MEBT MEETING AGENDA

February 1, 2001

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1. Chopper Target Brazement

- Faceplates & Backplates Received (photos)
- Target Braze Fixture (photo, dwg)

2. Raft and Frame Update

- Frame Concept
- Raft Status
- Pump Cart Interface (dwg)

3. Chopper Fabrication / Procurement Update

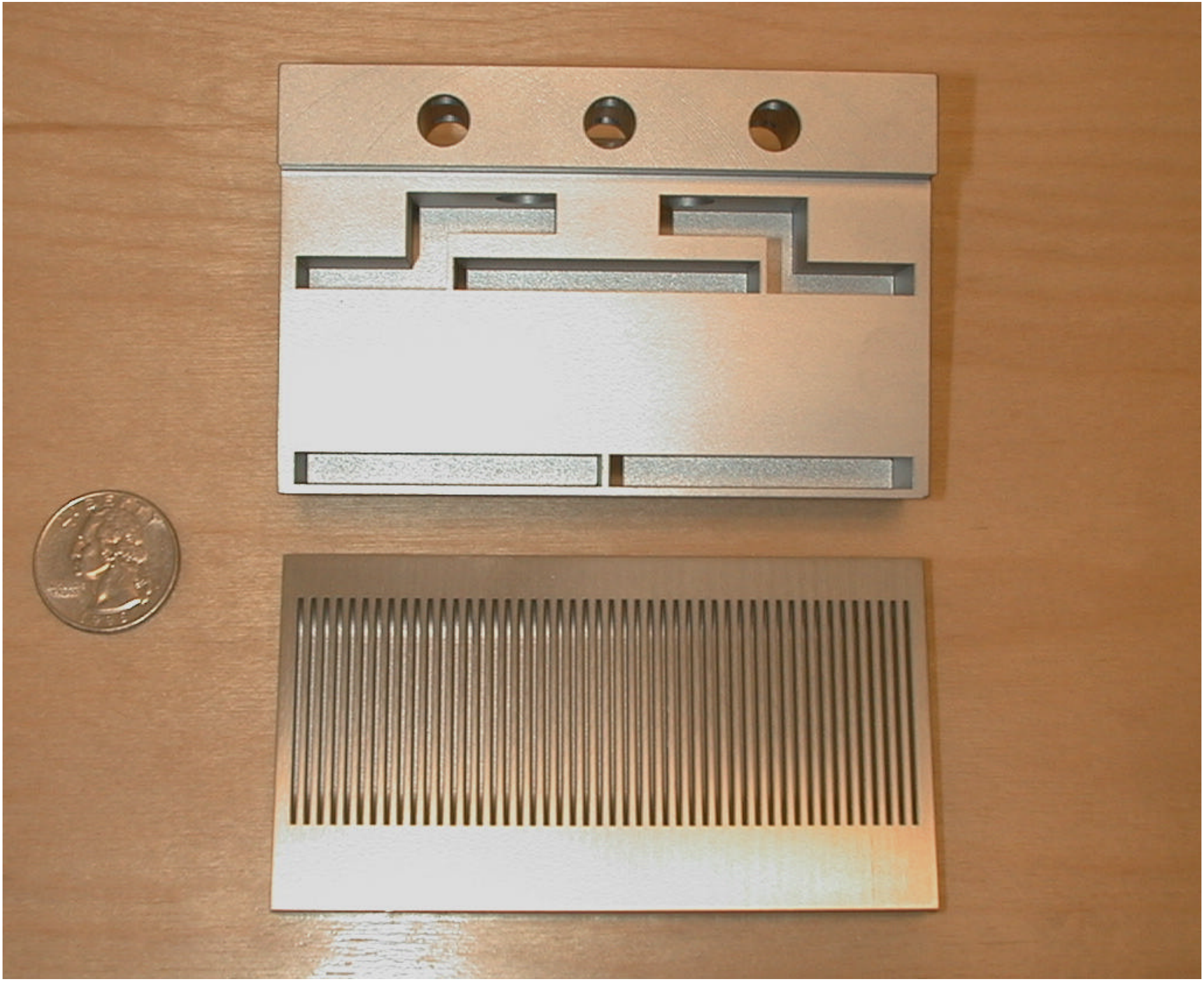
4. Diagnostics Status

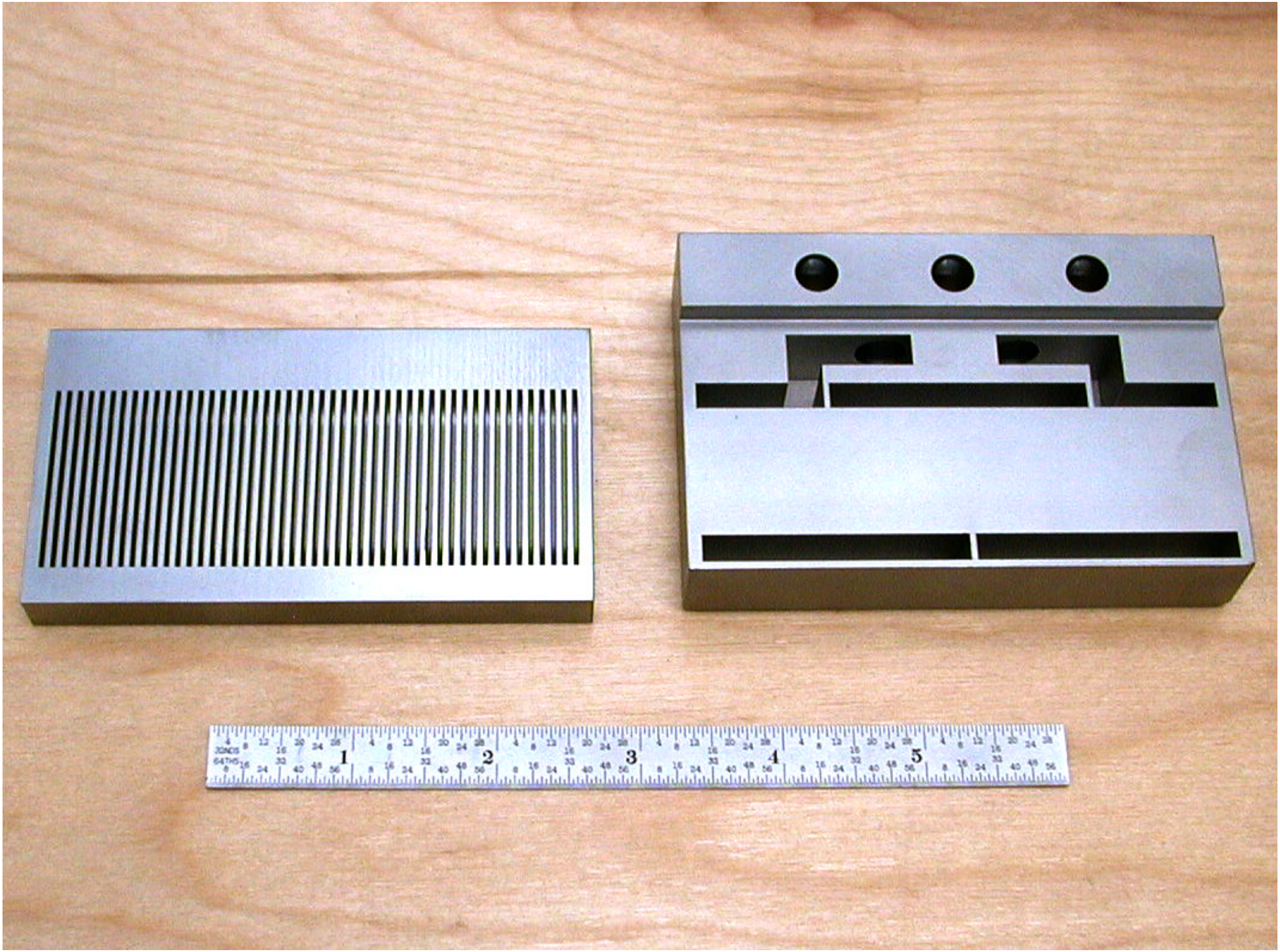
- Profile Monitor FDR (2-13-01)
- BPM Fabrication
- Emittance Scanner Action Items

