Attachment A

Actuator Mechanism Procurement

Static Support Design: Actuators with Release

- Static Support Actuator Design includes
  - A springy static support
  - A release mechanism
  - A loadcell
  - An actuator mechanism
  - Needs to fit in 5” dia, open bottom hole (10” deep)

- We are only interested in procuring the actuator mechanism in this RFB

- Duty cycle 5 minutes on, 1 hour off

- Electrical
  - 28V baseline, 24V to 34V variance
  - Amperage TBD
  - No need for redundant motor wiring

Actuator Mechanism

- The basic mechanism being ordered consists of
  - A stepper motor
  - A gear reduction
  - A lead screw

- The desired operation is
  - Turn motor on,
  - Go a few whole steps (even though they can be micro stepping),
  - Turn motor off and hold position

- Step size is not critical: a spring and load cell provides feedback
• Reliability is not critical: can tolerate some failures (10% can fail)
• Commercial parts that have successfully passed/capable of passing, or based on existing heritage in space applications, are desirable
• Actuator mechanisms will be used for both the UA’s Static Support and Hardpoint designs

Actuator Mechanism Requirements

<table>
<thead>
<tr>
<th>Load: Dynamic/Operational</th>
<th>1125N (253lbs) push and pull</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load: Static/Holding</td>
<td>1500N (274lbs) push and pull, on device</td>
</tr>
<tr>
<td>Load: Bench Testing</td>
<td>1000N push</td>
</tr>
<tr>
<td>NEMA Size</td>
<td>17</td>
</tr>
<tr>
<td>Vacuum Rated</td>
<td>yes</td>
</tr>
<tr>
<td>Actuator Total Travel / Stroke</td>
<td>25 mm</td>
</tr>
<tr>
<td>Interface</td>
<td>non-rotating top</td>
</tr>
<tr>
<td>Voltage</td>
<td>28V baseline, 24V to 32V DC variable</td>
</tr>
<tr>
<td>Step mode</td>
<td>200 full, 1.8 full step angle</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.001 mm/step desired, .003 maximum</td>
</tr>
<tr>
<td>Gear Ratio</td>
<td>provide micron to 2 micron full steps</td>
</tr>
<tr>
<td>Backlash</td>
<td>permitted but not desired: no need for anti-backlash mechanism</td>
</tr>
<tr>
<td>Backdrive</td>
<td>not desired: actuators may be off for days at a time</td>
</tr>
</tbody>
</table>
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

### Additional Information
- 1st order is for 6 Prototype units: 2 can be air rated, 4 must be vacuum rated
  - Term for the Prototype for 2 air rated units to commence upon release of the Purchase Order and conclude 2 months thereafter, remaining 4 vacuum rated units will conclude 4 months thereafter
- 2nd order is for ~200 Production units*
  - Term for the follow-on Production units will commence upon release of the Purchase Order and conclude 14 months thereafter
- Project has ambitious cost and schedule parameters
- Project is not government/not military, but production units will be subject to ITAR controls

* 2nd order will be a follow-on to the prototype order. The exact quantity and requirements for production units is TBD.

For this RFB purpose, use same performance requirements as prototype and Qty of 200. Changes in performance or quantity will be communicated in advance of follow-on PO for adjustment as needed.

### Deliverables
- Quantity of units as defined on PO
- With 100% of prototype units:
  - Certificate of Conformance (CoC)
  - Non-conformance report (NCR)
  - Quality Control Reports
    - Inspection reports
    - Verification reporting
    - Analysis reports
  - Performance characteristics/ data package: technical, mechanical, constructional as applicable
- Interface Control Drawing (ICD)
- Production unit Quality Control
  - TBD with negotiation based on the results of the prototype