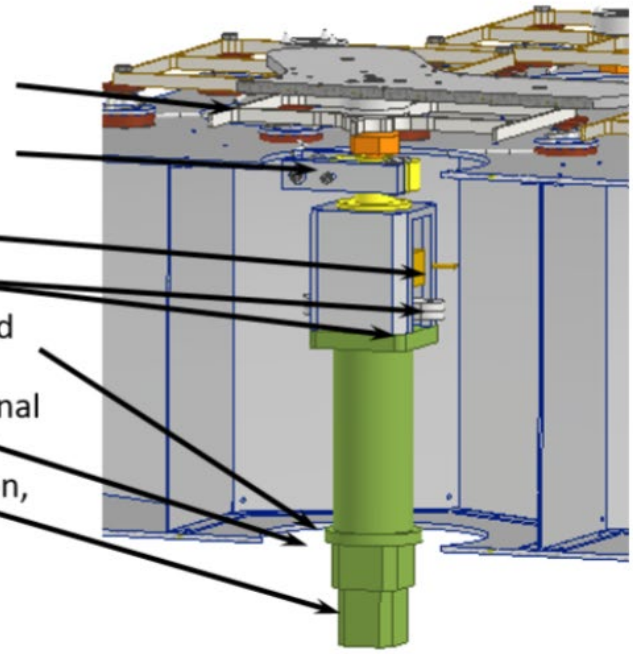
Attachment A, to RFP # L262203

1. General Information

- An Actuator design is being developed for the project by UArizona, for use in two applications: Static Support and Hardpoint.
- The Static Support design includes:
  - A springy static support
  - A release mechanism,
  - A loadcell,
  - A basic actuator mechanism.
- **The project is sourcing only the basic actuator mechanism in this RFP.**
- The basic actuator mechanism includes
  - A stepper motor,
  - A gear reducer,
  - A lead screw.
- The desired operation of the actuator mechanism is:
  - Turn motor on,
  - Go a few whole steps (even if they can be micro-stepped),
  - Turn motor off and hold position.
- The electrical motors and drivers are still in the requirements/ development stage, but they will have more functions than "*just a drive motor"*.
- Actuators will be operated in a vacuum.

Static Support Actuator Components

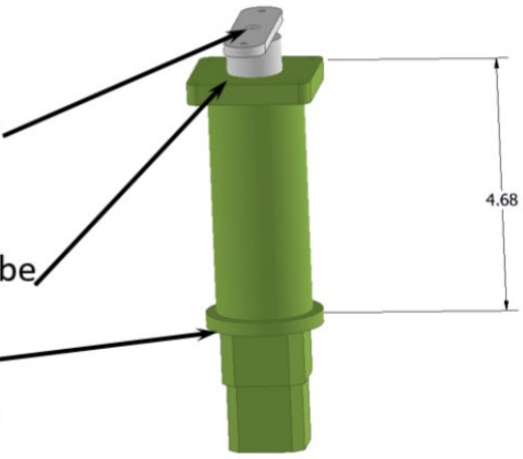
- Static support (6 way spring turns a position device to a force device)
- Release device to disengage a failed actuator
- Loadcell (for force feedback)
- Mount interfaces
- Through hole in platform for access and mounting 5” diameter
- Will need a interface flange for additional lateral support and heat path (TBD)
- Actuator (stepper motor, gear reduction, leadscrew, no encoder needed)



Position Actuator Properties

- Actuator Basic Shape
- ICD to be provided and possibly negotiated
- Rod Interface, two through holes for screws, maybe 2.625” on centers central pilot, maybe 0.25” diameter
- Primary load carrying interface, maybe 2.25” square with 4 mounting holes
- Secondary lower brace flange TBD
- Remove all attachments from below