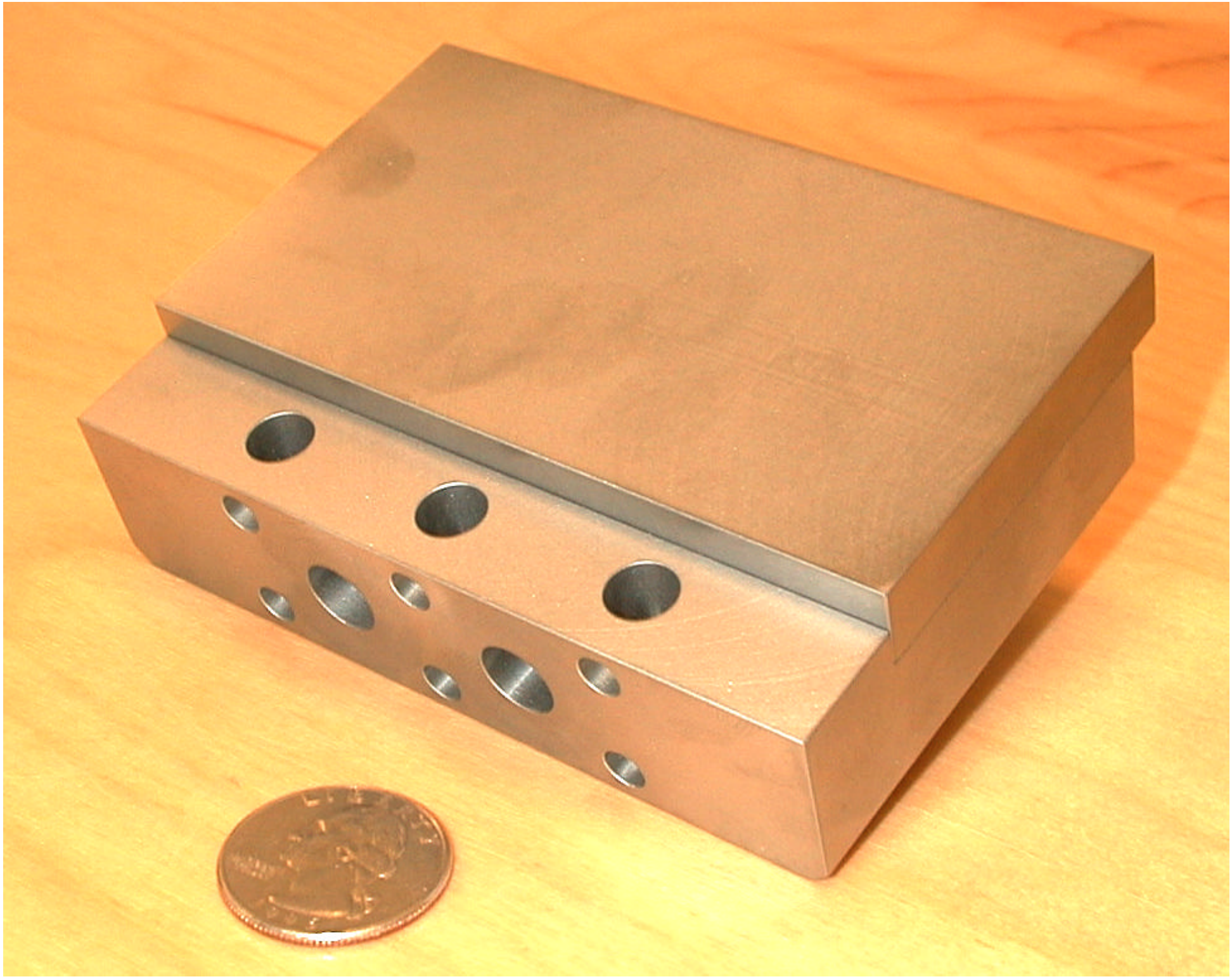
5. Upcoming Tasks and Milestones

♦ Raft Systems FDR	1/31/01 OR
♦ Rebuncher Cavity #1 Received	1/31/01 OR
♦ Profile Monitor FDR	1/31/01 2/13/01
♦ Profile Monitor First Article Complete	3/31/01
♦ Chopper Target Complete	4/30/01
♦ Chopper Vacuum Enclosures Complete	5/31/01
♦ Raft and Support Structure Complete	5/31/01 OR
♦ Profile Monitor all complete	7/31/01

