroneal nerve stimulator to Jack Dillon, W. C. Dillon Company, Van Nuys, California.

29 December 1972 David Culclasure, SwRI, forwarded Charles Yost, Dynamic Systems, Inc., a copy of an advertisement from Dec. 1972 issue of PARAPLEGIA NEWS describing T-Foam developed for astronauts being marketed by a Boston firm called Ali-Med.

29 December 1972 David Culclasure, SwRI, requested information from Ali Med, Inc., Boston, Mass. regarding their T-Foam. It sounds very much like Temper Foam.

29 December 1972 David Culclasure, SwRI, acquainted Dynamic Systems with the fact that AliMed (Boston) was marketing a T-Foam cushion that seemed to be exceedingly similar to Temper Foam.

SOUTHWEST RESEARCH INSTITUTE
BIOMEDICAL APPLICATIONS TEAM

APPENDIX A
CURRENTLY ACTIVE PROBLEMS
STATUS CODE DEFINITIONS

A. Problem Definition

Problem definition includes the identification of specific technology-related problems through discussions with biomedical investigators and the preparation of function descriptions of problems using nondisciplinary terminology.

B. Information Searching

Information relevant to a solution is being sought by computer and/or manual information searching.

C. Problem Abstract Dissemination

An information searching has revealed no potential solutions and a problem abstract is being circulated to individual scientists and engineers at NASA centers and contractor facilities to solicit suggestions.

D. Evaluation

Potentially useful information or technology has been identified and is being evaluated by the team and/or the problem originator.

E. Potential Technology Application

Information or technology has been evaluated and found to be of potential value but has not been applied.

F. Follow-Up Activity

Useful information has been identified, but further activity (i.e., documentation, obtaining experimental validation of utility, continuing modification, etc.) is required.

G. Prototype Hardware

Prototype hardware has been sent to problem originator for evaluation.

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Problem Number	Status Code	Problem Title
AEB-1	E	Method for Identifying Denominations of Paper Money
AEB-2	E	Measurement of Physiologic Stress Parameters
AEB-3	A	A Light Sensitive Vocation Rehabilitation Aid
AEB-4	E	Apparatus for Measuring Tactile Spatial Separation
AVA-2	D	Carotid Artery Pressure Waveform Measurement
BLM-17	B	Improved Procedures to Measure Regional Blood Flow in Kidney
BMC-4	D	Improved Arch Support Material
BMC-6	D	Bio-feedback Training of Experimental Subjects
BUD-1	D	Heat and Stress Resistant, High Strength Plastic for Fabrication of Orthotic Devices
BVA-1	G	X-Ray Transparent Electrodes and Leads
BVA-4	E	Portable ECG Telemetry Receiver and Tape Recorder
CHS-10	D	Hearing Aid Malfunction System
CRH-1	B	Differentially Inflated Segmented Seat Cushion
CRH-2	B	Low-Friction Porus Material for Orthopedic Collar
CRH-3	B	Means to Minimize Venous Pooling
CRH-4	B	Portable, Compact Breathing Machine
CRH-5	B	Improved Clamp for Urine Collection Device
CRH-6	B	Urine Collection Device for Incontinence in Female
DLM-14	D	Detection of Kidney Stones During Surgery
FTZ-1	E	On-Line Breath Analyzer

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Problem Number	Status Code	Problem Title
GLM-32	G	ECG Preamplifier for Home Tape Recorder
GLM-35	E	Beta Radiation Catheter Probe
GLM-39	E	Artificial Speech Synthesizer
GLM-40	D	Telemetry from Divers
GLM-43	D	Quick Attachment/Release Clamp
GLM-44	B	Quickly Adjustable Crutch
GLM-45	B	Material for Water Immersible Stretcher
GLM-50	B	Catheter Support for Rehabilitation Patients
GLM-51	B	Pressure Telemetry Alarm for Hydrocephalics
GVA-6	D	Respiration Monitor
HPH-1	D	Particle Detector Monitor for Clean Room Surgery
HSR-6	E	Sight Switch Operated Prehension Device
HUV-20	E	Perceptual Motor Testing of the Severely Disabled
HUV-22	D	Automobile Driving Assist for Triplegic
HUV-23	E	Automatically Operated Magnetic Tape Cassette Recorder
IOU-1	B	Method for Measurement of the Amount of Humidity Present in the Lower Respiratory Tract
LLU-10	D	Non-Invasive Techniques for Measuring Oxygen Count in the Blood
LSU-1	D	Physiological Effects of Motion Sickness Drugs
LSU-2	D	Whole Body Radiation Measurement

