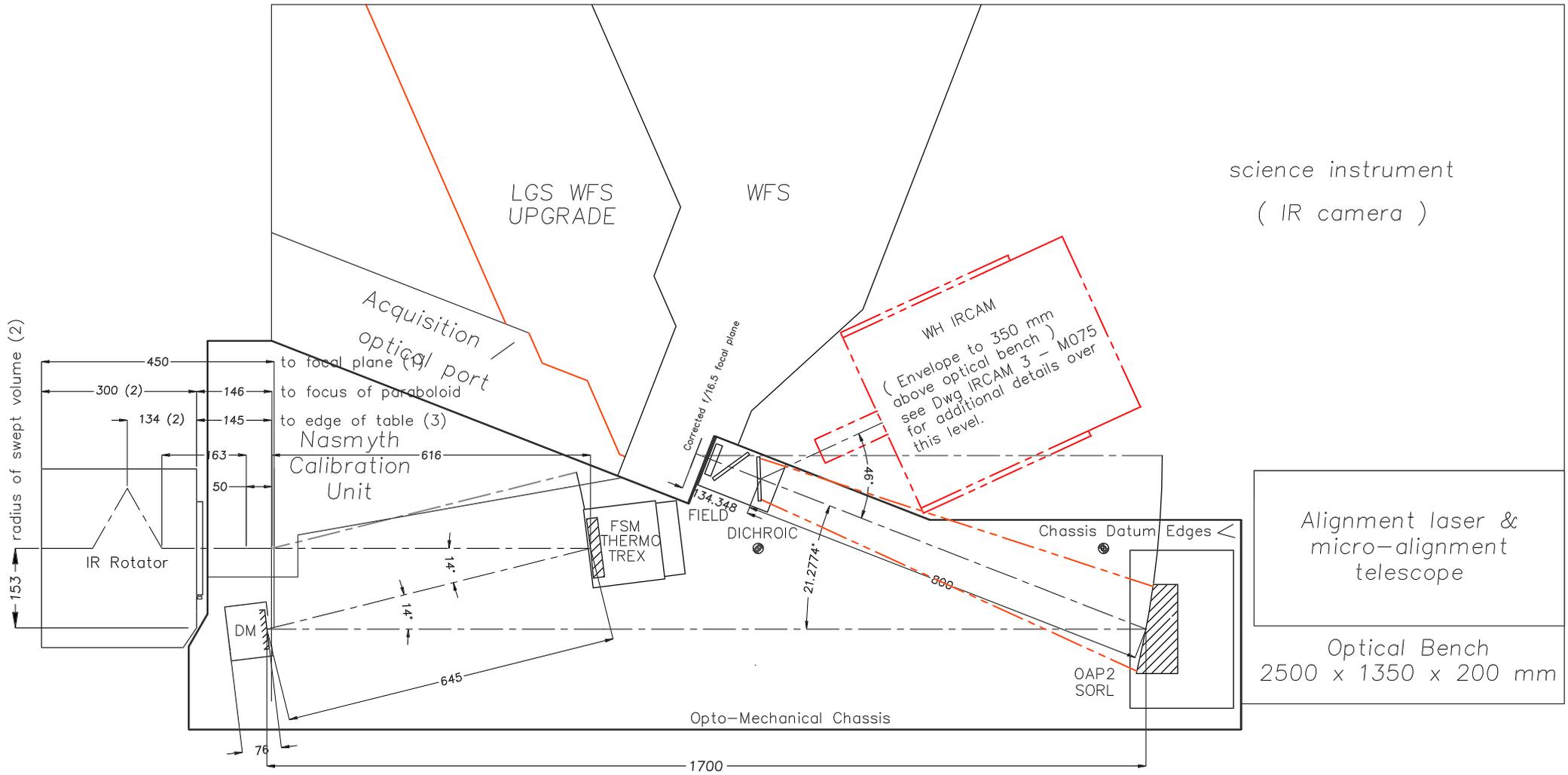


1000 mm



science instrument
(IR camera)

Alignment laser &
micro-alignment
telescope

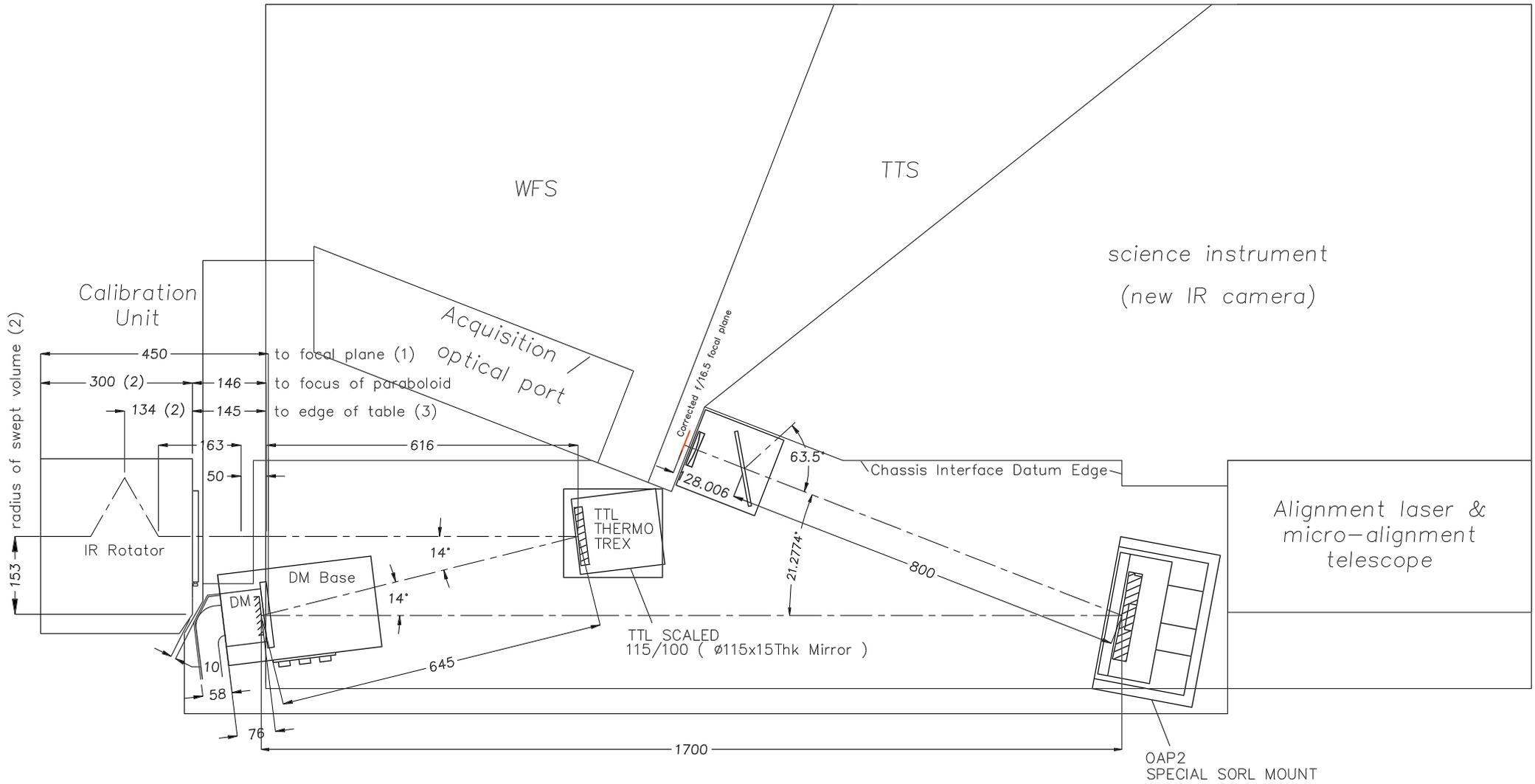
Optical Bench
2500 x 1350 x 200 mm

Sources
Zemax model file (Martyn Wells) except

- (1) RGO drawing V/AE/000
- (2) RGO drawing W/AE/001
- (3) RGO drawing W/BD/111

provisional drawing - not valid for manufacture

THIRD ANGLE PROJECTION DIMENSIONS IN MM		PARTICLE PHYSICS & ASTRONOMY RESEARCH COUNCIL ROYAL OBSERVATORY EDINBURGH	
Material		Weight	0.0 Kg
Finish			
Last Mod	WHIRCAM -17.5° ROT.+99.456 mm / wfs+10.347 mm 19 Dec96		
CTD Nos.			
Tolerances		Mod'd	
		Drawn	05-Nov-96 cjd
Title	Optical Chassis/Bench Space Envelope Layout	App'd	Sheet 1 of 1
		Instrument naomi	Drawing No. 00A03L Issue



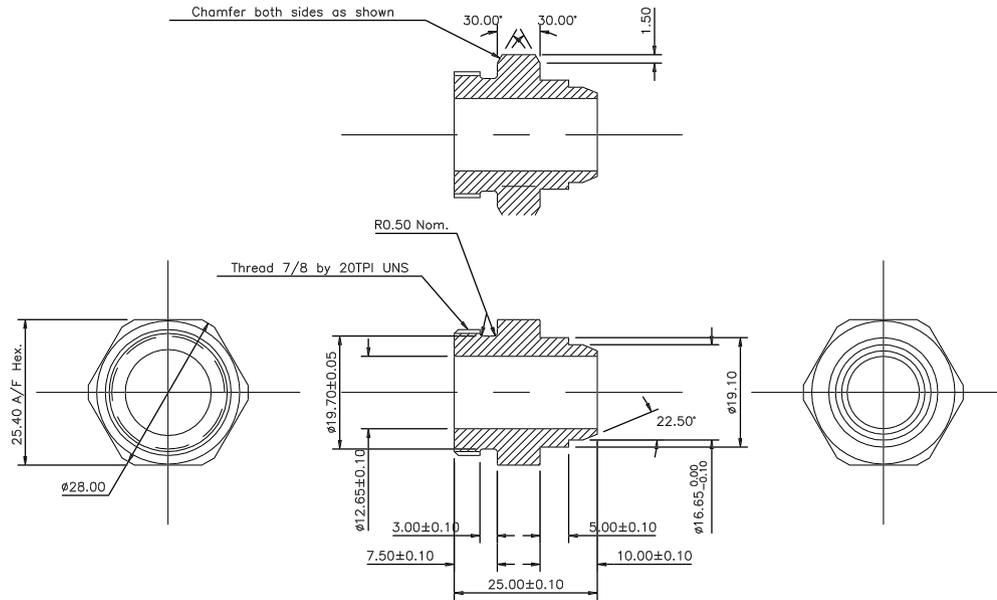
Sources
 Zemax model file WHTA05.ZMX (Eli Atad) except
 (1) RGO drawing V/AE/000
 (2) RGO drawing W/AE/001
 (3) RGO drawing W/BD/111

provisional drawing – not valid for manufacture

THIRD ANGLE PROJECTION DIMENSIONS IN MM		PARTICLE PHYSICS & ASTRONOMY RESEARCH COUNCIL ROYAL OBSERVATORY EDINBURGH	
Material		Weight	0.0 Kg
Finish			
Last Mod	first issue		
CTD Nos.			
Tolerances		Mod'd	
		Drawn	05-Nov-96 cjd
Title	Optical Chassis optical layout	App'd	Sheet 1 of 1
		Instrument naomi	Drawing No. 00A03L1 Issue

DRG NO.
BN / 001

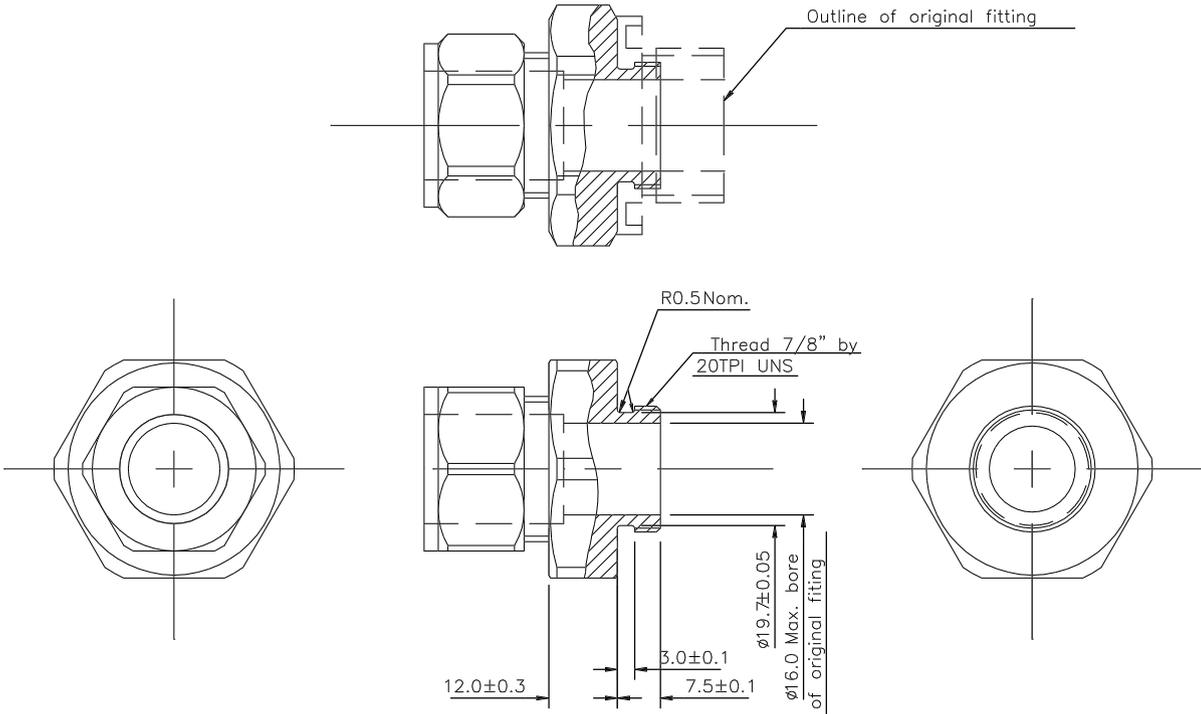
DO NOT SCALE



			TOLERANCES (UNLESS OTHERWISE STATED)	MATERIAL	THIRD ANGLE PROJECTION	DIMS IN mm	ORIGINAL SCALE	ORIGINAL SHEET SIZE A3	G.A. NO.	
			X \pm			ROYAL GREENWICH OBSERVATORY	TITLE	TUBE / AEROQUIP 5400 ADAPTOR		
1	28/06/95	DJH	X.X \pm	FINISH	No. REQ'D	MADINGLEY ROAD				
ISSUE	DATE	DRAWN	X.XX \pm			CAMBRIDGE CB3 0EZ	DRG NO.	BN / 001	SHT. 1	LOC'N BN
			ANG. \pm							

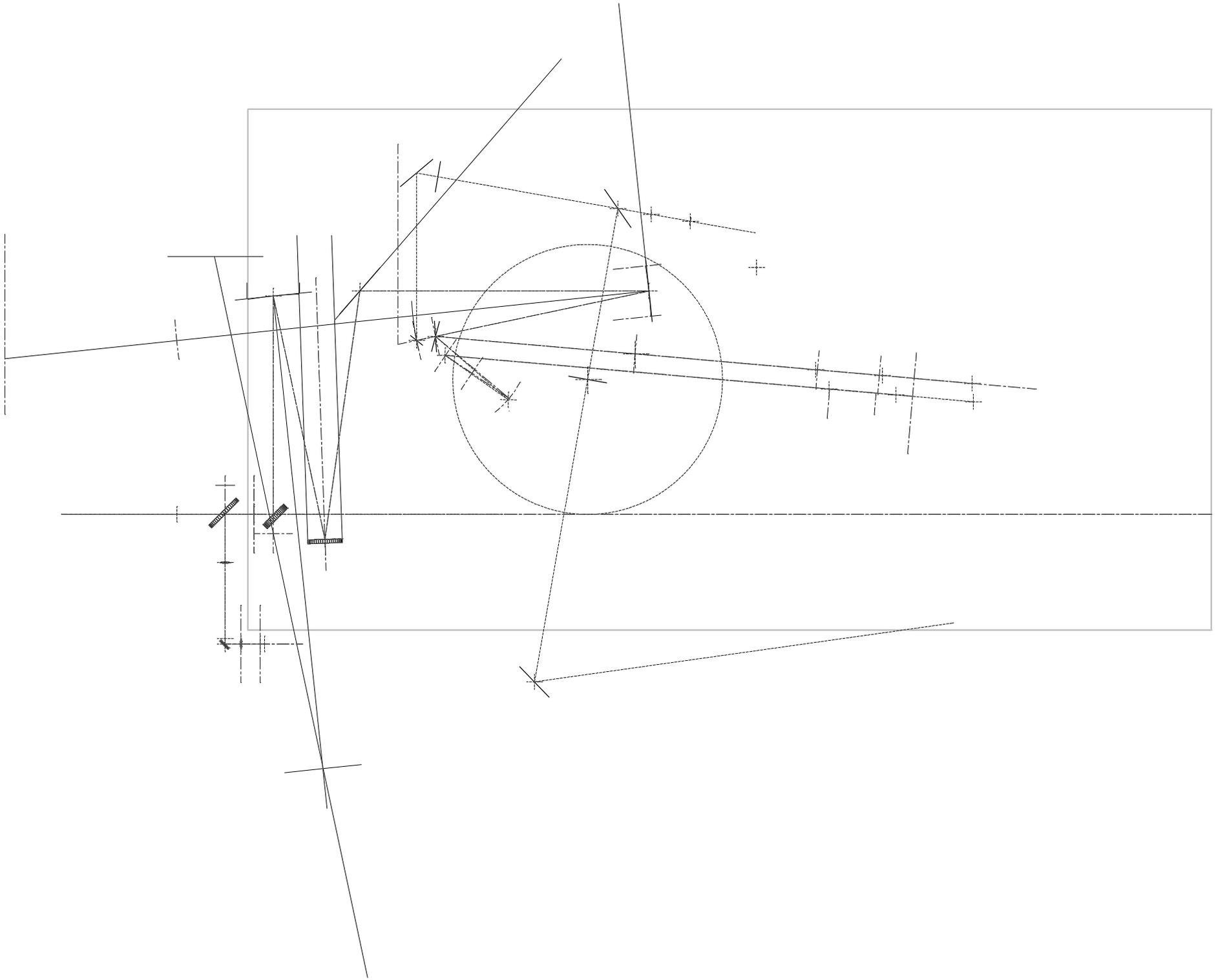
DRG NO.
BN/001

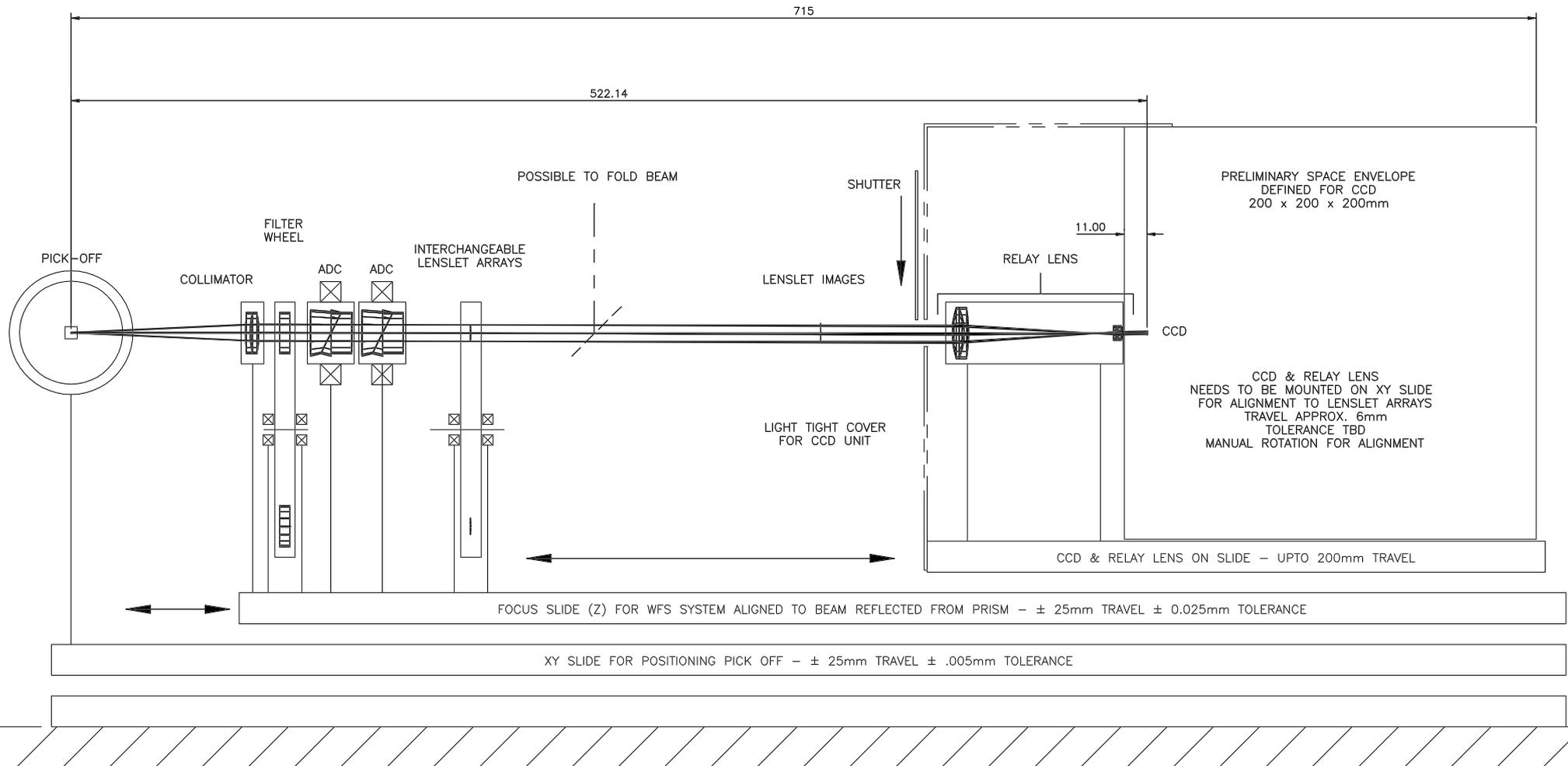
DO NOT SCALE



Net: This drawing details the modifications to Swagelok SS-1210-1-OR Male Connector

			TOLERANCES (UNLESS OTHERWISE STATED)	MATERIAL	THIRD ANGLE PROJECTION	DIMS IN mm	ORIGINAL SCALE	ORIGINAL SHEET SIZE A3	G.A. NO.	
			X ±			ROYAL GREENWICH OBSERVATORY	TITLE	TUBE / AEROQUIP 5400 ADAPTOR		
2	05/07/95	DJH	X.X ±	FINISH	No. REQ'D	MADINGLEY ROAD				
ISSUE	DATE	DRAWN	X.XX ±			CAMBRIDGE CB3 0EZ	DRG NO.	BN/001	SHT. 1	LOC'N BN
			ANG. ±							





GHRIL BENCH
OR BRACKET FIXED TO BENCH

PRELIMINARY

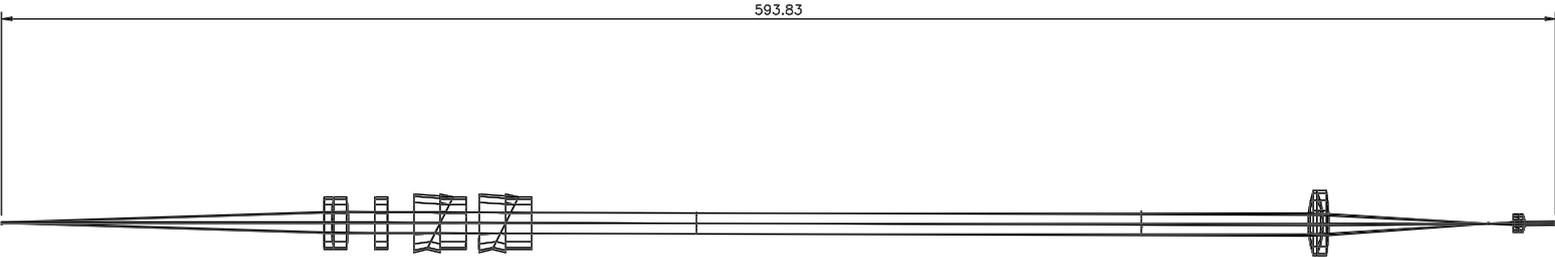
DO NOT USE FOR MANUFACTURE

OPTICAL INFORMATION PROVIDED FROM FILE WFSF11C.DXF
FROM ZEMAX PROVIDED BY S. WORSWICK 16-5-96

				TOLERANCES (UNLESS OTHERWISE STATED)				MATERIAL		THIRD ANGLE PROJECTION		DIMS IN mm		ORIGINAL SCALE 1:1		ORIGINAL SHEET SIZE A1				G.A. NO.		LOC'N. BN	
				X ±						ROYAL GREENWICH OBSERVATORY						WHT NGS AO WFS F/11 OPTICAL LAYOUT				DRG NO.		SHT. 1	
				X.X ±						MADINGLEY ROAD						PRELIMINARY DESIGN & SPACE ENVELOPE							
				X.XX ±						CAMBRIDGE		CB3 0EZ										BN/003	
				ANG. ±																			
ISSUE	MOD. NO.	DATE	DRAWN BY	ISSUE	MOD. NO.	DATE	DRAWN BY																
				1		16/05/96	AJW																

