

SOLICITATION/CONTRACT/ORDER FOR COMMERCIAL ITEMS
OFFEROR TO COMPLETE BLOCKS 12, 17, 23, 24, & 30

1. REQUISITION NUMBER 57-4000-05		PAGE 1 OF 10	
2. CONTRACT NO.	3. AWARD/EFFECTIVE DATE	4. ORDER NUMBER	5. SOLICITATION NUMBER N00173-05-R-JS02
7. FOR SOLICITATION INFORMATION CALL: a. NAME Jamie Brown			6. SOLICITATION ISSUE DATE 12/09/2004

b. TELEPHONE NUMBER (No collect calls) (202) 767-459701		8. OFFER DUE DATE/ LOCAL TIME 01/10/05
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9. ISSUED BY CONTRACTING OFFICER NAVAL RESEARCH LABORATORY ATTN: CODE 3220.JS WASHINGTON DC 20375-5326	CODE N00173	10. THIS ACQUISITION IS <input checked="" type="checkbox"/> UNRESTRICTED <input type="checkbox"/> SET ASIDE: % FOR <input type="checkbox"/> SMALL BUSINESS <input type="checkbox"/> HUBZONE SMALL BUSINESS <input type="checkbox"/> 8(A) NAICS: 541330 SIZE STANDARD: \$4,000,000	11. DELIVERY FOR FOB DESTINATION UNLESS BLOCK IS MARKED <input checked="" type="checkbox"/> SEE SCHEDULE <input type="checkbox"/> 13a. THIS CONTRACT IS A RATED ORDER UNDER DPAS (15 CFR 700)	12. DISCOUNT TERMS
15. DELIVER TO CODE		16. ADMINISTERED BY CODE	13b. RATING D0-C9	14. METHOD OF SOLICITATION <input type="checkbox"/> RFQ <input type="checkbox"/> IFB <input type="checkbox"/> RFP

17a. CONTRACTOR/OFFEROR CODE	FACILITY CODE	18a. PAYMENT WILL BE MADE BY CODE
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TELEPHONE NO.	<input type="checkbox"/> 17b. CHECK IF REMITTANCE IS DIFFERENT AND PUT SUCH ADDRESS IN OFFER	18b. SUBMIT INVOICES TO ADDRESS SHOWN IN BLOCK 18a UNLESS BLOCK BELOW IS CHECKED <input type="checkbox"/> SEE ADDENDUM
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19. ITEM NO.	20. SCHEDULE OF SUPPLIES/SERVICES	21. QUANTITY	22. UNIT	23. UNIT PRICE	24. AMOUNT
	Offer Due Date: 10 January 2005 Local Time: 4:00 PM Est. <i>(Use Reverse and/or Attach Additional Sheets as Necessary)</i>				

25. ACCOUNTING AND APPROPRIATION DATA	26. TOTAL AWARD AMOUNT (For Govt. Use Only)
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<input type="checkbox"/> 27a. SOLICITATION INCORPORATES BY REFERENCE FAR 52.212-1, 52.212-4. FAR 52.212-3 AND 52.212-5 ARE ATTACHED. ADDENDA	<input type="checkbox"/> ARE	<input type="checkbox"/> ARE NOT ATTACHED
<input type="checkbox"/> 27b. CONTRACT/PURCHASE ORDER INCORPORATES BY REFERENCE FAR 52.212-4. FAR 52.212-5 IS ATTACHED. ADDENDA	<input type="checkbox"/> ARE	<input type="checkbox"/> ARE NOT ATTACHED

<input type="checkbox"/> 28. CONTRACTOR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN COPIES TO ISSUING OFFICE. CONTRACTOR AGREES TO FURNISH AND DELIVER ALL ITEMS SET FORTH OR OTHERWISE IDENTIFIED ABOVE AND ON ANY ADDITIONAL SHEETS SUBJECT TO THE TERMS AND CONDITIONS SPECIFIED HEREIN.	<input type="checkbox"/> 29. AWARD OF CONTRACT: REF. OFFER DATED _____, YOUR OFFER ON SOLICITATION (BLOCK 5), INCLUDING ANY ADDITIONS OR CHANGES WHICH ARE SET FORTH HEREIN, IS ACCEPTED AS TO ITEMS:
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30a. SIGNATURE OF OFFEROR/CONTRACTOR	31a. UNITED STATES OF AMERICA (SIGNATURE OF CONTRACTING OFFICER)
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30b. NAME AND TITLE OF SIGNER (Type or print)	30c. DATE SIGNED	31b. NAME OF CONTRACTING OFFICER (Type or print)	31c. DATE SIGNED
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1. CONTINUATION OF THE SF 1449 - SOLICITATION/CONTRACT/ORDER FOR COMMERCIAL ITEMS

A. Blocks 19 - 24 are completed as follows:

Item No.	Schedule of Supplies/Services	Quantity	Unit	Unit Price	Amount
0001	Low Power Anechoic Chamber Target System Design	1	LO	\$	\$

B. Block 25 is completed as shown on Attachment 2.

2. ADDENDA TO FAR 52.212-4 CONTRACT TERMS AND CONDITIONS--COMMERCIAL ITEMS (OCT 2003)

A. REQUIRED DELIVERY OR PERIOD OF PERFORMANCE

The required delivery is as follows:

(a) The Government requires delivery to be made according to the following schedule:

REQUIRED DELIVERY SCHEDULE		
<i>[Contracting Officer insert specific details]</i>		
Item No.	Quantity	Within Days After Date Of Contract
0001	1	Not Later Than December 31, 2005

The Government will evaluate equally, as regards time of delivery, offers that propose delivery of each quantity within the applicable delivery period specified above. Offers that propose delivery that will not clearly fall within the applicable required delivery period specified above, will be considered nonresponsive and rejected. The Government reserves the right to award under either the required delivery schedule or the proposed delivery schedule, when an offeror offers an earlier delivery schedule than required above. If the offeror proposes no other delivery schedule, the required delivery schedule above will apply.

OFFEROR'S PROPOSED DELIVERY SCHEDULE		
Item No.	Quantity	Within Days After Date Of Contract

(b) Attention is directed to the Contract Award provision of the solicitation that provides that a written award or acceptance of offer mailed, or otherwise furnished to the successful offeror, results in a binding contract. The Government will mail or otherwise furnish to the offeror an award or notice of award not later than the day award is dated. Therefore, the offeror should compute the time available for performance beginning with the actual date of award, rather than the date the written notice of award is received from the Contracting Officer through the ordinary mails. However, the Government will evaluate an offer that proposes delivery based on the Contractor's date of receipt of the contract or notice of award by adding (i) five calendar days for delivery of the award through the ordinary mails or (ii) one working day if the solicitation states that the contract or notice of award will be transmitted electronically. (The term "working day" excludes weekends and U.S. Federal holidays.) If, as so computed, the offered delivery date is later than the required delivery date, the offer will be considered nonresponsive and rejected.

B. AUTHORIZED GOVERNMENT REPRESENTATIVES

Authorized Government Representative (AGR) for Inspection and Acceptance- * ,Code * ,Telephone number * .

Security Matters- Contracting Officer for Security, Code 1221, (202) 767-2240, DSN 297-2240, email security-group@nrl.navy.mil

Safety Matters- Head Safety Branch, Code 3540, (202) 767-2232, DSN 297-2232, email safety@nrl.navy.mil

*(To be filled in at time of award)

C. ELECTRONIC AND INFORMATION TECHNOLOGY (EIT)

In accordance with Section 508 of the Rehabilitation Act of 1973 (29 U.S.C. 794d), all EIT supplies and services provided under this contract must comply with the applicable accessibility standards issued by the Architectural and Transportation Barriers Compliance Board at 36 CFR part 1194 (see FAR Subpart 39.2). Electronic and information technology (EIT) is defined at FAR 2.101.