Example model of device



2. Requirements

Performance Requirements	Description of Desired Parameters
Load: Dynamic/ Operational	1125N (253lbs) push and pull
Load: Static/ Holding	1500N (274lbs) push and pull, on device - single digit application
Load: Bench Testing	1000N push in room temperature
NEMA Size*	17 *NOTE: sizing is for point of reference, i.e., metric motor with same output force is acceptable
Vacuum Rated	yes
Actuator Total Travel / Stroke	25 mm
Interface	non-rotating top
Voltage	28V baseline, 24V to 32V DC variable
Step mode	200 full, 1.8 full step angle
Resolution	0.001 mm/step desired, .003 maximum
Gear Ratio	provide micron to 2-micron full steps
Backlash	permitted but not desired: no need for anti-backlash mechanism
Backdrive	not tolerated: actuators may be off for days at a time
Feedback/ Encoder	none
Lead Screw Type	acme: no need for ball
Operational Temperature	15° to 25°C
Survival Temperature	45°C to -40°C
Duty Cycle	5 minutes on, 1 hour off
Redundant Motor Wiring	not required
Speed	10mm per minute

Additional Considerations	Prototype	Production
Vacuum Rating	4 must be vacuum rated, 2 can be air rated/non-vacuum.	All must be vacuum rated.
Cleanliness	Visibly clean, free of oil, FOD and other contaminants.	Visibly clean, free of oil, FOD and other contaminants. Each unit bagged, tagged, and ready for installation in cleanroom environment.
Outgassing*	Bake-out of 4 vacuum rated units	Bake-out of all units
Certificate of Conformance	Yes	yes
** to include list of materials used for outgassing evaluation*		

Inspections and Verification:	**Prototype**	**Production**
Dimensional Inspection *†	All units: mounting features, hole locations, mtg threads	Same as prototype
Functional test verification at room temperature †	All units: stroke, speed, direction of drive as commanded	Same as prototype
Performance test verification at room temperature †	All units: dynamic load, static load, stroke, back drive, speed, direction of drive as commanded	Same as prototype except test lot size = 20
** 0 critical defects, 0 major defects, </= 2 minor defects*		
† to include results of test measurements / inspection data		

3. Additional Technical Considerations

- Step size is not critical: a spring and load cell provides feedback
- No serious restrictions on weight.
- Sizing confined by static support configuration. Actuator mechanism needs to fit into a 5”diameter, 10” deep hole (open bottom). Prefer mechanism to be </= 8” long.
- Parts that have successfully passed, are capable of passing, or that are based on existing heritage in space applications are desirable.

4. Additional Project Considerations:

- Initial effort is to prototype the design. The design is not 100% fixed and alternatives to desired requirements that provide cost or schedule savings are encouraged as additions to the quote (though no guarantee of acceptance).
- The project has ambitious cost and schedule parameters.
- Prototyping is planned for 2022, Q2-Q3
- Timely and responsive communication is critical

5. Business Information

- Selection Criteria
  - Delivery Time
  - Technical and Performance Requirements
  - Total Cost
  - Project Approach
  - Vendor Background
- Quote Info (see also Detailed Pricing instructions in 5.3 of RFP)
  - Two separate quotes based on details in Section 2.
    - **(Qty 6) prototype units**: 1st order to be placed at end of RFP. Need date is ASAP. To accelerate the development, 2 prototype units may be delivered without vacuum rating for early bench testing. Remaining 4 must be vacuum rated for TVAC testing.
    - **(Qty 200) production units***: 2nd order to be placed at end of prototyping. Need date is 12-14 months.
  - Added options to reduce cost and/or delivery time, which may include deviations from desired specifications, are encouraged and should be clearly delineated.
  - Vendor should propose a charge method for change orders.

** Exact quantity and requirements for production units will be defined during prototyping. For this RFP, use the same performance requirements as shown in Section 2. Changes will be communicated to the vendor prior to 2nd PO, for related adjustments in the quotation.*

6. Deliverables

- Quantity of units as defined on Purchase Order (PO)
- Furnish with units:
  - Certificate of Conformance (CoC)
  - Copy of major and critical, non-conformance or corrective action reports
  - Inspection and performance/ functional verification test reports as defined in Section 2List of materials and mass (for outgassing acceptance)
- List of all materials used and mass of materials, per actuator, for prototype and production units.
- Interface Control Drawing (ICD) as negotiated with UArizona engineering
- Monthly progress reports to include delivery status, tracking against agreed milestones, and communication of problems (with scenario for resolution)