DRG NO. BN/004

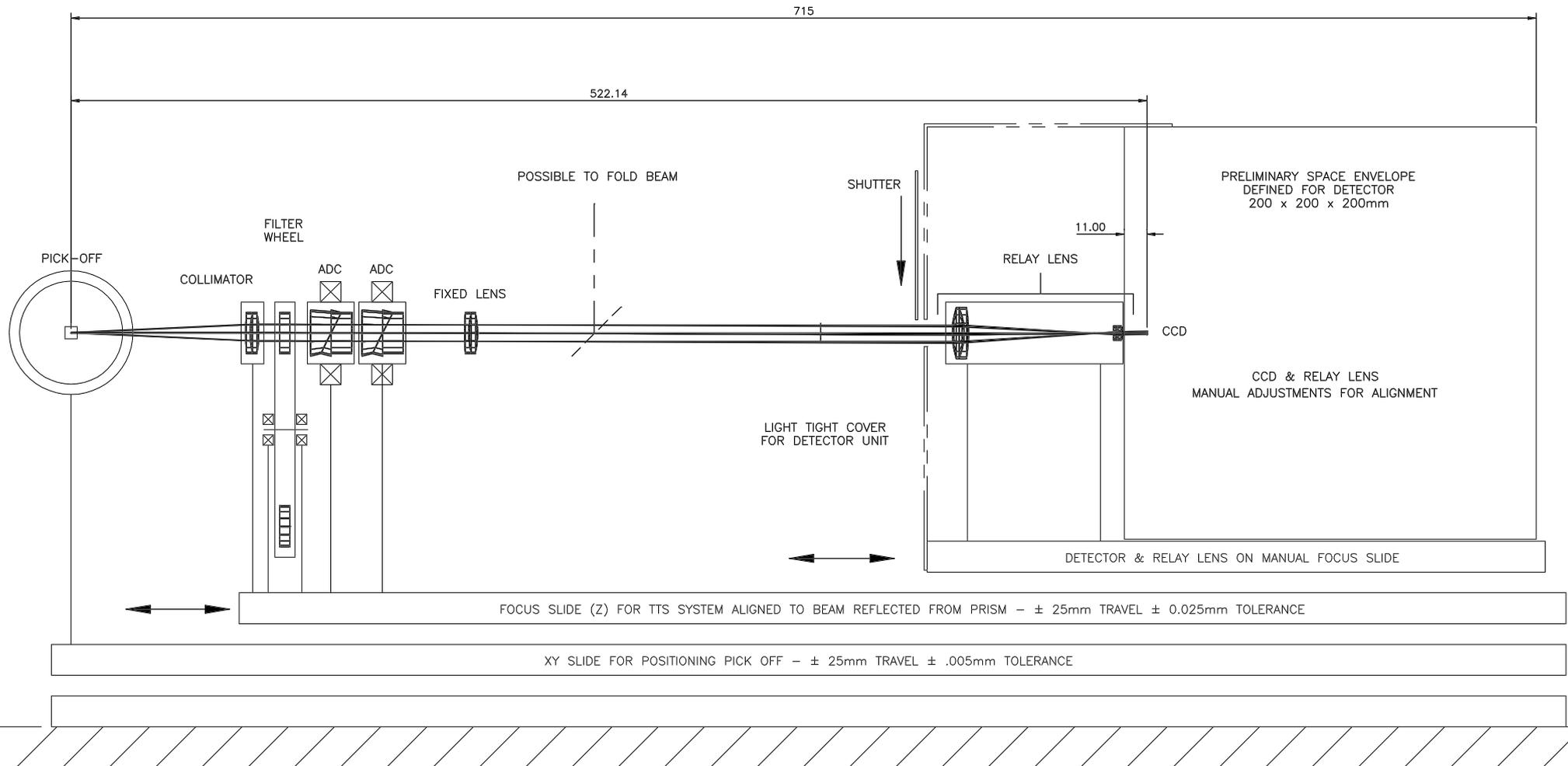
DO NOT SCALE



OPTICAL INFORMATION PROVIDED FROM FILE WFSF16C.DXF
FRPM ZEMAX PROVIDED BY S. WORSWICK 17-5-96

PRELIMINARY
DO NOT USE FOR MANUFACTURE

								TOLERANCES (UNLESS OTHERWISE STATED)	MATERIAL	THIRD ANGLE PROJECTION	DIMS IN mm	ORIGINAL SCALE	ORIGINAL SHEET SIZE A1		G.A. NO.	LOC'N. BN	
								X ±									
								XX ±	FINISH	NO. REQ'D PER ASS'Y	ROYAL GREENWICH OBSERVATORY	TITLE	WHT NGS AO WFS F/16 OPTICAL LAYOUT		DRG NO.	SHT. 1	
								XXX ±			MADINGLEY ROAD	PRELIMINARY DESIGN		BN/004			
ISSUE	MOD. NO.	DATE	DRAWN BY	ISSUE	MOD. NO.	DATE	DRAWN BY			CAMBRIDGE	CB3 0EZ						



PRELIMINARY SPACE ENVELOPE
DEFINED FOR DETECTOR
200 x 200 x 200mm

CCD & RELAY LENS
MANUAL ADJUSTMENTS FOR ALIGNMENT

DETECTOR & RELAY LENS ON MANUAL FOCUS SLIDE

FOCUS SLIDE (Z) FOR TTS SYSTEM ALIGNED TO BEAM REFLECTED FROM PRISM - ± 25mm TRAVEL ± 0.025mm TOLERANCE

XY SLIDE FOR POSITIONING PICK OFF - ± 25mm TRAVEL ± .005mm TOLERANCE

GHRIL BENCH
OR BRACKET FIXED TO BENCH

BASED ON DESIGN OF WFS BN/003

PRELIMINARY
DO NOT USE FOR MANUFACTURE

								TOLERANCES (UNLESS OTHERWISE STATED)	MATERIAL	THIRD ANGLE PROJECTION	DIMS IN mm	ORIGINAL SCALE 1:1	ORIGINAL SHEET SIZE A1		G.A. NO.	LOC'N. BN
								X ±		⊕	ROYAL GREENWICH OBSERVATORY	TITLE	WHT NGS AO TTS F/11 LAYOUT		DRG NO.	SHT. 1
ISSUE	MOD. NO.	DATE	DRAWN BY	ISSUE	MOD. NO.	DATE	DRAWN BY	FINISH	NO. REQ'D PER ASS'Y	CAMBRIDGE	CB3 0EZ	PRELIMINARY DESIGN & SPACE ENVELOPE		BN/005		

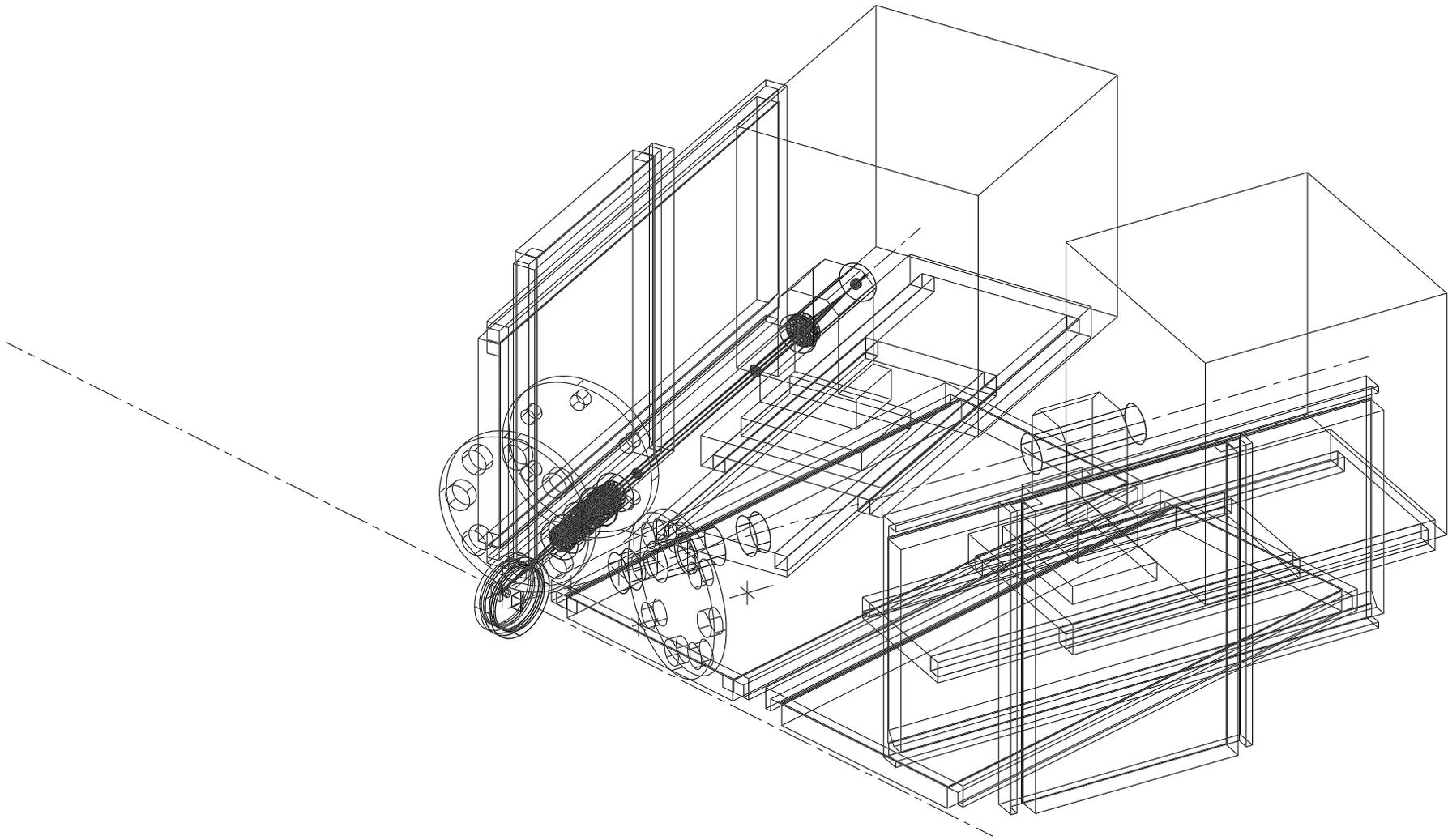


ILLUSTRATION OF WFS ON GHRIL BENCH

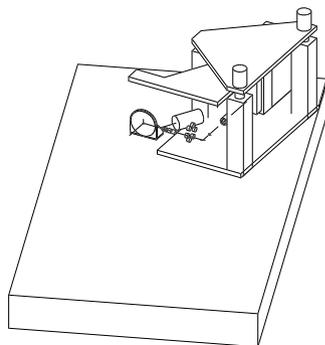
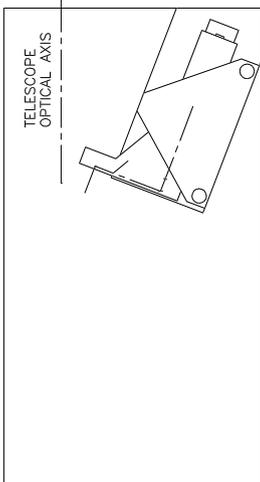
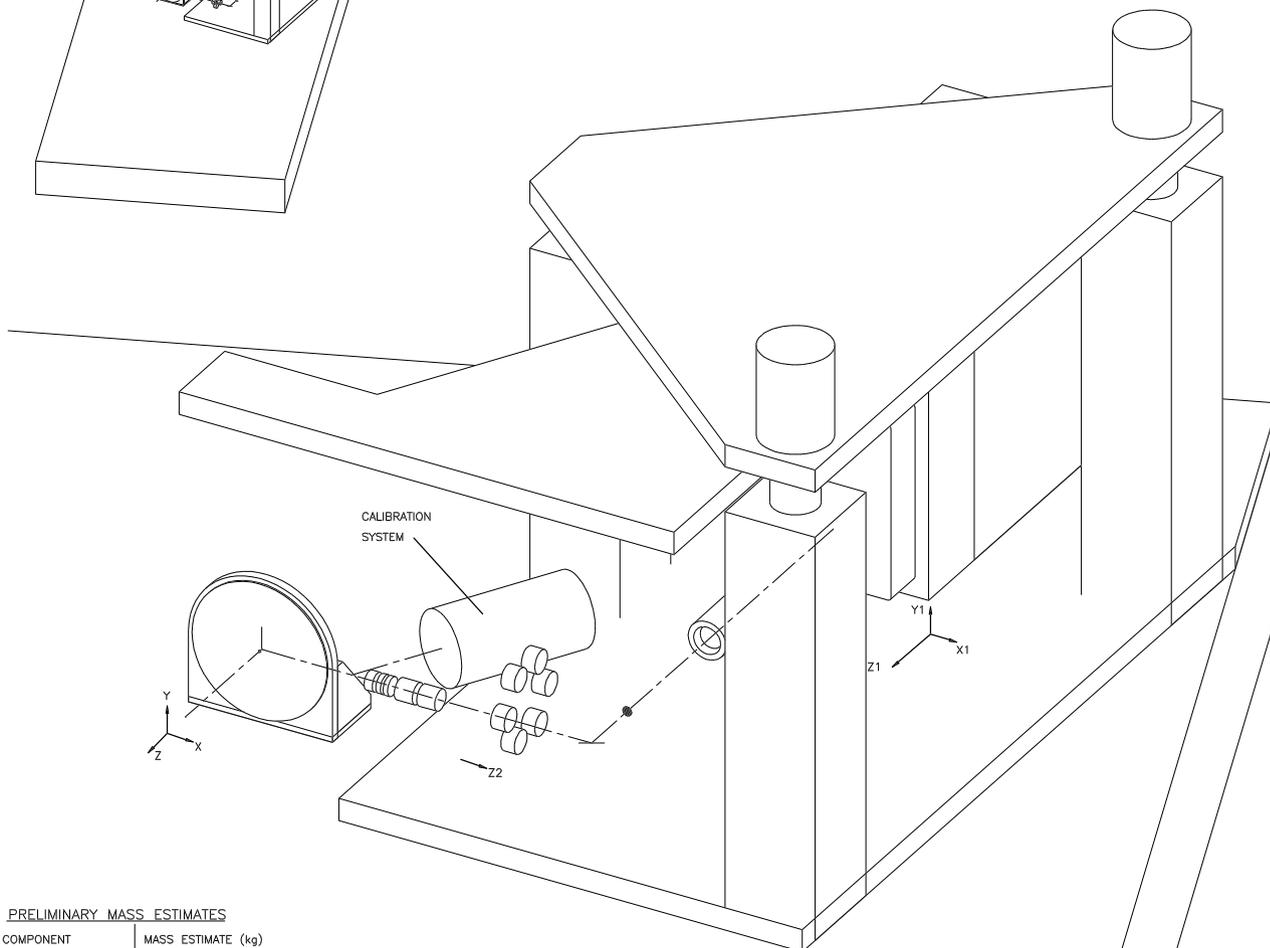
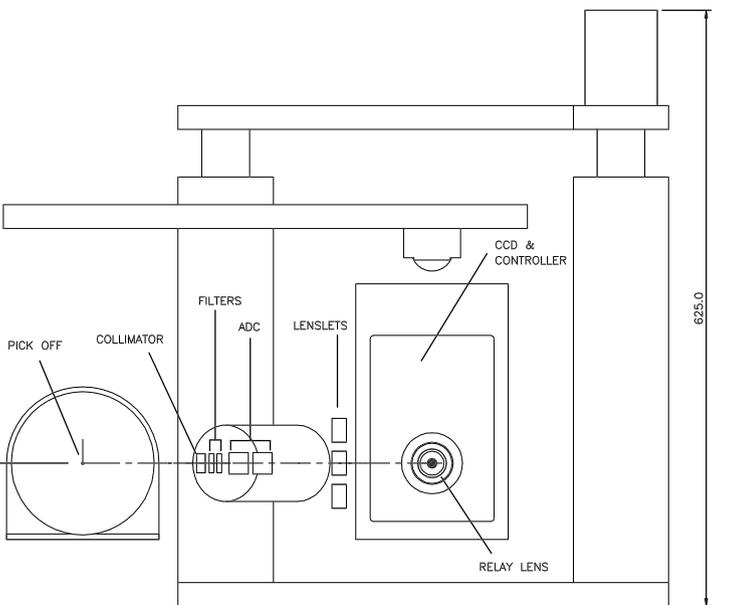
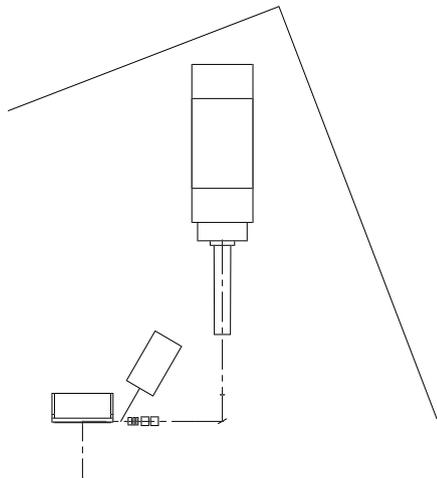


ILLUSTRATION OF WFS



PLAN VIEW SCALE 1:10



OPTICAL TABLE

FRONT ELEVATION SCALE 1:2

PRELIMINARY MASS ESTIMATES

COMPONENT	MASS ESTIMATE (kg)
PICK OFF	0.5
COLLIMATOR	0.2
FILTERS	1.0
ADC	1.0
SH LENSLETS	1.5
RELAY LENS & CCD CAMERA	10
CALIBRATION SYSTEM	2
WFS STRUCTURE	15
SLIDES	30
SUPPORT STRUCTURE	40

TOTAL ESTIMATED MASS APPROX 100kg

PRELIMINARY PERFORMANCE REQUIREMENTS

AXIS	TRAVEL	REPEATABILITY	MIN. VELOCITY	COMPONENTS
X	75mm	REPEATABILITY 2.5 MICRONS	2mm/sec	ALL
Y	75mm	REPEATABILITY 2.5 MICRONS	2mm/sec	ALL
Z2	60mm	REPEATABILITY 50 MICRONS	2mm/sec	FORE OPTICS
Z1	300mm	REPEATABILITY 100 MICRONS	10mm/sec	CCD CAMERA

ISSUE	MOD NO.	DATE	DRAWN BY	ISSUE	MOD NO.	DATE	DRAWN BY
				1		01/10/96	AJW

TOLERANCES (UNLESS OTHERWISE STATED)
X .±
XX .±
XXX .±
ANG. ±

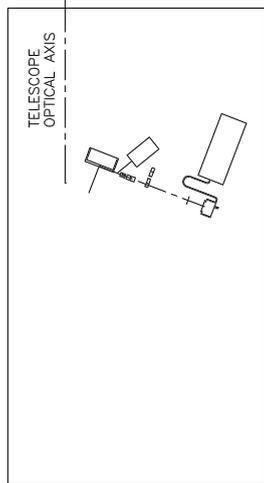
MATERIAL	THIRD ANGLE PROJECTION	DIMS IN mm	ORIGINAL SCALE
FINISH	NO. REO'D PER ASSY	ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD CAMBRIDGE CB3 0EZ	

TITLE
WHT NAOMI - WFS ASSEMBLY PRELIMINARY DESIGN

ORIGINAL SHEET SIZE A0

G.A. NO.	LOC'N.	BN
DRG. NO.		SHT.NO. 1

DO NOT SCALE



PLAN VIEW SCALE 1:10

PLAN VIEW SCALE 1:5

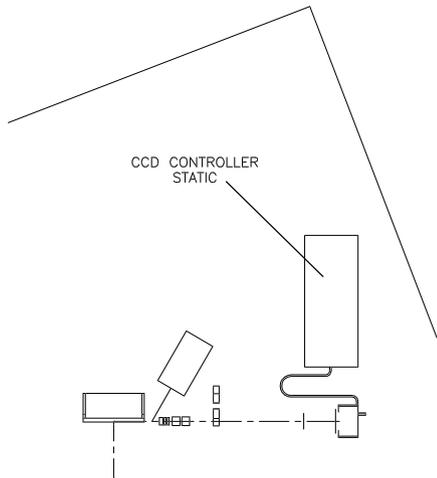


ILLUSTRATION OF WFS ON GHRIL BENCH

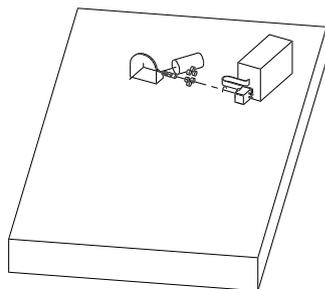
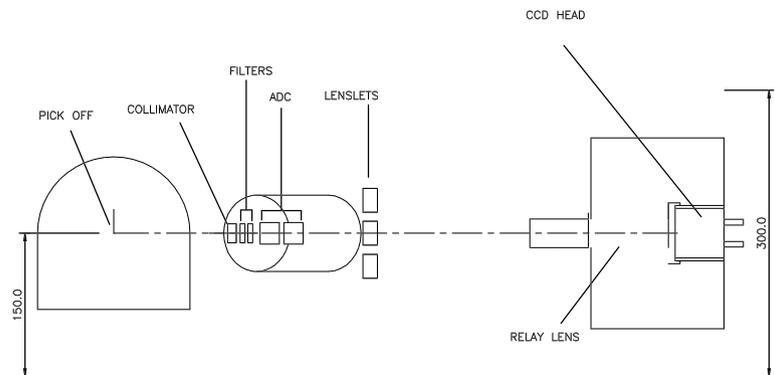


ILLUSTRATION OF WFS USING GEMINI CCD HEAD & SDSU CONTROLLER



OPTICAL TABLE

PRELIMINARY MASS ESTIMATES OF MOVING COMPONENTS

COMPONENT	MASS ESTIMATE (kg)
PICK OFF	0.5
COLLIMATOR	0.2
FILTERS	1.0
ADC	1.0
SH LENSLETS	1.5
RELAY LENS & CCD CAMERA	3
CALIBRATION SYSTEM STRUCTURE	2
	10

NOTE MASS OF SLIDES REQUIRED FOR MOTIONS NOT INCLUDED

PRELIMINARY PERFORMANCE REQUIREMENTS

AXIS	TRAVEL	REPEATABILITY	MIN. VELOCITY	COMPONENTS
X	75mm	REPEATABILITY 2.5 MICRONS	2mm/sec	ALL
Y	75mm	REPEATABILITY 2.5 MICRONS	2mm/sec	ALL
Z2	60mm	REPEATABILITY 50 MICRONS	2mm/sec	FORE OPTICS
Z1	300mm	REPEATABILITY 100 MICRONS	10mm/sec	CCD CAMERA

FRONT ELEVATION SCALE 1:2

ISSUE	MOD NO.	DATE	DRAWN BY	ISSUE	MOD NO.	DATE	DRAWN BY
				1		25/10/96	AJW

TOLERANCES (UNLESS OTHERWISE STATED)
 X .X ±
 XX .X ±
 XXX .X ±
 ANG. ±

MATERIAL
 FINISH
 THIRD ANGLE PROJECTION
 NO. REO'D PER ASS'Y

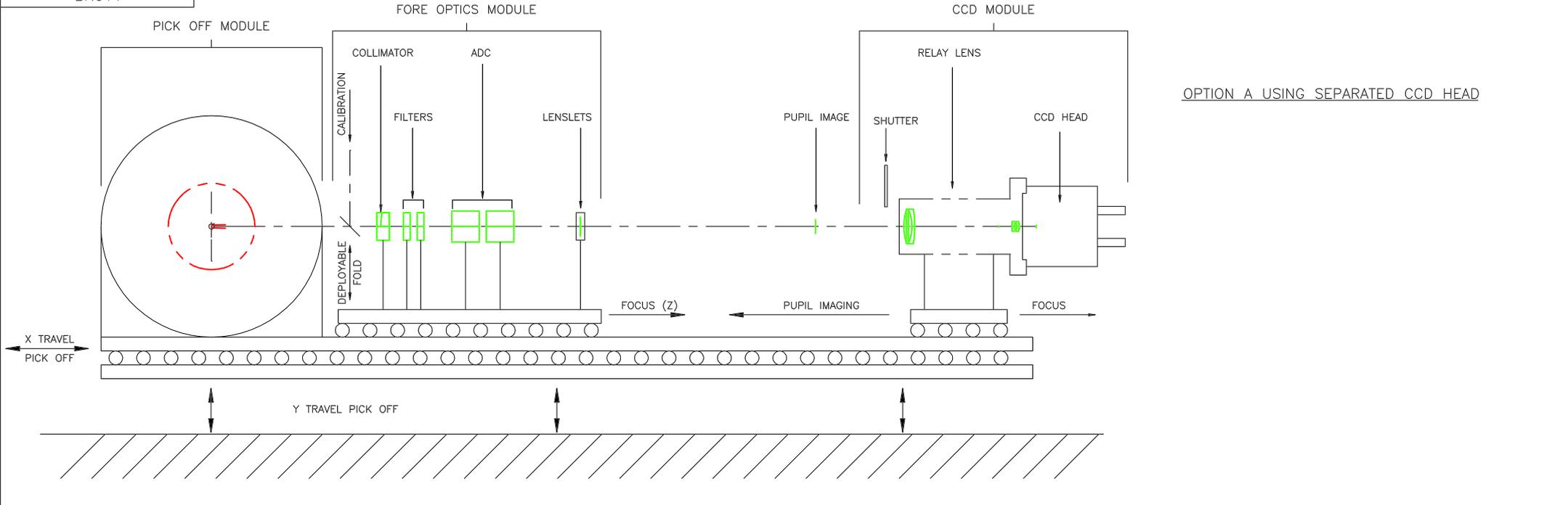
DIMS IN mm ORIGINAL SCALE
 ROYAL GREENWICH OBSERVATORY
 MADINGLEY ROAD
 CAMBRIDGE CB3 0EZ

TITLE

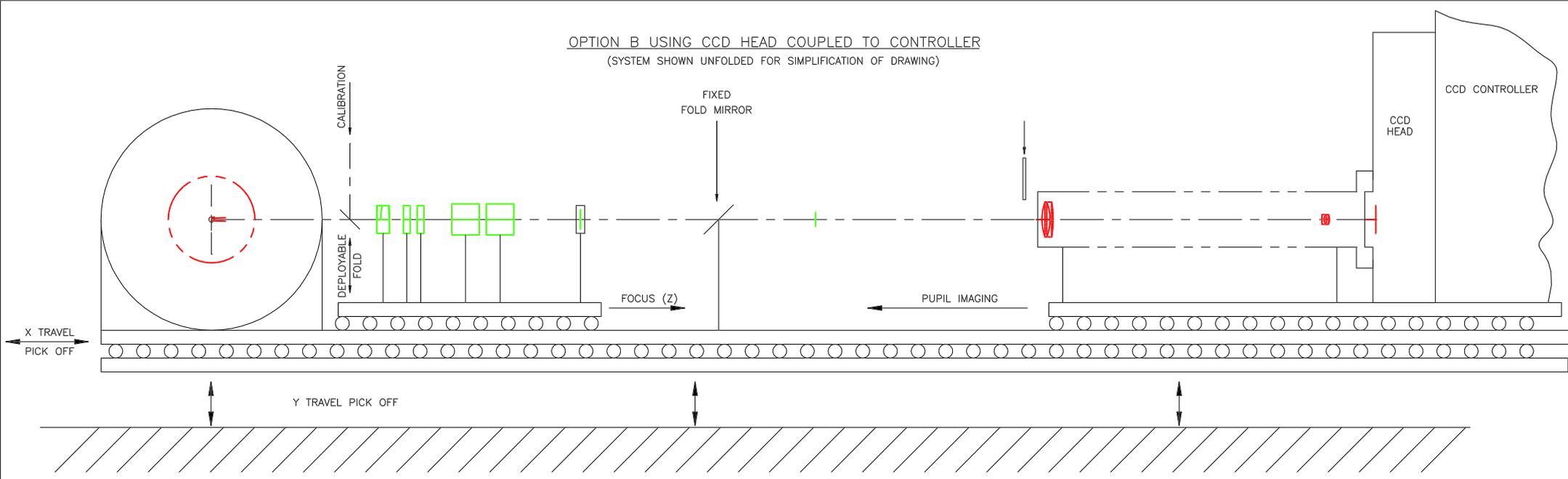
ORIGINAL SHEET SIZE A0
 WHT NAOMI - WFS ASSEMBLY 2
 ALTERNATIVE POPOSAL USING GEMINI CCD HEAD

