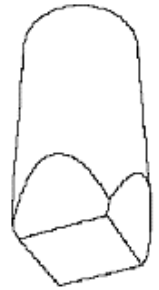
Excimer Immersion Microstepper

XIS193 / 248



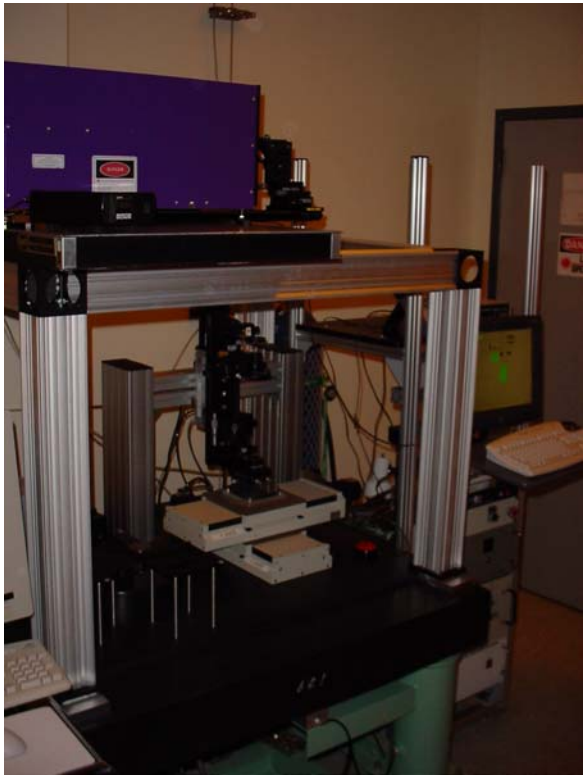
High-NA water immersion excimer laser stepper system for lithography research and development

Excimer Immersion Microstepper
XIS-193

Compact Excimer Laser

Optical Column

200mm stage

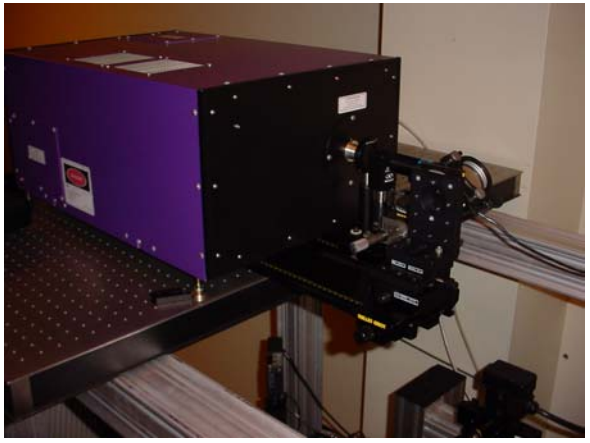


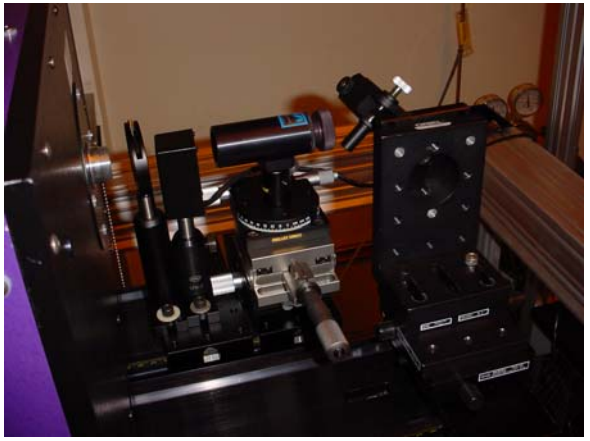
Graphical Interface

Stage and Robotic Controllers

Excimer Immersion Microstepper
XIS-193

Beam Delivery and Illumination System





Optical Column

Polarizer

PS Mask Plane

High NA Imaging Lens

200mm Stage

Immersion Phase-shift Lithography using Smith-Talbot Lens

Phase-shift lithography using a chromeless PSM and a Smith-Talbot interference lens

