

WHITMORE ENTERPRISES

DESIGNING AND MANUFACTURING

BLOOD PRESSURE MONITORING & RECORDING DEVICES • HYPOBARIC & HYPERBARIC CHAMBER CONTROLS
RESEARCH TREADMILLS, ERGOMETERS, & HUMAN BODY VOLUMETERS
AND SPECIALIZED MEDICAL & AEROSPACE RESEARCH DEVICES

RT. 5 BOX 369

SAN ANTONIO, TEXAS 78211

Henry B. Whitmore
(512) 624 - 2121
or 532 - 3344

VOLUME I

TECHNICAL PROPOSAL

for

EXHIBIT "A"

LOWER BODY NEGATIVE PRESSURE SUIT

#9-BB6-32-2-056P

EXHIBIT "A"

LOWER BODY NEGATIVE PRESSURE SUIT

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We propose to develop a system that will have the capability of applying negative pressure to the lower extremities of the human body. This system should have capability of providing this negative pressure in a series of steps divided by pressure seals between steps. The pressure in each step will be controlled by individual vacuum regulating valves, capable of maintaining the desired pressure differential between these steps or segments.

This system should have the capability of with standing ambient pressure and still have some mobility.

We will provide ports to monitor pressure in each individual segment.

This system when completed will be incorporated into one leg unit enclosing the foot all the way up to the groin level.

TASK I:

Will be spent developing a seal that will have a reasonable leak rate while maintaining comfort and having the capability of fitting a reasonable size variation. We hope to accomplish this by using a sealed cell foam material similar to the type used in the access ports in full body respirators (iron lungs).

If this type is not satisfactory we may use the type used in neck seals on partial pressure suits, but this would mean giving up some comfort, so I prefer the first approach.

TASK II:

This time will be used developing a small but sensitive negative pressure regulator valves to maintain the pressure differential between segments, to accomplish this we hope to develop a valve similar to the ones used in the exhalation valves on pressure breathing oxygen masks, this type would be mounted outside of the suit segments and connected through port or pressure taps.

TASK III:

This time will be spent developing a segment of a garment capable of withstanding ambient pressure without collapsing inward against the lower extremities. I believe this can best be accomplished by incorporating a series of small inflatable tubes running from the groin area to the ankle encircling the extremities, this system would resemble an air mattress but with much smaller diameter tubes. This type construction is very similar to the system I used in the Boyls Law Pressure Suit and it has greater mobility than the type incorporating circular ring that we also tried but discarded because of poor mobility.

TASK IV:

This final phase will integrate the systems developed in TASK I, II and III into fabricating a leg segment of a suit to demonstrate how the suit could be fabricated and to test the performances of this leg segment. A shoulder harness will be provided if found to be necessary.

A negative pressure pump will be provided to demonstrate this system.

We suggest the unit be tested and accepted in plant at Whitmore Enterprises location so that we can assist further test and development of final or complete suit.

PROFESSIONAL BACKGROUND OF OFFEROR:

The engineering and construction program will be completely under the supervision and technical experience of Mr. Henry B. Whitmore who has more than 10 years experience in Flight Pressure Suit development and testing, and have several United States Patents in pressure suits, and completed more than 10 years in development and construction of physical fitness exercisers and evaluators and monitoring equipment for training air crews in altitude chambers, as well as many other simulated flights facilities. Plus development of Prototype No. 1 and Prototype No. 2 for NASA and the Flight Prototype Treadmill which was of such Quality that it was Space Qualified and has made two (2) successful Space Shuttle Flights and is now scheduled to make a third (3) Flight. I also designed and fabricated the Hand Centrifuge used to separate Hydrogen Gas from Water. This has also been used on the Space Shuttle. We also designed and fabricated an ergometer for a space chamber requirement.

PROFESSIONAL BACKGROUND OF OFFEROR - Page 2:

I am now furnishing a number of the components that will be used on the next Shuttle Flight in some of the Visual and Vistibular experiments. I am doing this work for NASA through Technology Incorporated.

As you can see we have the full capability and the reputation in handling difficult Research and Development Projects, we only fall short in the Technical Writing and Documentation end which in NO WAY effects the final outcome of the afore mentioned Tasks.

Mr. Whitmore presently holds over 17 Inventions, and related Patents in the field of physiological test equipment. A complete list and more detailed explanation of patents and inventions will be furnished upon request.