G.A. NO.	LOC'N.	BN
DRG. NO.	SHT.NO.	2

DO NOT SCALE



OPTION A USING SEPARATED CCD HEAD

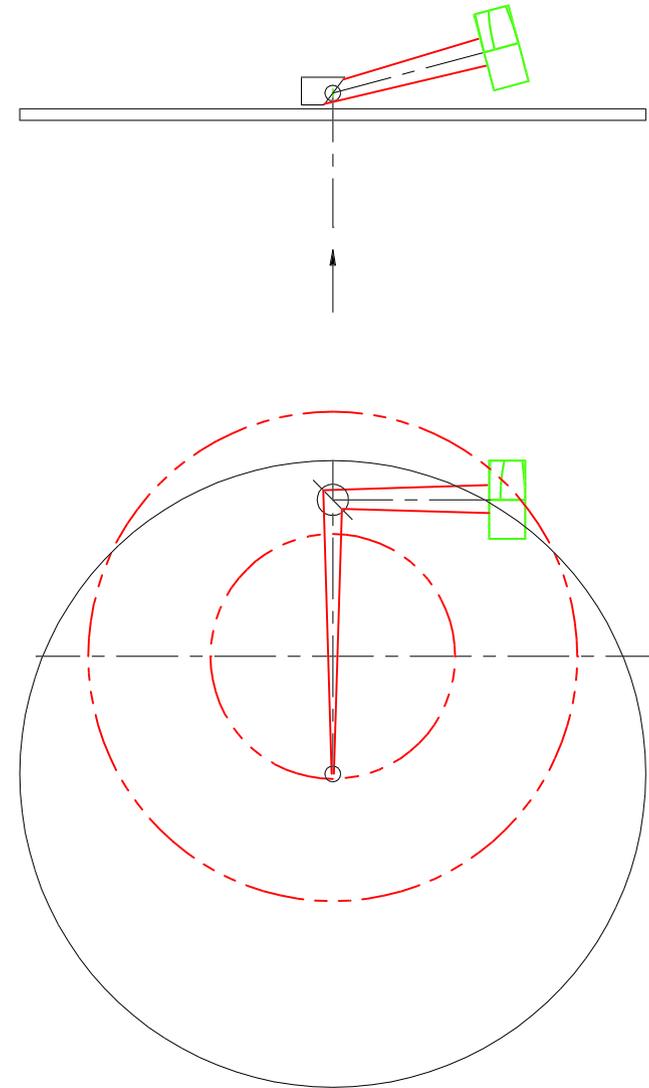
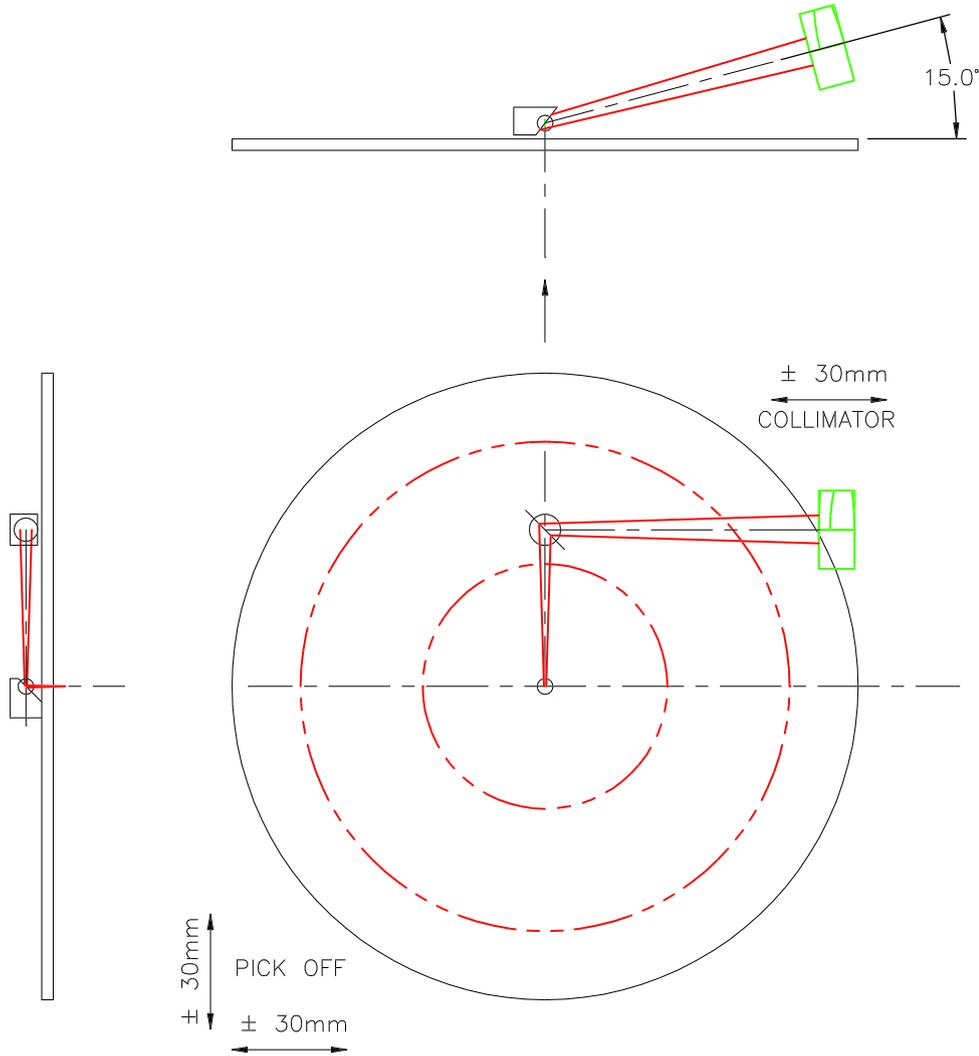


OPTION B USING CCD HEAD COUPLED TO CONTROLLER
(SYSTEM SHOWN UNFOLDED FOR SIMPLIFICATION OF DRAWING)

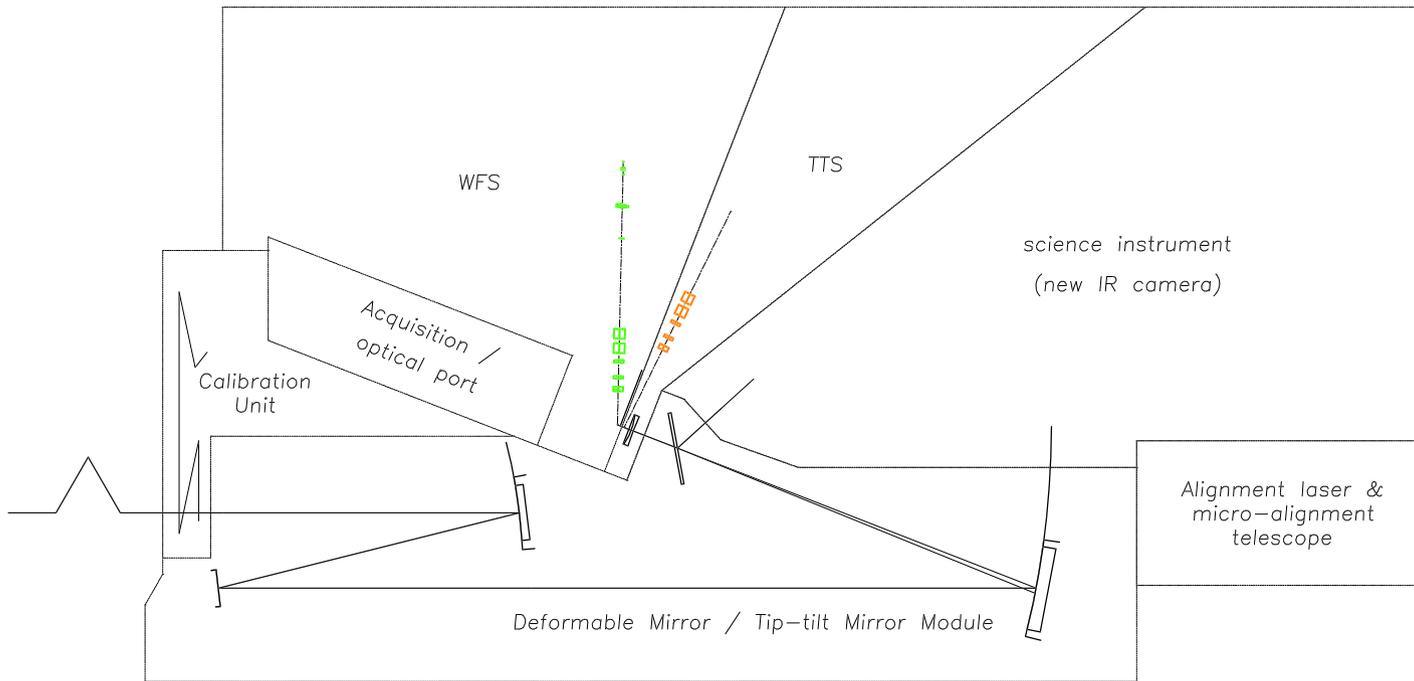
				TOLERANCES (UNLESS OTHERWISE STATED)		MATERIAL		THIRD ANGLE PROJECTION		DIMS IN mm		ORIGINAL SCALE 1:1		ORIGINAL SHEET SIZE A0		G.A. NO.		LOC'N. BN	
				X .X .X		FINISH		NO. REQ'D PER ASS'Y		ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD CAMBRIDGE CB3 0EZ		TITLE		WHT NAOMI - WFS ASSEMBLY OPTICAL SYSTEM REQUIREMENTS - BLOCK DIAGRAM		DRG. NO.		SHT.NO. 1	
ISSUE	MOD NO.	DATE	DRAWN BY	ISSUE	MOD NO.	DATE	DRAWN BY									BN011			
				1		25/10/96	AJW												

DO NOT SCALE

NOMINAL DISTANCE FROM FOCUS TO COLLIMATOR = 120mm
 FIRST FOLD 10mm FROM FOCUS (NOMINAL)
 FIRST FOLD TO SECOND FOLD 40mm (NOMINAL)
 NOMINAL TRAVEL FOR PICK-OFF ± 30mm IN X AND Y

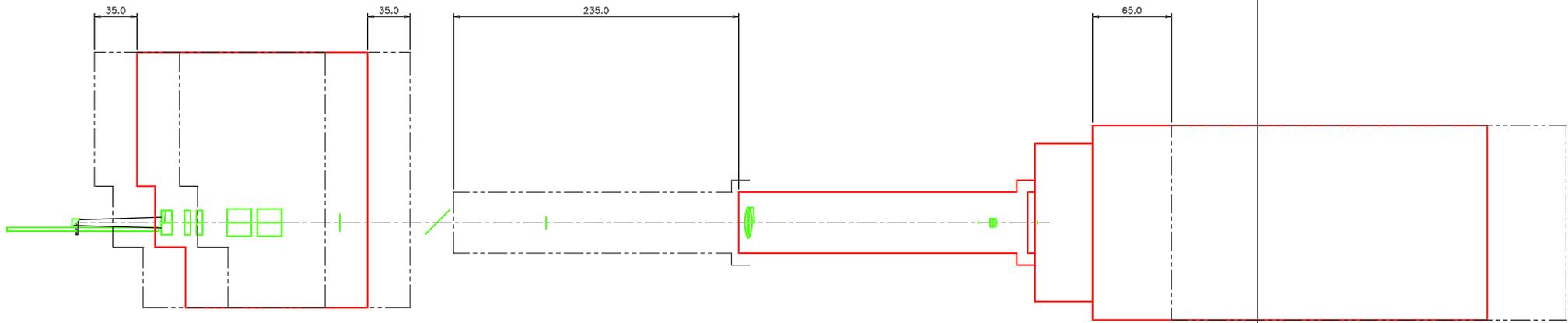


				TOLERANCES (UNLESS OTHERWISE STATED)	MATERIAL	THIRD ANGLE PROJECTION	DIMS IN mm	ORIGINAL SCALE	ORIGINAL SHEET SIZE A2		G.A. NO.	
				X ±							LOC'N.	BN
				X.X ±					TITLE		SHT.	1
				X.XX ±	FINISH	NO. REQ'D PER ASSY			ROYAL GREENWICH OBSERVATORY		DRG NO.	
				ANG. ±					MADINGLEY ROAD		BN012	
ISSUE	MOD. NO.	DATE	DRAWN BY						CAMBRIDGE CB3 0EZ		PRELIMINARY LAYOUT OF PROPOSAL	
1		29/10/96	AJW									



DRG. NO. BN016

DO NOT SCALE

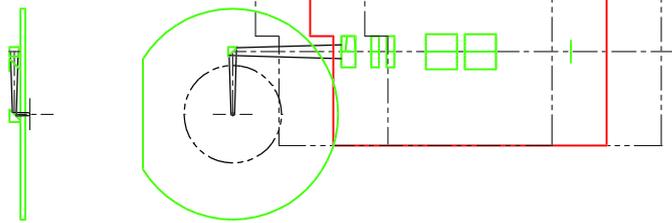


SYSTEM SHOWN UNFOLDED FOR SIMPLIFICATION
 IN USE PICK-OFF FOLDS AT 30° SEE DRG. BN017
 FOLD REQUIRED FOR CCD AND RELAY SYSTEM (TBD)

FORE OPTICS

CCD & RELAY

PICK-OFF



PICK-OFF DISK & FIRST FOLD
 TRAVEL IN Y DIRECTION
 INDEPENDENT OF WFS OPTICS
 ALL COMPONENTS MOVE IN X TOGETHER
 X TRAVEL OF WFS ± = 32.5mm
 Y TRAVEL OF PICK-OFF ± = 32.5mm
 NOT AS SPECIFIED IN WPD

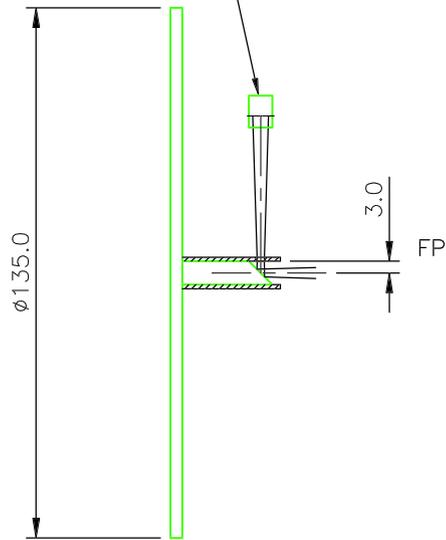
FOCUS TRAVEL OF FORE OPTICS & CCD = +35mm, -35mm
 POSITION SHIFT OF CCD = 170mm WITH 30mm FOCUS AT EACH POSITION EXTRA
 TOTAL CCD TRAVEL = + 235mm, - 65mm FROM NOMINAL FOCUS

PRELIMINARY
DO NOT USE FOR MANUFACTURE

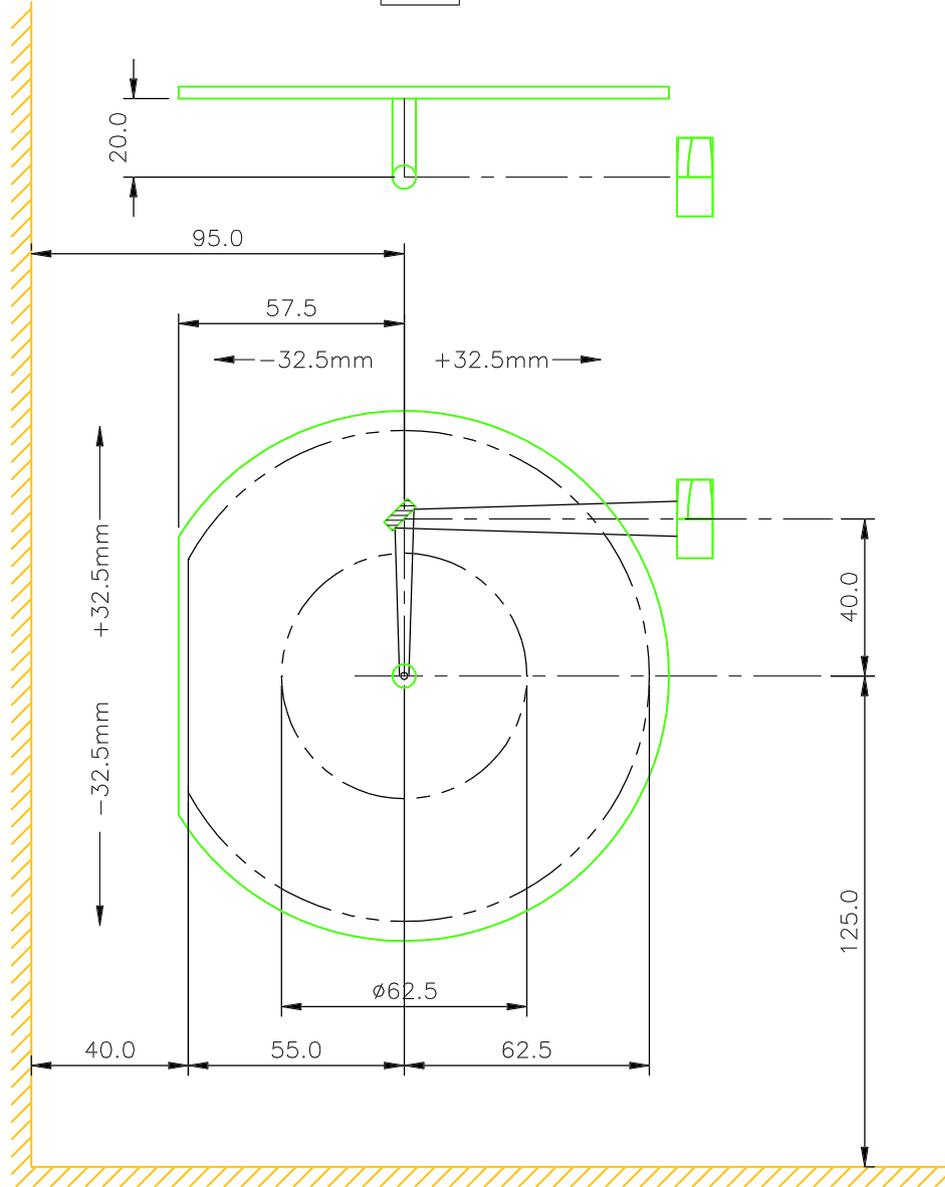
TOLERANCES (UNLESS OTHERWISE STATED)				MATERIAL		THIRD ANGLE PROJECTION	DIM IN mm ORIGINAL SCALE		ORIGINAL SHEET SIZE A0		G.A. NO.		LOCN. BN	
±	±	±	±	±	±		DWG. NO.	DATE	TITLE	DRG. NO.	SHT. NO.	BN		
±	±	±	±	±	±		ROYAL GREENWICH OBSERVATORY	12/11/96	WHT NAOMI WFS LAYOUT	BN016	1	BN		
±	±	±	±	±	±		MADINGLEY ROAD	AJW	2D BLOCK DIAGRAM TO DEPICT SPACE ENVELOPES			BN		
±	±	±	±	±	±		CAMBRIDGE CB3 0EZ					BN016		



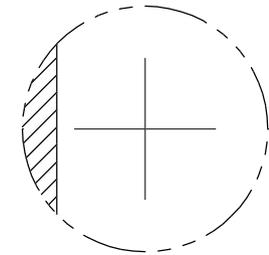
SECOND FOLD



EDGE OF SPACE ENVELOPE ALLOWED BY OPTICAL CHASSIS



EDGE OF SPACE ENVELOPE ALLOWED BY OPTICAL BENCH AND BASEPLATE



VIGNETTED AREA OF FIELD
WHEN PICK-OFF AT RH EDGE
OF 3 ARCMIN FIELD
(8.5% OF AREA)

PRELIMINARY
FOR INFORMATION ONLY
SUBJECT TO CHANGE
05/02/97
PRELIMINARY ISSUE: 1
DO NOT USE THIS DRAWING FOR
PROCUREMENT OR MANUFACTURE.

REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE
1	ORIGINAL DESIGN	AJW			ST	14/11/96
ISSUE DESCRIPTION						

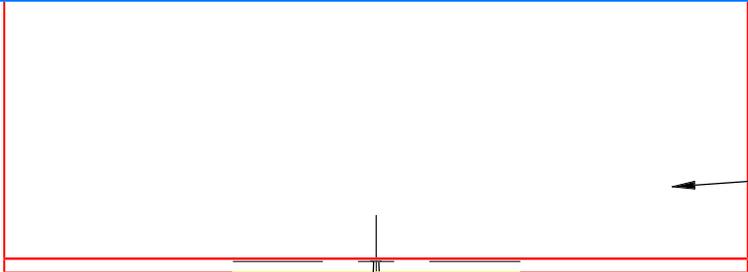
UNLESS OTHERWISE STATED
DIMENSIONS ARE IN mm
GENERAL TOLERANCE: ±
ANGULAR TOLERANCE: ±
SURFACE FINISH: (MICRONS) ✓
REMOVE ALL SHARP EDGES
DO NOT SCALE THIS DRAWING

MATERIAL
FINISH
USED ON

 ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM		PPARC	
TITLE		WHT NAOMI WFS PICK-OFF SIZING & SPACE ENVELOPE	
ORIGINAL SHEET A2	LOCATION BN	DWG. No. BN017	REV 1
ORIGINAL SCALE 1:1	SHEET 1 OF 1		



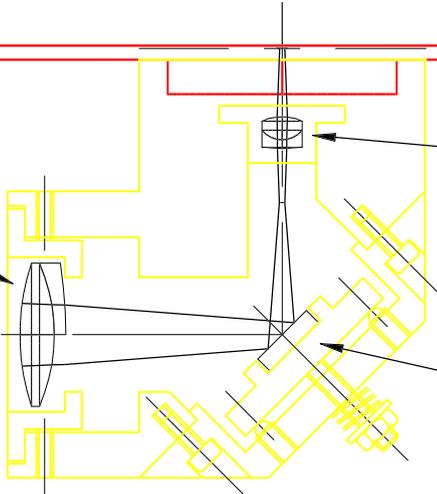
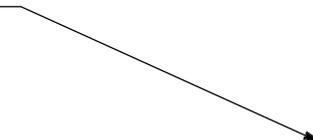
CCD ELECTRONICS



RAL CCD HEAD



ADJUSTABLE LENS OF RELAY SYSTEM



FIXED LENS OF RELAY SYSTEM



ADJUSTABLE FOLD MIRROR



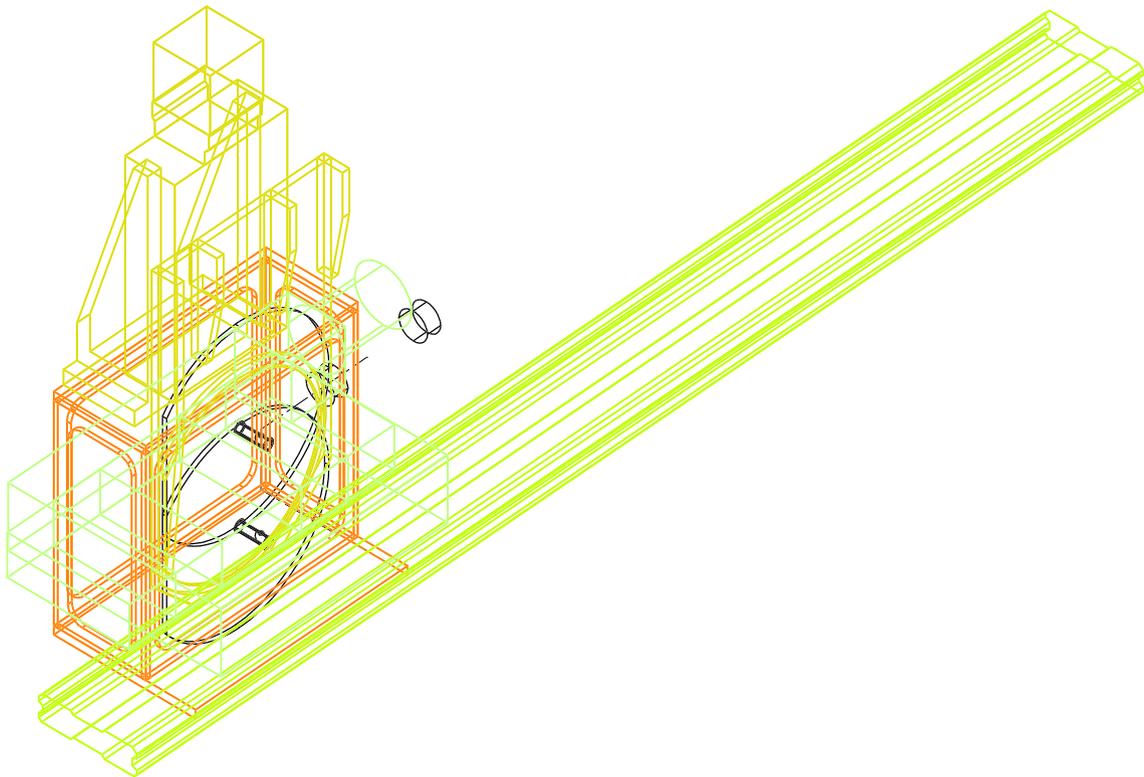
PRELIMINARY
 FOR INFORMATION ONLY
 SUBJECT TO CHANGE
 05/02/97
 PRELIMINARY ISSUE: 1
 DO NOT USE THIS DRAWING FOR
 PROCUREMENT OR MANUFACTURE.

REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE
1	ORIGINAL DESIGN	AJW			ST	21/11/96

UNLESS OTHERWISE STATED
 DIMENSIONS ARE IN mm
 GENERAL TOLERANCE: ±
 ANGULAR TOLERANCE: ±
 SURFACE FINISH: ✓
 (MICRONS)
 REMOVE ALL SHARP EDGES
 DO NOT SCALE THIS DRAWING

MATERIAL	
FINISH	
USED ON	

		ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM			
TITLE WHT NAOMI WFS – RELAY TO CCD LAYOUT PRELIMINARY DESIGN FOR FOLDED SYSTEM					
ORIGINAL SHEET	LOCATION	DWG. No.		REV	
A3	BN	BN018		1	
ORIGINAL SCALE	1:1			SHEET 1 OF 1	

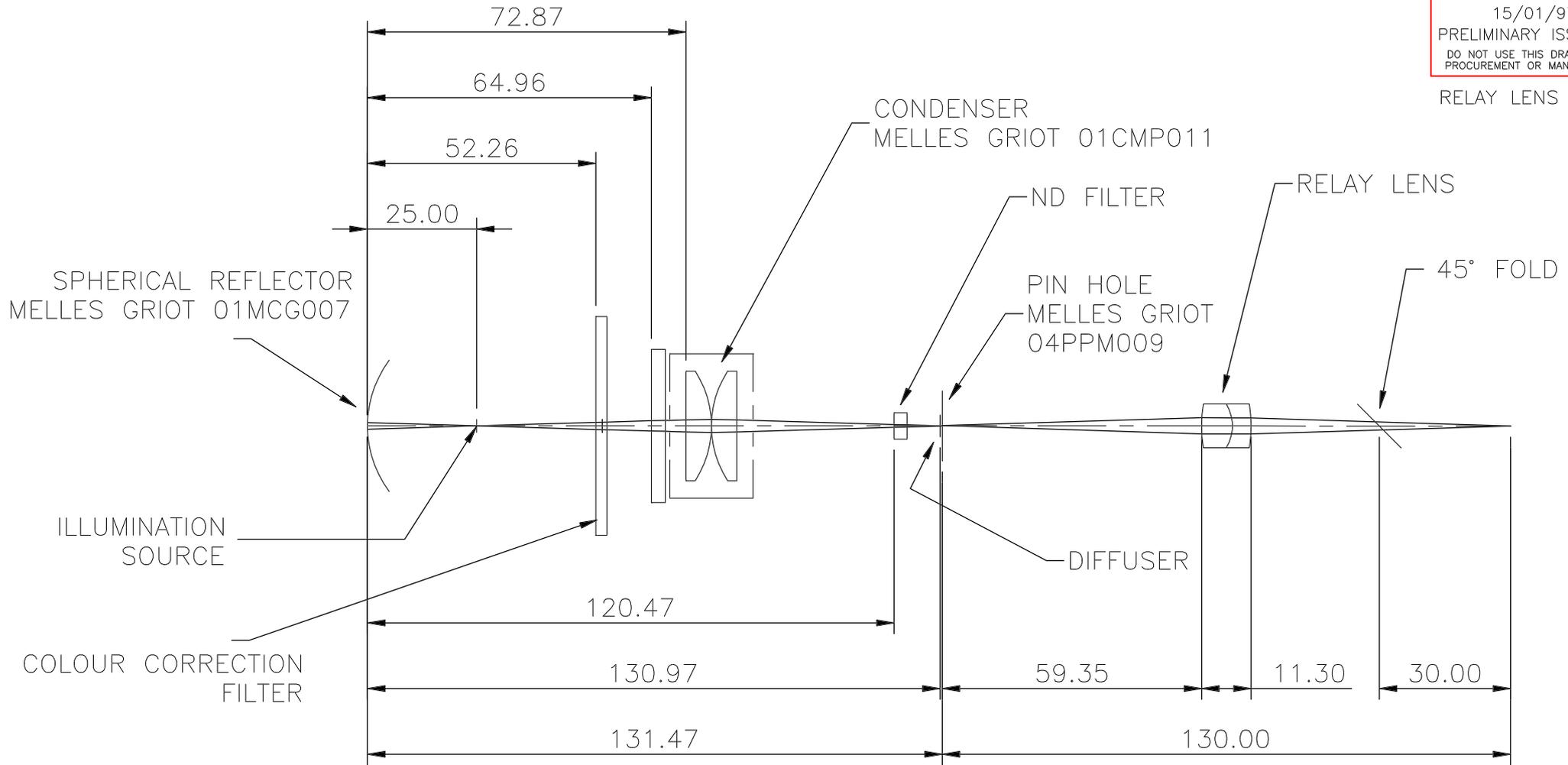


DWG. No. BN021

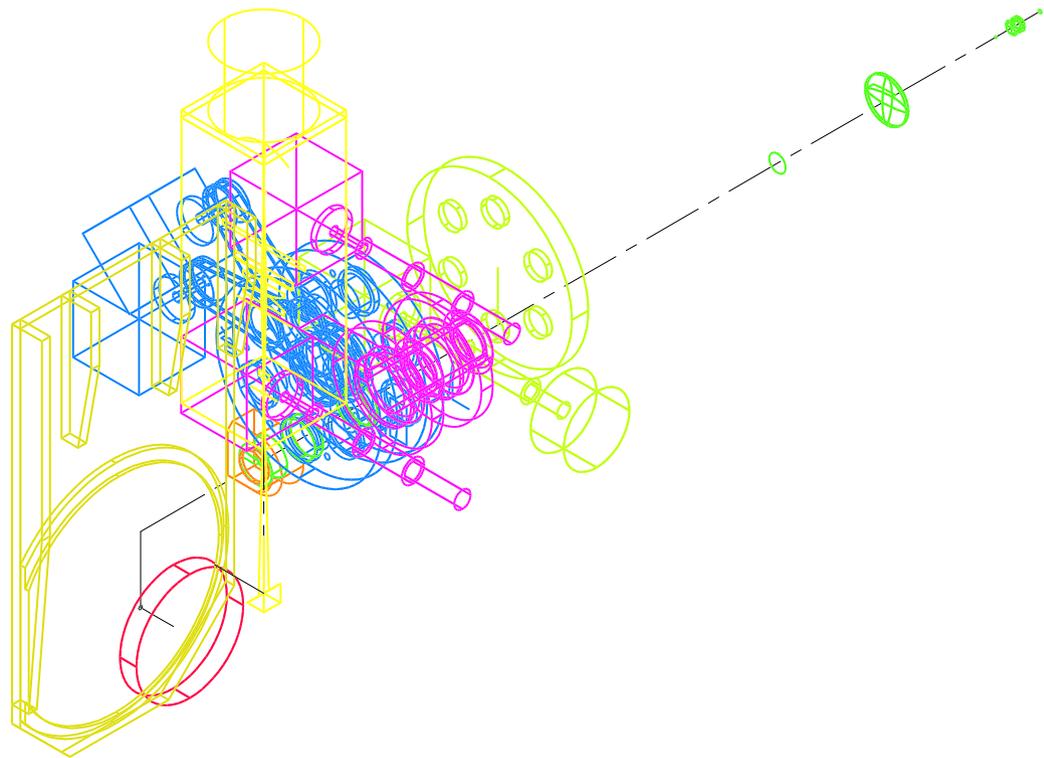


PRELIMINARY
 FOR INFORMATION ONLY
 SUBJECT TO CHANGE
 15/01/97
 PRELIMINARY ISSUE: 2
 DO NOT USE THIS DRAWING FOR
 PROCUREMENT OR MANUFACTURE.

RELAY LENS ADDED

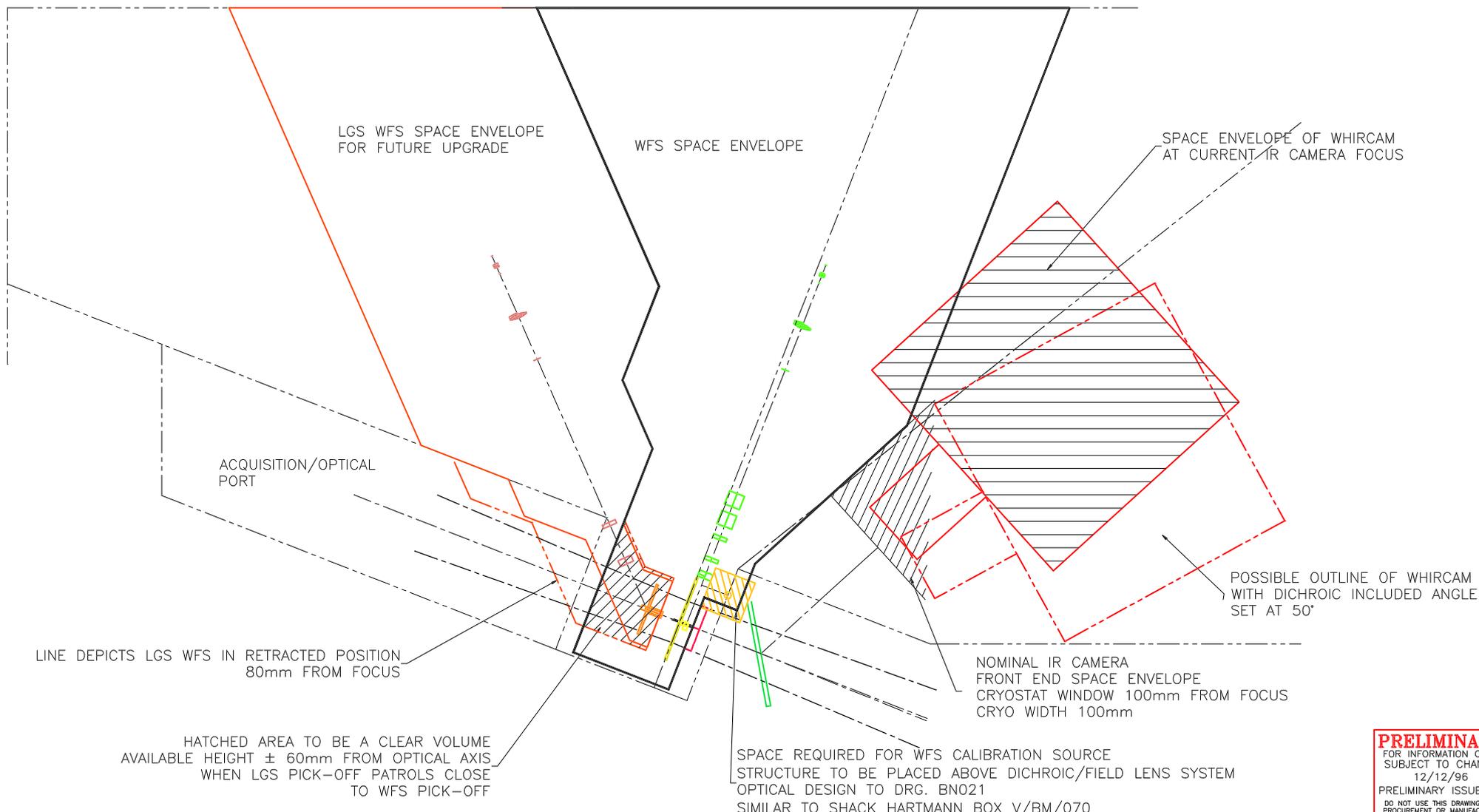


							UNLESS OTHERWISE STATED	MATERIAL	 ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM					
							DIMENSIONS ARE IN mm	FINISH	TITLE					
							GENERAL TOLERANCE: ±	WHT NAOMI WFS CALIBRATION SYSTEM						
							ANGULAR TOLERANCE: ±	PRELIMINARY DESIGN						
							SURFACE FINISH: (MICRONS) ✓	USED ON	ORIGINAL SHEET	LOCATION	DWG. No.		REV	
1	ORIGINAL DESIGN	AJW			ST	11/12/96	REMOVE ALL SHARP EDGES	A3	BN	BN021		1		
REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE	DO NOT SCALE THIS DRAWING	ORIGINAL SCALE	1:1			SHEET 1 OF 1		



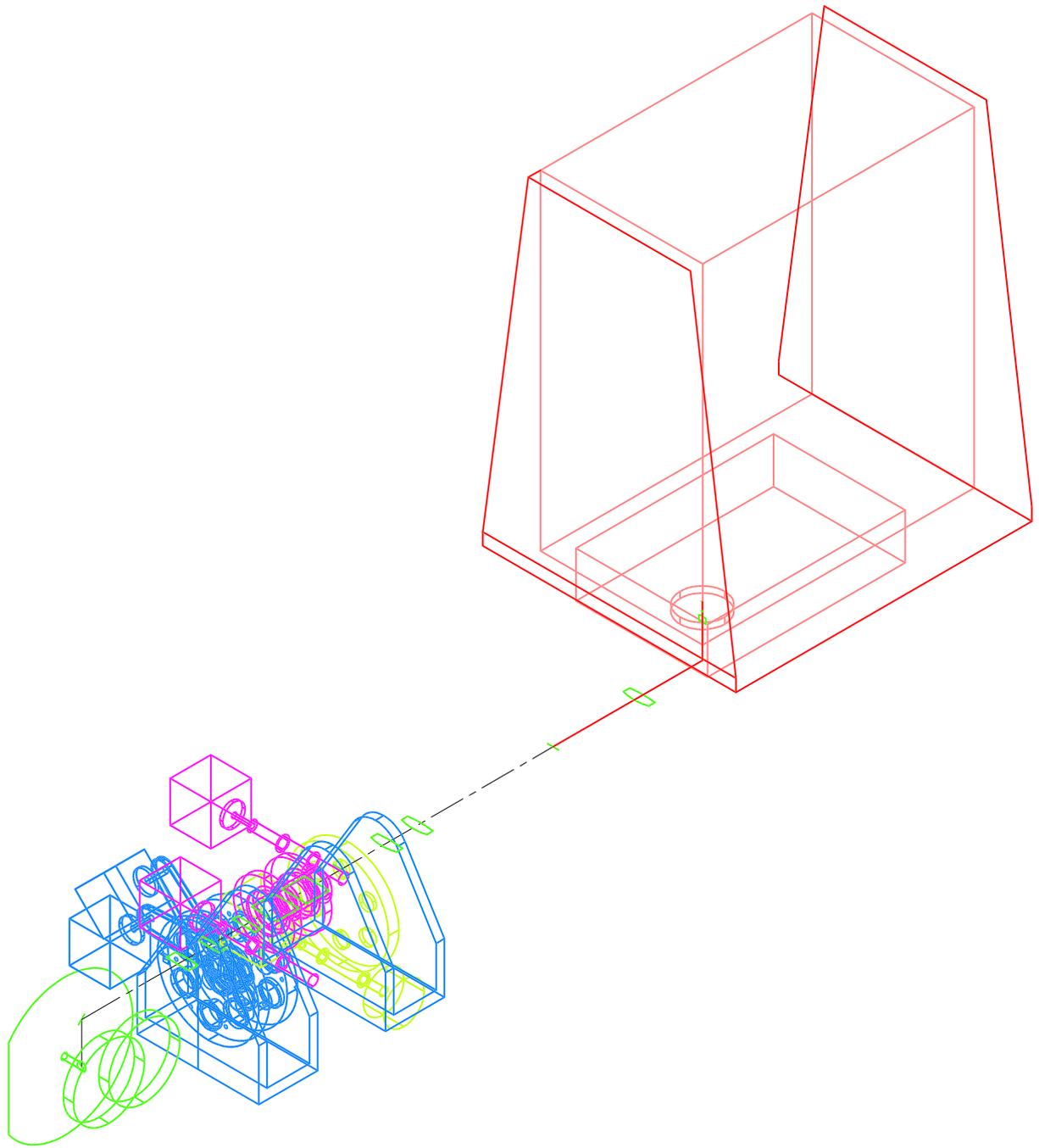


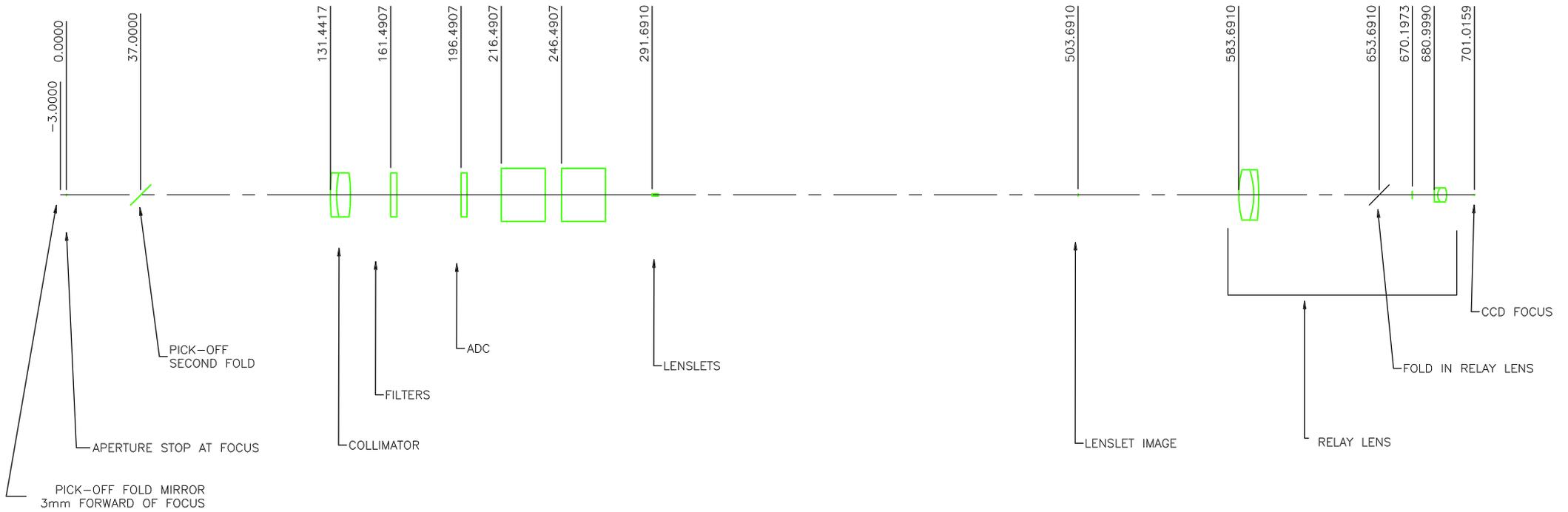
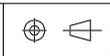
PHANTOM LINES DEPICT PREVIOUS ALLOCATION OF SPACE ENVELOPES AS DETAILED IN ROE DRAWING 00A03L1



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 FOR INFORMATION ONLY
 SUBJECT TO CHANGE
 12/12/96
 PRELIMINARY ISSUE: 1
 DO NOT USE THIS DRAWING FOR
 PROCUREMENT OR MANUFACTURE.

						UNLESS OTHERWISE STATED	MATERIAL	ROYAL GREENWICH OBSERVATORY <small>MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM</small>			
						DIMENSIONS ARE IN mm	FINISH	TITLE			
						GENERAL TOLERANCE: ±		WHT NAOMI WFS SPACE ENVELOPE			
						ANGULAR TOLERANCE: ±		BASED ON 90 DEGREE PICK-OFF AND SEPARATE LGS WFS			
						SURFACE FINISH: (MICRONS) ✓		ORIGINAL SHEET	LOCATION	DWG. No.	REV
1	PRELIMINARY LAYOUT	AJW		ST	12/12/96	REMOVE ALL SHARP EDGES	USED ON	AO	BN	BN023	1
REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE					
ISSUE DESCRIPTION						DO NOT SCALE THIS DRAWING	ORIGINAL SCALE	1:2	SHEET 1 OF 1		





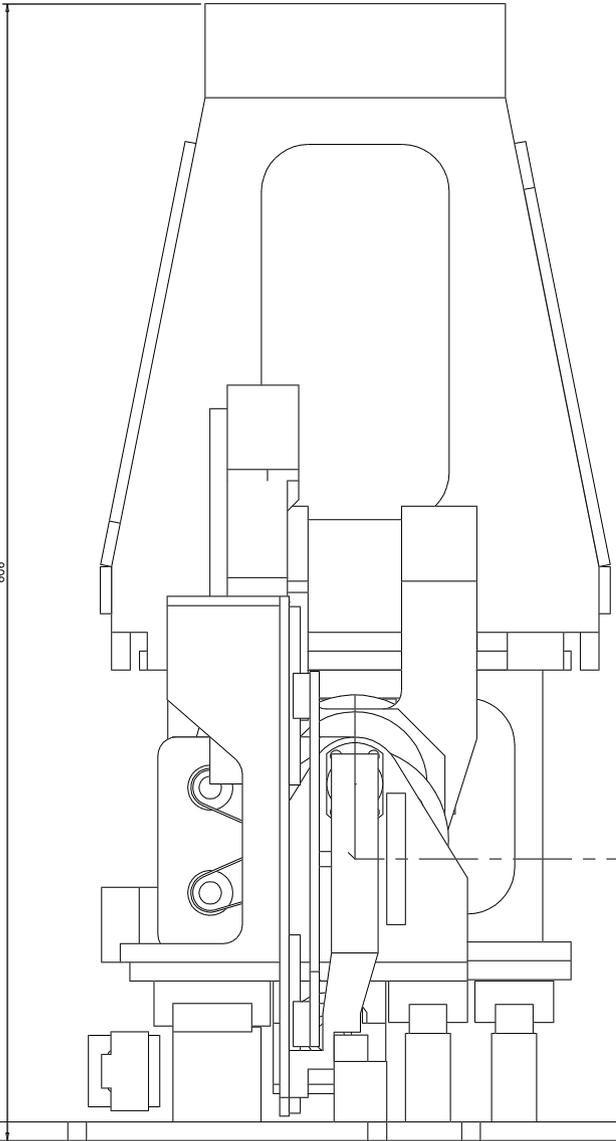
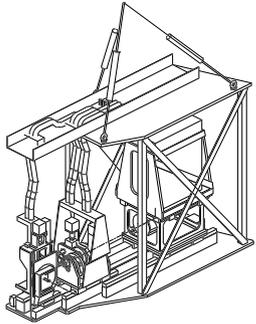
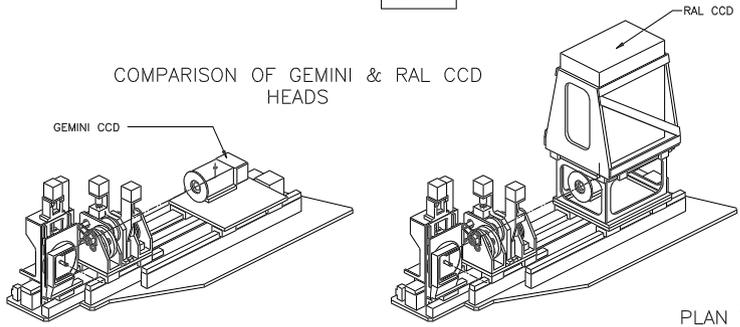
BASED ON ZEMAX FILE W11F168.DXF PROVIDED BY SPW WITH MODIFICATION TO FOCAL LENGTH OF LENSLETS DIM WAS 190 NOW 209

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 SUBJECT TO CHANGE
 18/12/96
 PRELIMINARY ISSUE: 2
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 PROCUREMENT OR MANUFACTURE.

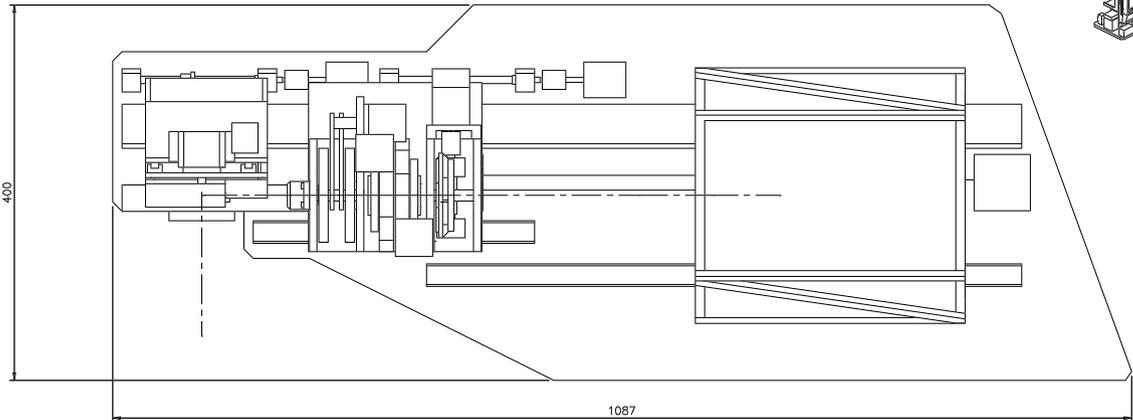
							UNLESS OTHERWISE STATED		MATERIAL		ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM	
							DIMENSIONS ARE IN mm GENERAL TOLERANCE: ± ANGULAR TOLERANCE: ± SURFACE FINISH: (MICRONS) ✓ REMOVE ALL SHARP EDGES		FINISH		TITLE	
											WHT NAOMI WFS OPTICAL LAYOUT 2 MODIFIED TO CURRENT DESIGN (ZEMAX WF11168N.DXF)	
1	DRAWING STARTED	AJW			ST	17/12/96	USED ON		ORIGINAL SHEET	LOCATION	DWG. No.	REV
REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE			A1	BN	BN025	1
ISSUE DESCRIPTION							DO NOT SCALE THIS DRAWING		ORIGINAL SCALE		SHEET 1 OF 1	



ILLUSTRATION OF WFS WITH LIFTING RIG & SERVICE DUCT

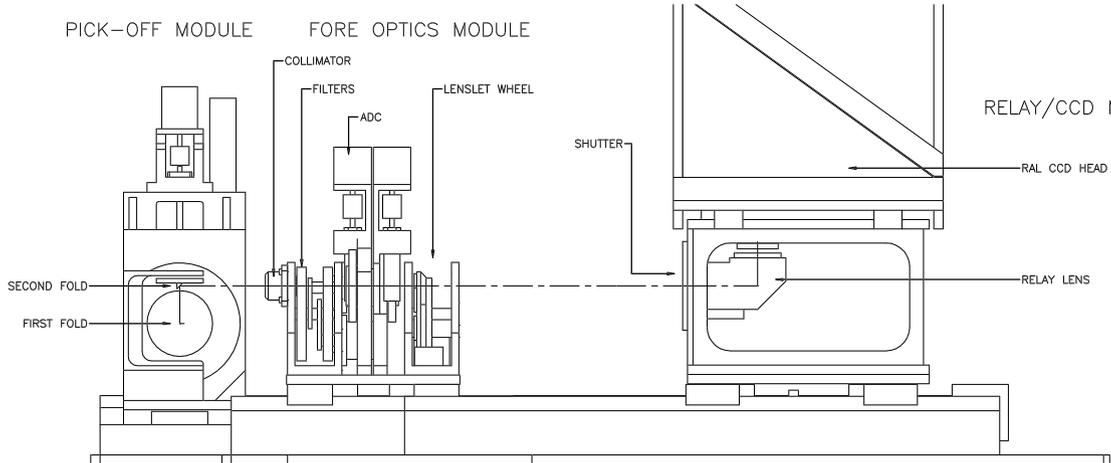


PLAN VIEW SCALE 1:2



BASEPLATE & LINEAR SLIDE

PICK-OFF MODULE FORE OPTICS MODULE



FRONT ELEVATION SCALE 1:2

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05/02/97
PRELIMINARY ISSUE: 1
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SIDE ELEVATION
SCALE 1:1

REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE
1		AJW			ST	06/01/97
ISSUE DESCRIPTION						

UNLESS OTHERWISE STATED
DIMENSIONS ARE IN mm
GENERAL TOLERANCE: ±
ANGULAR TOLERANCE: ±
SURFACE FINISH: (MICRONS) ✓
REMOVE ALL SHARP EDGES
DO NOT SCALE THIS DRAWING

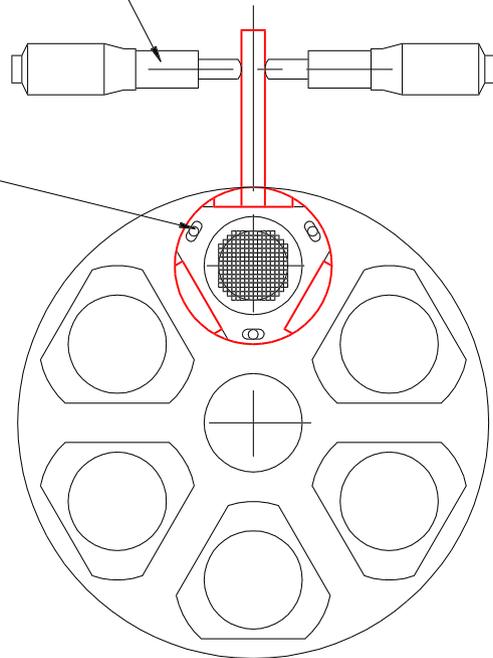
MATERIAL	
FINISH	
USED ON	

		ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM			
TITLE WHT NAOMI WFS - PRELIMINARY DESIGN JANUARY 1997 FOR PDR					
ORIGINAL SHEET AO	LOCATION BN	DWG. No. BN026	REV 1		
ORIGINAL SCALE					SHEET 1 OF 1



ROTATION ADJUSTMENT $\pm 1^\circ$
 PUSH/PULL MICROMETER HEAD
 0.002 DEGREE INCREMENTS
 (.002/50)

CLAMP SCREWS

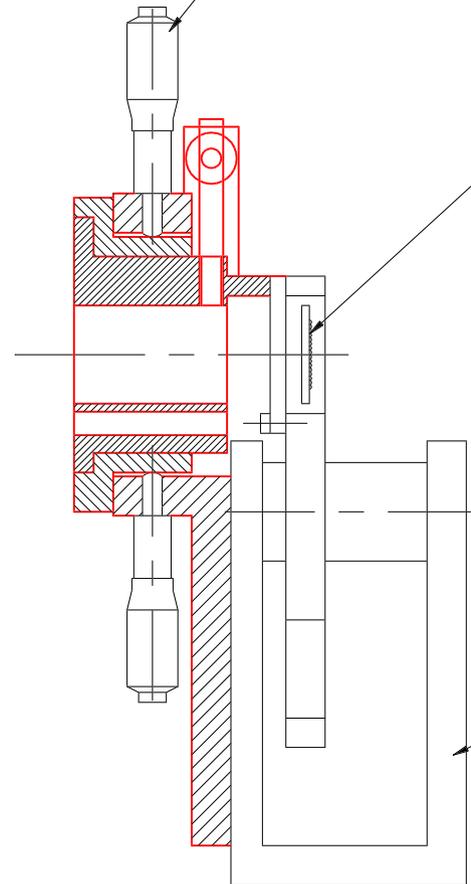


RADIAL ADJUSTMENT $\pm 0.2\text{mm}$
 PUSH/PULL MICROMETER HEAD
 2 MICRON INCREMENTS

LENSLET BARREL MOUNT

TO CCD

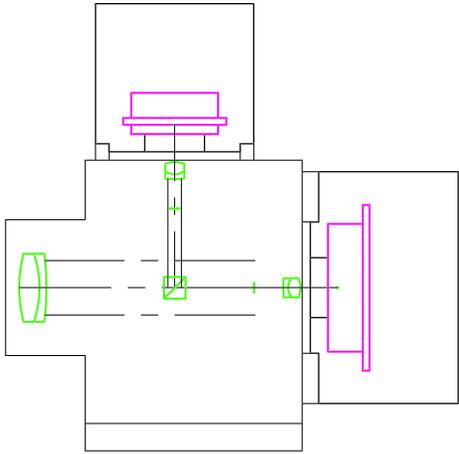
LENSLET ASSEMBLY
 SUPPORT BRACKET



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 SUBJECT TO CHANGE
 17/02/97
 PRELIMINARY ISSUE: 1
 DO NOT USE THIS DRAWING FOR
 PROCUREMENT OR MANUFACTURE.

						UNLESS OTHERWISE STATED	MATERIAL	ROYAL GREENWICH OBSERVATORY PPARC <small>MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM</small>			
						DIMENSIONS ARE IN mm	FINISH	TITLE			
						GENERAL TOLERANCE: \pm		WHT NAOMI WFS LENSLET ALIGNMENT			
						ANGULAR TOLERANCE: \pm		PRELIMINARY PROPOSAL FOR ADJUSTING RIG			
						SURFACE FINISH: (MICRONS) ✓	USED ON	ORIGINAL SHEET	LOCATION	DWG. No.	REV
1	ORIGINAL DESIGN	AJW			ST	17/02/97	A2	BN	BN028	1	
REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE	ORIGINAL SCALE	1:1		SHEET 1 OF 1	
						REMOVE ALL SHARP EDGES					
						DO NOT SCALE THIS DRAWING					

DWG. No. BN029



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 20/02/97
 PRELIMINARY ISSUE: 1
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 PROCUREMENT OR MANUFACTURE.

REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE
1	DRAWING STARTED	AJW			ST	20/02/97
ISSUE DESCRIPTION						

UNLESS OTHERWISE STATED
 DIMENSIONS ARE IN mm
 GENERAL TOLERANCE: ±
 ANGULAR TOLERANCE: ±
 SURFACE FINISH: (MICRONS) ✓
 REMOVE ALL SHARP EDGES
 DO NOT SCALE THIS DRAWING

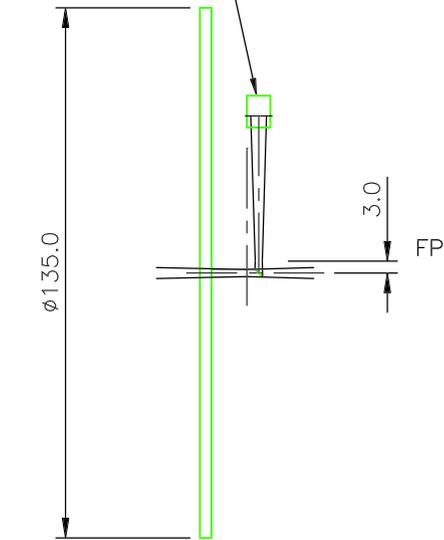
MATERIAL
 FINISH
 USED ON

 ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM			
TITLE WHT NAOMI WFS RELAY/TWIN CCD SCHEME PRELIMINARY LAYOUT TO SHOW IDEA AND SPACE REQ'D			
ORIGINAL SHEET A1	LOCATION BN	DWG. No. BN029	REV 1
ORIGINAL SCALE	1:1	SHEET 1 OF 1	

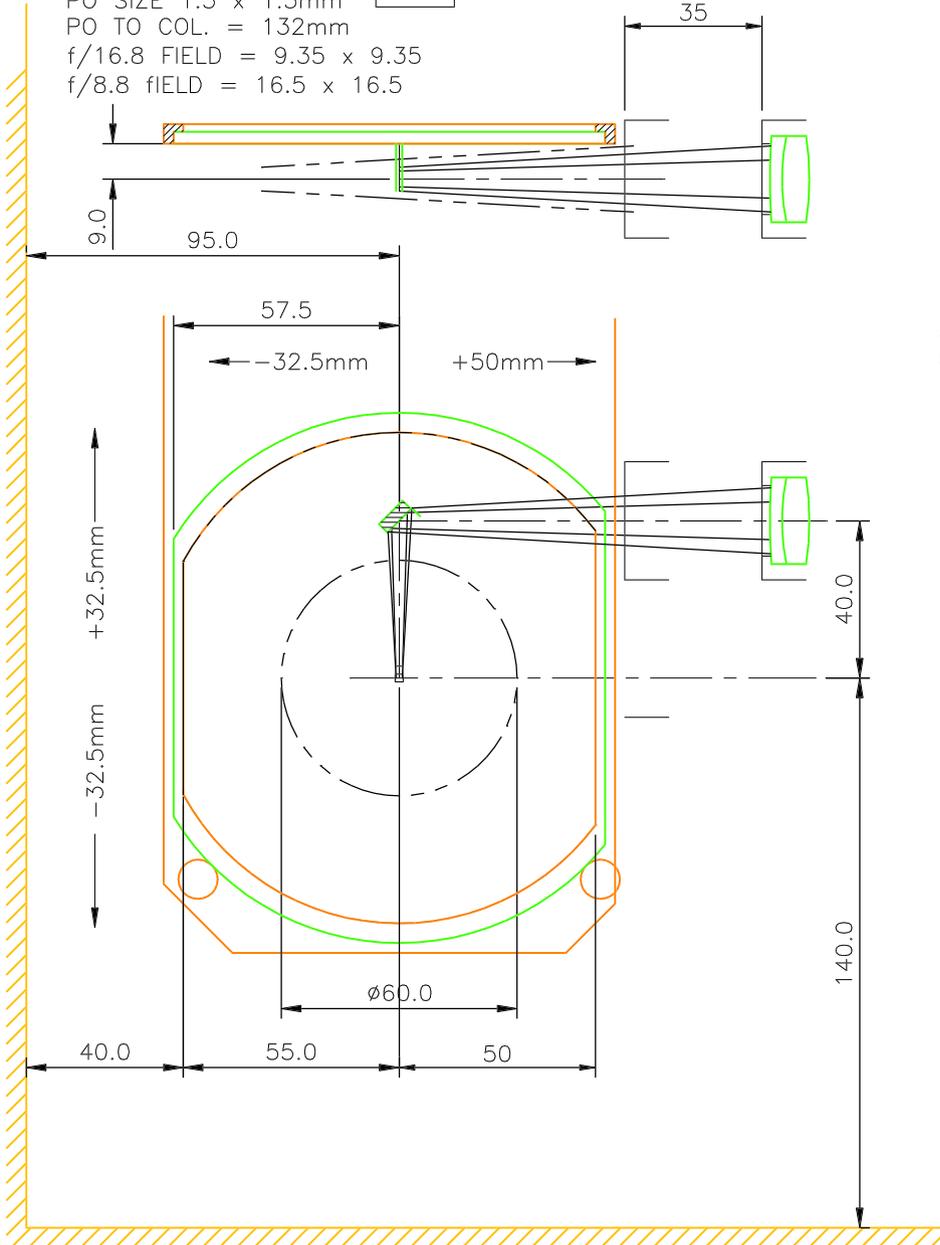
PO SIZE 1.5 x 1.5mm
 PO TO COL. = 132mm
 f/16.8 FIELD = 9.35 x 9.35
 f/8.8 FIELD = 16.5 x 16.5



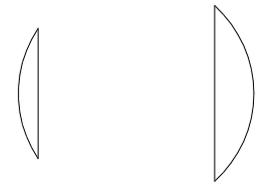
SECOND FOLD



EDGE OF SPACE ENVELOPE ALLOWED BY OPTICAL CHASSIS

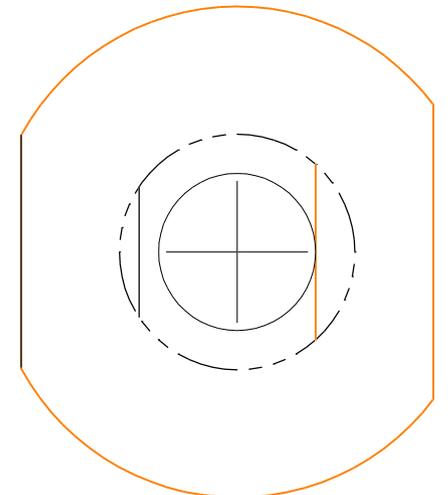


$\phi 60$ CIRCLE AREA
 = 2827.43



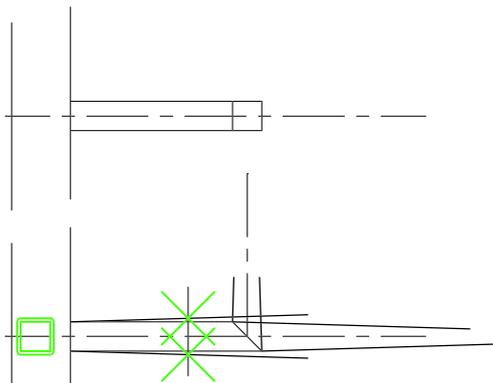
AREA = 112.54
 (3.98%)

AREA = 309.75
 (10.96%)



VIGNETTED AREA OF FIELD
 WHEN PICK-OFF AT EDGES
 OF 3 ARCMIN FIELD

EDGE OF SPACE ENVELOPE ALLOWED BY OPTICAL BENCH AND BASEPLATE

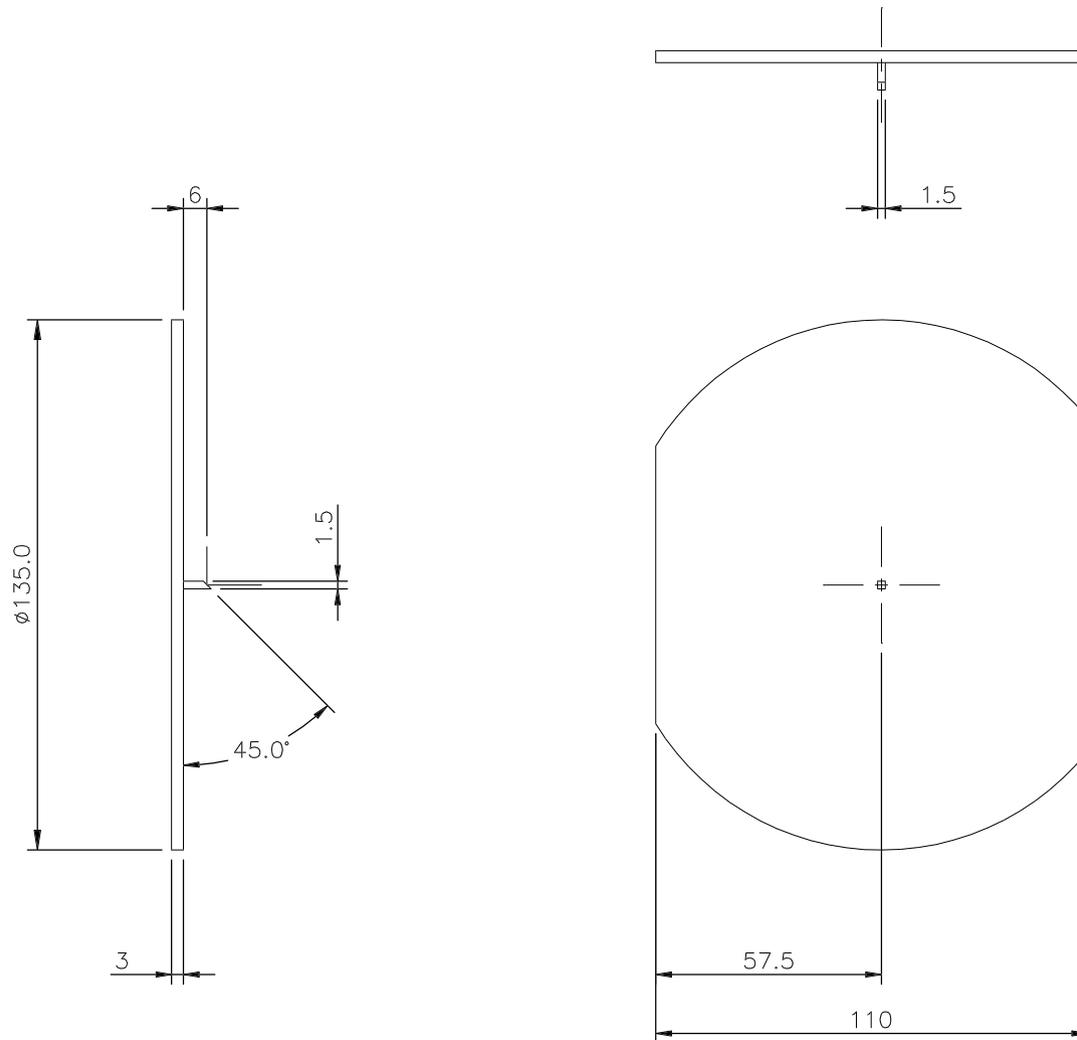


VIGNETTING PATTERN
 SCALE 5:1

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REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE
1	ORIGINAL DESIGN	AJW			ST	24/02/97
ISSUE DESCRIPTION						

UNLESS OTHERWISE STATED		MATERIAL	
DIMENSIONS ARE IN mm		FINISH	
GENERAL TOLERANCE: \pm		TITLE	
ANGULAR TOLERANCE: \pm		ROYAL GREENWICH OBSERVATORY PPARC	
SURFACE FINISH: (MICRONS)		MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM	
REMOVE ALL SHARP EDGES		USED ON	
DO NOT SCALE THIS DRAWING		ORIGINAL SHEET A2	
		LOCATION BN	
		DWG. No. BN030	
		ORIGINAL SCALE 1:1	
		SHEET 1 OF 1	



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 24/02/97
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REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE
1	ORIGINAL DESIGN	AJW			ST	24/02/97

UNLESS OTHERWISE STATED
 DIMENSIONS ARE IN mm
 GENERAL TOLERANCE: ±
 ANGULAR TOLERANCE: ±
 SURFACE FINISH:
 (MICRONS) ✓
 REMOVE ALL SHARP EDGES
 DO NOT SCALE THIS DRAWING

MATERIAL
 FUSED SILICA
 FINISH
 USED ON

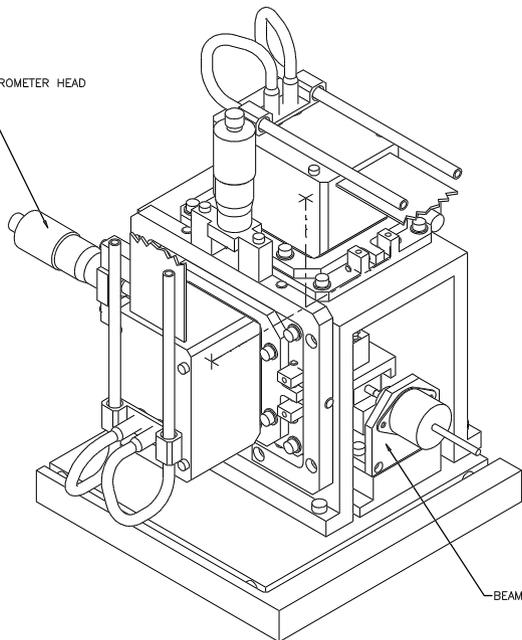
 ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM		PPARC	
TITLE WHT NAOMI WFS PICK-OFF DISC DETAIL DRAWING FOR QUOTATION PURPOSES			
ORIGINAL SHEET A2	LOCATION BN	DWG. No. BN031	REV 1
ORIGINAL SCALE 1:1			SHEET 1 OF 1



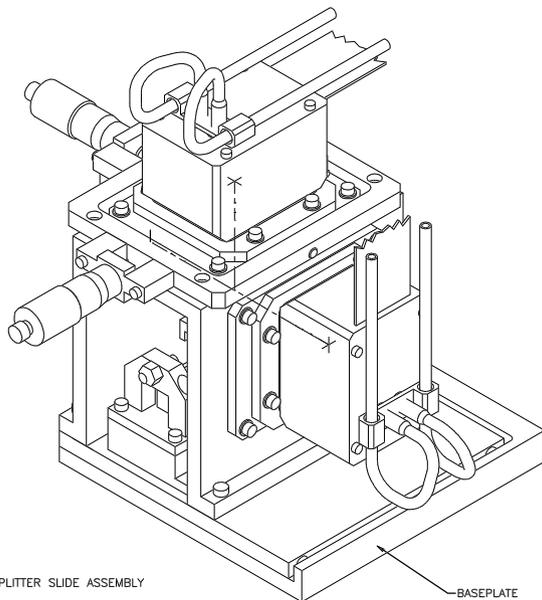
VIEW SHOWING CENTRING JIG ON CCD No.1

VIEW SHOWING CENTRING JIG ON CCD No.2

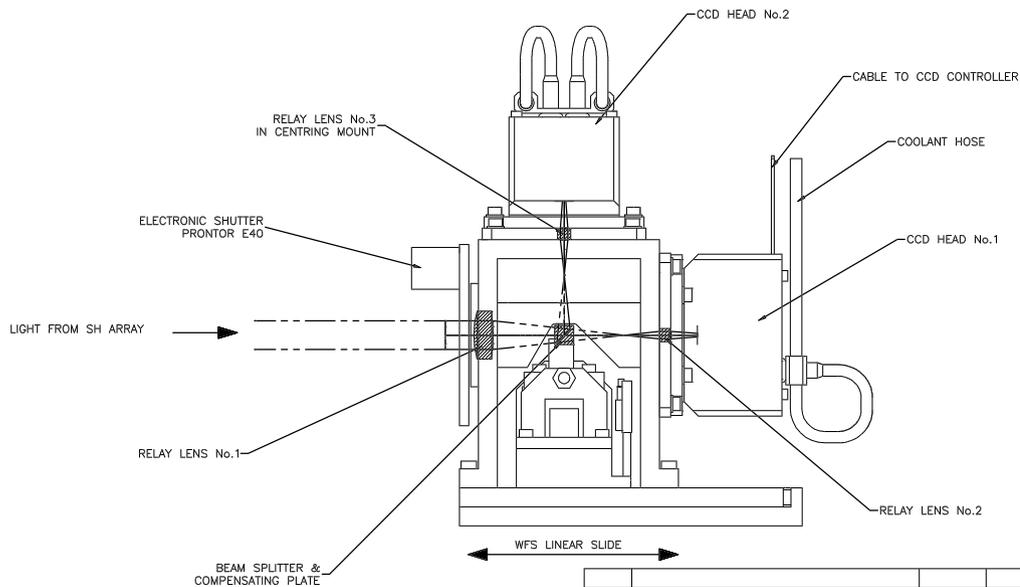
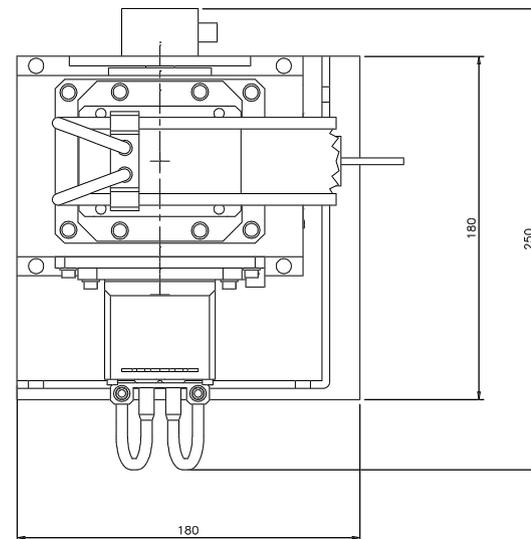
DIFFERENTIAL MICROMETER HEAD