D. REQUIREMENTS FOR ON-SITE CONTRACTORS

For those portions of the work under this contract performed at any NRL site, the contractor shall comply with the Requirements for On-Site Contractors dated 30 July 2004 which are hereby incorporated by reference. The full text is available at <http://heron.nrl.navy.mil/contracts/home.htm>.

3. FAR 52.212-5 CONTRACT TERMS AND CONDITIONS REQUIRED TO IMPLEMENT STATUTES OR EXECUTIVE ORDERS--COMMERCIAL ITEMS (OCT 2004)

(a) The Contractor shall comply with the following Federal Acquisition Regulation (FAR) clauses, which are incorporated in this contract by reference, to implement provisions of law or Executive orders applicable to acquisitions of commercial items:

(1) 52.233-3, Protest after Award (AUG 1996) (31 U.S.C 3553).

(2) 52.233-4, Applicable Law for Breach of Contract Claim (OCT 2004) (Pub. L. 108-77, 108-78)

(b) The Contractor shall comply with the FAR clauses in this paragraph (b) that the Contracting Officer has indicated as being incorporated in this contract by reference to implement provisions of law or Executive orders applicable to acquisitions of commercial items :

(Contracting Officer check as appropriate.)

- (1) 52.203-6, Restrictions on Subcontractor Sales to the Government (JUL 1995), with Alternate I (OCT 1995)(41 U.S.C.253g and 10 U.S.C.2402).
- (2) 52.219-3, Notice of Total HUBZone Set-Aside (Jan 1999) (15 U.S.C. 657a).
- (3) 52.219-4, Notice of Price Evaluation Preference for HUBZone Small Business Concerns (Jan 1999) *(if the offeror elects to waive the preference, it shall so indicate in its offer)* (15 U.S.C. 657a).
- (4) (i) 52.219-5, Very Small Business Set-Aside (JUN 2003) (Pub. L. 103-403, section 304, Small Business Reauthorization and Amendments Act of 1994)
- (ii) Alternate I (MAR 1999) to 52.219-5
- (iii) Alternate II (JUN 2003) to 52.219-5
- (5) (i) 52.219-6, Notice of Total Small Business Set-Aside (JUN 2003) (15 U.S.C. 644).
- (ii) Alternate I (OCT 1995) of 52.219-6
- (iii) Alternate II (MAR 2004) of 52.219-6
- (6) (i) 52.219-7, Notice of Partial Small Business Set-Aside (JUN 2003) (15 U.S.C. 644).
- (ii) Alternate I (OCT 1995) of 52.219-7
- (iii) Alternate II (MAR 2004) of 52.219-7

- (7) 52.219-8, Utilization of Small Business Concerns (MAY 2004) (15 U.S.C.637 (d)(2) and (3)).
- (8) (i) 52.219-9, Small Business Subcontracting Plan (JAN 2002)(15 U.S.C.637 (d)(4)).
- (ii) Alternate I (OCT 2001) of 52.219-9.
- (iii) Alternate II (OCT 2001) of 52.219-9.
- (9) 52.219-14, Limitations on Subcontracting (DEC 1996) (15 U.S.C.637(a)(14)).
- (10) (i) 52.219-23, Notice of Price Evaluation Adjustment for Small Disadvantaged Business Concerns (JUN 2003) (Pub. L. 103-355, section 7102, and 10 U.S.C. 2323) (if the offeror elects to waive the adjustment, it shall so indicate in its offer)
- (ii) Alternate I (JUN 2003) of 52.219-23.
- (11) 52.219-25, Small Disadvantaged Business Participation Program - Disadvantaged Status and Reporting (OCT 1999) (Pub L. 103-355, section 7102, and 10 U.S.C. 2323).
- (12) 52.219-26, Small Disadvantaged Business Participation Program - Incentive Subcontracting (OCT 2000) (Pub. L. 103-355, section 7102, and 10 U.S.C. 2323).
- (13) 52.219-27, Notice of Total Service-Disabled Veteran-Owned Small Business Set-Aside (MAY 2004).
- (14) 52.222-3, Convict Labor (JUN 2003) (E.O. 11755).
- (15) 52.222-19, Child Labor –Cooperation with Authorities and Remedies (JUN 2004) (E.O. 13126).
- (16) 52.222-21, Prohibition of Segregated Facilities (Feb 1999)
- (17) 52.222-26, Equal Opportunity (APR 2002)(E.O.11246).
- (18) 52.222-35, Equal Opportunity for Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans (DEC 2001) (38 U.S.C.4212).
- (19) 52.222-36, Affirmative Action for Workers with Disabilities (JUN 1998) (29 U.S.C.793).
- (20) 52.222-37, Employment Reports on Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans (DEC 2001) (38 U.S.C.4212).
- (21) (i) 52.223-9, Estimate of Percentage of Recovered Material Content for EPA-Designated Products (AUG 2000) (42 U.S.C. 6962(c)(3)(A)(ii)).
- (ii) Alternate I (AUG 2000) of 52.223-9 (42 U.S.C. 6962(i)(2)(c)).
- (22) 52.225-1, Buy American Act – -Supplies (JUN 2003) (41 U.S.C.10a – 10d).

- (23) (i) 52.225-3, Buy American Act –Free Trade Agreements—Israeli Trade Act (OCT 2004) (41 U.S.C.10a –10d, 19 U.S.C.3301 note, 19 U.S.C. 2112 note, Pub. L. 108-77, 108-78).
- (ii) Alternate I (JAN 2004) of 52.225-3.
- (iii) Alternate II (JAN 2004) of 52.225-3.
- (24) 52.225-5, Trade Agreements (OCT 2004) (19 U.S.C. 2501, *et seq.*, 19 U.S.C. 3301 note).
- (25) 52.225-13,Restrictions on Certain Foreign Purchases (DEC 2003) (E.o.s. proclamations, and statutes administered by the Office of Foreign Assets Control of the Department of the Treasury).
- (26) 52.225-15,Sanctioned European Union Country End Products (FEB 2000) (E.O.12849).
- (27) 52.225-16,Sanctioned European Union Country Services (FEB 2000) (E.O.12849).
- (28) 52.232-29,Terms for Financing of Purchases of Commercial Items (FEB 2002) (41 U.S.C. 255(f), 10 U.S.C. 2307(f)).
- (29) 52.232-30,Installment Payments for Commercial Items (OCT 1995) (41 U.S.C. 255(f), 10 U.S.C. 2307(f)).
- (30) 52.232-33, Payment by Electronic Funds Transfer -- Central Contractor Registration (OCT 2003) (31 U.S.C. 3332).
- (31) 52.232-34, Payment by Electronic Funds Transfer --Other than Central Contractor Registration (MAY 1999) (31 U.S.C. 3332).
- (32) 52.232-36, Payment by Third Party (MAY 1999) (31 U.S.C. 3332).
- (33) 52.239-1, Privacy or Security Safeguards (AUG 1996) (5 U.S.C.552a).
- (34) (i) 52.247-64, Preference for Privately Owned U.S.-Flag Commercial Vessels (APR 2003) (46 U.S.C. Appx 1241and 10 U.S.C. 2631).
- (ii) Alternate I (APR 2003) of 52.247-64.

(c) The Contractor shall comply with the FAR clauses in this paragraph (c), applicable to commercial services, that the Contracting Officer has indicated as being incorporated in this contract by reference to implement provisions of law or Executive orders applicable to acquisitions of commercial items :

(Contracting Officer check as appropriate.)

- (1) 52.222-41, Service Contract Act of 1965, As Amended (MAY 1989) (41 U.S.C.351, *et seq.*).