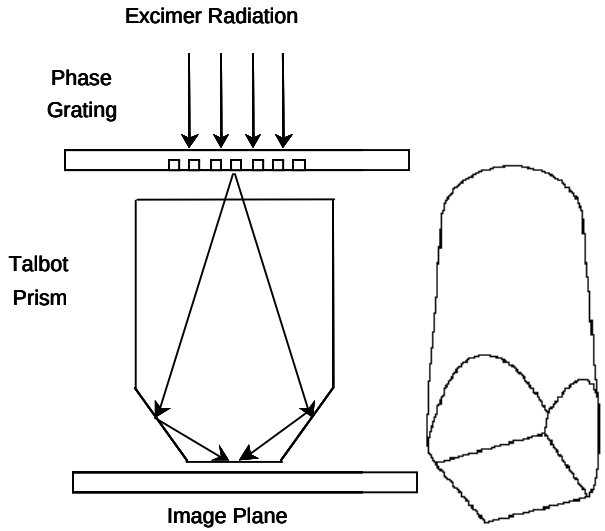
Operation at 193nm or 248nm possible using commercial π_{193} or π_{248} phase shift mask gratings

Dual wavelength tool available

High-NA water immersion operation at 0.80 to 1.35NA for 60nm to 36nm resolution

Line/space and contact patterns are possible

Standard UV optical components used for polarization and beam delivery



193 Prism Lens Designs

NA	*half-pitch*
0.8	*60nm*
1.05	*45nm*
1.20	*40nm*
1.35	*36nm*

Lambda Physik OPTexProT-ROM

Small-footprint line-narrowed 193-nm excimer laser designed to meet the demanding specifications of immersion photolithography