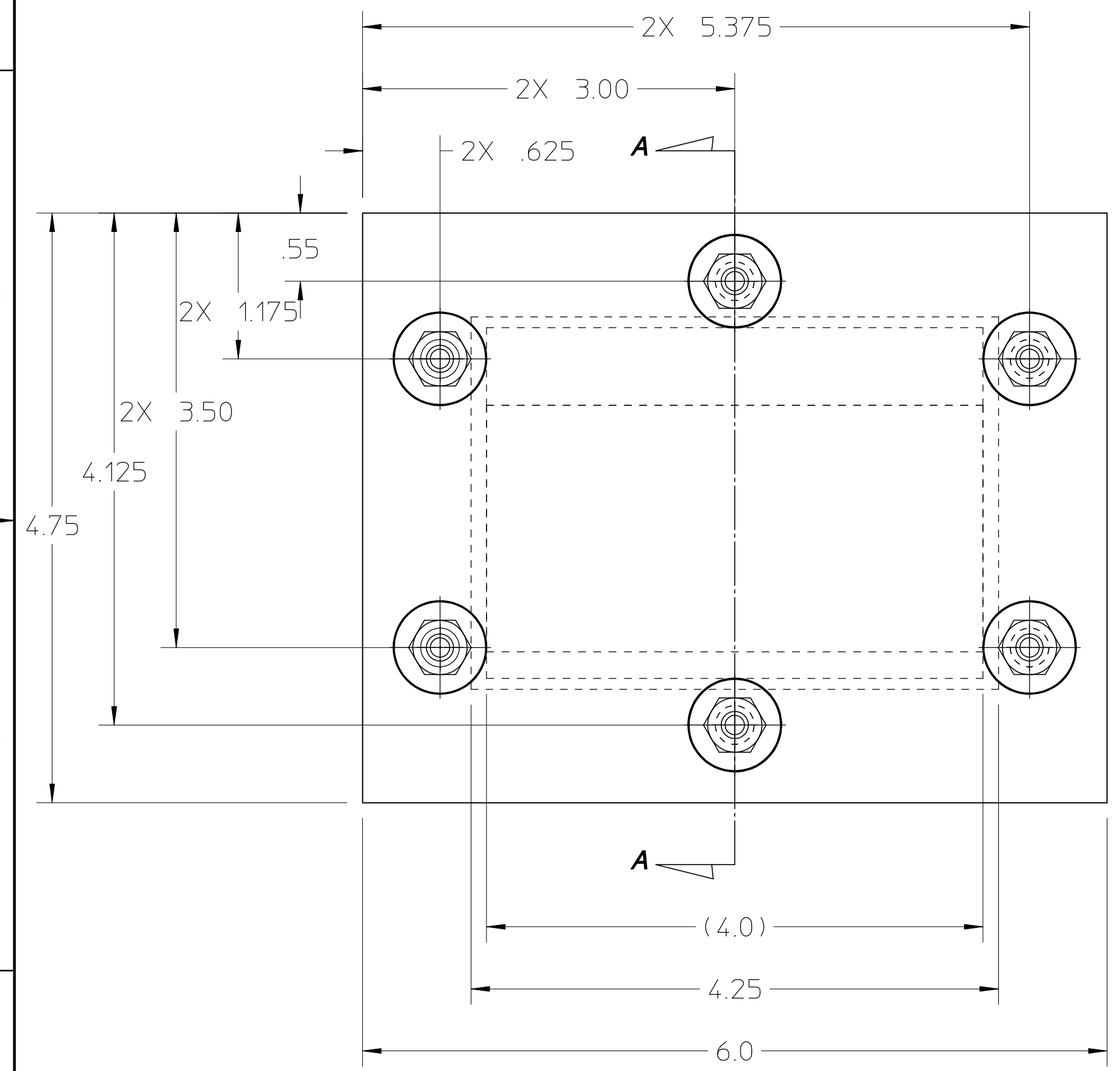
Next Meeting, Thursday, 2/15/01, 10 AM

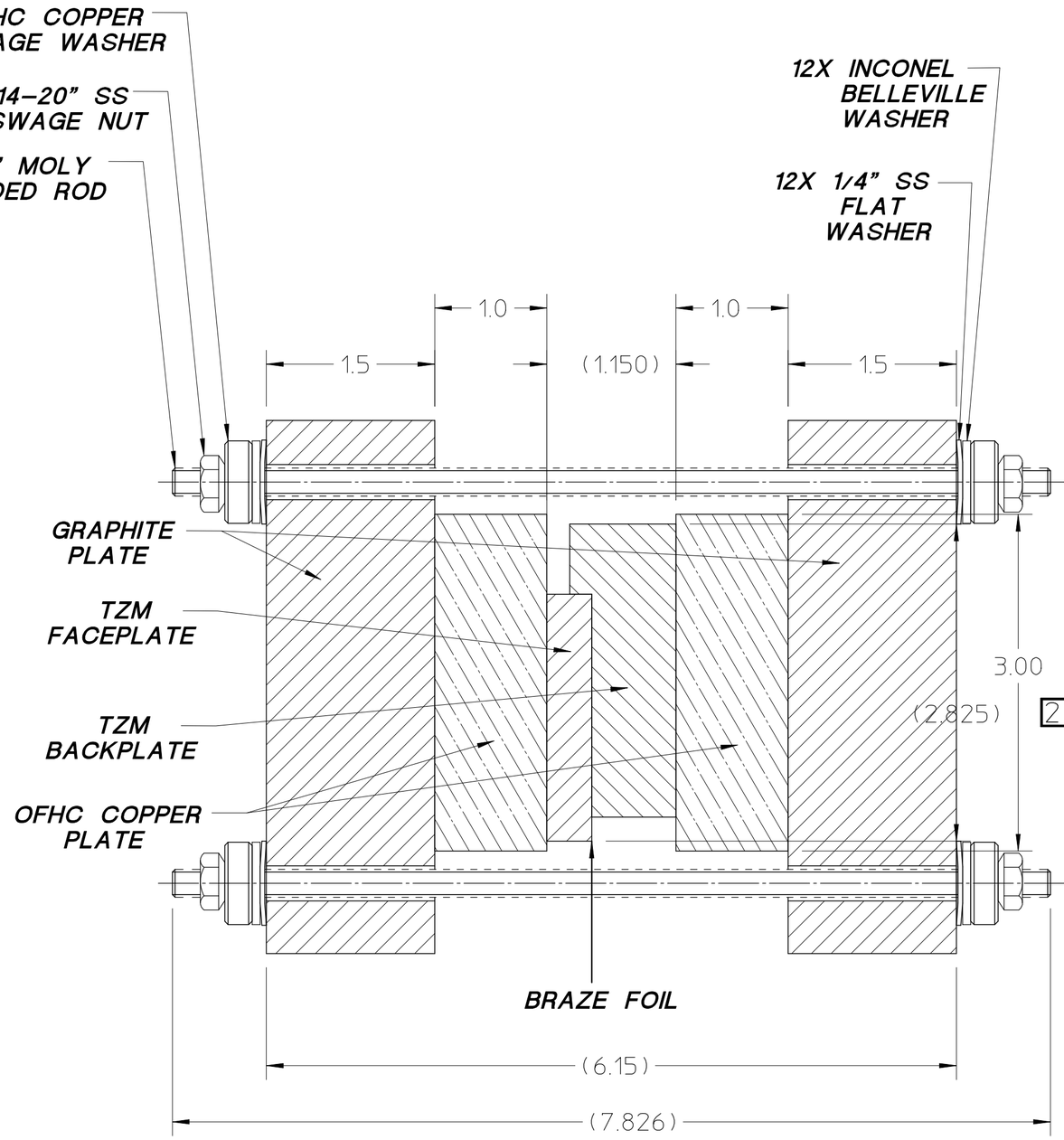






REQ	ITEM	PART NUMBER	DESCRIPTION





SECTION A–A

25B1683A

REV	DWG	CHK	ZONE	DATE	CHANGES
A					INITIAL RELEASE

UNLESS OTHERWISE SPECIFIED

TOLERANCES		
.X ± .1	FRAC. ±1/64	
.XX ± .02	ANGLES ±.01°	
.XXX ± .005	FINISH 125	

THREADS ARE CLASS 2
CHAMFER ENDS OF ALL SCREW THREADS 30°.
CUT 1.5 PITCH THRD RELIEF WITH ROUND NOSE TOOL ON MACHINE CUT THREADS.
BREAK EDGES .016 MAX. ON MACHINED WORK
REMOVE BURRS WELD SPLATTER & LOOSE SCALE
REFERENCES: ANSI Y14.5 & B46.1.