- (2) 52.222-42, Statement of Equivalent Rates for Federal Hires (MAY 1989) (29 U.S.C.206 and 41 U.S.C.351, *et seq.*).
- (3) 52.222-43, Fair Labor Standards Act and Service Contract Act -- Price Adjustment (Multiple Year and Option Contracts) (MAY 1989) (29 U.S.C.206 and 41 U.S.C.351, *et seq.*).
- (4) 52.222-44, Fair Labor Standards Act and Service Contract Act - Price Adjustment (FEB 2002) (29 U.S.C.206 and 41 U.S.C.351, *et seq.*).
- (5) 52.222-47, SCA Minimum Wages and Fringe Benefits Applicable to Successor Contract Pursuant to Predecessor Contractor Collective Bargaining Agreement (CBA) (MAY 1989) (41 U.S.C.351, *et seq.*).

(d) *Comptroller General Examination of Record.* The Contractor shall comply with the provisions of this paragraph (d) if this contract was awarded using other than sealed bid, is in excess of the simplified acquisition threshold, and does not contain the clause at 52.215-2, Audit and Records -- Negotiation.

(1) The Comptroller General of the United States, or an authorized representative of the Comptroller General, shall have access to and right to examine any of the Contractor's directly pertinent records involving transactions related to this contract.

(2) The Contractor shall make available at its offices at all reasonable times the records, materials, and other evidence for examination, audit, or reproduction, until 3 years after final payment under this contract or for any shorter period specified in FAR Subpart 4.7, Contractor Records Retention, of the other clauses of this contract. If this contract is completely or partially terminated, the records relating to the work terminated shall be made available for 3 years after any resulting final termination settlement. Records relating to appeals under the disputes clause or to litigation or the settlement of claims arising under or relating to this contract shall be made available until such appeals, litigation, or claims are finally resolved.

(3) As used in this clause, records include books, documents, accounting procedures and practices, and other data, regardless of type and regardless of form. This does not require the Contractor to create or maintain any record that the Contractor does not maintain in the ordinary course of business or pursuant to a provision of law.

- (e) (1) Notwithstanding the requirements of the clauses in paragraphs (a), (b), (c) or (d) of this clause, the Contractor is not required to flow down any FAR clause, other than those listed in paragraphs (i) through (vi) of this paragraph in a subcontract for commercial items. Unless otherwise indicated below, the extent of the flow down shall be as required by the clause –

(i) 52.219-8, Utilization of Small Business Concerns (MAY 2004) (15 U.S.C. 637 (d)(2) and (3)), in all subcontracts that offer further subcontracting opportunities. If the subcontract (except subcontracts to small business concerns) exceeds \$5000,000 (\$1,000,000 for construction of any public facility), the subcontractor must include 52.219-8 in lower tier subcontracts that offer subcontracting opportunities.

(ii) 52.222-26, Equal Opportunity (APR 2002) (E.O.11246).

- (iii) 52.222-35, Equal Opportunity for Special Disabled Veterans, Veterans of the Vietnam Era, and Other Eligible Veterans (DEC 2001) (38 U.S.C.4212).

Vietnam Era (38 U.S.C.4212).

4. 252.212-7001 -- CONTRACT TERMS AND CONDITIONS REQUIRED TO IMPLEMENT STATUTES OR EXECUTIVE ORDERS APPLICABLE TO DEFENSE ACQUISITIONS OF COMMERCIAL ITEMS. (SEP 2004)

- (a) The Contractor agrees to comply with the following Federal Acquisition Regulation (FAR) clause which, if checked, is included in this contract by reference to implement a provision of law applicable to acquisitions of commercial items or components.

52.203-3 Gratuities (APR 1984) (10 U.S.C. 2207).

- (b) The Contractor agrees to comply with any clause that is checked on the following list of Defense FAR Supplement clauses which, if checked, is included in this contract by reference to implement provisions of law or Executive orders applicable to acquisitions of commercial items or components.

252.205-7000 Provision of Information to Cooperative Agreement Holders (DEC 1991) (10 U.S.C. 2416).

252.219-7003 Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan (DoD Contracts) (APR 1996) (15 U.S.C. 637).

252.219-7004 Small, Small Disadvantaged and Women-Owned Small Business Subcontracting Plan (Test Program) (JUN 1997) (15 U.S.C. 637 note).

252.225-7001 Buy American Act and Balance of Payments Program (APR 2003) (41 U.S.C. 10a-10d, E.O. 10582).

252.225-7012 Preference for Certain Domestic Commodities (JUN 2004) (10 U.S.C. 2533a).

252.225-7014 Preference for Domestic Specialty Metals (APR 2003) (10 U.S.C. 2533a).

252.225-7015 Preference for Domestic Hand or Measuring Tools (APR 2003) (10 U.S.C. 2533a).

252.225-7016 Restriction on Acquisition of Ball and Roller Bearings (MAY 2004)
 (Alternate I) (APR 2003) (10 U.S.C. 2534 and Section 8099 of Public Law 104-61 and similar sections in subsequent DoD appropriations acts).

252.225-7021 Trade Agreements (JUN 2004) (19 U.S.C. 2501-2518 and 19 U.S.C. 3301 note).

- 252.225-7027 Restriction on Contingent Fees for Foreign Military Sales (APR 2003) (22 U.S.C. 2779).
- 252.225-7028 Exclusionary Policies and Practices of Foreign Governments (APR 2003) (22 U.S.C. 2755).
- 252.225-7036 Buy American Act--Free Trade Agreements--Balance of Payments Program(JAN 2004)
 (Alternate I) (JAN 2004) (41 U.S.C. 10a-10d and 19 U.S.C. 3301 note).
- 252.225-7038 Restriction on Acquisition of Air Circuit Breakers (APR 2003) (10 U.S.C. 2534 (a)(3)).
- 252.226-7001 Utilization of Indian Organizations, Indian-Owned Economic Enterprises, and Native Hawaiian Small Business Concerns (SEP 2004) (Section 8021 of Pub. L. 107-248) [and similar sections in subsequent DoD appropriations acts]).
- 252.227-7015 Technical Data--Commercial Items (NOV 1995) (10 U.S.C. 2320).
- 252.227-7037 Validation of Restrictive Markings on Technical Data (SEP 1999) (10 U.S.C. 2321).
- 252.232-7003 Electronic Submission of Payment Requests (JAN 2004) (10 U.S.C. 2227)
- 252.243-7002 Requests for Equitable Adjustment (MAR 1998)(10 U.S.C. 2410).
- 252.247-7023 Transportation of Supplies by Sea (MAY 2002)
 (Alternate I) (MAR 2000)
 (Alternate II) (MAR 2000)
 (Alternate III (MAY 2002) (10 U.S.C. 2631).
- 252.247-7024 Notification of Transportation of Supplies by Sea (MAR 2000) (10 U.S.C. 2631).

- (c) In addition to the clauses listed in paragraph (e) of the Contract Terms and Conditions Required to Implement Statutes or Executive Orders--Commercial Items clause of this contract (FAR 52.212-5), the Contractor shall include the terms of the following clauses, if applicable, in subcontracts for commercial items or commercial components, awarded at any tier under this contract:

252.225-7014 Preference for Domestic Specialty Metals, Alternate I (APR 2003) (10 U.S.C. 2533a).

252.247-7023 Transportation of Supplies by Sea (MAY 2002) (10 U.S.C. 2631).

252.247-7024 Notification of Transportation of Supplies by Sea (MAR 2000) (10 U.S.C. 2631).

DFARS:

252.204-7004 Required Central Contractor Registration (NOV 2001)

5. CONTRACT DOCUMENTS, EXHIBITS OR ATTACHMENTS:

1. Specifications – 12 Pages
2. Accounting and Appropriation Data – 1 Page*
(* To be included at time of award)

6. ADDENDUM TO FAR 52.212-1 INSTRUCTIONS TO OFFERORS- COMMERCIAL ITEMS (JAN 2004)

The Government intends to award a contract resulting from this solicitation to that responsible offeror proposing the lowest price for the Supplies or Services that has been determined to comply with the requirements of the solicitation.