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Problem Number	Status Code	Problem Title
LVA-3	D	Radioactive Microcell Counting Techniques for Diagnosis and Treatment of Leukemic Disorders
LVA-8	D	Abrasive-resistant Plastic Material for use in Trace Element Research Programs
MHH-1	E	Rapid Identification of Surgical Instruments
MSC-1	E	Portable Scalp Cooling Device
NMA-1	D	Program to Establish Electrical Safety Standards for Equipment and Instruments Used Around Patients
NMA-10	D	Video Tape Programming for Speech Therapy
NMV-1	D	Control System to Permit Quadriplegics to Operate Long Playing Recording Devices
NUM-1	D	Methods for Interpreting Ultrasonic Doppler Blood Flow Velocity Signals
NUM-2	D	Measure Diameter of Femoral Artery by Ultrasonic Pulse-Echo Method
OCH-1	E	Plastic Long Leg Braces for Children
OCH-5	C	Failure Resistant Cerebrospinal Fluid Shunt
OCH-6	D	Sensory Hemiplegiac Stimulator
OVA-2	E	Measurement of Lung Compliance
OVA-4	G	Assessing Sleep Psychophysiology in Extreme Environments
PPR-1	B	Home Paging System for Reminding Elderly Patients of Medication Times
RNV-34	D	Pressure Sensitive Device for Use in Tongue Operated Control Systems for Artificial Organs and Wheelchairs
ROS-2	D	Method for Measuring Blood Gas Without Breaking the Skin

APPENDIX A...CURRENTLY ACTIVE PROBLEMS...continued

Problem Number	Status Code	Problem Title
RRC-1	D	High Energy Cost Exerciser with Ergometric Monitor
RRC-2	G	Accurate Cardiac Telemetry from Active Subjects
RRC-6	B	Lightweight, Portable Cushion Seat Jack for Weak or Paralyzed Patients
RRC-8	D	Ultra Thin Electromyographic Needles
SLU-1	B	Elimination of Motion Artifact from EEG Leads in Pedestal Equipped Animals
SNM-13	D	Miniature pH Electrode for Fetus
SNM-14	D	Fetal ECG Telemetry
SNM-15	D	Uterine Pressure Telemetry
SNM-25	B	Development of an In Vivo Blood Glucose, pH and pO_2 Analyzer
SNM-26	E	Monitoring of Pelvic Pressure of Women During Labor
SWC-2	E	Cortical Audiometry Measurements
SWR-1	F	Custom Fitted Composite Leg Brace
TCB-2	C	Blind Person Guidance Detector of Impregnated Paint or Wire Boundary Market
TCB-17	D	Acoustic Signal to alert Blind Persons to Obstacles between the Waist and Head
TCB-18	E	Permanent Reflective Coating for Use on Canes for the Blind
TCB-19	B	Navigation Assistance to keep Blind on a Set Direction of Travel
TCD-1	F	Portable Sound Meter for Use by Deaf
TCD-2	F	Warning System for Use by Deaf
TCD-3	F	Portable Substitute for Door/Telephone Bell for Deaf
TCD-4	E	Noise Activated Flasher Warning for Deaf Driver