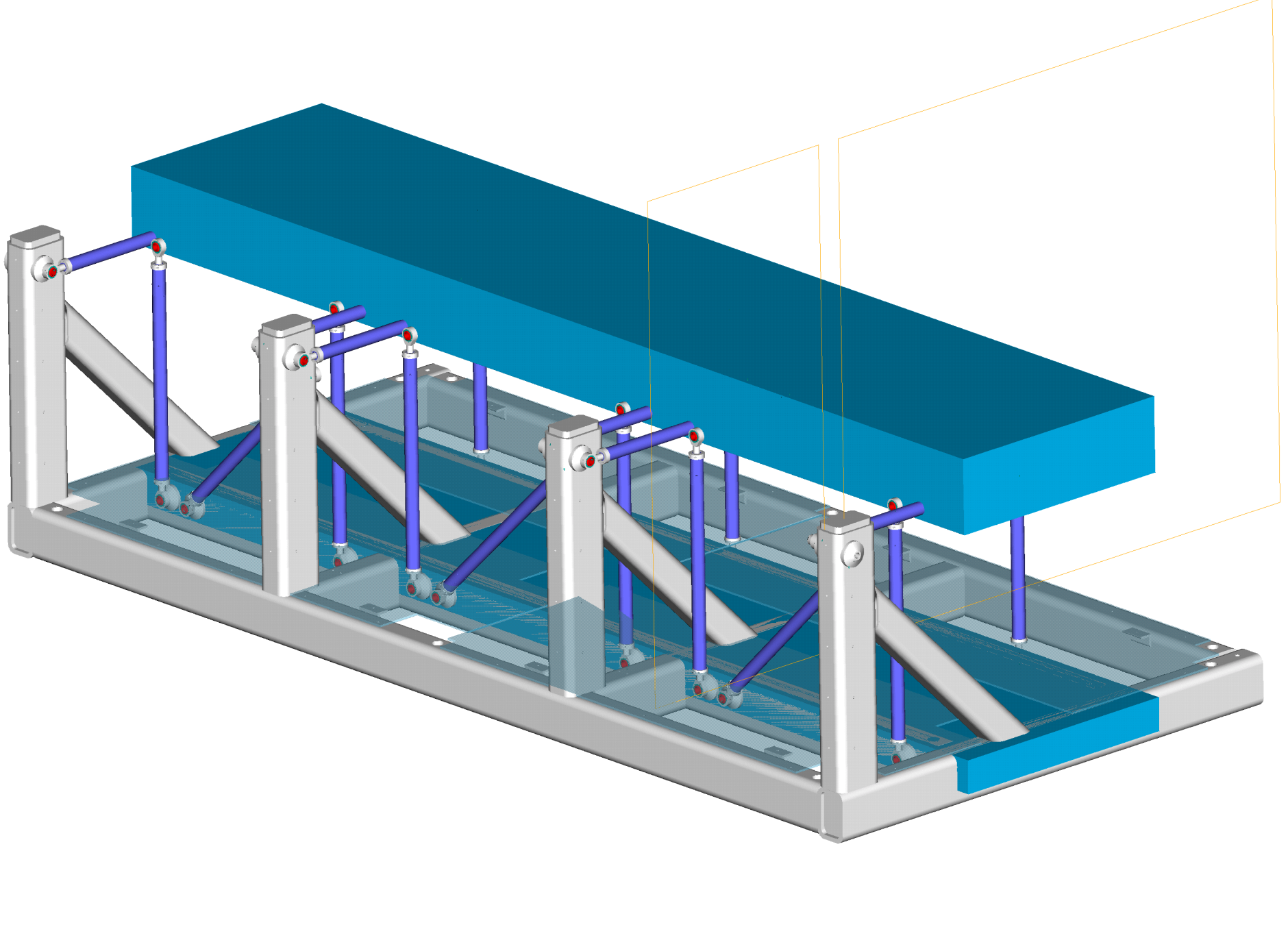
SHOP ORDERS

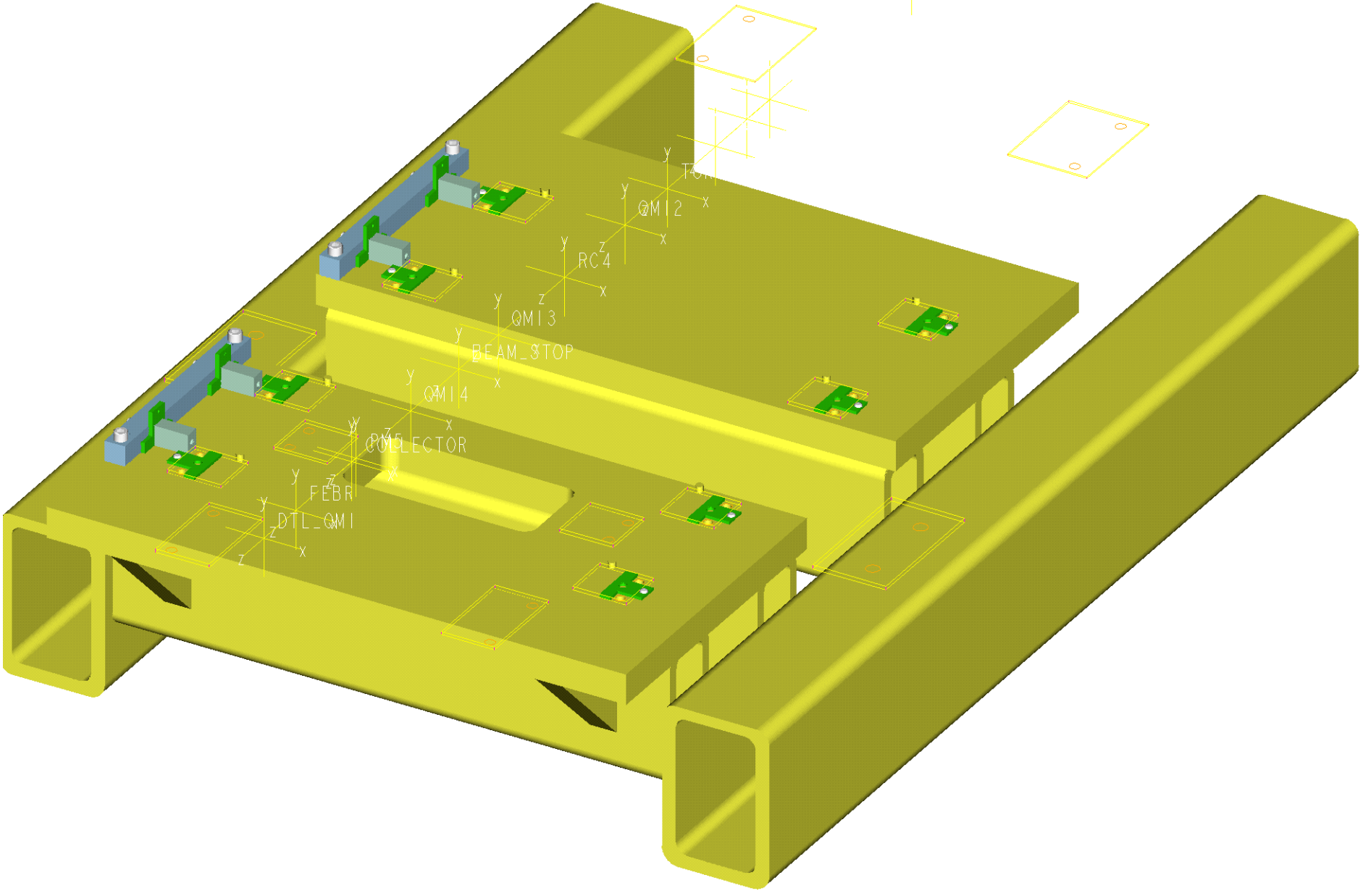
ACCT. NO.	SERIAL NO.	
DATE ISSD	DATE REQD.	NO. REQD.
DELIVER TO		
SURFACE TREATMENT –		
IDENT. METH. TAG		
DWG. BY D. OSHATZ	DATE 01-31-01	
CHK. BY –	DATE –	