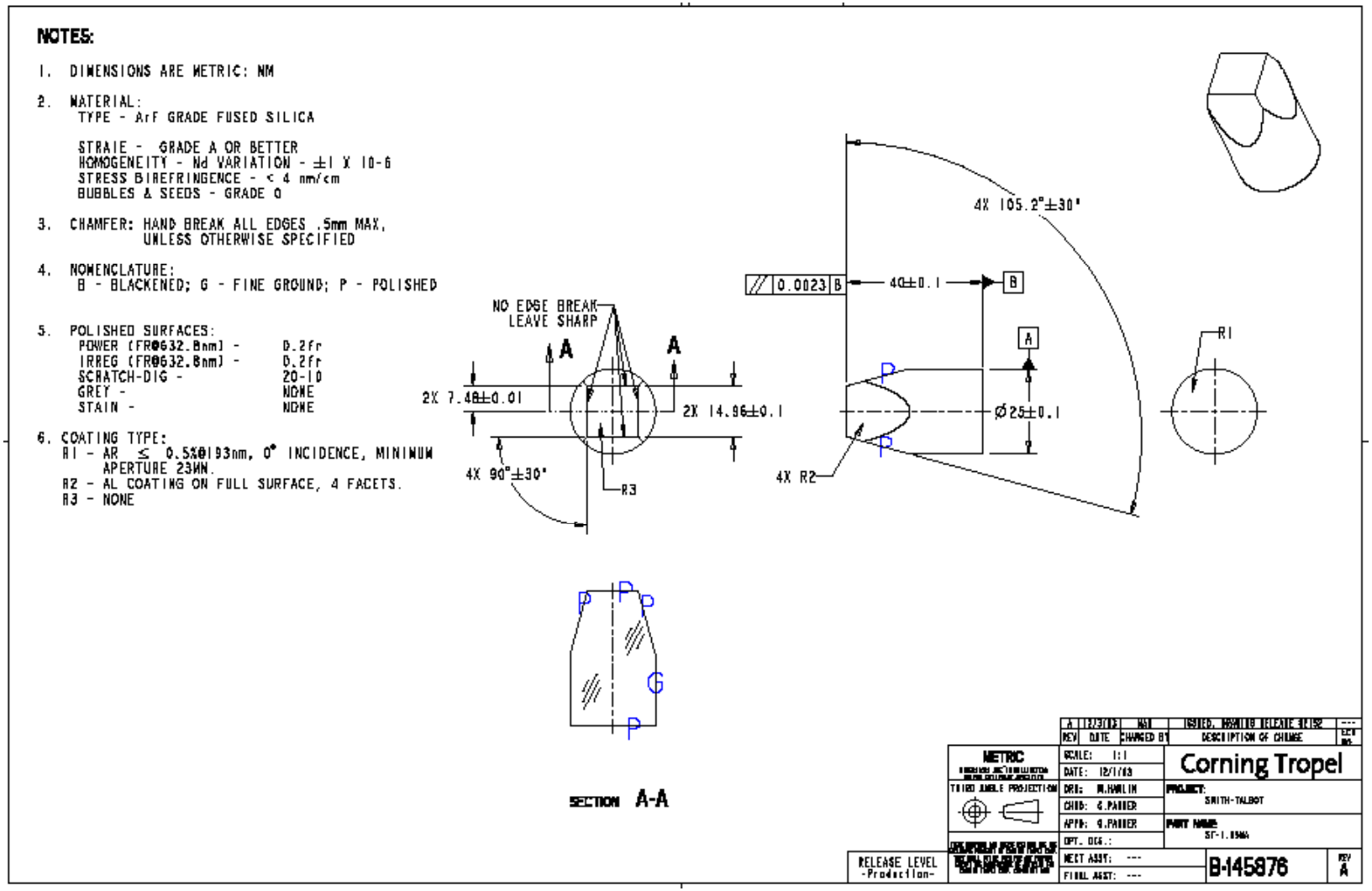
OPTexPro*	F_2**	ArF	KrF	XeCl	XeF	
Wavelength	157	193	248	308	351	nm
Max. Pulse Energy	1	10	17	8	8	mJ
Max. Average Power	0.5	4	8	4	3	W
Max. Repetition Rate	500	500	500	500	500	Hz
Energy Stability (1σ)	n/a	3	3	3	3	%
Pulse Duration (FWHM, typ.)	n/a	10	10	10	10	ns
Beam Dimensions (v x h, FWHM, typ.)	n/a	6x3	6x3	6x3	6x3	mm^3
Part No. 16113250 (193 nm, 115 V, 230 V, 50/60 Hz) 16113210 (308 nm, 115 V, 230 V, 50/60 Hz)						

Dimensions (l x w x h)	Laser head: 605 x 304 x 450 mm^3 / 24 x 12 x 18 in
Weight	Laser head: 73 kg / 161 lbs