7. OFFEROR REPRESENTATIONS AND CERTIFICATIONS

Offeror must complete and submit with its proposal *Offeror Representations and Certifications-- Commercial Items* ., which are available electronically in full text at :
<http://heron.nrl.navy.mil/contracts/rep sandcerts.htm>

Use Commercial Item Representations and Certifications: B

SPECIFICATIONS

This acquisition is for a Low Power Anechoic Chamber Target System Design. The target system, which has been affectively called an x-y plotter will be independently controlled and programmable and will move exactly the same in all respects. The controller must be able to be reactive to a direct analogue(s) signal from a main frame computer or be programmable point to point, loop, or go to any of several preselected positions. The anechoic chamber is best run with no exposed metal and shall be modified to include a composite called an EXTREN structure, which is a structure of non-metallic material that replaces the aluminum extrusion to provide strength and supporting surfaces allowing the vertical strut to operate as the original actuator. Stopping and the motions of the slide and horn and the components such as the motors, encoders, brakes and sensors are all critical to the design of this system.

The chamber maximum dimensions are shown in Figure 1. They absolutely define the limit of all mechanical parts of the plotter. The working area of the plotter however is 120" x 120" as shown in Figure 2.

My translation of the parameters of the new pedestal to linear performance required of the x-y plotter horn, mounted on the vertical element of the plotter, is in red in Table 1 below.

positioner data	x-y plotter
position data	position data
el&az accuracy 2arc sec	0.004"
el&az resolution .004 deg	0.0025"
el&az repeatability .2 arc sec	0.0004"
rate data	rate data
el&az range 0-100 deg/sec	0-314"/sec
el&az accuracy 0.4%	2.5"/sec
el&az resolution .002 deg/sec	.01"
acceleration	acceleration
el&az acceleration 420 to 1250 deg/sec/sec (load dependent)	501 to 1276 in/ sec/sec (load dependent)

TABLE 1

Performance: The x and y motion must be independently controllable and programmable however the two y rails shown in Figure 2 (top and bottom) must move exactly the same in all respects. The controller must be able to be reactive to a direct analogue(s) signal from a main frame computer or be programmable point to point, loop, or go to any of several pre-selected positions, etc.

Modification of the vertical element: The anechoic chamber is best run with no exposed metal. The floor and ceiling rails will be beneath the level of the anechoic material. The vertical strut, though an actuator like the horizontal units may be modifiable over the center 10 ft with a composite called EXTREN¹ (<http://www.strongwell.com/PultrudedProducts/Extren.HTM>). An EXTREN structure or combination of EXTREN components forming a structure or other such non-metallic material replaces the aluminum extrusion to provide strength and supporting surfaces allowing the vertical strut to operate as the original actuator. At this point in the design we lack specific knowledge of all types of actuators and so have arbitrarily chosen one to discuss, i.e., the MACRON 6 and MACRON SINGLE BELT DRIVE (<http://www.macrodynamics.com>), though we need a more detailed consideration of the MACRON 6 design and function or any unit which would be used vertically visa-a-vie the modification of its center 10 feet in EXTREN (see the APPENDIX). Other products may be more amenable to this modification and may be substituted. Our fall back position is to simply use a standard actuator with absorbing material on the sides and back like ECCOSORB (by EMERSON AND CUMING) which is the premise of the basic design below.

System construction: Figure 3 depicts the floor mounting of the system. The ceiling mounting is similar but the ¾ inch steel plate will have to be bolted to the top of the chamber as opposed to using a HILTI system attachment through the steel into the concrete which is preferable for stability. The steel plate provides the base for the y axis actuators and the slide rail. The connection between the actuator and the rail sliders or guides and the method of attachment of the vertical actuator is left to the vender².

¹ EXTREN and MACRON 6, AS USED IN THIS DOCUMENT ARE GENERIC. THEY REFER TO PRODUCTS FOUND ON THE INTERNET AND ARE BEING USED TO DEFINE THE PERFORMANCE WE WANT FOR OUR SYSTEM HOWEVER THIS PROCUREMENT DOES NOT REQUIRE THE SPECIFIC USE OF THESE PRODUCTS IN THAT OTHER COMPANIES MAY HAVE AS GOOD OR BETTER PRODUCTS WHICH ARE ACCEPTABLE. LIKewise, THIS ALSO APPLIES TO OTHER NAMED PRODUCTS IN SOME OF THE DRAWINGS LIKE ECCOSORB, THK, MACMASTER CARR, ETC.

² The term vender used in this RFQ refers to the selected company who will build the entire system, not the any of the product providers referenced in this document.