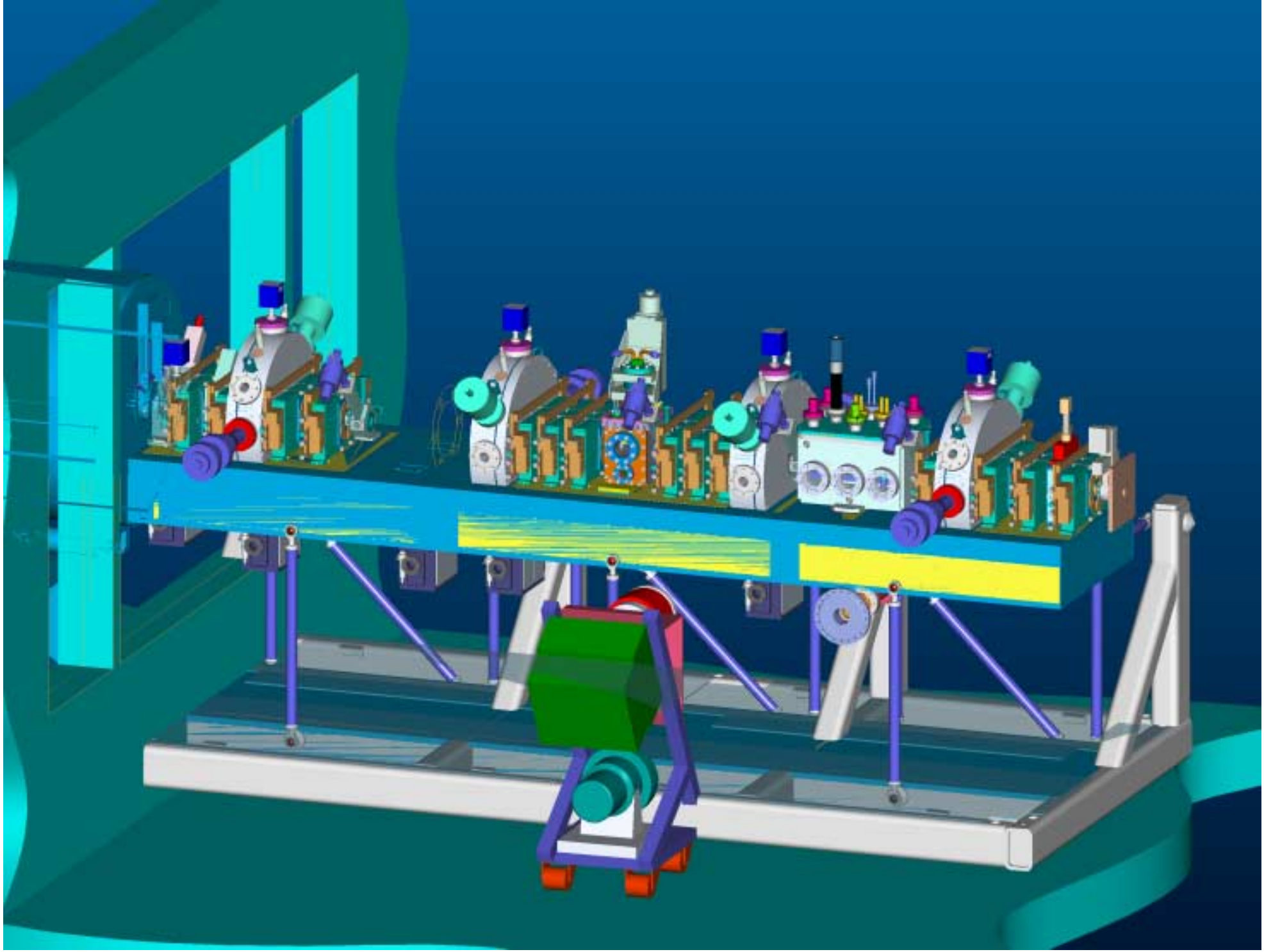
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA-BERKELEY

SNS - FES MEBT
MECHANICAL BEAM TRANSPORT SYSTEMS
CHOPPER TARGET BRAZE FIXTURE ASSEMBLY

PATENT CLEAR	DWG. TYPE	SHOWN ON	SCALE FULL	DO NOT SCALE PRINTS
	ASSEMBLY	–		
MICROFILMED	DESIGN ACCT. NO. –	CATEGORY CODE FE3312	DWG. NO. 25B1683	SIZE / REV. A




TCM
QMI2
RC4
QMI3
BEAM_STOP
QMI4
COLLECTOR
FEBR
DTL_QMI



Preliminary Specification for Turbomolecular Pump Cart

1.0 Scope

The following preliminary specifications are based on the current (9/8/00) vacuum system design. This design uses four turbo pumps per CCL module (based on 6" diameter manifolds for the CCL) and one turbo pump per DTL tank during the initial pump down.

2.0 Mechanical specifications/requirements

The turbo pump cart shall be versatile enough to pump down both the CCL modules and the DTL tanks. Adequate space shall be provided during cart use to allow technicians access to the gate valve/cart interface; this space shall allow the use of standard tools to connect the cart to the gate valve flange. The cart shall be small enough to allow safe passage of personnel through the tunnel during cart use.

2.1 Cart space constraints

The cart space constraints are based on the support structure geometry, the turbo pump port locations, and vacuum system geometry. Other systems (e.g., cooling systems) are not included in the space constraints; hence, interference problems may still exist even if these space constraints are met. Figure 1 gives the space constraints for DTL access. Figure 2 gives the space constraints for CCL access.

Details describing a preliminary quote from Varian based on a modified version of their standard turbo cart are given in Appendix A.