APPENDIX A...CURRENTLY ACTIVE PROBLEMS...continued

Problem Number	Status Code	Problem Title
TCD-5	D	Speech Analyzer
TCD-9	G	Portable Amplifier System for Patient with Partially Inactivated Vocal Cords
TCM-3	D	Peak Detector for Signal Conditioning of Blood in Basic Medical Research
TPR-1	G	Electro-Sleep Electrodes
TPR-2	B	Device to Correct Foot Pronation
TTU-1	D	Automated Instructional Activity Machines for Mental Retardates
TTU-2	D	Vocational Assessment Apparatus for the Physically and Culturally Handicapped Person
TVA-2	G	Portable Heart Rate Indicator for Active Patients
UAD-3	E	Determination of Tooth Vitality
UAD-4	D	Tooth Vitality Measured by Nerve Condition
UAD-7	E	Telemetry of Oral pH for Determination of Linkage to Cavity Formation
UAM-1	E	Capacitative ECG Electrodes
UAM-2	G	Heart Sounds Telemetry
UAM-8	D	Electrical Safety for Hospital Patients
UAM-13	E	Flexible Oral Transducer Matrix
UFM-6	D	Xeroradiography of Mammary Glands for Cancer Detection and Multiphasic Health Screening
UOF-2	D	Low-Level Non-Invasive Blood Pressure Measurement
UOF-4	B	A Method for Determining Blood Coagulation by Phonocardiography

APPENDIX A
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Problem Number	Status Code	Problem Title
UTH-1	D	A Tactile Projector for Teaching Blind Students
UTM-25	B	Ionizing Radiation Detection of Thrombogenesis
UTM-31	D	Plastic Prosthetic Materials
UTM-32	D	Improved Design for Foot Supports
UTM-37	E	Butt-Welded Fine Gage Wire
UTM-38	E	Improved Urethral Valve for Nonsurgical Implantation
UTM-39	D	Multi-Channeled Hypothermia Blanket for Heart Surgery
UTM-40	D	Detecting Oxygen Toxicity in the Lung
UTM-41	D	Measurement of Thrombus Adhesion to Blood Vessel Wall
UTM-42	D	Composites for Internal Biocompatible Protheses
UTM-43	D	Techniques for Characterizing Surface Roughness Under Electron Micrography
UTM-44	D	Detection/Measurement of Microbubbles or Microthrombi in the Blood
WLH-2	G	Device to Clinically Evaluate Nasal-Airway Obstructions
WMC-1	G	Plethys mographic Data Interfacing System
WMC-2	D	Identification of Korotkoff Diastolic Point
WMC-3	D	Optimum Methodology for Analyzing Cardiovascular Data

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APPENDIX B
PLANS FOR UPCOMING MONTH

During the upcoming month, team representatives will visit NASA Headquarters, Goddard Space Flight Center, Langley Research Center, and Marshall Space Flight Center, in connection with applications engineering efforts underway at these centers on the team's behalf.

The team will also conduct an evaluation of the revised complex coordinator (developed at Langley and modified by a contractor) to assess its utility for work sampling procedures in rehabilitation medicine. The results will be presented at a conference to be held at NASA Headquarters at the end of the month.

In consonance with guidance provided earlier, the team is exploring initiation of problem activity by the Federal Medical Services---the aim being to attempt to have such agencies share in the cost of developing prototype instrumentation and equipment. To this end, a series of conferences will be held with senior medical personnel at Brooke Army Medical Center regarding technology of potential interest. Considerable interest has been expressed in the visual sensitivity tester developed at Ames Research Center, which--with modification---may hold considerable promise for testing visual fields. This is a principal diagnostic procedure used for glaucoma follow-up, to assess deterioration. The U. S. Army Medical Service has also expressed considerable interest in application of composite technology for fabrication of orthotic and prosthetic appliances.

To the extent that time permits, team visits will be made to institutions which have problems pending and for which problem solutions from NASA technology have been proposed. The aim will be to determine what, if anything, the team can do to facilitate implementation of the proposed solution. In this connection, additional candidates for applications engineering will be recommended--particularly in those cases where pertinent NASA technology has been identified, which promises a solution to a problem of biomedical significance.

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BIOMEDICAL APPLICATIONS TEAM

APPENDIX C
TIME/EFFORT SUMMARY FOR THE PERIOD

NON-PROBLEM RELATED ACTIVITIES	HOURS
Program Analysis and Evaluation:	15
Program Management:	23
Program Promotion:	48
Symposium and Conference Attendance:	16
Report Preparation:	
Monthly:	40
Final:	
Other: _____	
Secretarial:	75
Other (Specify)	
_____	
_____	
_____	
Total Non-Problem Related Activities:	217
PROBLEM RELATED ACTIVITIES, TOTAL:	438
Total Hours for the Period December, 1972	655
Average Hourly Rate for the Team:	$ 16.11