

Justification for Other than Full and Open Competition for Whitmore Treadmill

No other contractor has the experience nor the unique and proprietary design features to meet the requirements for this item. Not only has the contractor established an unsurpassed record in design, production, cost, delivery, reliability (there has never been an inflight treadmill failure including 10 flights of the original 1g prototype) but he also has the only experience to date in such work on the orbiter treadmill.

More importantly he has invested large, unreimbursed amounts of his own time, efforts and resources in a variety of improved designs. This includes two unique and essential designs for this item (belt and subject load) for which patents are pending.

This contractor probably has more experience than any other in provision of flight hardware for use in crew exercise devices and life sciences studies. In addition to the orbiter treadmills, he has designed, built and qualified a flight prototype improved waste collection system. Some 10 items of his have been flown for investigations ranging from head position goniometers, through inflight height scales and precision mechanical oscillators.

Without his unique capabilities the design of this device could not be considered. The current price and delivery would also be increased several fold by any other contractor.

## Statement of Work for Treadmill

1. **Scope.** General task consists of fabrication and delivery of a 1g prototype Tread Mill and subject equivalent weight load system for use on the orbiter. It will be a 1g test and demonstration of an equipment design for hardware which can be flown on orbiter as a replacement for the existing treadmill. It will also provide experience and form the basis for design for the space station treadmill. A number of limitations and deficiencies of the present T/M will be overcome with the new design. Success of the unit will depend upon the unique experience and proprietary design of one contractor.

2. Contractor's tasks:

To design, fabricate, demonstrate its function, and deliver a 1g prototype treadmill as described in the following paragraph. This development will be closely monitored such that minimal reporting and documentation will be required as stated in paragraph 5.

3. Contract end items will consist of a subject driven treadmill with the following characteristics and capacities:

Tread size - 14 x 48 ± 1 in

Tread type - low noise, uniflex design, proprietary to Whitmore Ent.

Speeds - 7 approximately equal fixed steps from 2 to 6 mph selected through a manual control located on the TM body. (10° 1g elevation and 200 lbs. subject or equivalent conditions)

Speed will be indicated by a 5% accuracy tachometer and analog meter readable to 0.2 mph with analog voltage available for 10K $\Omega$  load. Means for manually set elevation steps of 0, 5, 10, and 15% grade in 1g will be provided.

Tread will continuously support subject equivalent weight of 300# at equivalent grade of 10% and speeds to 5 mph.

Sound pressure level - goal will be 70dba measured at subject head level at 5 mph.

Life - indefinite with maintenance and replacement schedule specified by contractor - goal for belt life is 500 hours.

Provision only will be made for mounting of strain gages for total force measurement of subject forces normal to belt and for connecting a motor drive to the belt.

A subject handrail which can be laid parallel to tread or be elevated to typical subject hand heights will be provided. Speed indicator will be mounted on it.

Speed control mechanism and other features will be similar to those proven on orbiter T.M.s (produced by the same contractor) but improved as required to meet these specifications.

Permanent appropriate markings will be provided. All corners and angles will have appropriate radius and finish will be corrosion resistant anodize or equivalent.

#### Subject load device

A loading mechanism to provide subject forces normal to the tread over a range of 100 to 200 lbs. will be provided. The force will be essentially constant with a design goal of < 2% variation/inch displacement of load point.

Force will be provided to the subject by attachment of cables fore and aft to the existing orbiter treadmill harness. (Harness is not part of contract).

The force generator will be passive and is a proprietary design of the contractor.

It can be individually, manually adjusted over the range of force for each cable (50-100 lb. vertical force) by means of a suitable control.

Measured force will be displayed for each cable by a suitable indicator with a scale and accuracy such that it may be adjusted to  $\pm 5\%$ . Provision for a strain gage to measure this force will be provided.

Overall size and weight

6-1/2 x 19 x 63" exclusive of subject hand rail; and 100 lb design goal (light weight flight materials will not necessarily be used).

Provisions for attachment of 4 NASA orbiter mechanical supports (but not the supports) will be provided.

4. No requirements exist for conformance to existing documentation other than specified in 3. A monthly letter progress report will be provided.





National Aeronautics and Space Administration  
Lyndon B. Johnson Space Center  
Houston, TX 77058

# PURCHASE REQUEST

(See Instructions on Reverse Side)

1. Date 15 Sept. 1988

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2. Accounting Code

928-20-01-01-6A-VA2511CB.6

3. Originating Organization Request No.

CB

4. Purchase Request Control No.

5. Equipment Category

- Flight Equipment     Flight Experiments/Payloads     Test Article Only  
 Support Equipment     Nonflight Related

6. Government-Furnished Property Required

(If yes, identify property in block 13.)

- Yes     No

7a. Quality Requirement

- Category (A)     Category (C)     Not Applicable  
 Category (B)     Category (D)

7b. Reliability Requirement

- Category (A)     Not Applicable  
 Category (B)

7c. System Safety Requirement

- Category (A)  
 Not Applicable

8. Follow-on Procurement Required?

- Yes     No

Data Required?

- Yes     No

9. Contractor Will Require Access to Classified Information?

- Yes     No

Contractor Will Generate Classified Information?

- Yes     No

10. Item No.	11. Object Class Code	12. Mat. Stock No. Mfgr. Part No.	13. Description (Include statement on government facility changes - see JSCI 5101.6 as amended.)	14. Qty.	15. Unit of Issue	16. Unit Cost	17. Total Cost
			TO PROVIDE A 1G PROTOTYPE TREAD MILL IN ACCORDANCE WITH THE ATTACHED STATEMENT OF WORK.				98,000.00

18. Required Delivery Date/Performance Period

see SOW

19. Estimated Total Cost of Procurement

98,000.00

20. Total

98,000.00

21. Use

22. Type of Request

- a.  New Procurement    b.  Funding Action Only    c.  Add On/New Work (Cont. No. \_\_\_\_\_)    d.  Unsolicited Proposal (No. \_\_\_\_\_)    e.  CCA/CO

23. Sources (Attach additional sheet if necessary)

- Competitive (Source List attached)  
 Noncompetitive (IOFOC attached)

~~WHITMORE ENTERPRISE~~  
WHITMORE ENTERPRISE  
Box 369  
ROUTES  
SAN ANTONIO TX. 78221

24. Approval Signatures

	Date
Center Director	
Program Manager or Director	
Division Chief	
Branch Chief	
R&QA Safety	
Budget	
Supply Branch	
Other	

25. Tech. Monitor/Initiator (Name, Office Code & Ext.)

W. Thornton, CB 32785

26. Excess Review: Not available from excess lists/NEMS CDB file screening.

NEMS Reutilization Coordinator \_\_\_\_\_ Date \_\_\_\_\_

27. Acceptance

- At Source     At Destination  
 By Engineer     By Receiving

28. Fund Control

- Committed    Amount Committed \_\_\_\_\_  
 Not Available: Planning Purchase Request For Preliminary Proc. Process Only

Signature \_\_\_\_\_ Date \_\_\_\_\_

29. Shipping Instructions

Deliver to: Transportation Officer, JSC Building 420

Mark for: Individual/Office Code \_\_\_\_\_ Bldg. No. \_\_\_\_\_ Rm. No. \_\_\_\_\_ Ext. No. \_\_\_\_\_

30. Procurement Branch

31. Classification Code

32. Date