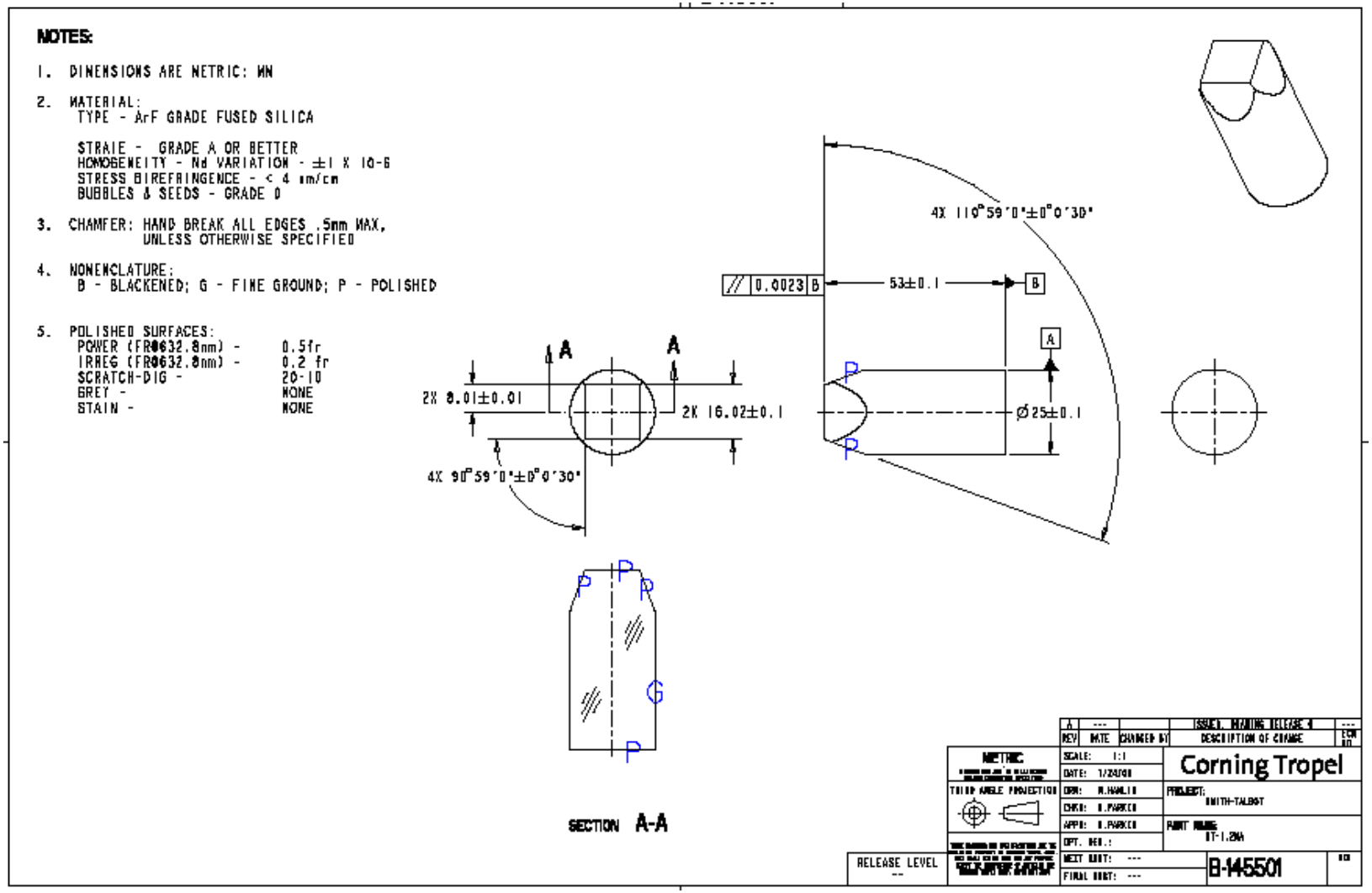
LAMBDA PHYSIK®

Driving the Pulse of UV Technology