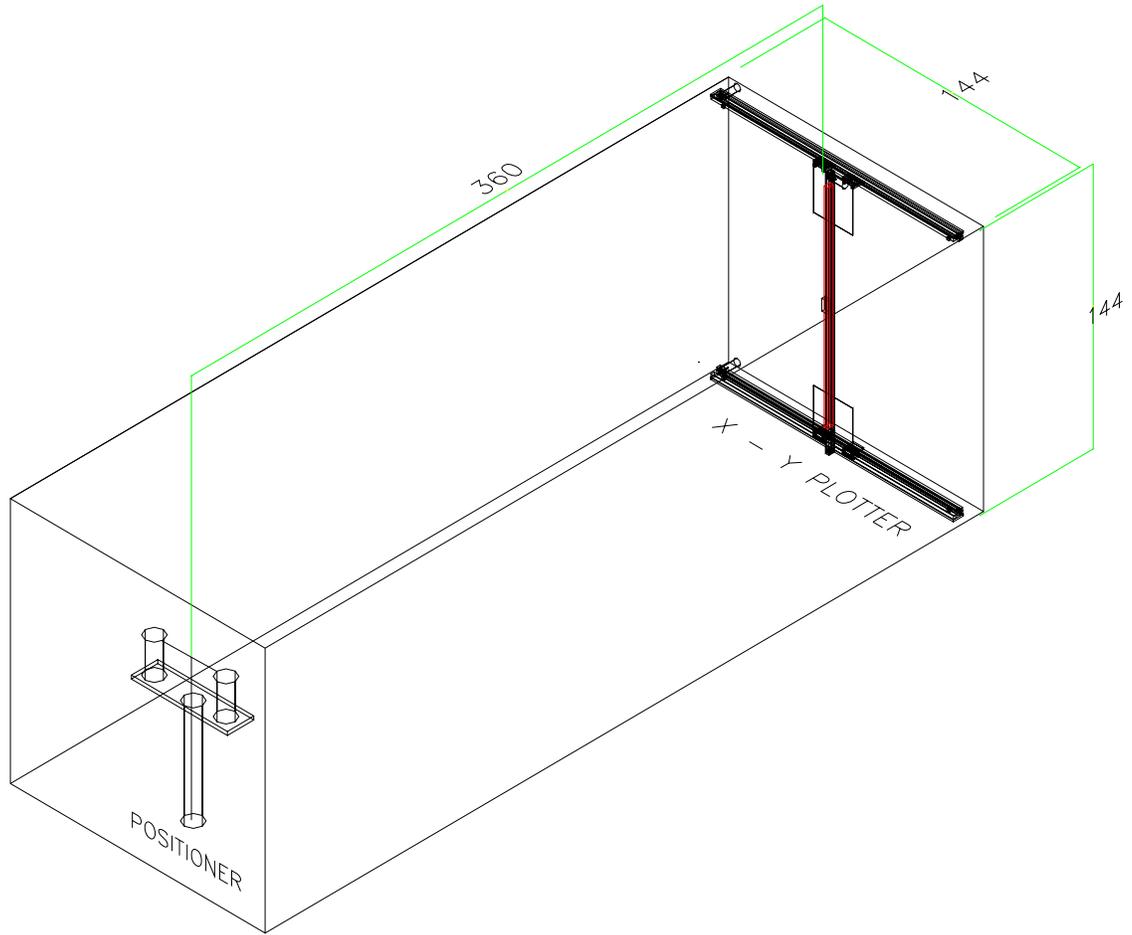


FIGURE I
ANECHOIC CHAMBER

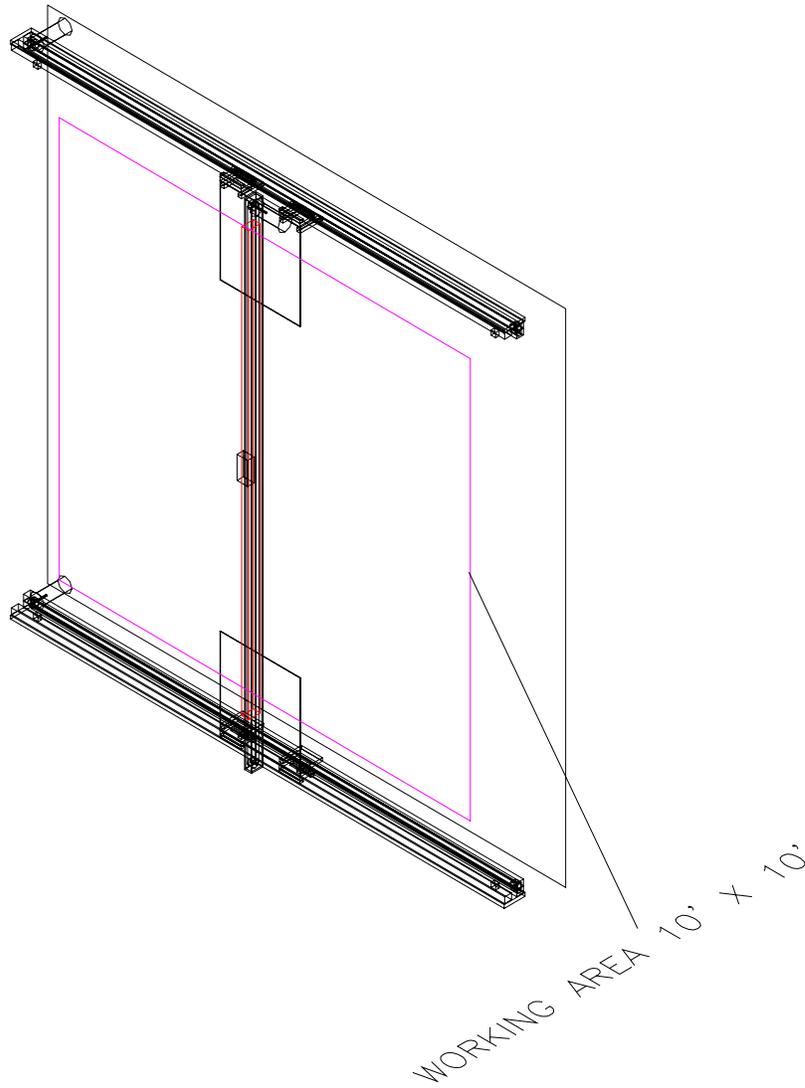


FIGURE 2
X-Y PLOTTER

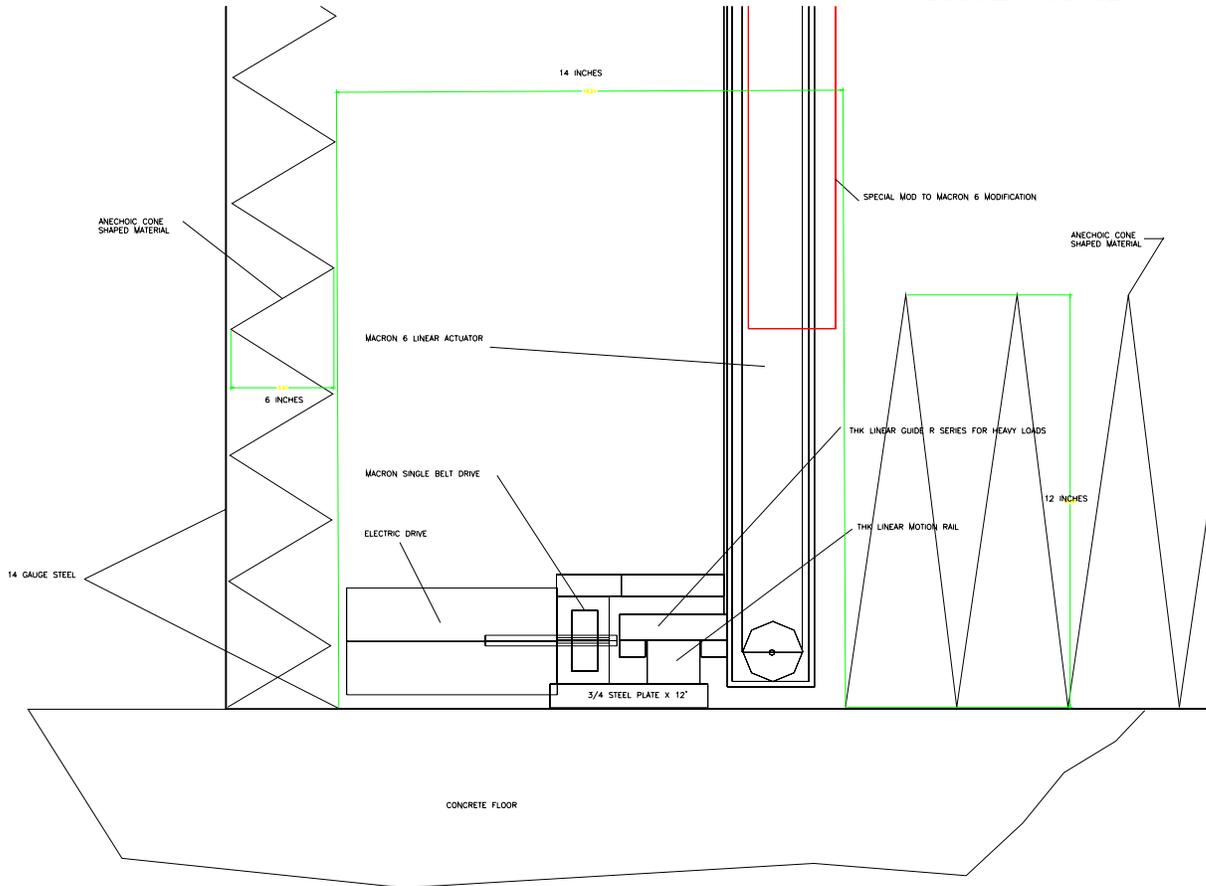


FIGURE 3

DETAIL OF CONSTRUCTION

Stops: The motion and stopping of the slide and horn is to be done programmatically via the drive and brake system. However, if that fails we wish two fail safes, an electronic cutoff switch to the drives and then a mechanical hard stop as shown in Figure 4.