BEAM SPLITTER SLIDE ASSEMBLY



BASEPLATE



LIGHT FROM SH ARRAY

RELAY LENS No.1

ELECTRONIC SHUTTER PRONTOR E40

RELAY LENS No.3 IN CENTRING MOUNT

RELAY LENS No.2

BEAM SPLITTER & COMPENSATING PLATE

WFS LINEAR SLIDE

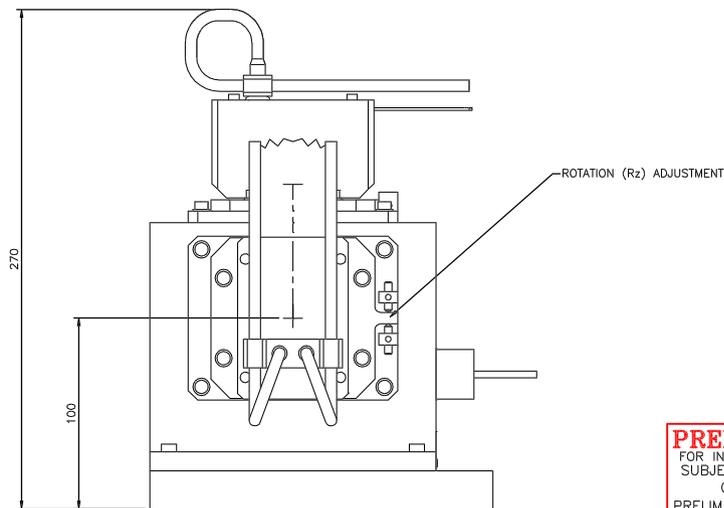
CCD HEAD No.2

CABLE TO CCD CONTROLLER

COOLANT HOSE

CCD HEAD No.1

RELAY LENS No.2

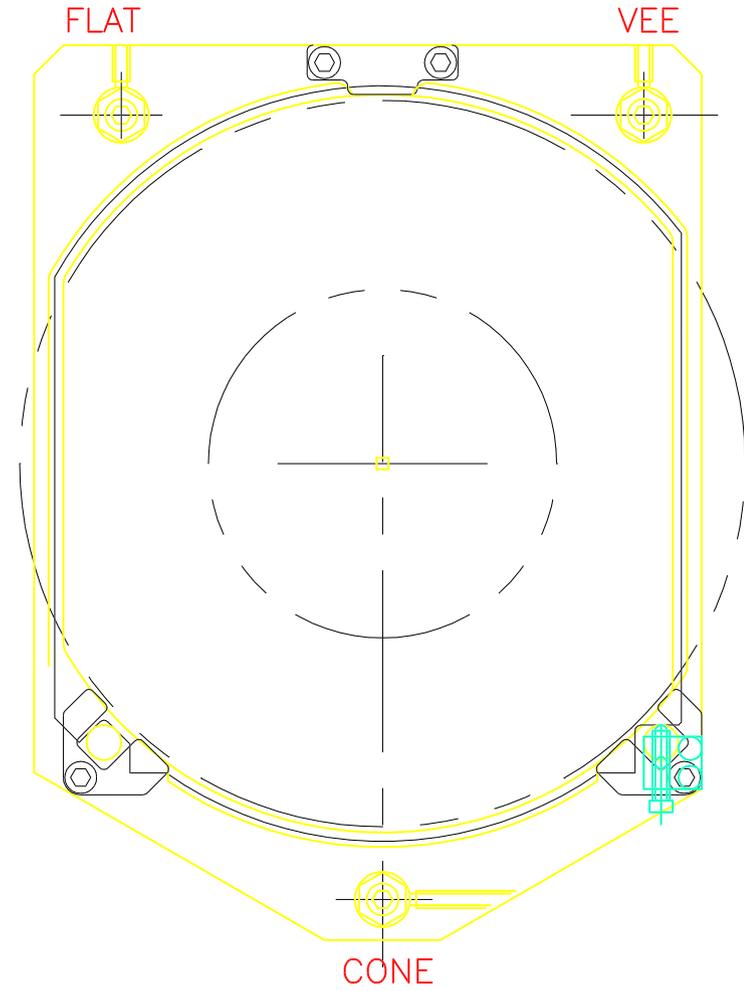
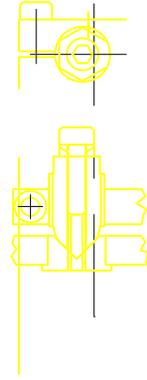
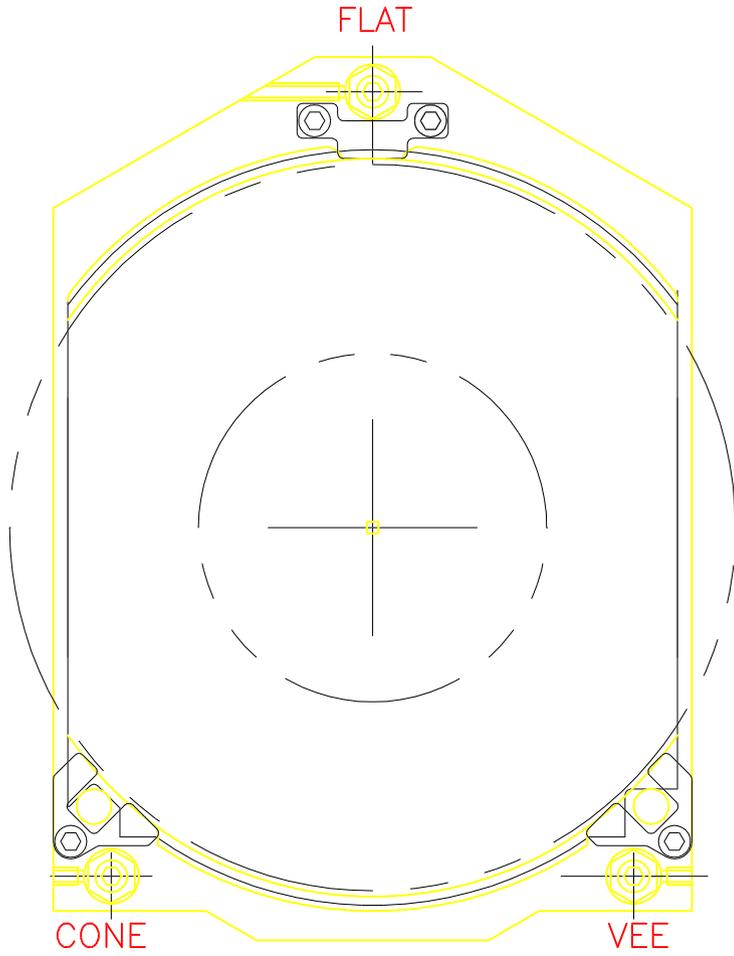
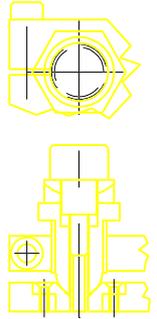


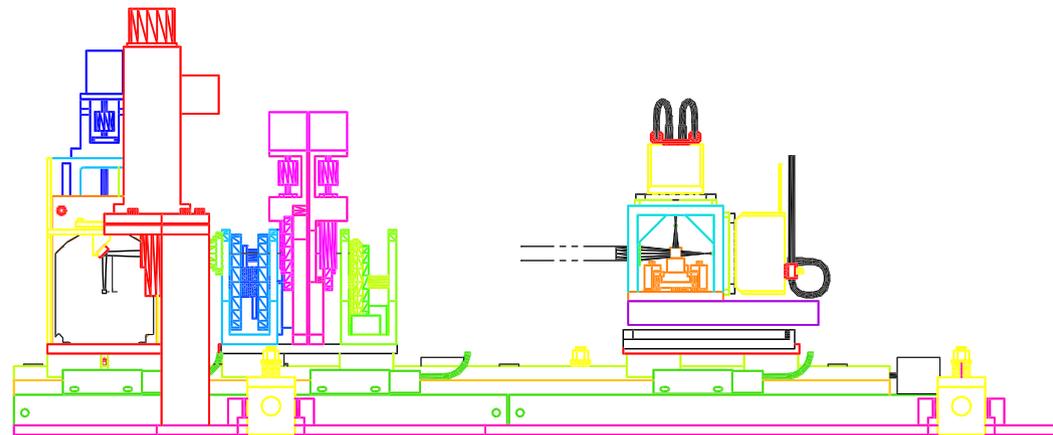
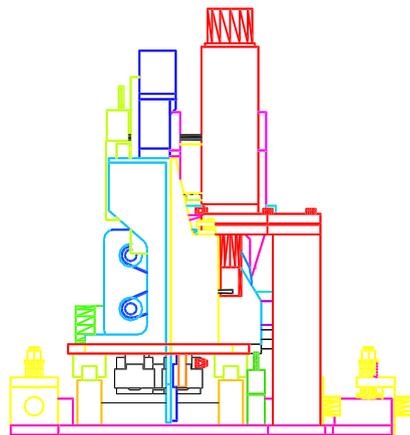
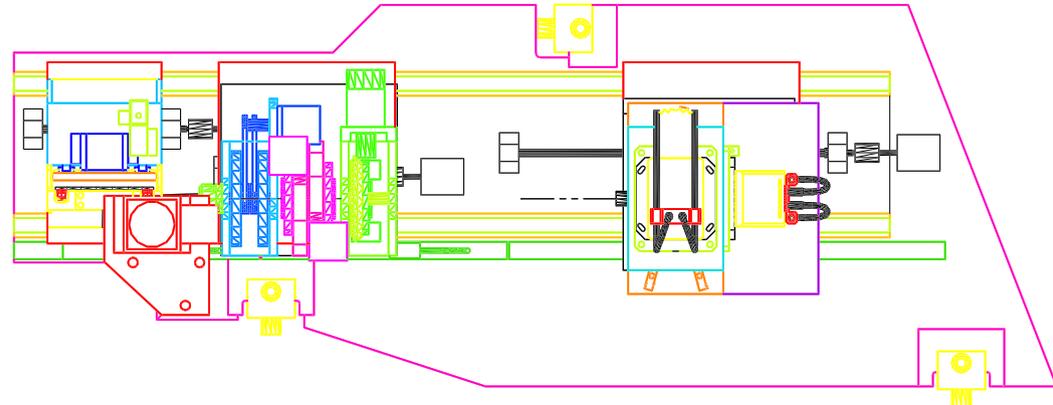
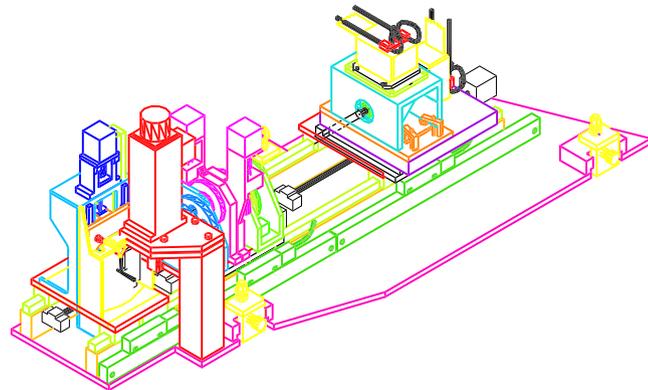
ROTATION (Rz) ADJUSTMENT

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07/05/97
PRELIMINARY ISSUE: 1
DO NOT USE THIS DRAWING FOR
PROCUREMENT OR MANUFACTURE.

REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE
1	ORIGINAL DESIGN	AJW			ST	08/04/97
	ISSUE DESCRIPTION					

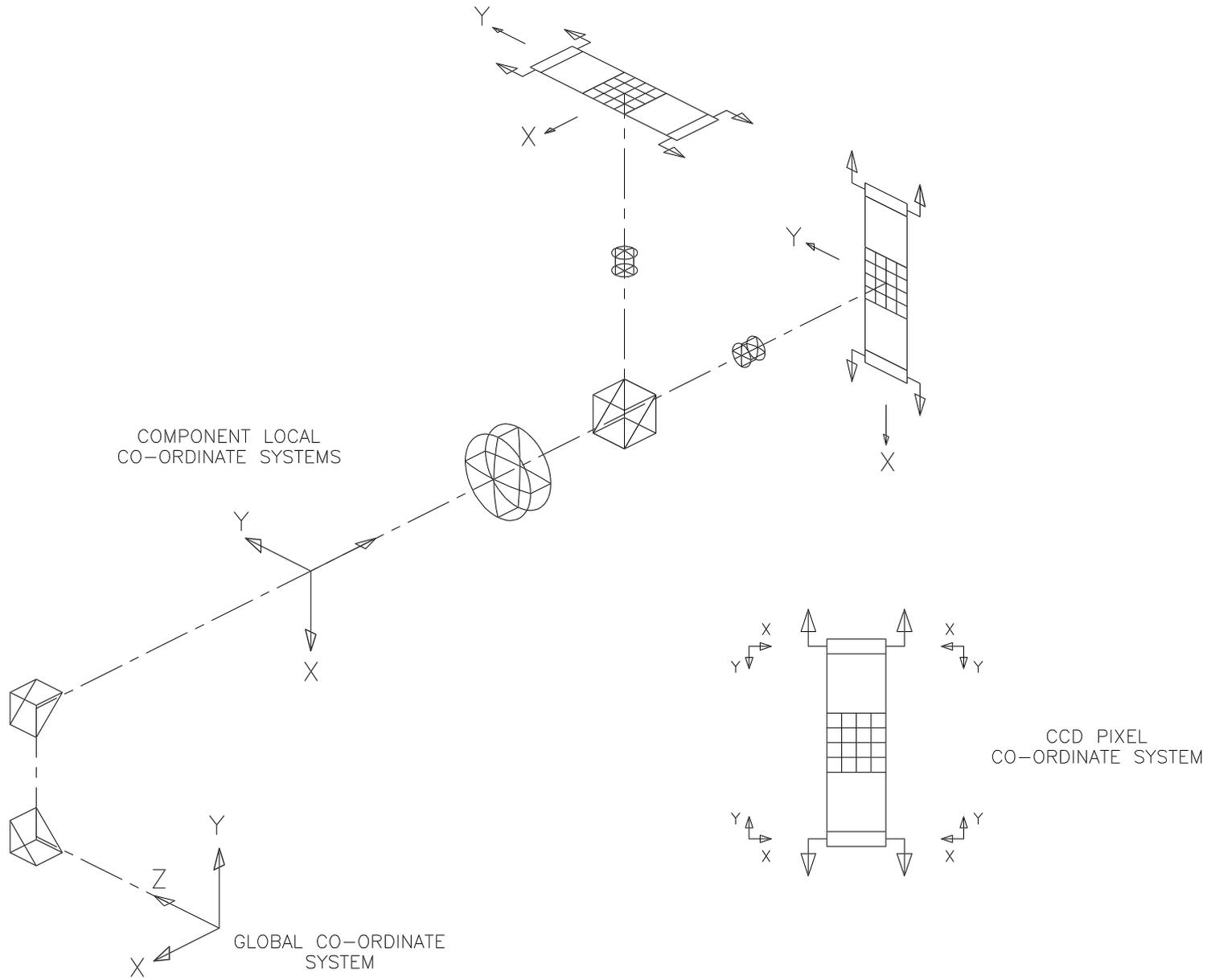
UNLESS OTHERWISE STATED		MATERIAL	
DIMENSIONS ARE IN mm			
GENERAL TOLERANCE: ±			
ANGULAR TOLERANCE: ±			
SURFACE FINISH: (MICRONS)		✓	
REMOVE ALL SHARP EDGES		USED ON	
DO NOT SCALE THIS DRAWING			
ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM		PPARC	
TITLE WHT NAOMI WFS - TWIN CCD SOLID MODEL PRELIMINARY DESIGN			
ORIGINAL SHEET AO	LOCATION BN	DWG. No. BN033	REV 1
ORIGINAL SCALE 1:1			SHEET 1 OF 1





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						UNLESS OTHERWISE STATED	MATERIAL	 ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM 			
						DIMENSIONS ARE IN mm	FINISH	TITLE			
						GENERAL TOLERANCE: ±		WHT NAOMI WFS PICK-OFF APRIL 97			
						ANGULAR TOLERANCE: ±		MODIFIED DESIGN FROM PDR			
						SURFACE FINISH: (MICRONS) ✓	USED ON	ORIGINAL SHEET	LOCATION	DWG. No.	REV
1	DESIGN AT AUGUST 97	AJW		ST	14/05/97	REMOVE ALL SHARP EDGES	AO	BN	BN035	1	
REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE	ORIGINAL SCALE	1:2		SHEET 1 OF 1	
ISSUE DESCRIPTION						DO NOT SCALE THIS DRAWING					



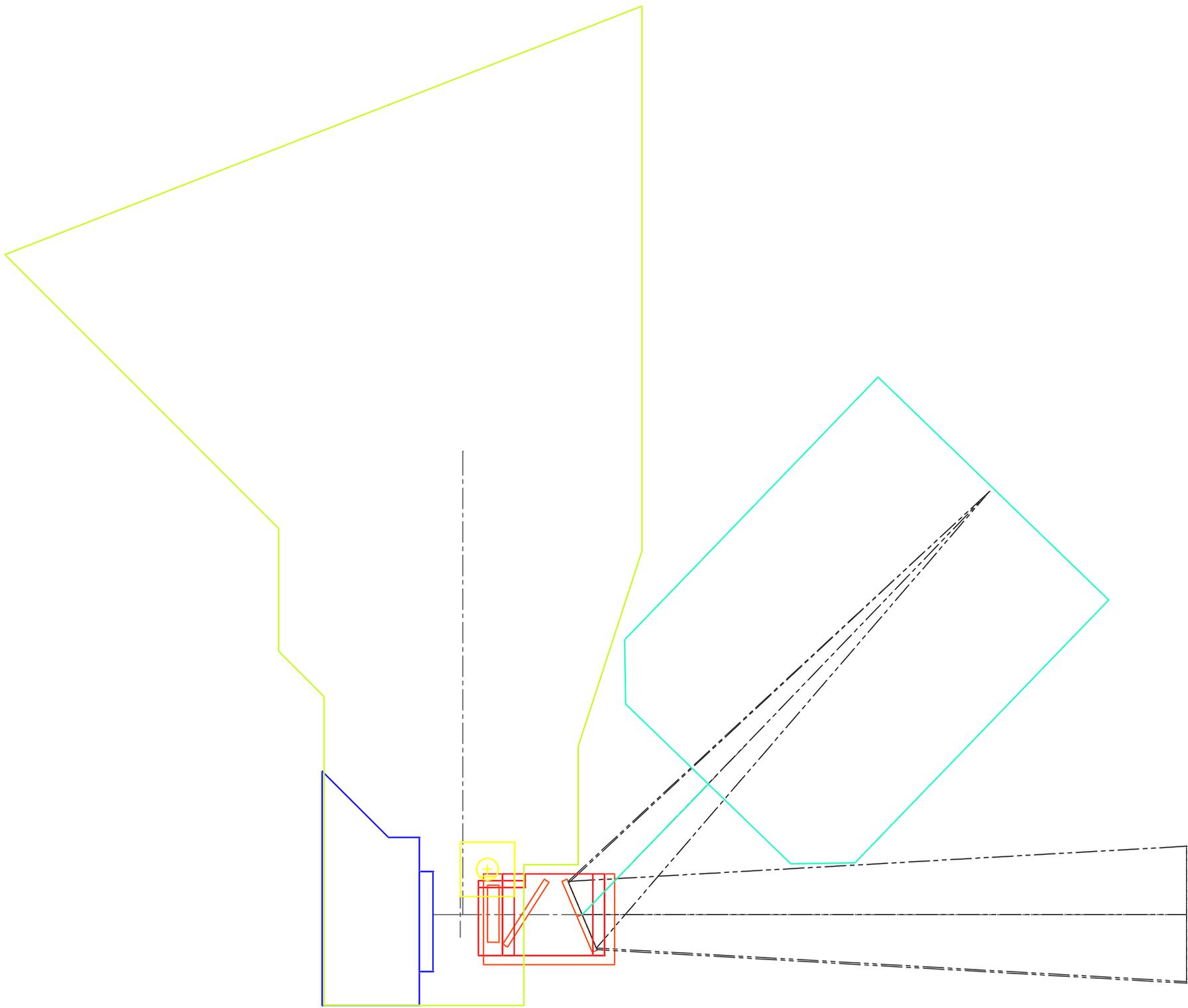
PRELIMINARY
 FOR INFORMATION ONLY
 SUBJECT TO CHANGE
 08/12/97
 PRELIMINARY ISSUE: 1
 DO NOT USE THIS DRAWING FOR
 PROCUREMENT OR MANUFACTURE.

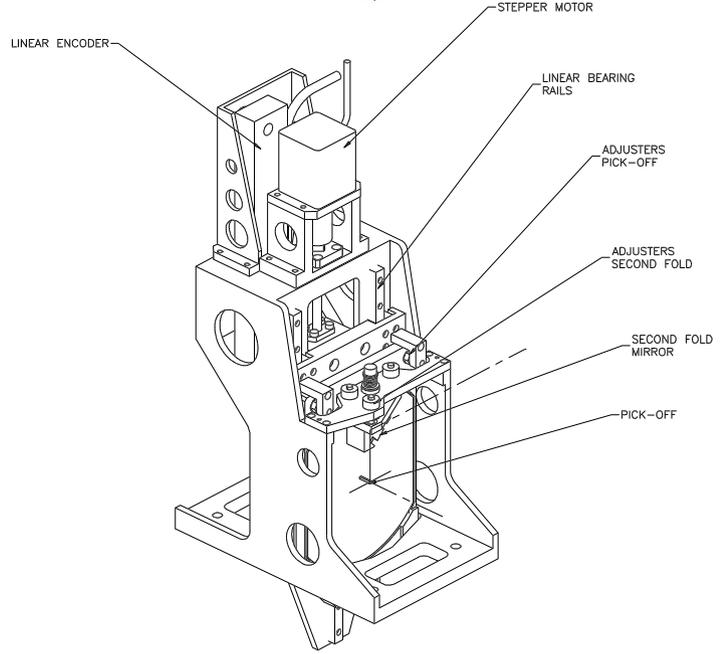
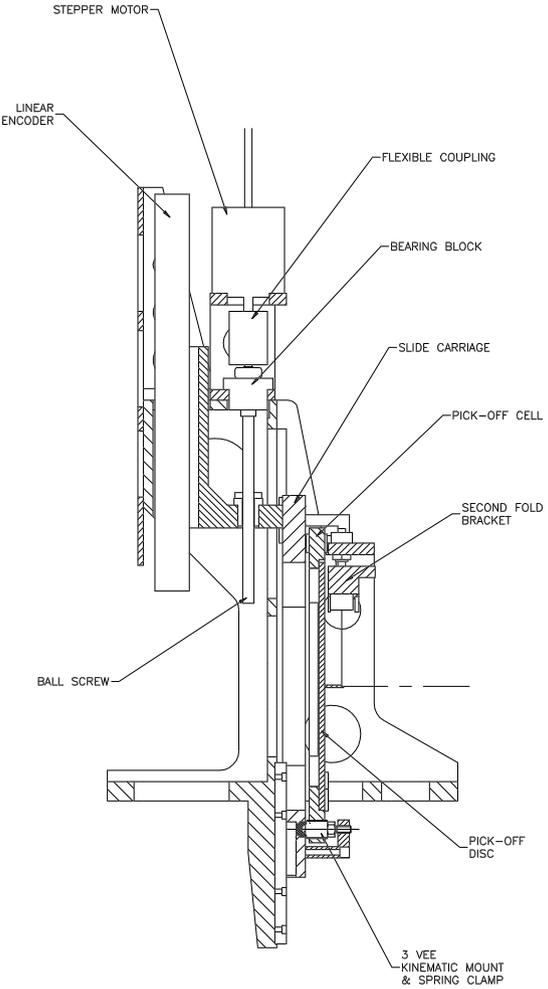
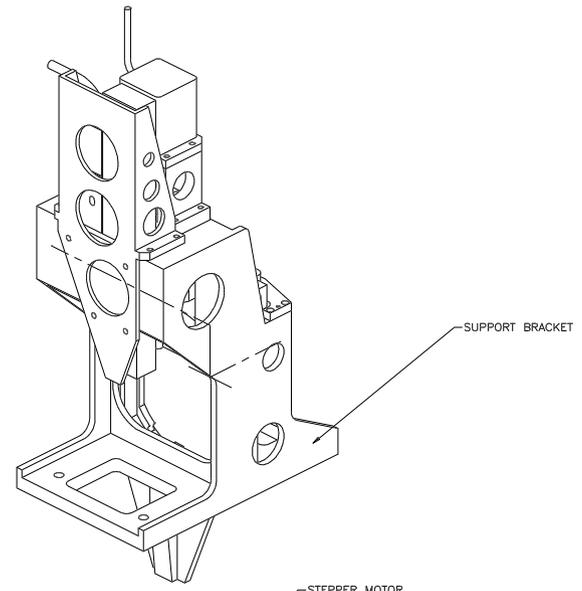
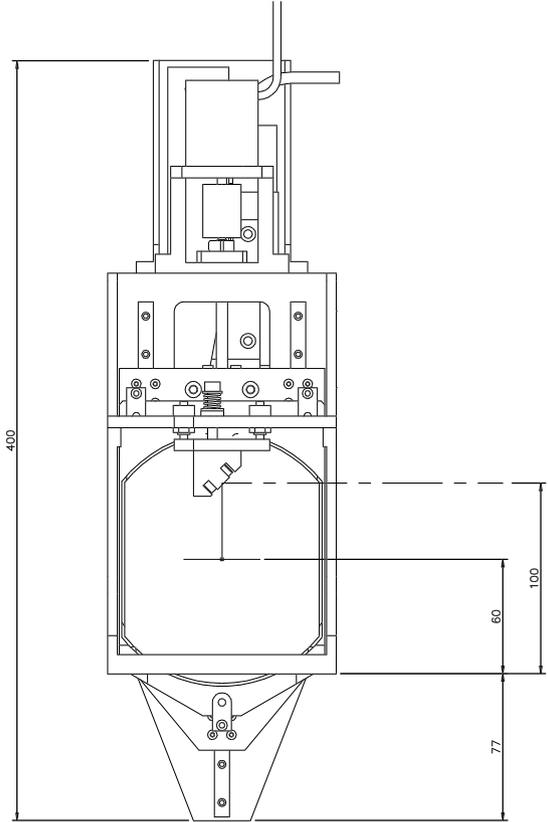
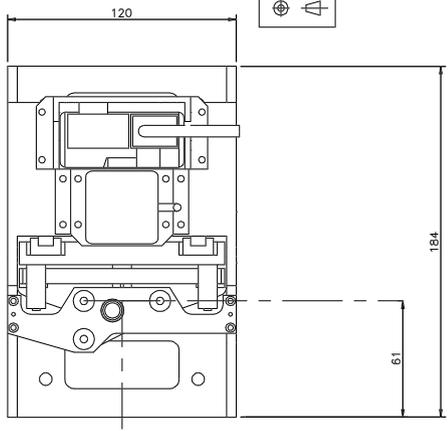
1	ORIGINAL DESIGN	AJW			ST	16/05/97
REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE
ISSUE DESCRIPTION						

UNLESS OTHERWISE STATED
 DIMENSIONS ARE IN mm
 GENERAL TOLERANCE: ±
 ANGULAR TOLERANCE: ±
 SURFACE FINISH: (MICRONS) ✓
 REMOVE ALL SHARP EDGES
 DO NOT SCALE THIS DRAWING

MATERIAL	
FINISH	
USED ON	

 ROYAL GREENWICH OBSERVATORY			
MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM			
TITLE WHT NAOMI WFS CO-ORDINATE SYSTEM ILLUSTRATION OF GLOBAL & LOCAL CO-ORDINATE SYSTEMS			
ORIGINAL SHEET	LOCATION	DWG. No.	REV
A2	BN	BN036	1
ORIGINAL SCALE	NTS		SHEET 1 OF 1