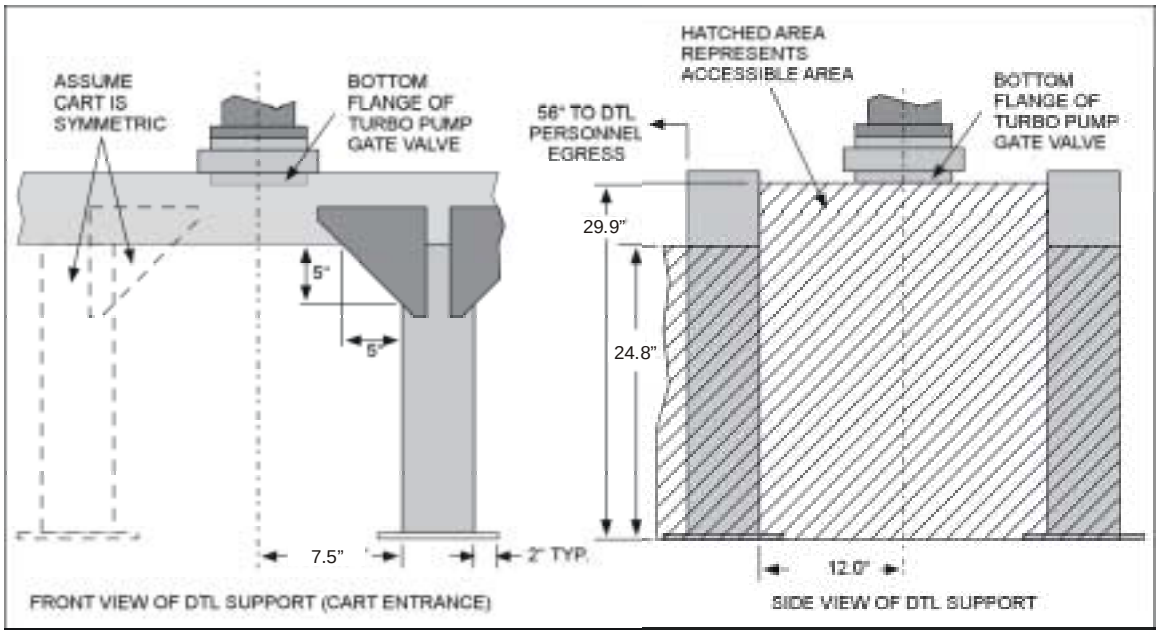


Figure 1: DTL space constraints

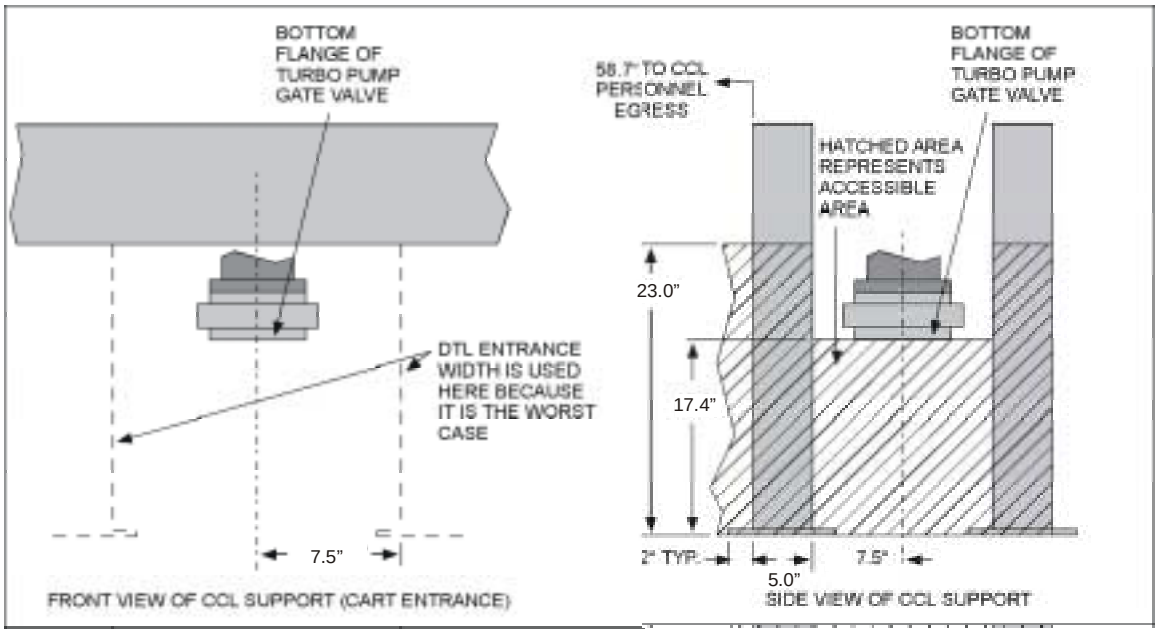


Figure 2: CCL space constraints

2.2 Parts, Materials and Processes

The parts, materials and processes used in the manufacturing the turbomolecular pump, primary pump, vacuum gauge, foreline and associated vacuum hardware shall be compatible for use in an ultra high vacuum system. See Spallation Neutron Source Accelerator Systems Division Vacuum Standards Handbook (SNS 102020000-ST0001-R00).

3.0 Primary (roughing) pump

The primary pump will be oil-free. The primary pump will have a pumping speed of 250 liters/minute while operating at 120 VAC and 60 Hz. The primary pump will have an ultimate base pressure below 10 milliTorr. The mean time between minor maintenance shall be 6000 hours or more. The mean time between major maintenance shall be 12,000 hours or more.

3.1 Primary pump controls

The Primary pump will have an approved (UL or CE) motor starter circuit. A remote normally open contact will control the start/stop function. A closed contact will start the primary pump. If the closed contact were to open, then the primary pump will stop. The motor starter will have an auxiliary contact that is open when the pump is stopped and closed when the pump is running. The motor starter will have a thermal overload that has a normally closed contact. If an overload condition occurs, the contact will open.

4.0 Low vacuum gauge

The turbo pump cart will have a low vacuum gauge mounted on the foreline between the turbo and the scroll pump. This gauge will measure the vacuum pressure by a combination of thermal conductivity and convection. The measurement range of the low vacuum gauge will be from 1000 Torr to $1x10^{-3}$ Torr.

4.1 High vacuum gauge
The turbo pump cart will have a high vacuum gauge mounted above the turbo. The high vacuum gauge will be an inverted magnetron cold cathode gauge. . The high vacuum gauge will have a 2.75" conflat flange. The measurement range of the high vacuum gauge will be from $1x10^{-3}$ Torr to $1x10^{-10}$ Torr.

A reducing tee with a 1.75" port will be mounted on the inlet of the turbo. The 1.75" port will have a 2.75" conflat flange. The high vacuum gauge will be mounted to this 2.75" conflat flange.

4.2 Vacuum gauge controller
The gauge controller will be able to read both the low and high vacuum gauges simultaneously and will have a local digital display where both pressures are shown. The gauge controller will have an adjustable setpoint for the pressure of each gauge. The setpoint will have a normally open contact that will close when the pressure goes below the setpoint. The gauge controller will have analog outputs each gauge. The analog outputs will be proportional to the pressure that each gauge is reading.

5.0 Turbomolecular pump
The turbomolecular pump will have a pump speed of at least 280 liters/second for nitrogen and 210 liters/second for hydrogen. The turbomolecular pump shall have a compression ratio of at least $2x10^{8}$ for nitrogen and $1x10^{4}$ for hydrogen. The turbomolecular pump will have an 8 inch "conflat" inlet flange. The turbomolecular pump will have ceramic bearings and will be able to operate in any orientation. The turbomolecular pump will have a throughput of at least 60 liters/second at 75 milliTorr for nitrogen. The turbomolecular pump will have a base pressure of $1.5x10^{-10}$ Torr when the foreline pressure is below 7.5 milliTorr.

The turbomolecular pump will have forced air cooling. Water-cooling is not acceptable. The turbomolecular pump will have an automatic fixed delay vent valve.

5.1 Turbomolecular pump controls
The turbomolecular pump will have a controller that can start and stop the pump by a remote contact. When the contact is closed the pump will start and when the contact opens the pump will stop.

The controller will have +24VDC outputs that indicate the status of the turbo pump. One output will indicate the turbomolecular pump is in the startup mode. During startup, the +24 VDC will be present on the output and will return back to 0 VDC once the pump has reached normal operation. One output will indicate that the RPMs of the turbomolecular pump are higher than a programmable setpoint. One output will indicate if there is a fault condition in the turbomolecular pump. The +24 VDC will be present on the output if there is a fault and will be 0 VDC if the pump is operating correctly.

See Figure 3 for a block diagram of the turbo cart.

6.0 Remote Control Interface
The various remote control signals discussed in sections 3.1, 4.0 and 5.1 will be available on a single panel mounted connector on the turbo cart. This connector shall be a multi-pin circular connector that meets military specification MIL-C-26482.

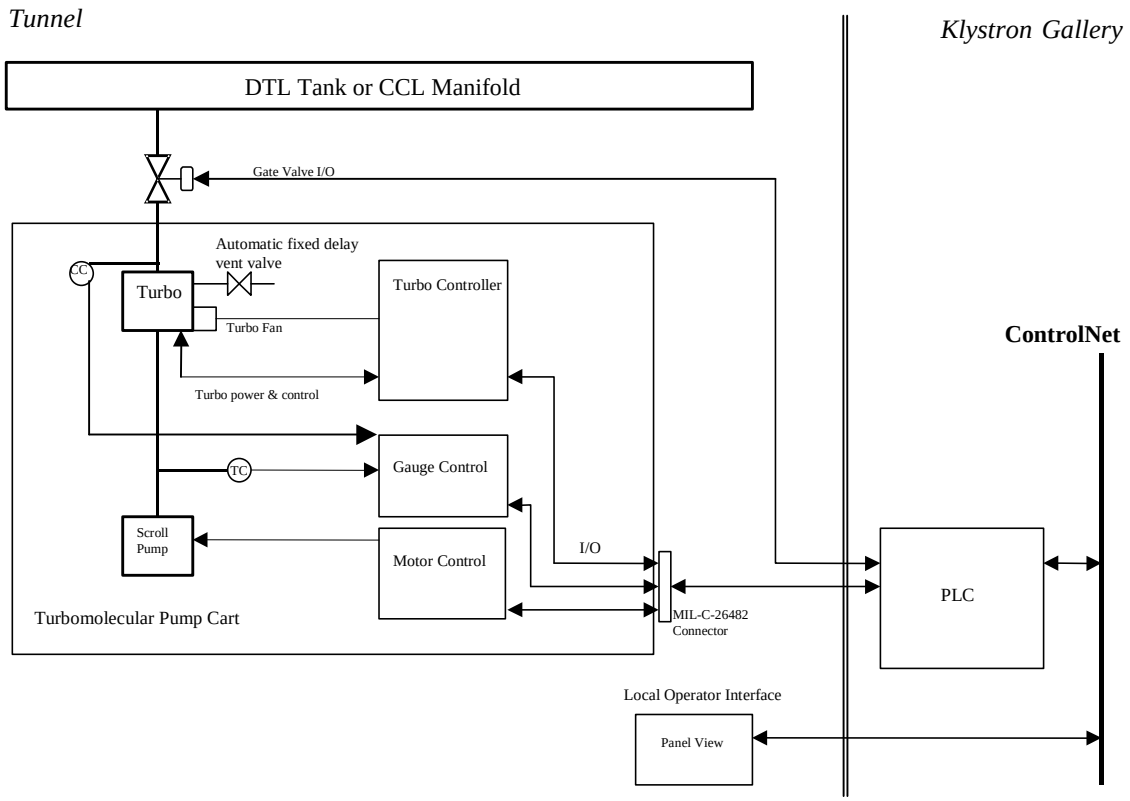


Figure 3. Block diagram of the turbo cart.