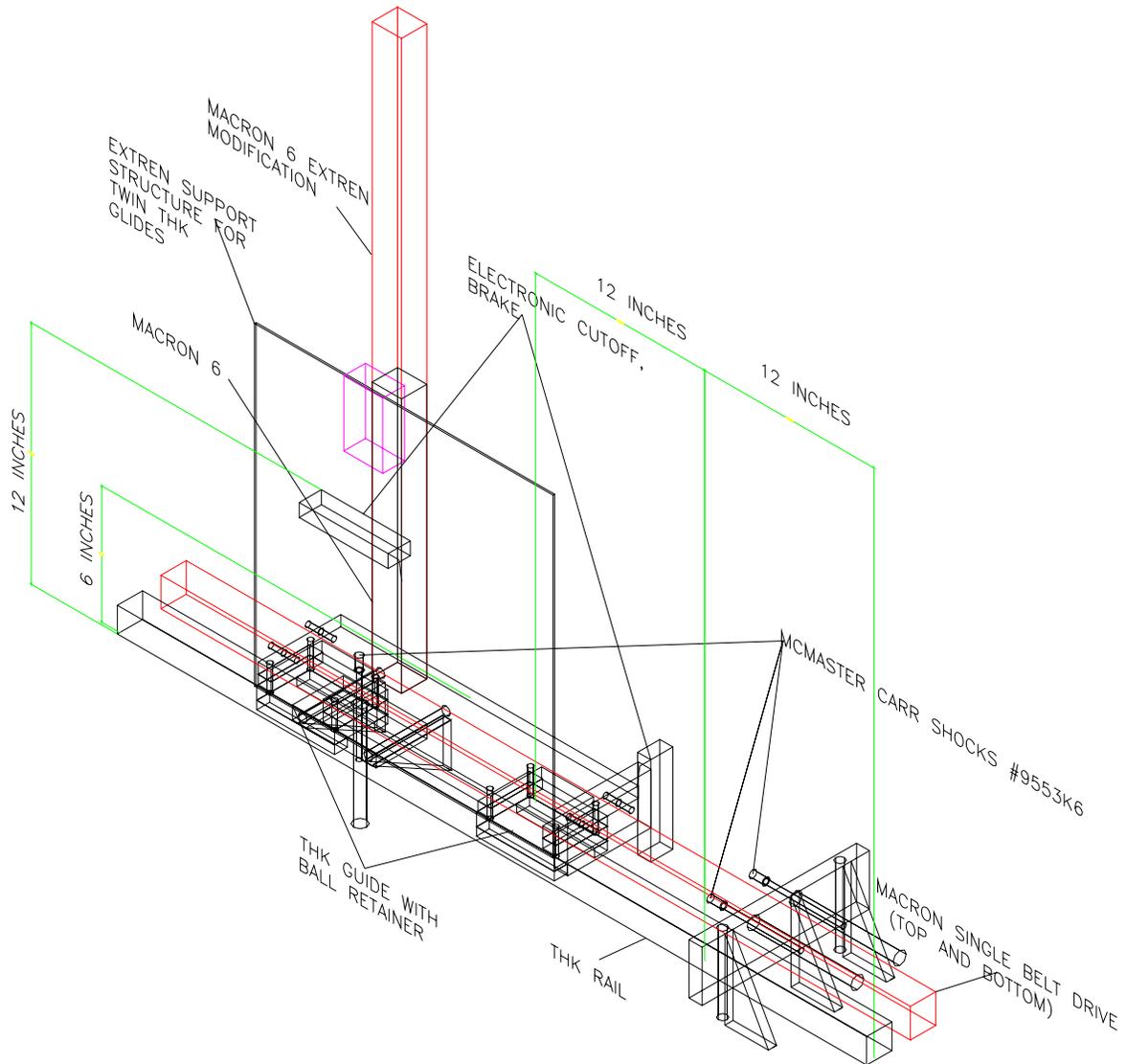


FIGURE 4
FURTHER DESIGN CONSIDERATIONS

The horn rotator: The magenta colored block, shown in Figure 4 on the vertical actuator represents a mechanism which is used to attach the horn antenna to the actuator slide. This mechanism is required to rotate the horn such that it will always point to the center

point of the crossing of the positioners horizontal and vertical rotational axes. This motion must be synchronous with the plotters linear motion. The mechanism is depicted in Figure 5. An example of that which is required is the side view mirror on a contemporary car, which rotates up or down and in and out yet is small and light as is our horn.

The horn has a maximum weight of 5 pounds. A light weight rotating system is important to maintain pointing and vertical position because this mechanism is attached directly to the actuator slide. Rotational speed, velocity and accelerations for this device are the “reverse” of those of the positioner, that is the motion of the rotators must be exactly those of the positioner but in the opposite direction. The range of rotation of this special mechanism is approximately 10 degrees in both directions.

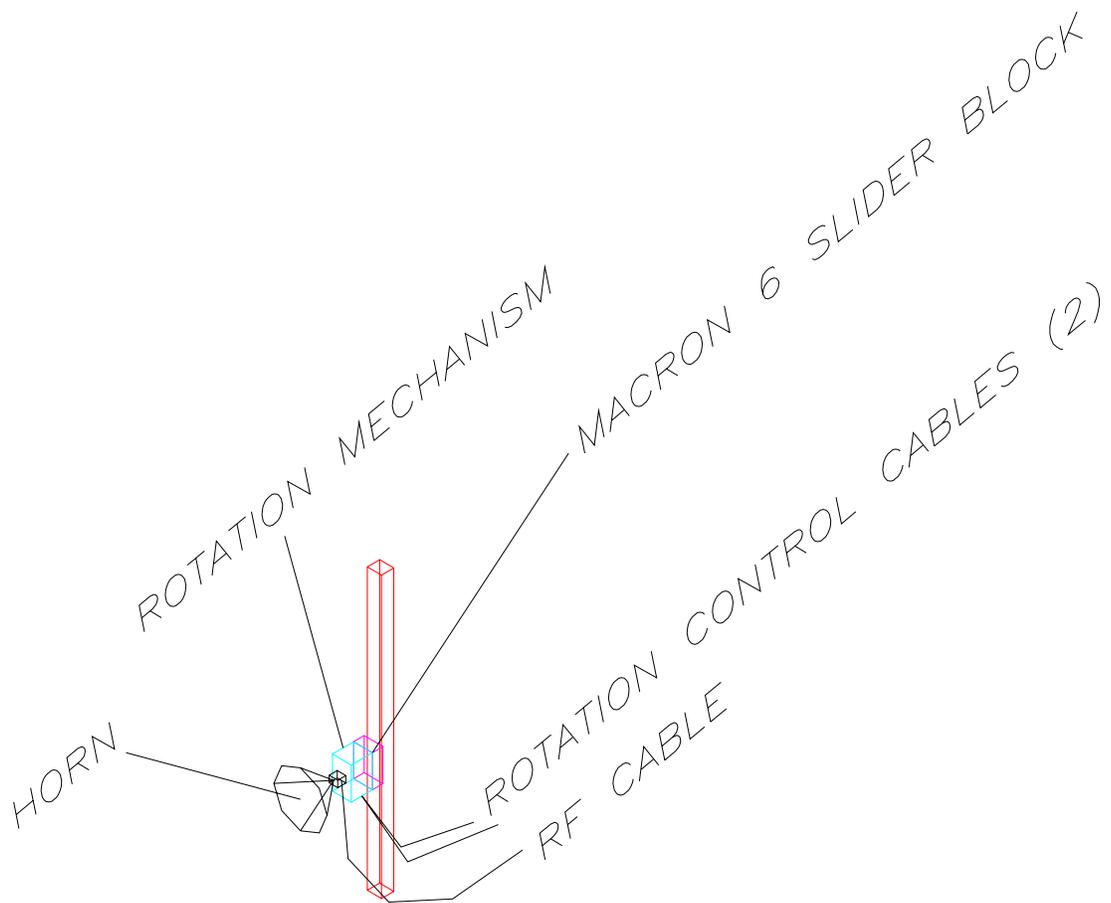


Figure 5
Horn rotator

Components: Motors, encoders, brakes, sensors, etc.: The Figure below is a “mechanical” interpretation of the drive electronics for the system.