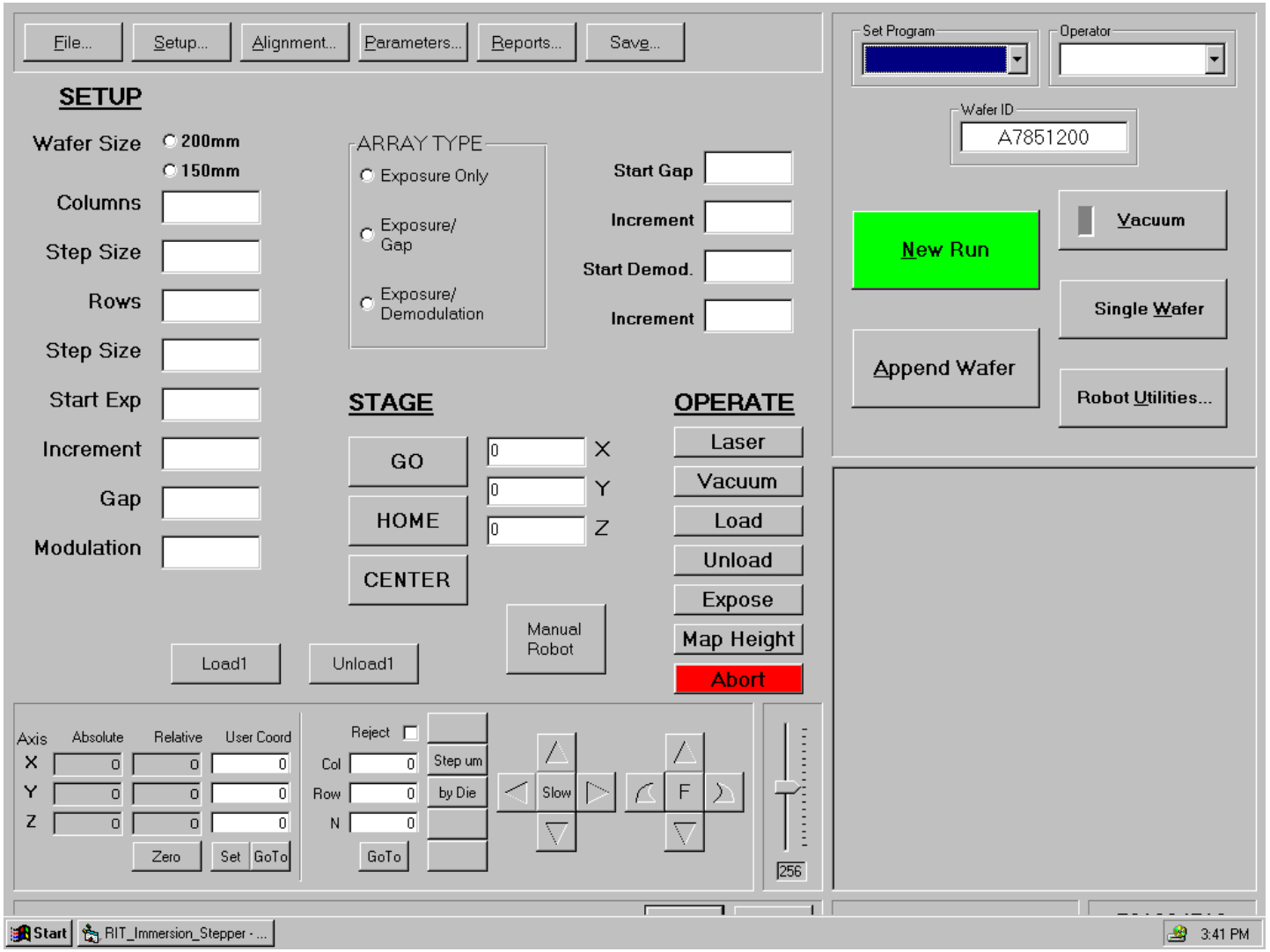
1.05NA Smith Talbot Lens
45nm half-pitch resolution