Turbo cart quote from Varian

A preliminary cost estimate for a modified Varian turbo cart has been obtained. The cart design was modified to work with the most recent DTL/CCL geometric models available at that time. (Note: These are not the same as LANL's current CCL/DTL geometric models.) The modifications were designed based on the Varian T-series turbo cart (Model number MSPT9040/MSP1505 – 300 l/s turbo & 300 l/min dry scroll primary pump).

The standard T-series cart (Figure A-6) does not fit under the DTL or CCL support structures based on the Varian catalog dimensions and the geometric model of the support structures. Moreover, the DTL and CCL ports were are at different heights. Therefore, modifications to the standard cart are necessary.

Since the standard cart will not fit under the accelerator regardless of orientation, the preliminary specification proposed the simplest changes necessary to get the cart to work with both the DTL and CCL turbo ports.

Figure A-1 shows the modified turbo cart under the CCL structure. Figures A-2 and A-3 show the cart with the turbo pump in both the upper-most and lowermost positions. The range of motion satisfies the installation clearances for both the DTL and CCL configurations. Figure A-4 and A-5 give cart dimensions. Figure A-6 shows the cart in its original, unmodified state.

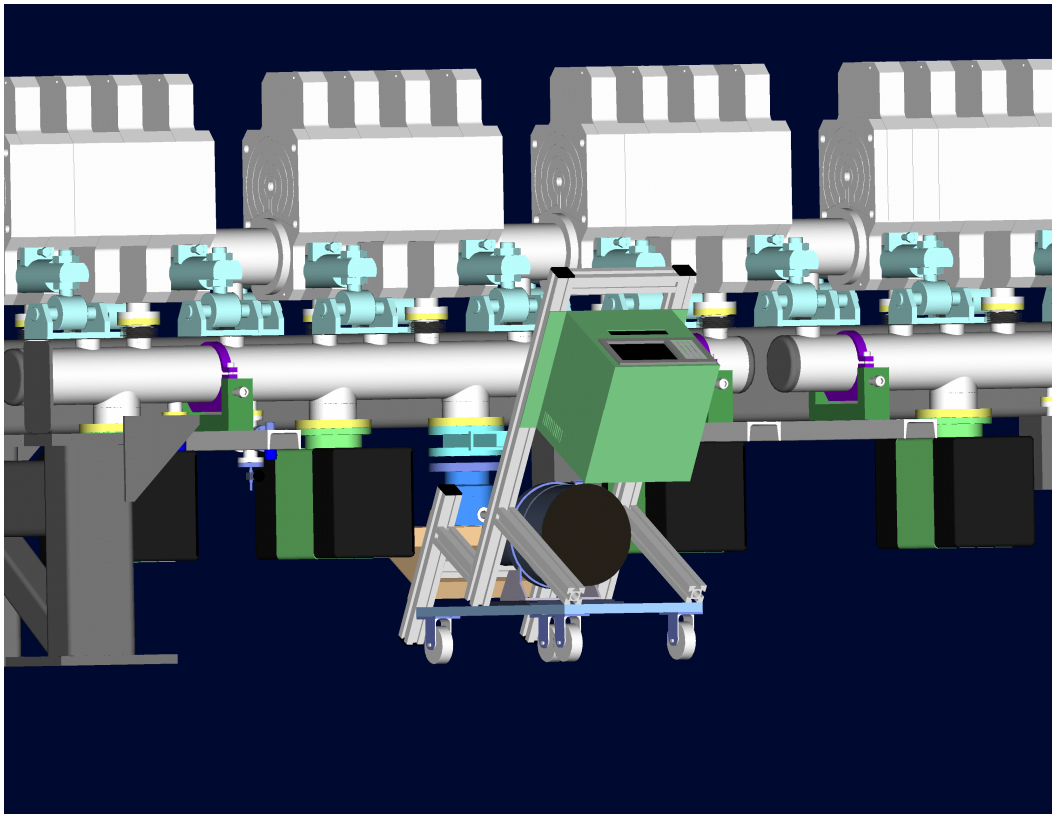


Figure A-1: Modified cart under the CCL structure

Varian turbo cart cost estimate:

Description: Basic turbo cart (T-series turbo pumping cart) with a V300HT turbo pump with 8" CF connection, turbo pump controller and a Triscroll 300 primary pump. Note: the prices listed here are for a turbo pump cart without accessories. These prices do not include quantity discounts.

Unmodified turbo cart:

Turbo pump & cart (MSPT9040)		$10,660
Scroll pump (MSP0202)		$5,195
TOTAL		$15,855

Modified turbo cart:

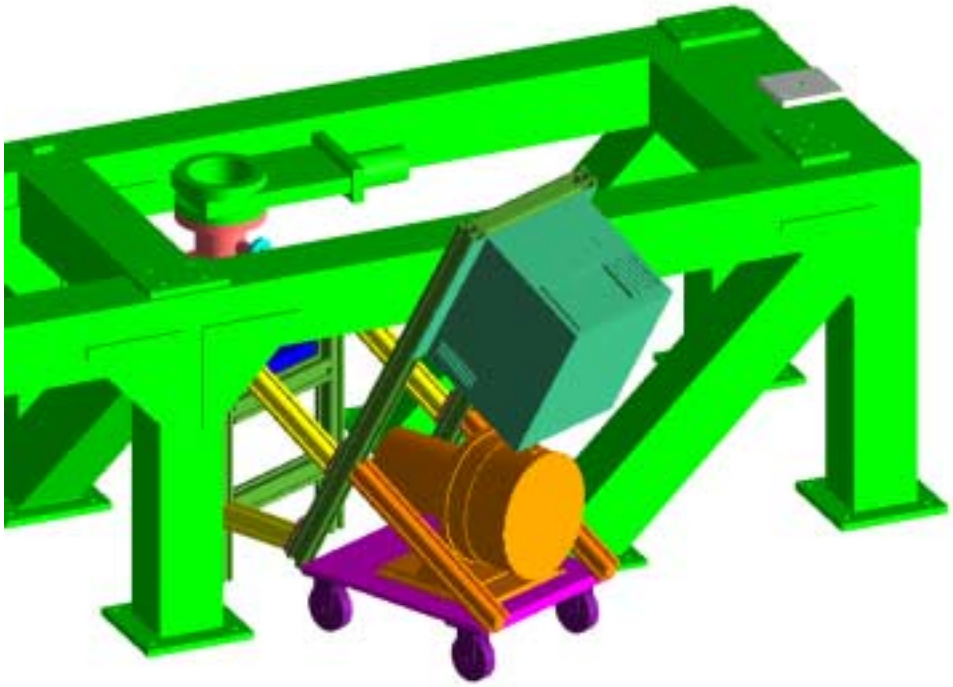
Modified standard product (quote from Varian)		$16,589

Pumps alone:

Turbo pump (V300HT)		$7,260
Controller for turbo		$2,355
Scroll pump (PTS03001)		$5,450
TOTAL		$15,065

Cart costs alone:

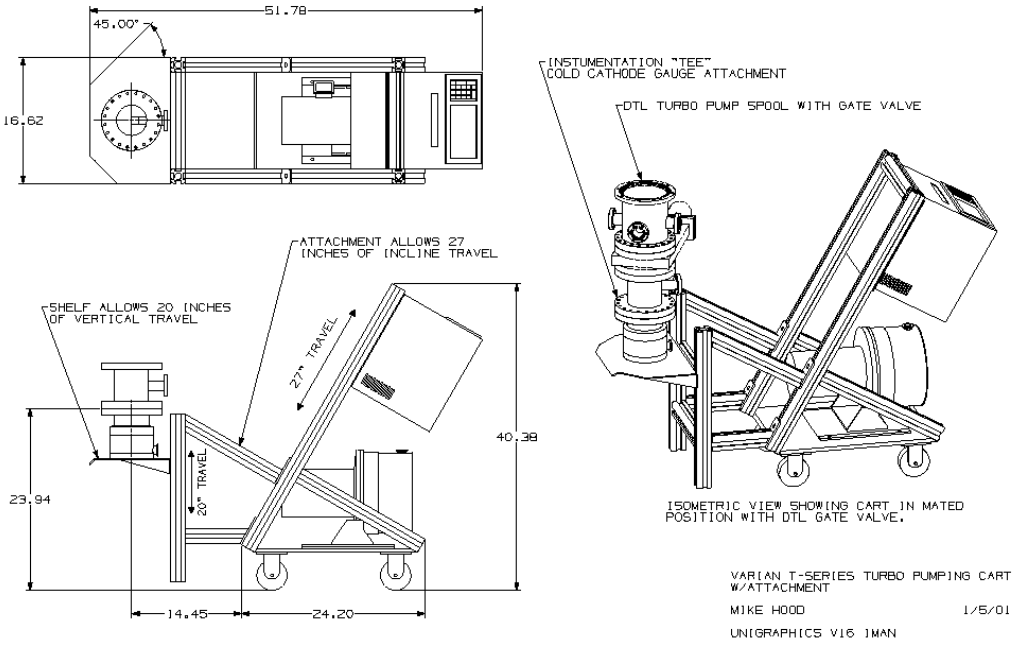
Unmodified:	$15,855-$15,065=	$790
Modifications:	$16,589-$15,855=	$734
TOTAL		$1,524



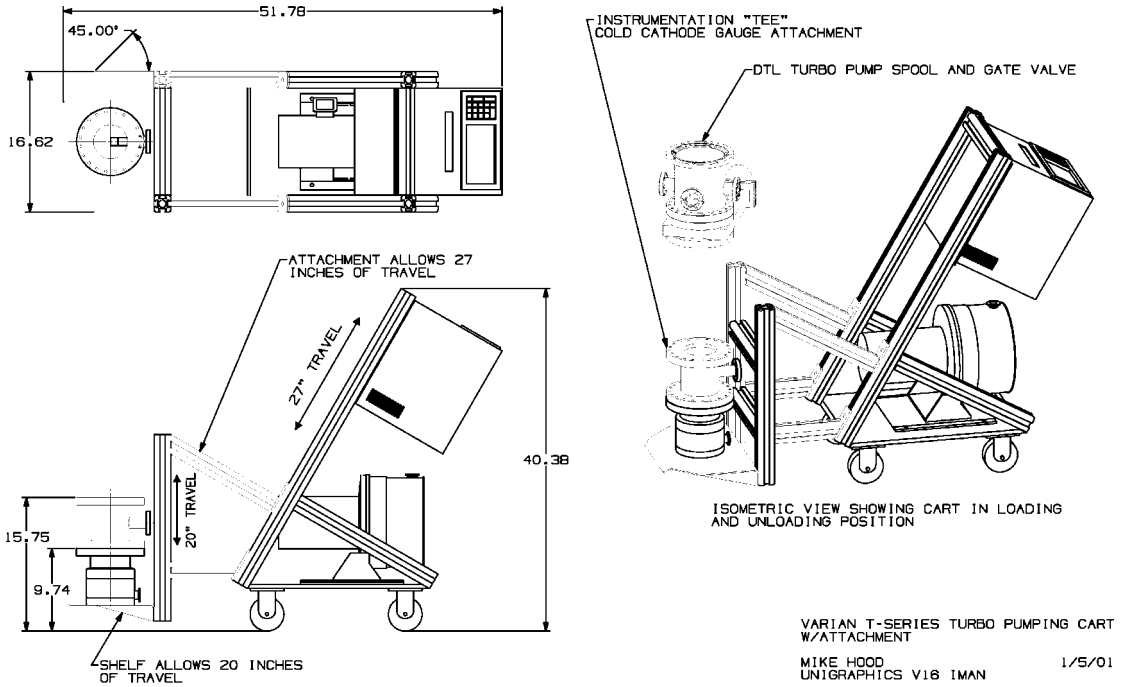
Appendix A-2: Varian Turbo Pumping Cart with support attachment in mated position with the DTL gate valve. Also shown is cart clearance under DTL support structure interference area.

Appendix A-3: Varian Turbo Cart with support attachment in mated position.

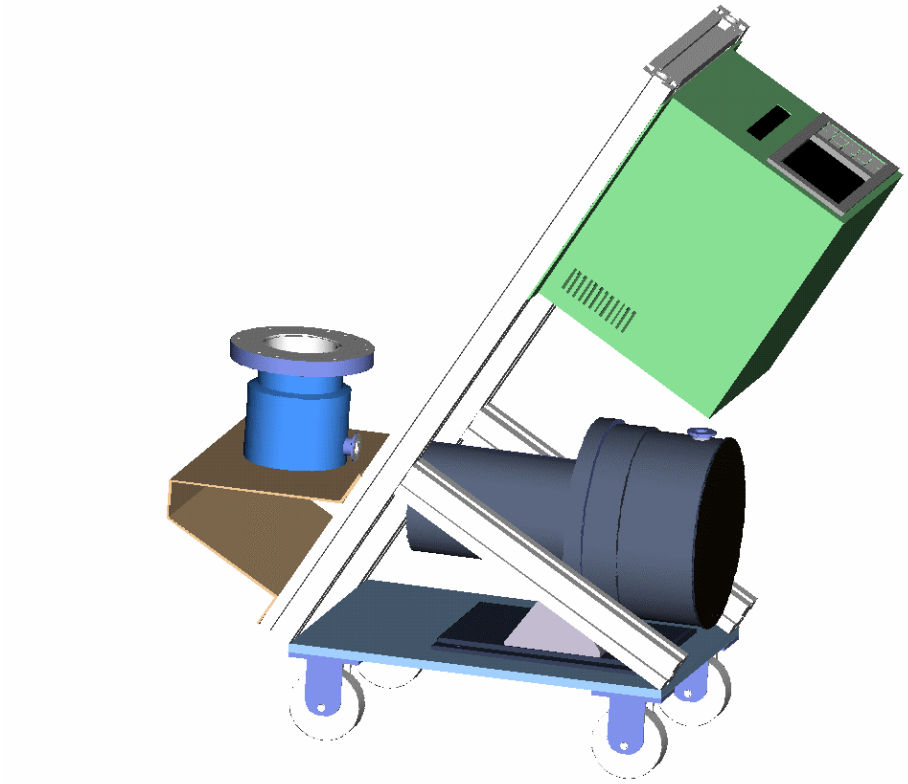
Appendix A-4 Varian Turbo Cart with support attachment in mobile position.



Appendix A-5: Detail drawing of Varian Turbo Cart with support attachment mated to the DTL spool and gate valve.



Appendix A-6: Detail drawing of Varian Turbo Cart with support attachment in moblile position.



Appendix A-7: Standard T-series turbo cart.