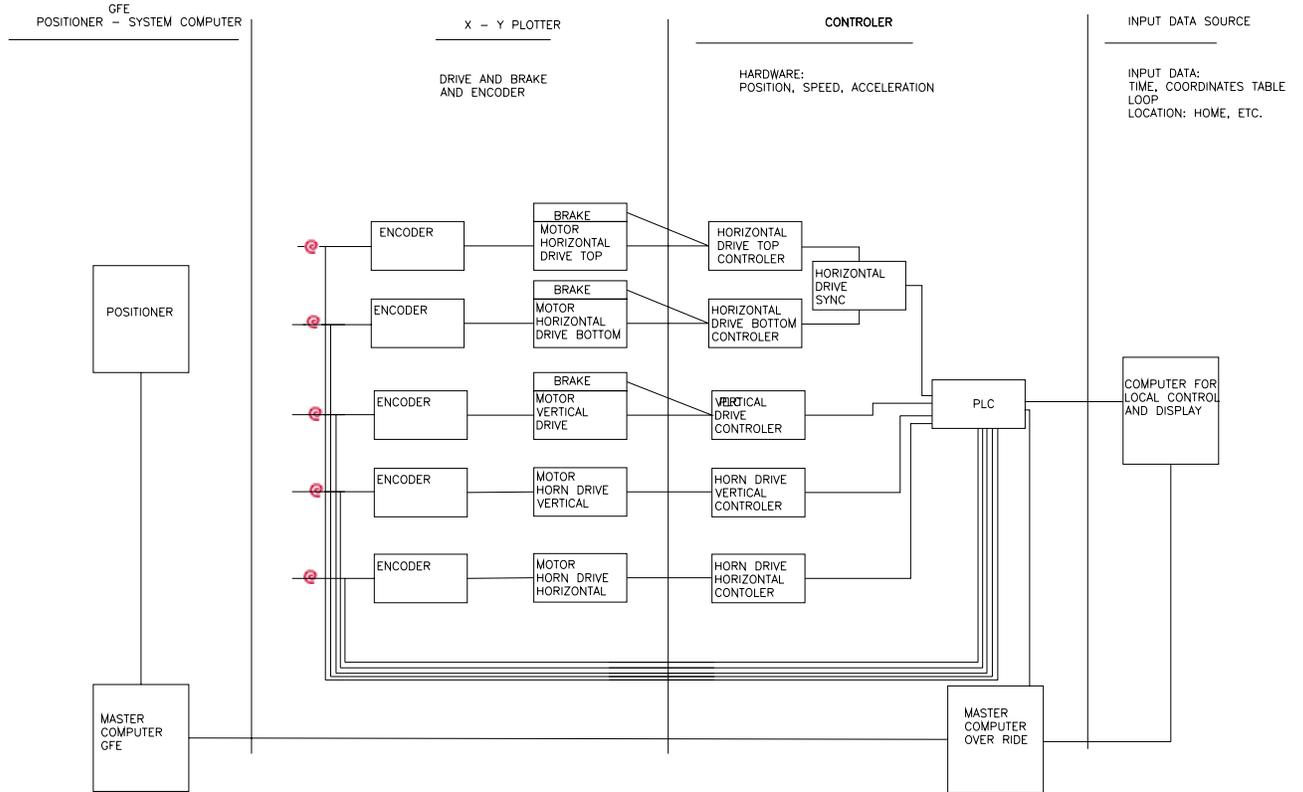


Figure 6
Control System

Positioner-computer- plotter interface: The master computer up-date rate to the PLC must be one millisecond or less therefore commands within the system must be significantly faster. The data provided from the main frame computer (SYSTRAN DAC) is two analogue voltages, both between +/- 10 volts, one each for the x and y axis. The resolution is 4.88 mill-Volts with an output current of +/- 20 mill-Amps.

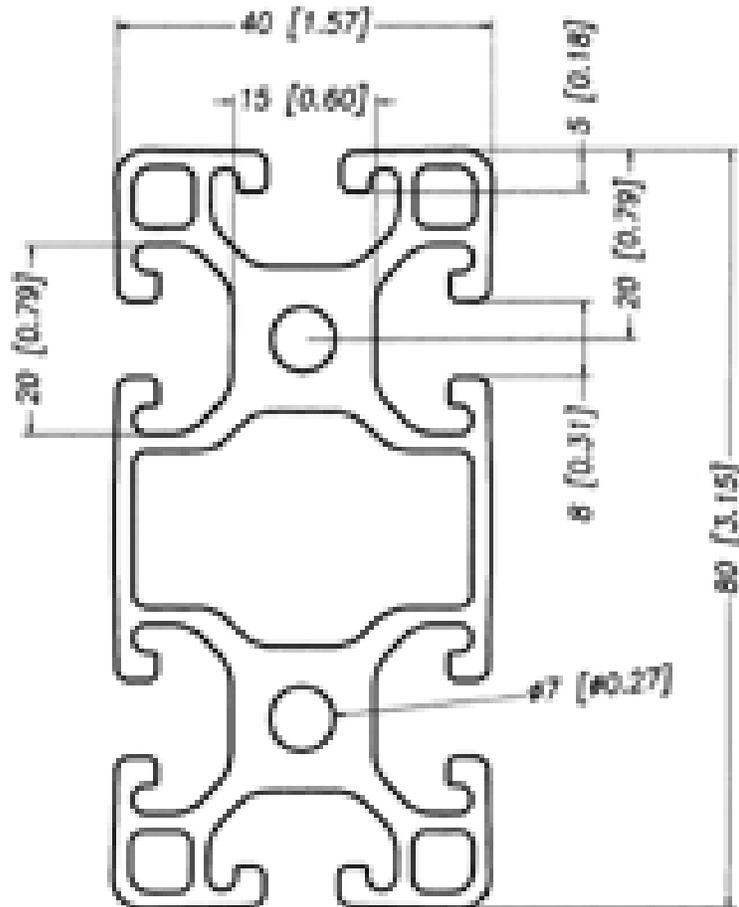
The computer and any other system hardware which can be external to the chamber are to be rack mounted in a standard 19” frame provided by the vender.

Factory acceptance test: The vender will test entire system at the factory using a 5-pound weight as the horn. The vender will demonstrate the system capabilities via the computer for local control and separately through the master computer over ride.

Installation: The vender will install the x-y plotter in the anechoic chamber at NRL.

APPENDIX

The internet site for MACRON shows the MACRON 6 actuator cross section for the 10 foot center section discussed above in the figure below.



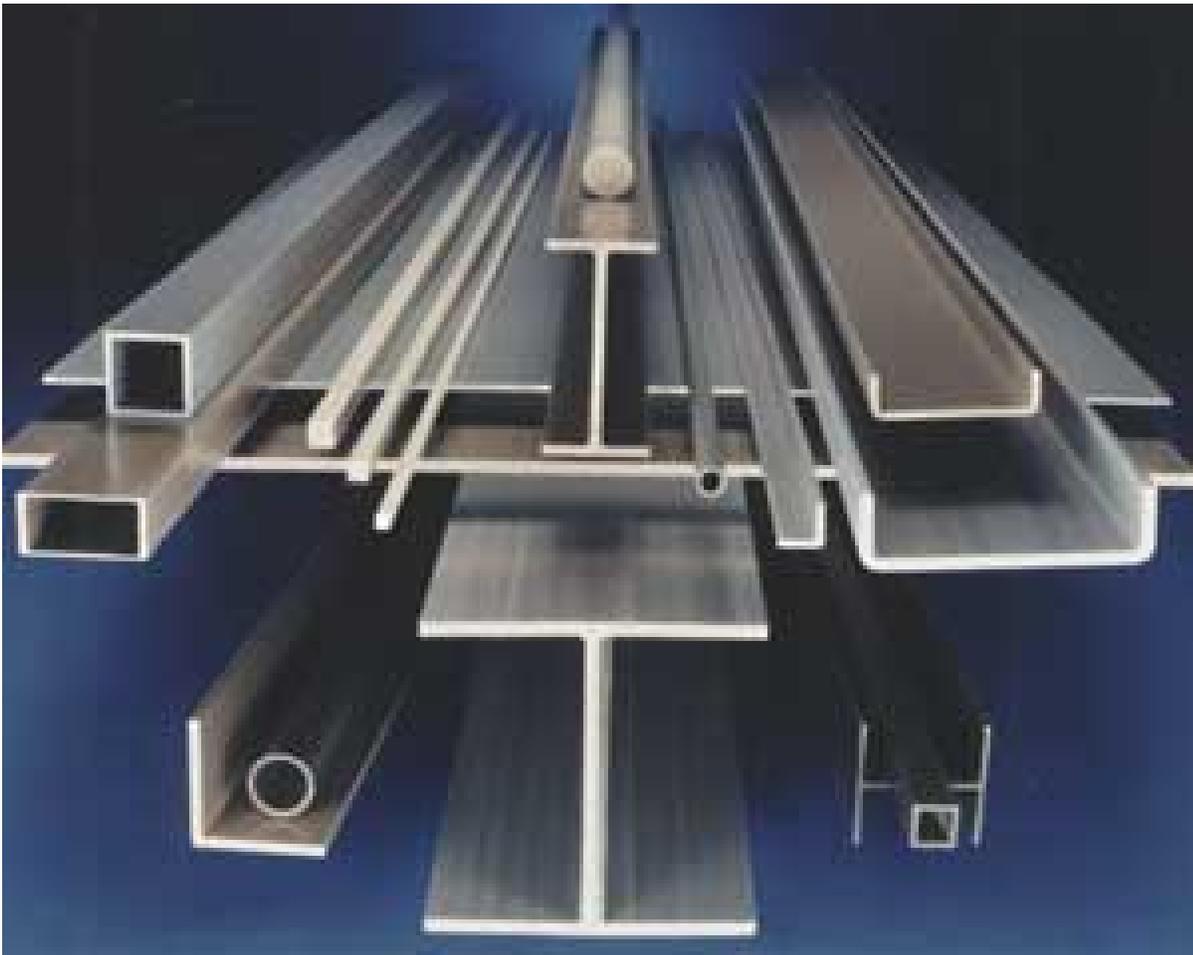
In EXTREN, the function, strength and inertia of this cross section of the actuator must be duplicated though the shape is not critical except that it must attach to the Micron extrusion at either end to complete the replacement of the visible metal center portion of the slide and allow the attachment of the rotational mechanism and horn. The strength and inertia equivalency will then allow the vertical brace to have the same rigidity and support as the metallic form shown above which will permit the same horizontally motion. The shape is not critical because aerodynamics is a secondary effect especially since we are driving from both the top and bottom of the EXTREN / Micron 6 assembly.