WORK AND DELIVERY SCHEDULE

Our Schedule for WORK PERFORMANCE IS:

- 1) We would like to have three (3) calendar months to complete this project.
- 2) TASK I - On approximately 15 days after receipt of contract award, this total effort breaks down to:
 - a) Design and engineering - 15 hours
 - b) Construction - 30 hours
 - c) Test and modification - 15 hours
 - d) Task I, Man Hour Total - 60 hours
- 3) TASK II - On approximately 25 days after receipt of contract this total effort breaks down to:
 - a) Design and engineering - 10 hours
 - b) Construction - 20 hours
 - c) Test and modification - 10 hours
 - d) Task II, Man Hour Total - 40 hours
- 4) TASK III - On approximately 70 days after receipt of contract award, this total effort breaks down to:
 - a) Design and engineering - 25 hours
 - b) Construction - 55 hours
 - c) Test and modification - 40 hours
 - d) TASK III, Man Hour Total - 120 hours
- 5) TASK IV - On approximately 90 days after receipt of contract award, this total effort breaks down to:
 - a) Design and engineering - 30 hours
 - b) Construction - 60 hours
 - c) Test and modification - 65 hours
 - d) TASK IV, Man Hour Total - 155 hours

Our Schedule for DELIVERY IS:

We will deliver Exhibit "A" Lower Body Negative Pressure Suit, but we suggest the unit be tested and accepted in plant at Whitmore Enterprises location so that we can assist further test and development of final or complete suit.

MANNING TABLE

MAN-MONTHS BY

TIME
Days
FROM CONTRACT
60-AHEAD)

CLASSIFICATION→
& TASK
↓

DES & ENG.
CONSTRUCT
TEST & MOD

			TOTAL	% OF TOTAL	TASKS	SUPERVISION	PROFESSIONAL	TECHNICAL	CLERICAL
10	20	30	TASK I - DESIGN & DEVELOPING A SEAL = 60 MAN HOURS						
X			15 hours	.04	DESIGN			X	
	X		30 hours	.08	CONSTRUCTION			X	
	X		15 hours	.04	TEST & MOD			X	
20	30	40	TASK II - DESIGN & DEVELOPING NEGATIVE PRESSURE REGULATOR VALVES = 40 MAN HOURS						
X			10 hours	.026	DESIGN			X	
X	X		20 hours	.053	CONSTRUCTION			X	
X			10 hours	.026	TEST & MOD			X	
50	60	70	TASK III - DESIGN & DEVELOPING GARMENT SEGMENT = 120 MAN HOURS						
X			25 hours	.066	DESIGN			X	
X	X		55 hours	.146	CONSTRUCTION			X	
X			40 hours	.106	TEST & MOD			X	
70	80	90	TASK IV - INTEGRATION OF DEVELOPMENT TASKS I, II & III INTO LEG SEGMENT = 155 MAN HOURS						
X	X		30 hours	.08	DESIGN			X	
X	X		60 hours	.16	CONSTRUCTION			X	
X	X		65 hours	.173	TEST & MOD			X	
			375 hrs.	100%	TOTAL MAN-HOURS				
				100%	PERCENT OF TOTAL				

NOTE: This form is furnished as a guideline for submitting required information to the MSC Procurement and Contracts Division. Number of months (first 4 columns) should include time through completion of contracts. (Only 4 months are shown because of space limitation.)

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Whitmore Enterprises is a research and development corporation specializing in equipment design and development. We have complete design and manufacturing capacity. We welcome the opportunity to assist your company in this phase of your operation.

The following are some of our achievements and accomplishments:

Weight Control

Development and manufacture of the **New Improved Volumeter**, which is used to determine percent of body fat in weight control programs. The Volumeter is now accepted as the most accurate equipment to perform this task by hospitals, clinics and fitness centers.

NASA Space Program

Developed and built Treadmill for the NASA Space Program. This lightweight treadmill weighs only 38 pounds and can be disassembled for storage and reassembled without tools in less than 5 minutes, thus allowing the Astronauts in space to exercise by walking, jogging and running.

Cancer Research

Designed and built Patient Immobilization and Positioning System, now being used by the **Cancer Research Center** at Los Alamos, New Mexico. Use of this unit has cut the time required for properly positioning each patient for radiation treatment from 45 minutes to less than 5 minutes. This allows treatment of five times the number of patients in the same facility without using additional radiation accelerators, thus saving millions of dollars.

Packaging Industry

We have developed two types of Automatic Orienting Machines used in packaging in the **Candy Industry**. The efficiency of these systems greatly reduce labor costs by increased production.

Association For the Blind

We have recently developed two types of equipment for use by the blind or otherwise handicapped in the manufacture of automatic pens and pencils. Additional machinery is currently being developed for this industry.

Solar-Wind Energy

Currently we are involved in a wind electricity generation system for household use. We would welcome an opportunity to work with qualified companies in a joint effort.

WHITMORE ENTERPRISES IS EQUIPPED WITH A MORE THAN SUFFICIENT NUMBER AND VARIETY OF MODERN MACHINERY AND EQUIPMENT FULLY CAPABLE OF IN-HOUSE DEVELOPMENT.