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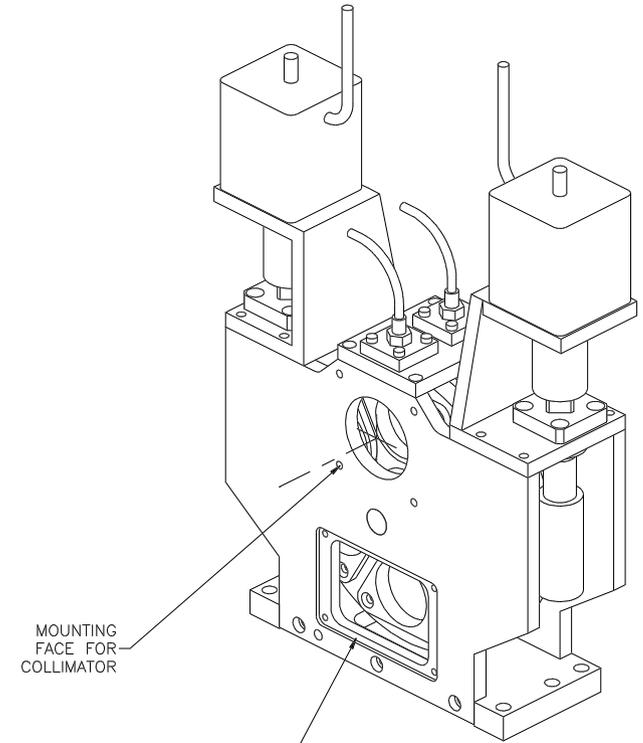
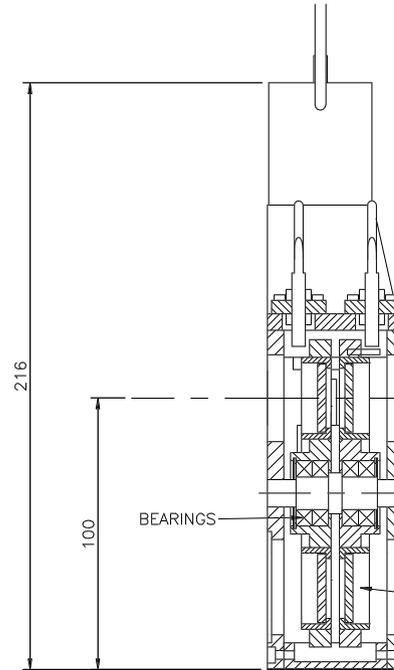
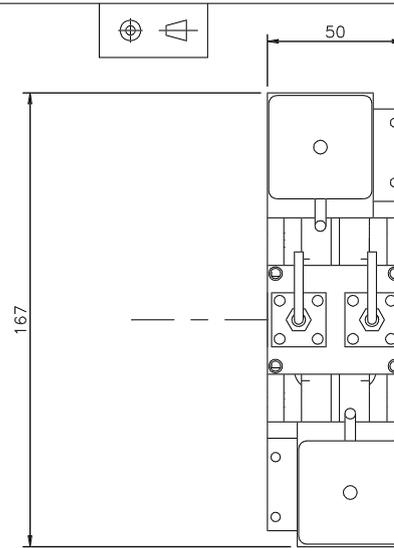
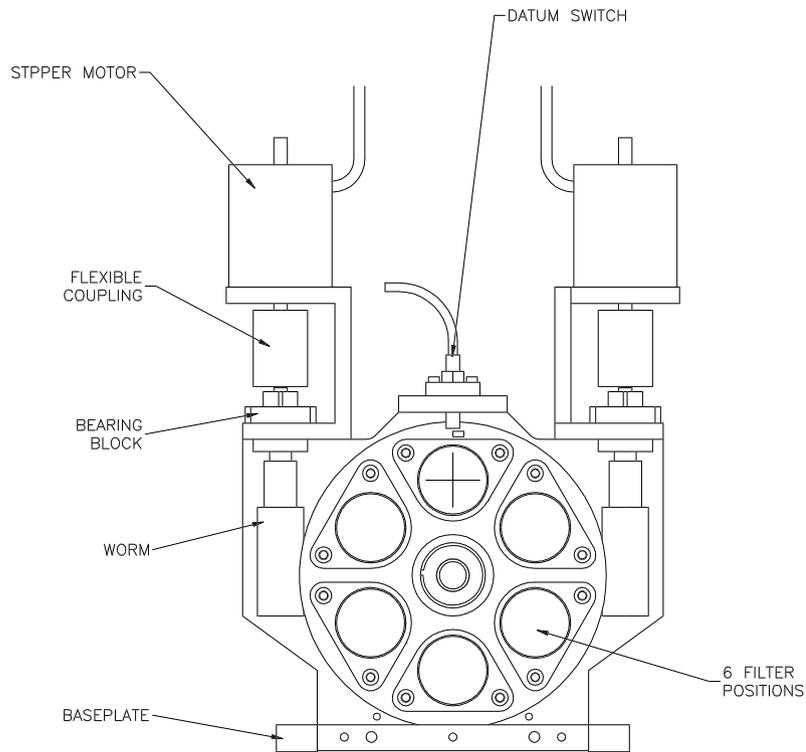
1	ORIGINAL DESIGN	AJW		ST	15/10/97	
REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE
	ISSUE DESCRIPTION					

UNLESS OTHERWISE STATED
 DIMENSIONS ARE IN mm
 GENERAL TOLERANCE: ±
 ANGULAR TOLERANCE: ±
 SURFACE FINISH: ✓
 (MICRONS)
 REMOVE ALL SHARP EDGES
 DO NOT SCALE THIS DRAWING

MATERIAL	
FINISH	
USED ON	

 ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM		
TITLE WHT NAOMI WFS PICK-OFF ASSEMBLY DESIGN PRESENTED AT CDR		
ORIGINAL SHEET AO	LOCATION BN	DWG. No. BN040
ORIGINAL SCALE 1:1	SHEET 1 OF 1	

END VIEW SHOWN WITH SIDE PLATE REMOVED



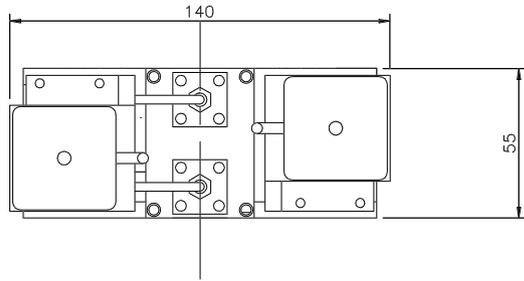
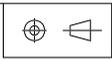
TWO FILTER WHEELS SHOWN BUT IT IS POSSIBLE TO FIT TWO FILTERS IN ONE WHEEL

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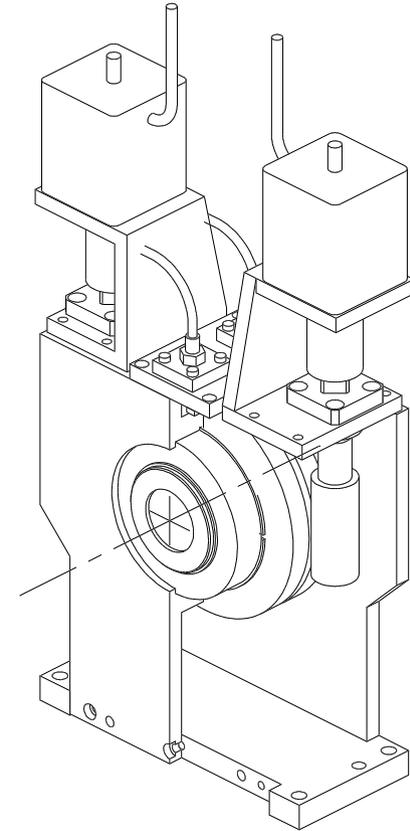
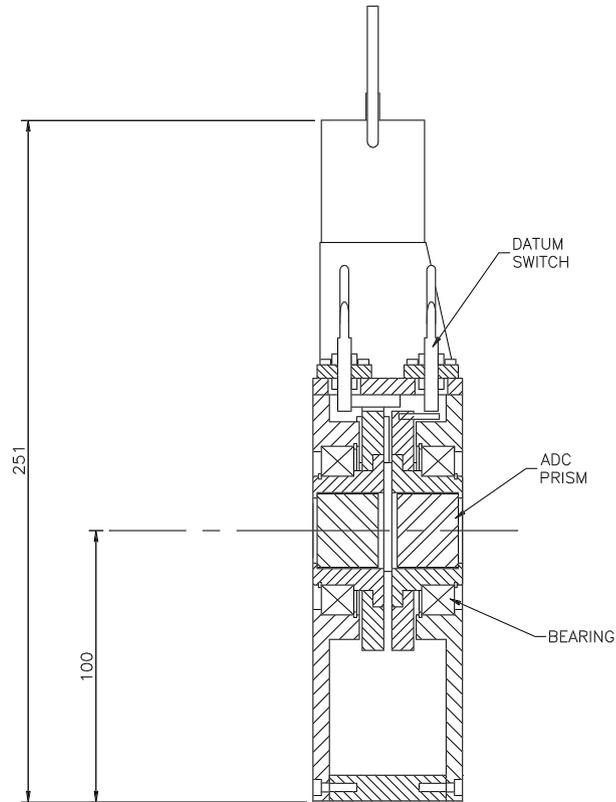
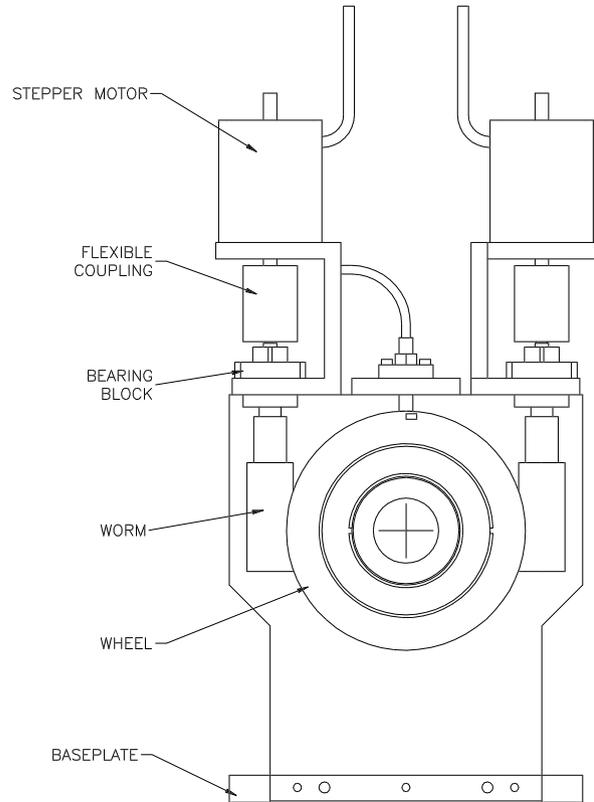
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1	ORIGINAL DESIGN	AJW			ST	11/11/97
ISSUE DESCRIPTION						

UNLESS OTHERWISE STATED
 DIMENSIONS ARE IN mm
 GENERAL TOLERANCE: ±
 ANGULAR TOLERANCE: ±
 SURFACE FINISH: (MICRONS) ✓
 REMOVE ALL SHARP EDGES
 DO NOT SCALE THIS DRAWING

MATERIAL	 ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM			
FINISH	TITLE WHT NAOMI WFS FILTER WHEEL ASSY DESIGN PRESENTED AT CDR			
USED ON	ORIGINAL SHEET A1	LOCATION BN	DWG. No. BN041	REV 1
	ORIGINAL SCALE	1:1	SHEET 1 OF 1	



END VIEW SHOWN WITH SIDE PLATE REMOVED

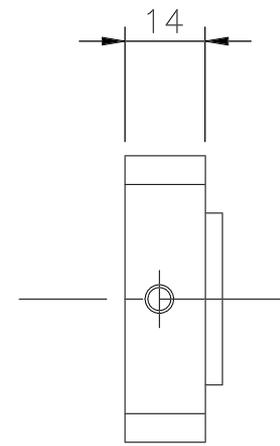
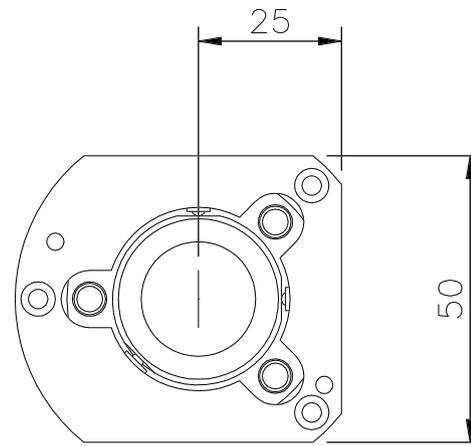
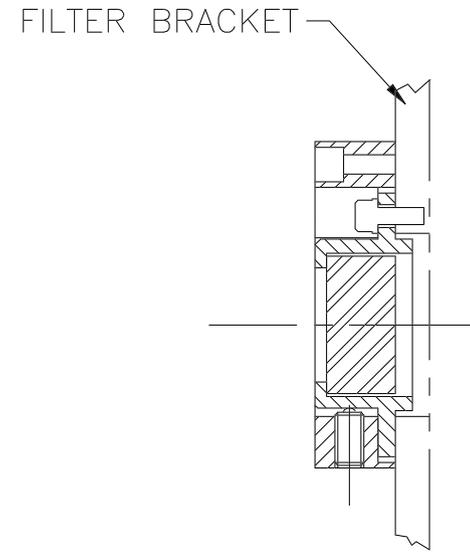
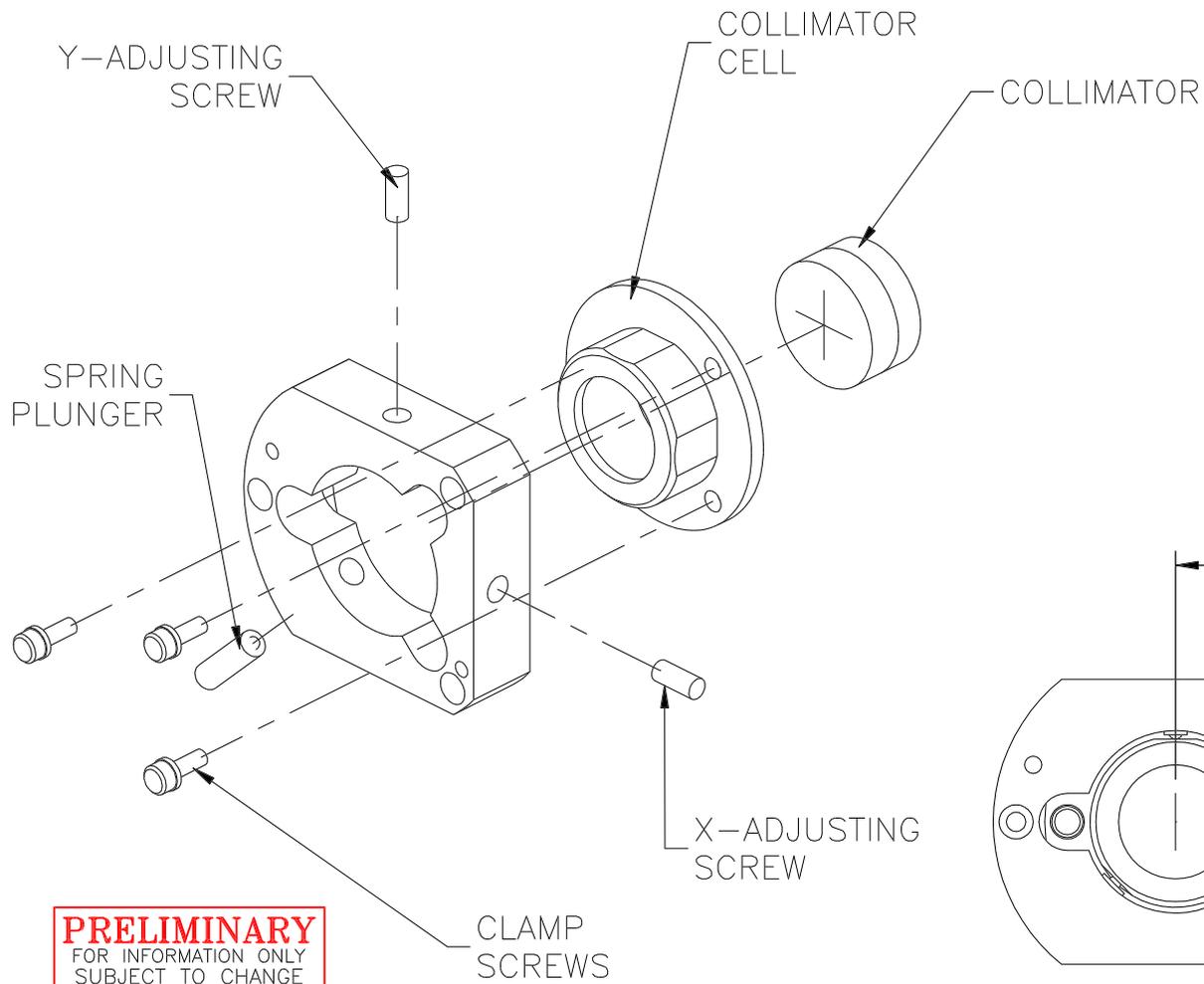


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ISSUE DESCRIPTION						

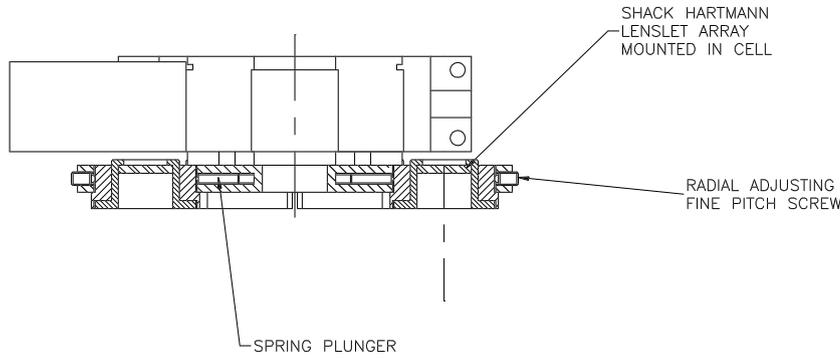
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DIMENSIONS ARE IN mm GENERAL TOLERANCE: ± ANGULAR TOLERANCE: ± SURFACE FINISH: (MICRONS) ✓ REMOVE ALL SHARP EDGES		FINISH		TITLE			
DO NOT SCALE THIS DRAWING		USED ON		WHT NAOMI WFS ADC ASSEMBLY		SOLID MODEL FOR CDR	
				ORIGINAL SHEET	LOCATION	DWG. No.	REV
				A1	BN	BN042	1
				ORIGINAL SCALE	1:1	SHEET 1 OF 1	

DWG. No. BN043

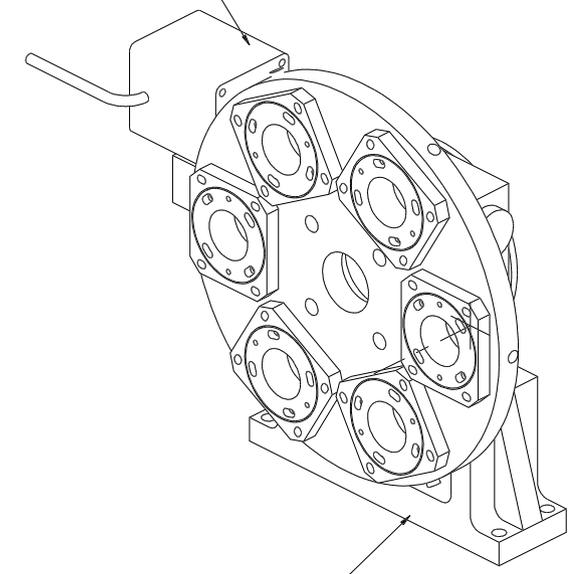


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							UNLESS OTHERWISE STATED	MATERIAL	 ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM					
							DIMENSIONS ARE IN mm	FINISH	TITLE					
							GENERAL TOLERANCE: ±	WHT NAOMI WFS COLLIMATOR ASSMEBLY						
							ANGULAR TOLERANCE: ±	SOLID MODEL FOR CDR						
							SURFACE FINISH: (MICRONS) ✓	USED ON	ORIGINAL SHEET	LOCATION	DWG. No.		REV	
1	ORIGINAL DESIGN	AJW			ST	12/11/97		A3	BN	BN043		1		
REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE	REMOVE ALL SHARP EDGES	ORIGINAL SCALE	1:1			SHEET 1 OF 1		
ISSUE DESCRIPTION							DO NOT SCALE THIS DRAWING							

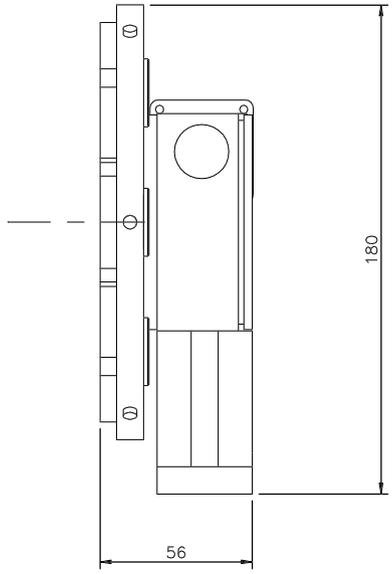
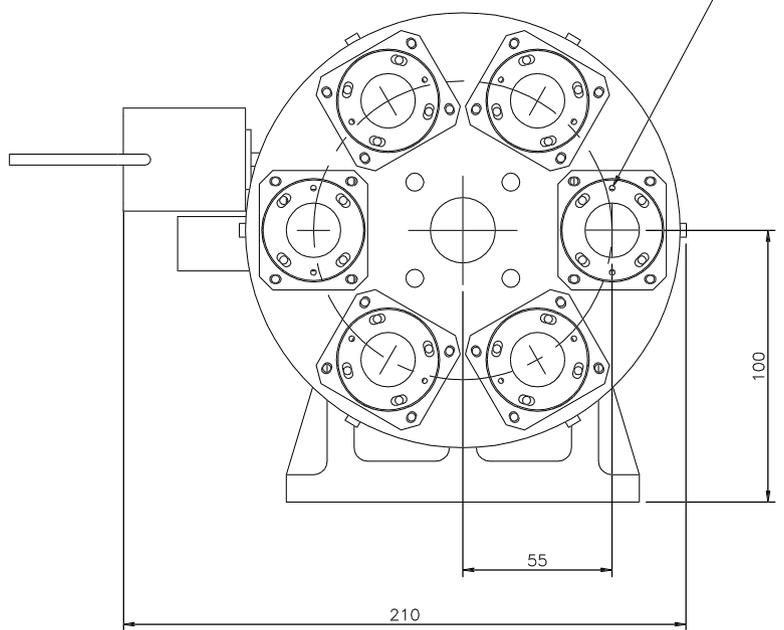


HIGH-RESOLUTION ROTARY STAGE NEWPORT M-URM80



SUPPORT BRACKET

HOLES FOR ROTARY ADJUSTMENT OF LENSLET ARRAY

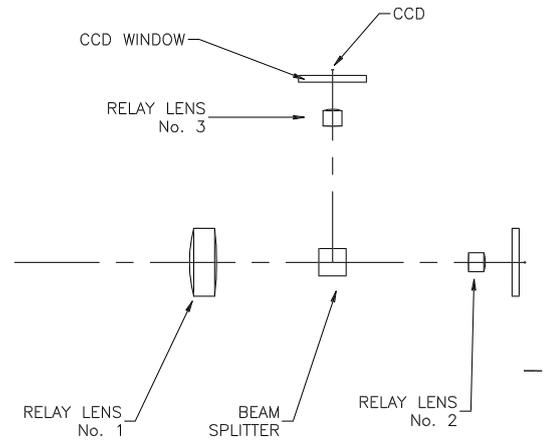
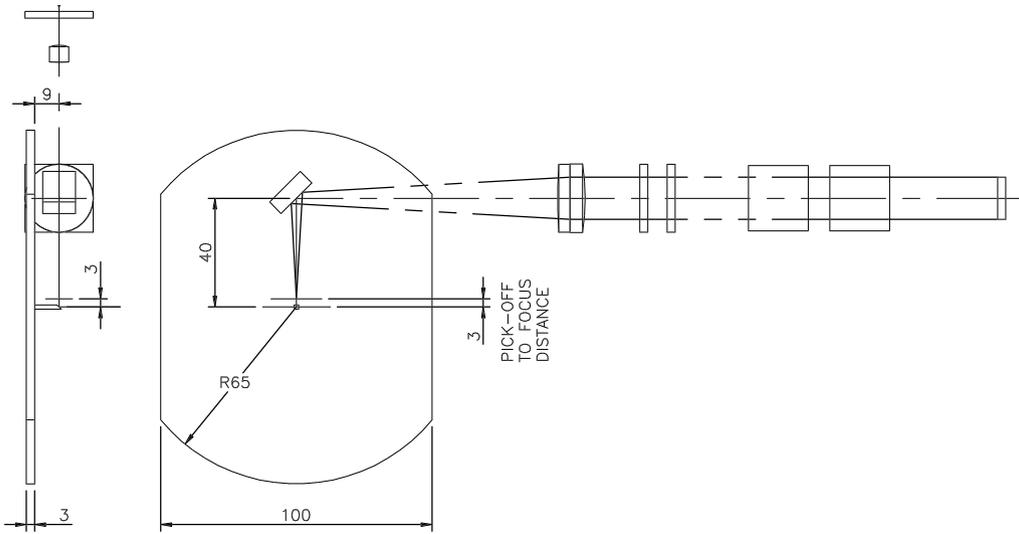
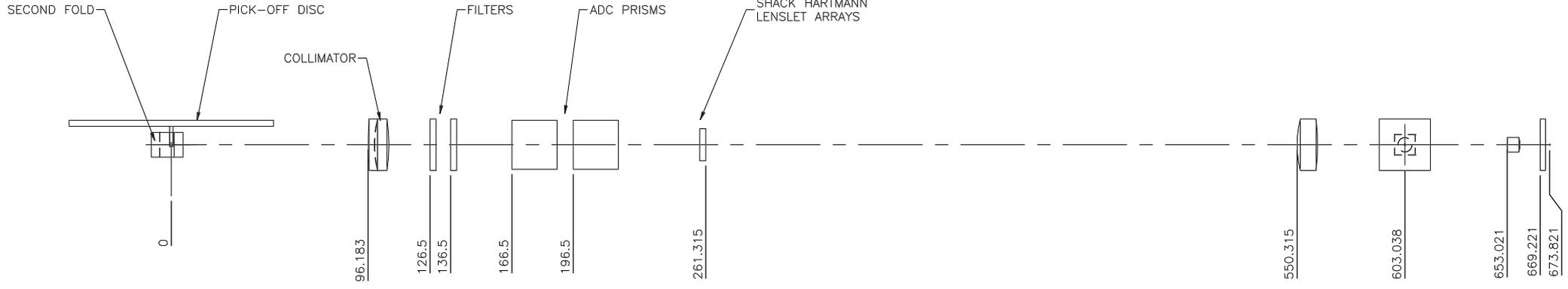


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REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE
1	ORIGINAL DESIGN	AJW			ST	14/11/97
ISSUE DESCRIPTION						

UNLESS OTHERWISE STATED
 DIMENSIONS ARE IN mm
 GENERAL TOLERANCE: ±
 ANGULAR TOLERANCE: ±
 SURFACE FINISH: (MICRONS) ✓
 REMOVE ALL SHARP EDGES
 DO NOT SCALE THIS DRAWING

MATERIAL	 ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM				
FINISH	TITLE WHT NAOMI WFS LENSLET WHEEL ASSY				
USED ON	ORIGINAL SHEET A1	LOCATION BN	DWG. No. BN044	REV 1	
	ORIGINAL SCALE	1:1	SHEET 1 OF 1		