EXTREN shapes are shown below.

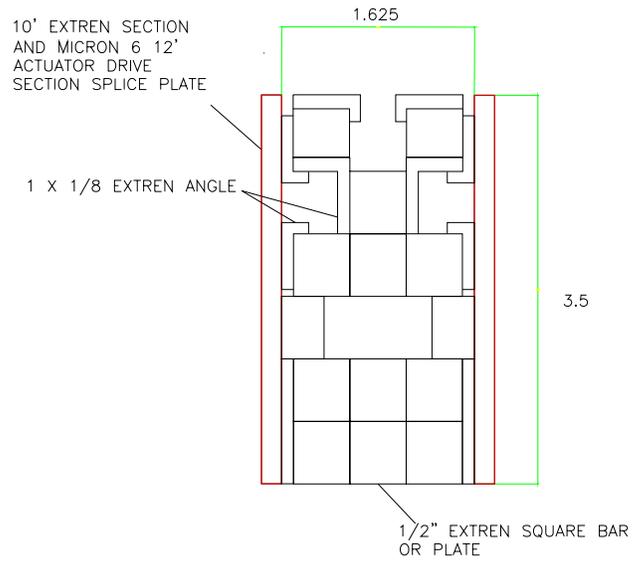
EXTREN comes in a variety of sizes and shapes which can be found on the internet at the address below.

<http://www.strongwell.com/PDFfiles/Extren/Extren%20Brochure%200804.pdf>

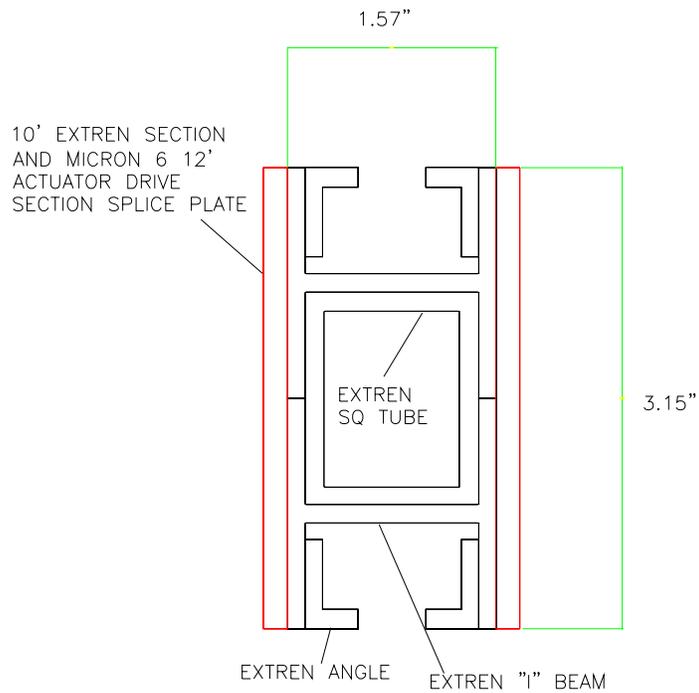
Using a few of the EXTREN shapes shown above a typical cross section is displayed below but other combinations of sections may work better, be stronger or guide better.

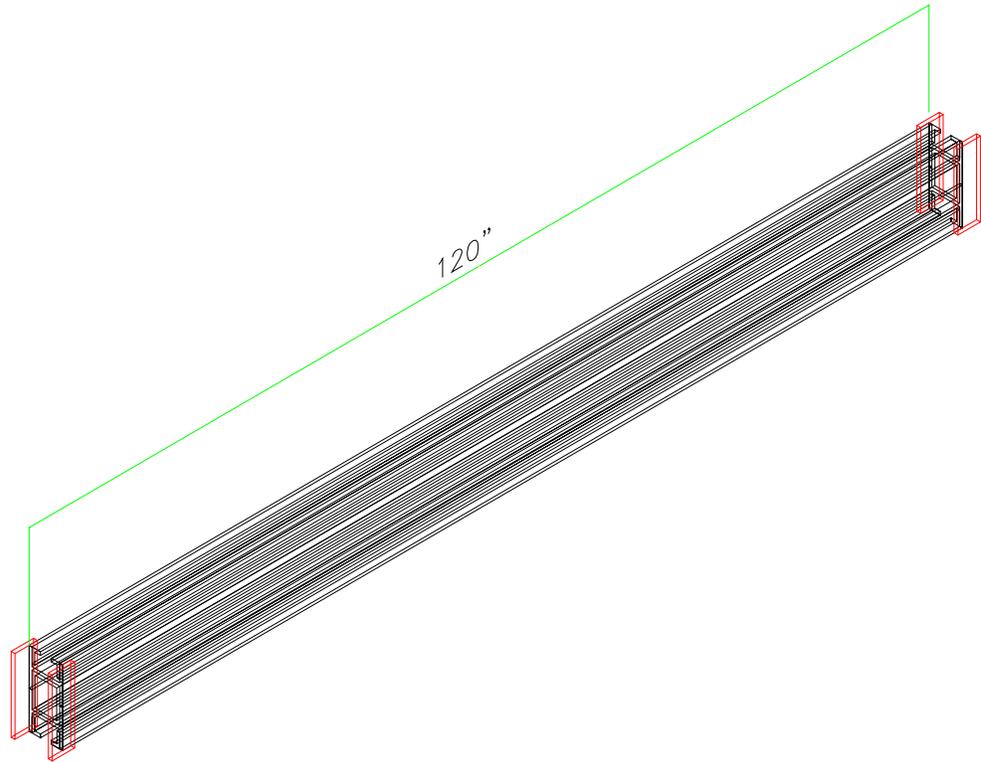


The final configuration will be determined by the vender.



As an example, using other EXTREN shapes one can develop another cross section as shown below.





Final assembly details of the manufacturing of this special section are left to the vender but ultimately the ten foot section with splice plates is to attach to the actuator ends so that the entire unit functions within the Macron 6 specifications.