1.20NA Smith Talbot Lens
40nm half-pitch resolution

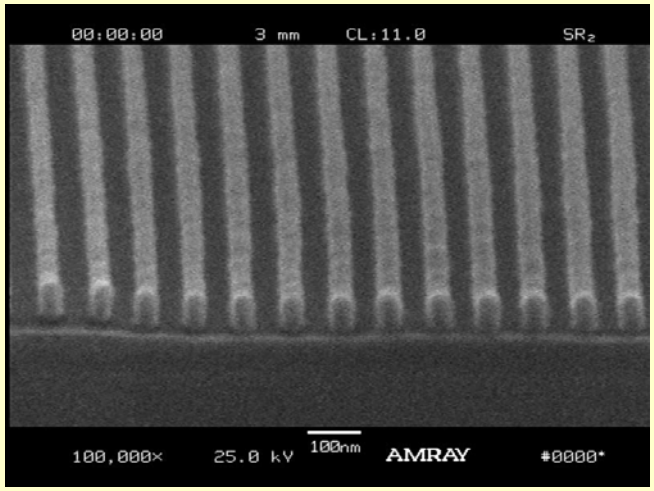


Graphical System Interface

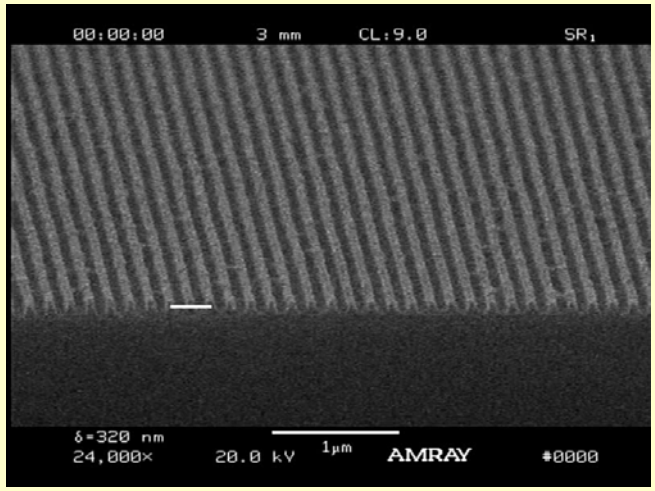


Resist Imaging Results

193nm 1.05NA
45nm resolution



248nm 0.82NA
75nm resolution



I. SYSTEM CAPABILITIES

A. IMAGING PERFORMANCE

Wavelength	193nm (ArF) or 248nm (KrF)
Optics system	Smith-Talbot lens (Corning Tropel)
NA	0.80, 1.05, 1.20
Resolution	60nm, 45nm, 40nm half-pitch (@193nm)
Wafer Size	150 and 200mm
Exposure area	2mm diameter field
Field uniformity	90% image contrast over 1mm and 10% uniformity
Irradiance at wafer	0.2 to 50 mW/cm2
Exposure throughput	0.2 to 50 mJ/cm2 per second
Minimum exposure	0.01 mJ/cm2
DOF	500 microns at 1.05NA

B. SYSTEM PERFORMANCE

X-Y stage travel	200 mm
X-Y stage accuracy	1 micrometer
Z stage travel	50 mm
Z stage accuracy	0.5 micrometer
Laser temporal coherence	< 10pm
Laser spatial coherence	> 250 micrometers
Laser energy	> 2mJ/pulse
Laser rep rate	200 Hz

II. SYSTEM DESCRIPTION

A. WEIGHTS AND DIMENSIONS

(all dimensions in mm and weights in kg unless noted)

XIS 193		Width	Depth	Height	Weight	Comments
1	Exposure Tool	900	1200	1200	100	Optical column, stages, and robot
2	*FabFloor Pedistal*	*1500*	*1500*	*300*	*400*	*Optional Newport subfloor pedastal*
3	Workstation Frame	900	1200	700	200	Self leveling isolation frame
4	Optical Tabletop	900	1200	210	300	
5	GAM Laser	430	630	300	50	Laser supported by electronics rack
6	Electronics Rack	560	560	2000	150	Controls, CPU, and monitor
7	Gas Cabinet					User supplied

