MEMORANDUM:

TO: Active Surface Group
FROM: J. Payne
SUBJECT: Actuators

We now have a starting point for the surface controlling actuators. The surface will be arranged in rafts of panels; the largest raft contains 12 panels, the smallest 4 panels. When wind loading (60 mph) is considered, each actuator should meet the following rough specifications. These can be refined as we go along.

- Number of actuators: 1,152
- Range of movement: ± 1 cm
- Force required: 2,000 lbs.
- Time for full travel: 10 seconds

I’ve attached a data sheet from a suitable manufacturer. The estimated price for 1,000 actuators would be about $1,000 each.

My feelings are that each actuator should form part of a closed-loop servo system consisting of a position transducer, an amplifier, and the actuator. Position input commands could be analog or, more likely, digital with each actuator having a unique address. The commands could then be distributed on a fiber optic network (or maybe even over the power lines to the actuators). The actuator/readout package should have built-in travel limits.

So that we don’t duplicate efforts, please note that I have written to the manufacturers on the attached list.

Would everyone please think about the actuator problem so that we can discuss it at our next meeting (Thursday, September 7, 10:00 a.m.).

Distribution: F. Crews
L. King
R. Lacasse
R. Maddalena

cc: M. Balister
D. Schiebel
A. R. Thompson
G. Seielstad
Precision Mechanical Drives
For CNC Applications

New Products
Modernization Of Existing Machines

™ DESIGN, INC.
239 Commerce Street • Glastonbury, CT 06033
Phone (203) 633-1134 • FAX (203) 659-2185
EA3 Linear Actuator

- 1 inch pitch diameter, .250 inch lead, precision preloaded ball screw assembly
- 3500 pounds thrust capacity
- Single fixed end support using super precision ball screw bearings
- .0002 inches per foot, non-cumulative lead accuracy
- Medium spring constant (see chart)
- 1:1.5 motor to ball screw ratio
- Arranged for rotary feedback and limit switch package
- Completely sealed against chip and coolant contamination
- Pulleys and gearbelt included

Special features available as standard options

- Female thread connection available on the piston
- Motor mounting plate designed to accommodate any type servo motor
- Special flange configurations (available with standard hydraulic cylinder flanges for "bolt for bolt" interchangeability)
- Oil-air mist or trabon type lubrication provisions
VERSATRON CORPORATION
103 Plaza St.
Healdsburg, CA 95448

PARKER HANNIFIN CORP
Aerospace Hydraulics Division
18321 Jamboree Blvd
Irvine, CA 92715

SIEBELAIR
5563-65 W. Washington Blvd.
Los Angeles, CA 90016

MENZIMER AIRCRAFT COMPONENTS CO.
1537-T Foothill Dr.
Vista, CA 92084

MENZIMER AIRCRAFT COMPONENTS, INC.
1966 Vineyard Ave.
Vista, CA 92083

EATON CONSOLIDATED CONTROLS CORP.
15 Durrant Ave.
Bethel, CT 06801

EATON CORPORATION
Defense Pressure Sensors Division
15 Durrant Ave.
Bethel, CT 06801

GENERAL ELECTRIC CO.
3135 Easton Turnpike
Fairfield, CT 06431

REAL-TIME LABORATORIES, INC.
350-T N.W. 12th Ave.
Deerfield Beach, FL 33441

CEF INDUSTRIES, INC.
506 US Hwy 27 North
Haines City, FL 33844

CEF INDUSTRIES, INC.
Environ Div
506 US Hwy 27 North
Haines City, FL 33844

BARBER-COLMAN CO
Aircraft Products Div
1354 Clifford Ave.
P.O. Box 2940
Loves Park, IL 61132
MICRO-PRECISION OPERATIONS, INC.
525-T Berne St.
Berne, IN  46711

BURR ENGINEERING & DEVELOPMENT CORP.
732 E. Michigan Ave.
Battle Creek, MI  49016

CALTHERM CORP.
2025-T Franklin Rd.
Bloomfield Hills, MI  48013

MCDONNELL DOUGLAS ELECTRONICS CO.
Electro-Mechanical Div.
P.O. Drawer 1704
Grand Rapids, MI  49501

AMERICAN BALLSCREW
11825-T Mayfield
Livonia, MI  48150

THOMSON SAGINAW
P.O. Box 9550
Saginaw, MI  48608

20TH CENTURY MACHINE CO., INC.
6070 E. 18 Mile Rd.
Dept. B
Sterling Heights, MI  48078

TECHNICAL ORDNANCE, INC.
654 Industrial Blvd.
Waconia, MN  55387

WATLER MACHINE SHOP, INC.
P.O. Drawer 88
Lucedale, MS

RACO INTERNATIONAL, INC.
Raco Bldg, Industrial Blvd.
Bethel Park, PA  15102

LINEAR INDUSTRIES, LTD.
1850 Enterprise Way
Montovia, CA  91016-9912

INDUSTRIAL DEVICES CORP.
35-T Pamaron Way
Novato, CA  94947

BALL SCREWS & ACTUATORS CO., INC.
490 Parrott St. at 10th
San Jose, CA  95112
SCHLENKER ENTERPRISES, LTD.
5143 Electric Ave.
Dept. T
Hillside, IL  60162

PGM BALLSCREWS
340-T N. Main, Suite 204
Plymouth, MI  48170

MOTION SYSTEMS CORPORATION
61-T Riordan Place
Shrewsbury, NJ  07701

PMI MOTION TECHNOLOGIES
Division of Kollmorgen Corp.
49-T Mall Dr.
Commack, NY  11725

PRECOMP, INC.
17 Barstow Rd.
Suite 302A
Great Neck, NY  11021

TECHNO, INC., A DSG CO.
Division of Designatronics, Inc.
2101-T Jericho Tpk
New Hyde Park, NY  11040

DUFF-NORTON CO.
Dept. T
P.O. Box 7010
Charlotte, NC  28241

NOOK INDUSTRIES, INC.
23202 Commerce Park Oval
Cleveland, OH  44122

ZAYTRAN, INC.
P.O. Box Drawer 1660
Elyria, OH  44036

POW-R-JAC LINEAR MOTION SYSTEMS
Division of Limitorque Corp.
P.O. Box 11318
Lynchburg, VA  24506

ROBEC, INC.
P.O. Box 41, Dept. 66
S82 W19275 Apollo Dr.
Muskego, WI  53150

FOXBORO/JORDON
Division of Foxboro Company
5607 W. Douglas Ave., Dept. M
Milwaukee, WI  53218