B. SERVICES

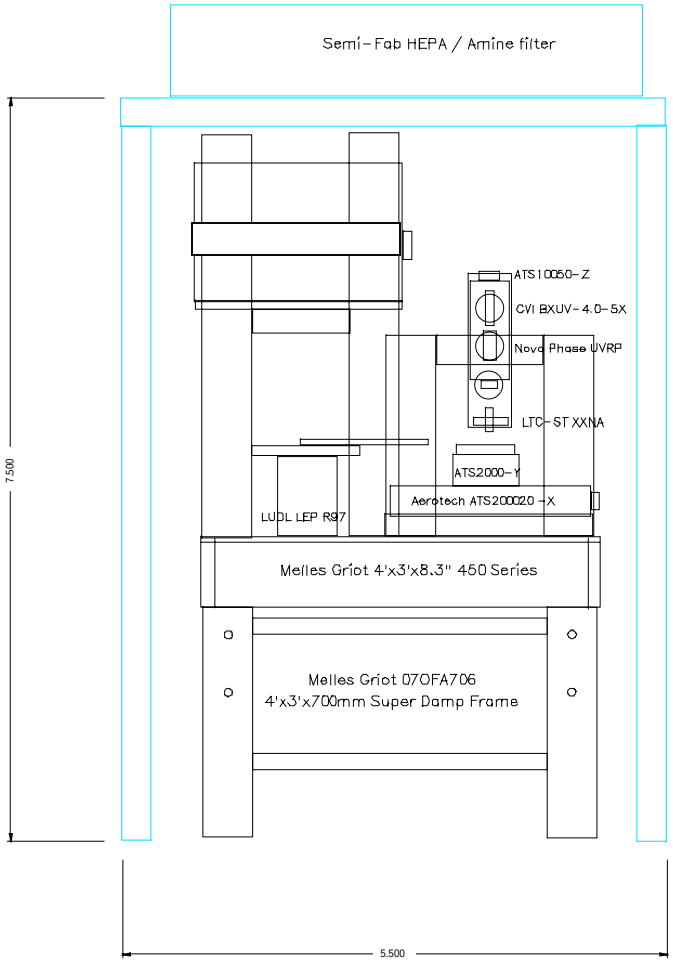
Gases, air, vacuum, and exhaust						
			Gases	Delivery		
1	Lambda Physik					See OpTex Pro manual for specifications
	OpTex Pro T-ROM		0.17% F2			
			6% Ar			
			1% He			
			Helium			
			Bal. Ne			
			N2			Line Narrowing purge, 10-100 cc/min.
			Exhaust			1/4" Swagelock to 3/4" flexible hose
2	Workstation Frame		CDA	100 psi		Compressed Air CDA, isolation mounts
3	Exposure Tool		PV	200 mbar		Regulated process vacuum, wafer chuck
			CDA	100 psi		Mask actuator, regulated
4	Gas Cabinet		Exhaust			Exhaust as specified by user (160-230 m3/h

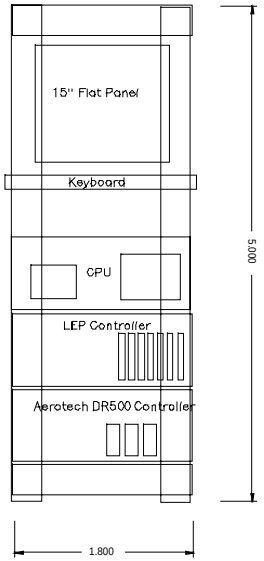
Electrical				
			Service	
1	Exposure tool and rack		110-125 VAC 47/63 Hz	Total requirements for system including
2	Laser		110-125 VAC 47/63 Hz	laser 20Amp

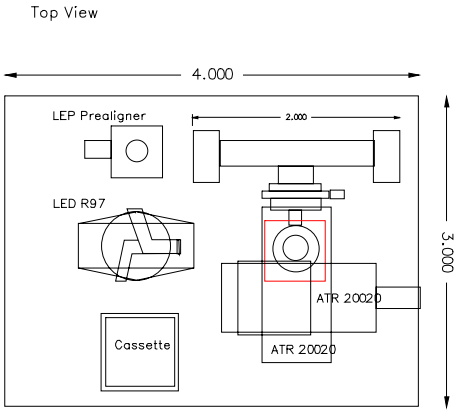
Lithographic Technology Corp.

REVISIONS

REV.	DESCRIPTION	DATE	APPROVED







ITEM NO.	PART NUMBER	PART DESCRIPTION	MATERIAL SPECS.	QTY.
	XXS193			

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± DECIMALS .XX± .XXX± ANGLES ±

CAD GENERATED DRAWING
DO NOT UPDATE MANUALLY

APPROVALS	DATE
DRAWN	
CHECKED	

MATERIAL

FINISH

NEXT ASSY. USED ON

APPLICATION

LTC

SIZE C | DRAWING NO. | REV.

SCALE: XX CAD FILE: XXXX.XXX | SHEET XX OF XX