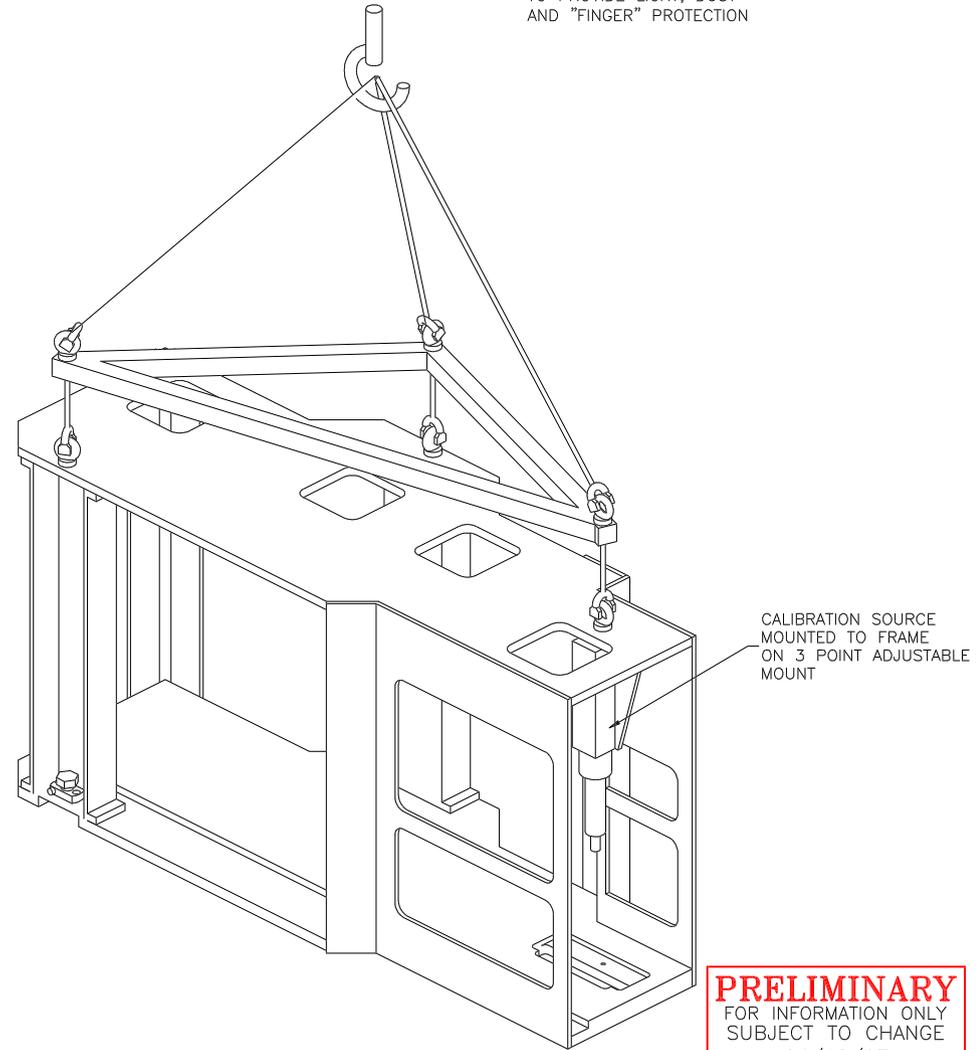
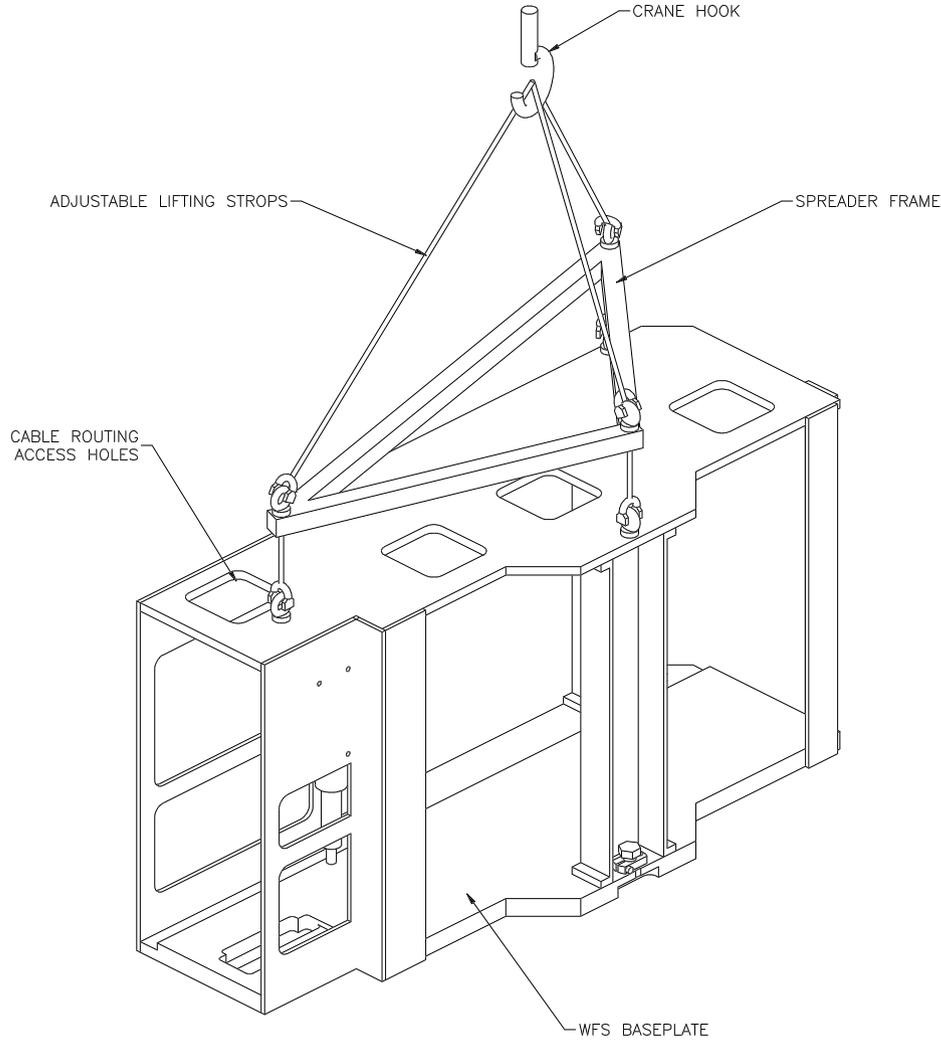
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REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE
1	ORIGINAL DESIGN	AJW			ST	15/11/97
ISSUE DESCRIPTION						

UNLESS OTHERWISE STATED		MATERIAL		ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM			
DIMENSIONS ARE IN mm		FINISH		TITLE			
GENERAL TOLERANCE: ±				WHT NAOMI WFS OPTICAL DIAGRAM			
ANGULAR TOLERANCE: ±				FROM ZEMAX FILE WFSCDR.DXF			
SURFACE FINISH: (MICRONS) ✓		USED ON		ORIGINAL SHEET	LOCATION	DWG. No.	REV
REMOVE ALL SHARP EDGES				A1	BN	BN045	1
DO NOT SCALE THIS DRAWING				ORIGINAL SCALE	1:1	SHEET 1 OF ?	



PANELS CAN BE ATTACHED AS REQUIRED TO FRAME TO PROVIDE LIGHT, DUST AND "FINGER" PROTECTION

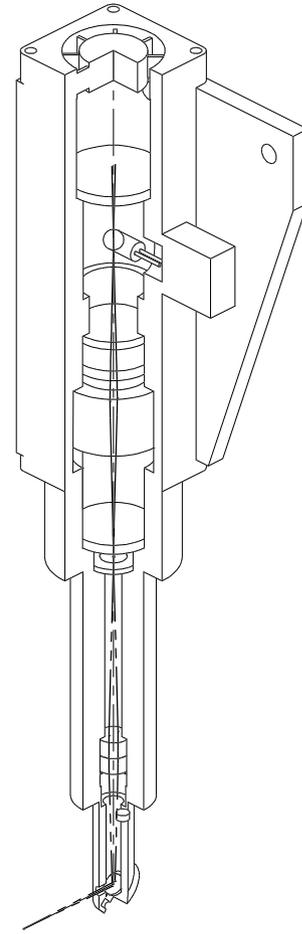
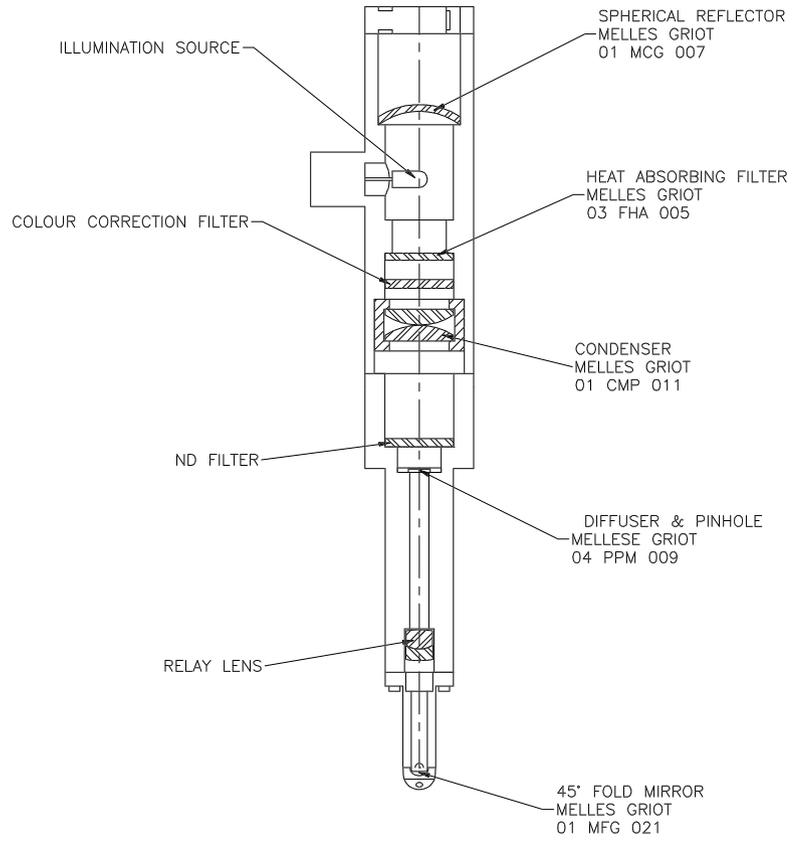
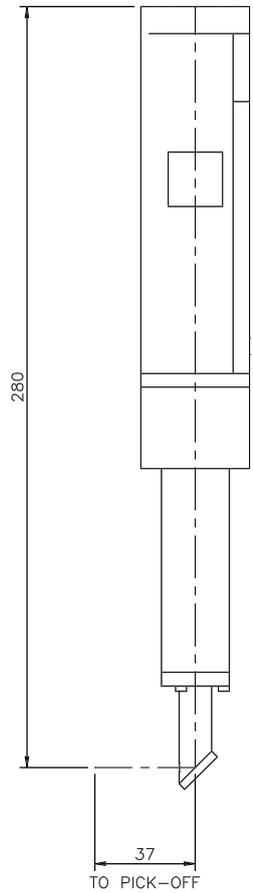
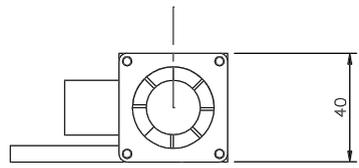
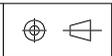


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REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE
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ISSUE DESCRIPTION						

UNLESS OTHERWISE STATED
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 ANGULAR TOLERANCE: ±
 SURFACE FINISH: (MICRONS) ✓
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 DO NOT SCALE THIS DRAWING

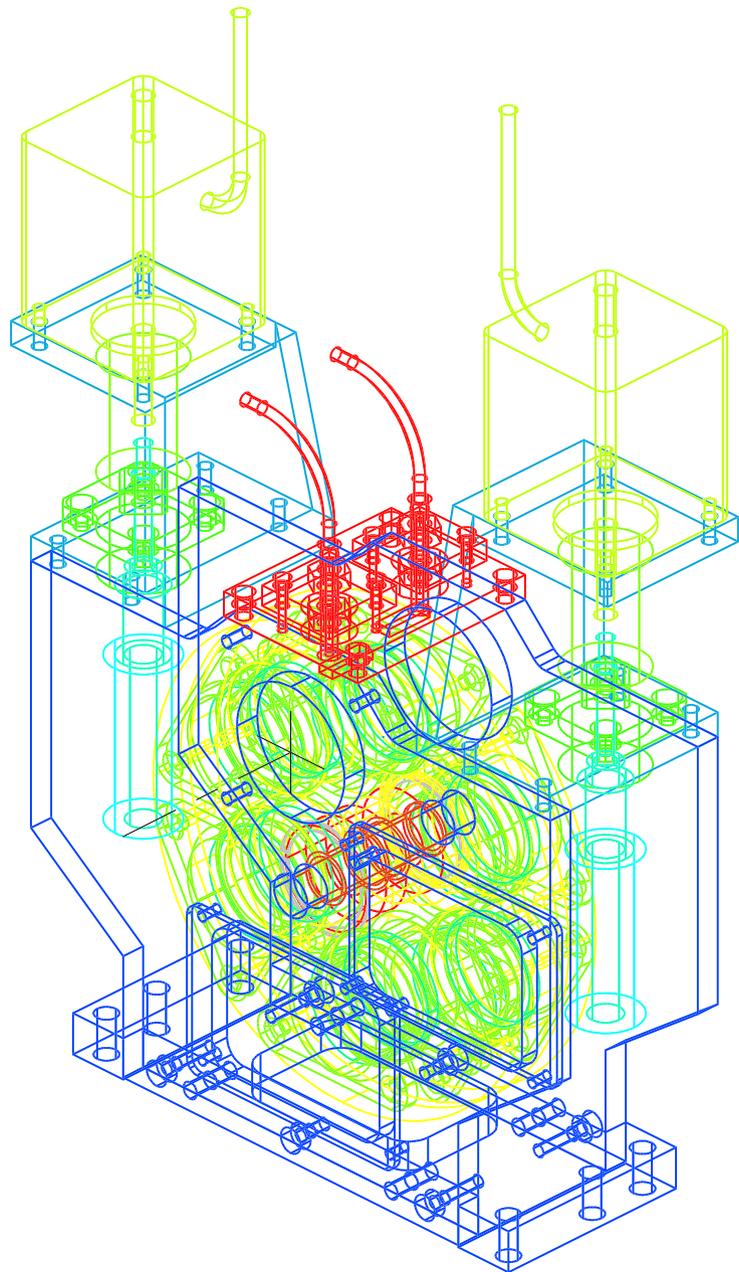
MATERIAL	 ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM					
FINISH	TITLE WHT NAOMI WFS OVERHEAD SUPPORT FRAME FOR CALIBRATION MOUNT, CABLE ROUTING & HANDLING					
USED ON	ORIGINAL SHEET A1	LOCATION BN	DWG. No. BN048	REV 1		
	ORIGINAL SCALE	NTS				SHEET 1 OF 1

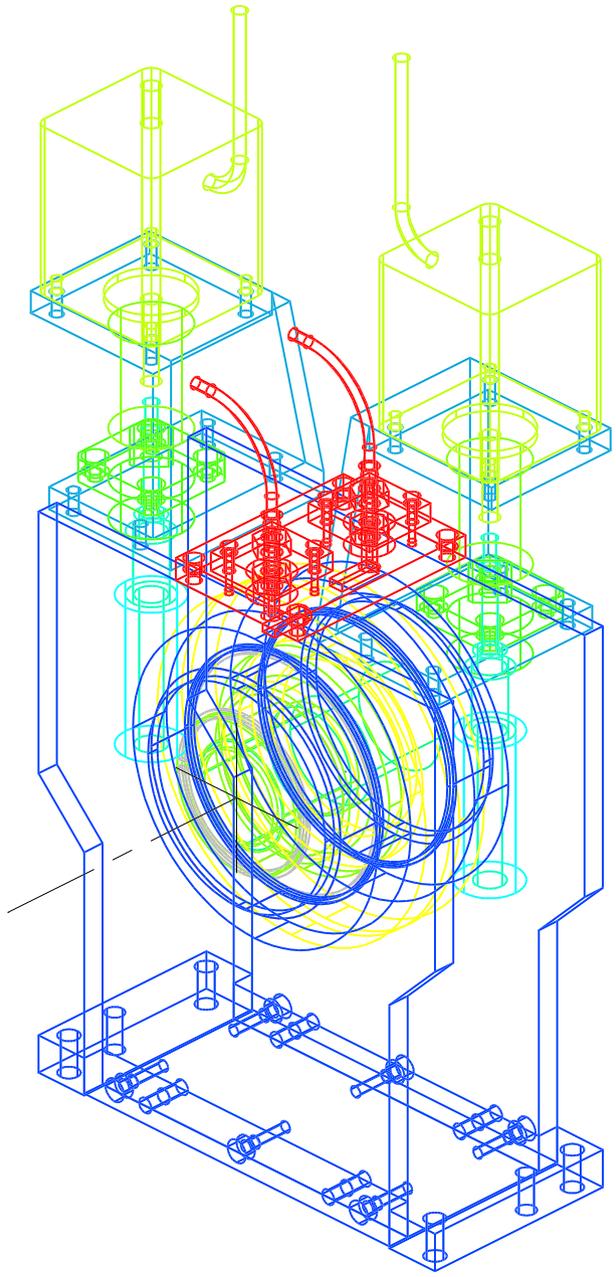


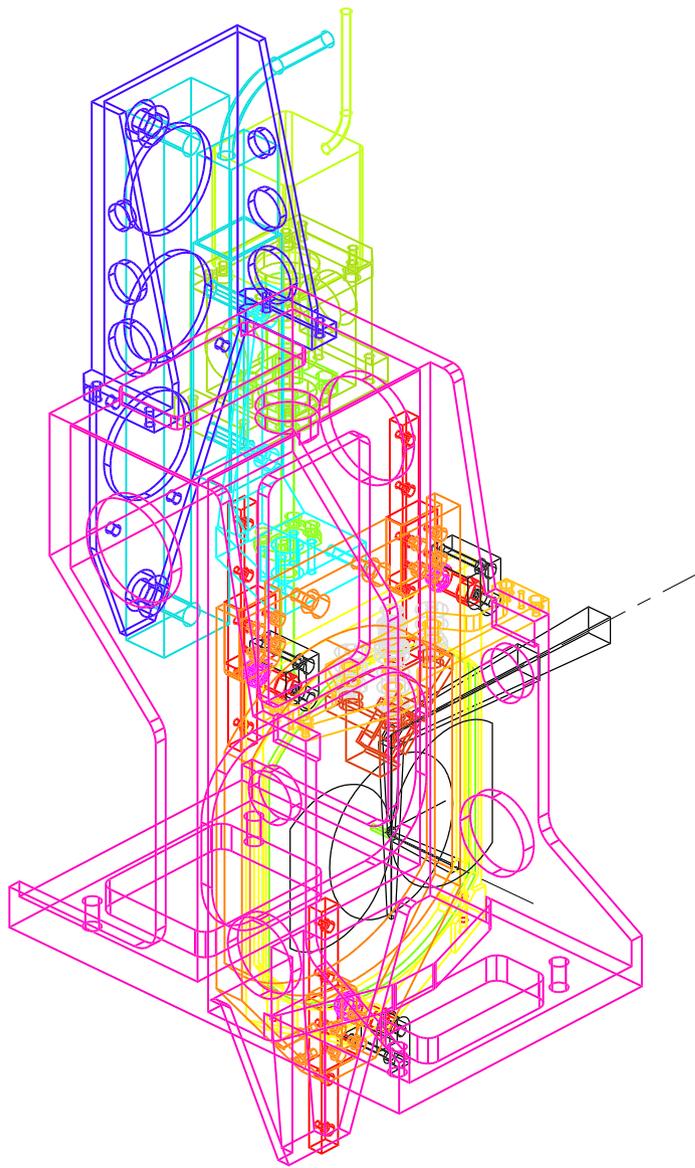
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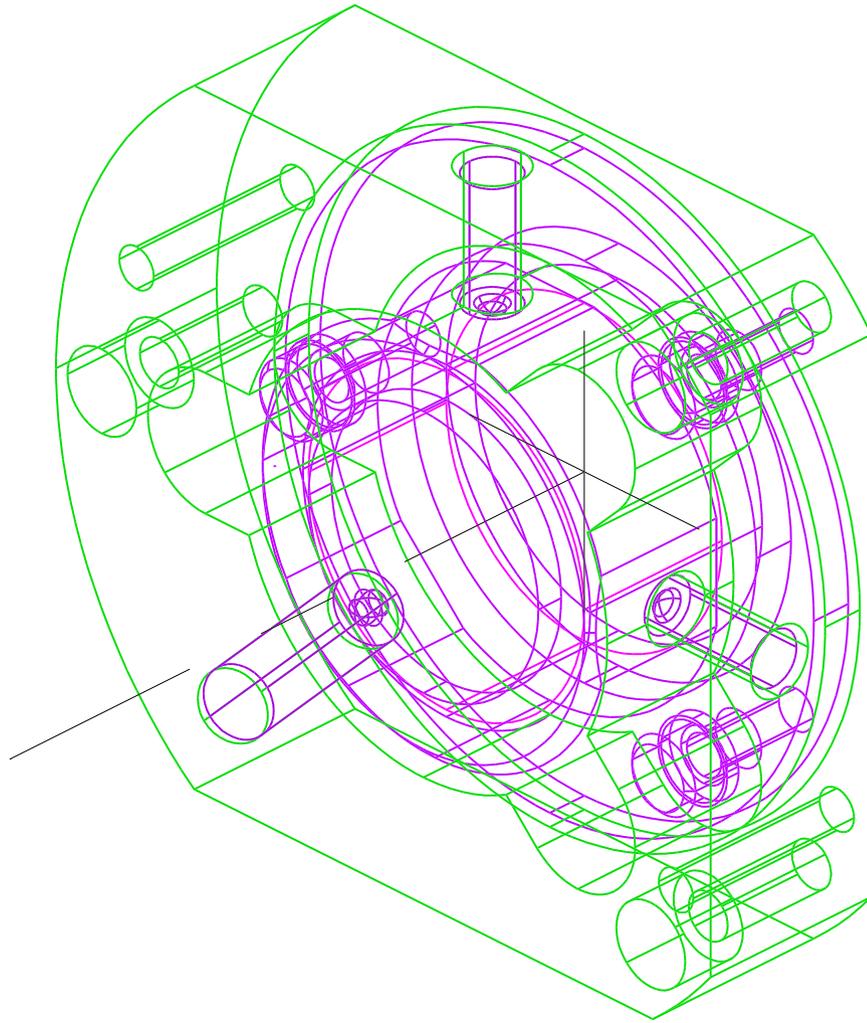
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ISSUE DESCRIPTION						

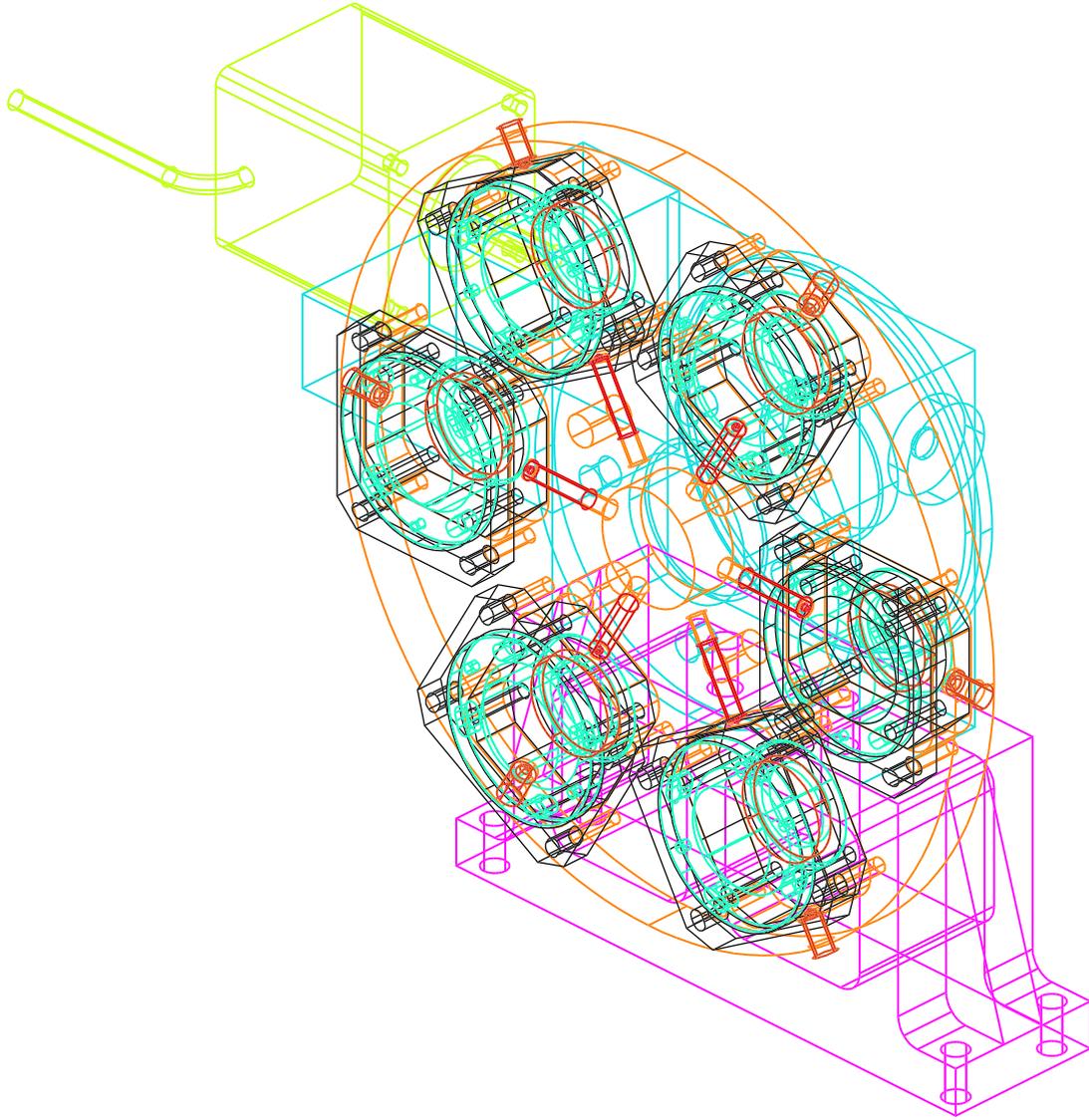
UNLESS OTHERWISE STATED		MATERIAL		 ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM			
DIMENSIONS ARE IN mm GENERAL TOLERANCE: ± ANGULAR TOLERANCE: ± SURFACE FINISH: (MICRONS) ✓ REMOVE ALL SHARP EDGES		FINISH		TITLE WHT NAOMI WFS CALIBRATION SOURCE SOLID MODEL FOR CDR			
DO NOT SCALE THIS DRAWING		USED ON		ORIGINAL SHEET	LOCATION	DWG. No.	REV
				A1	BN	BN049	1
				ORIGINAL SCALE	1:1	SHEET 1 OF 1	

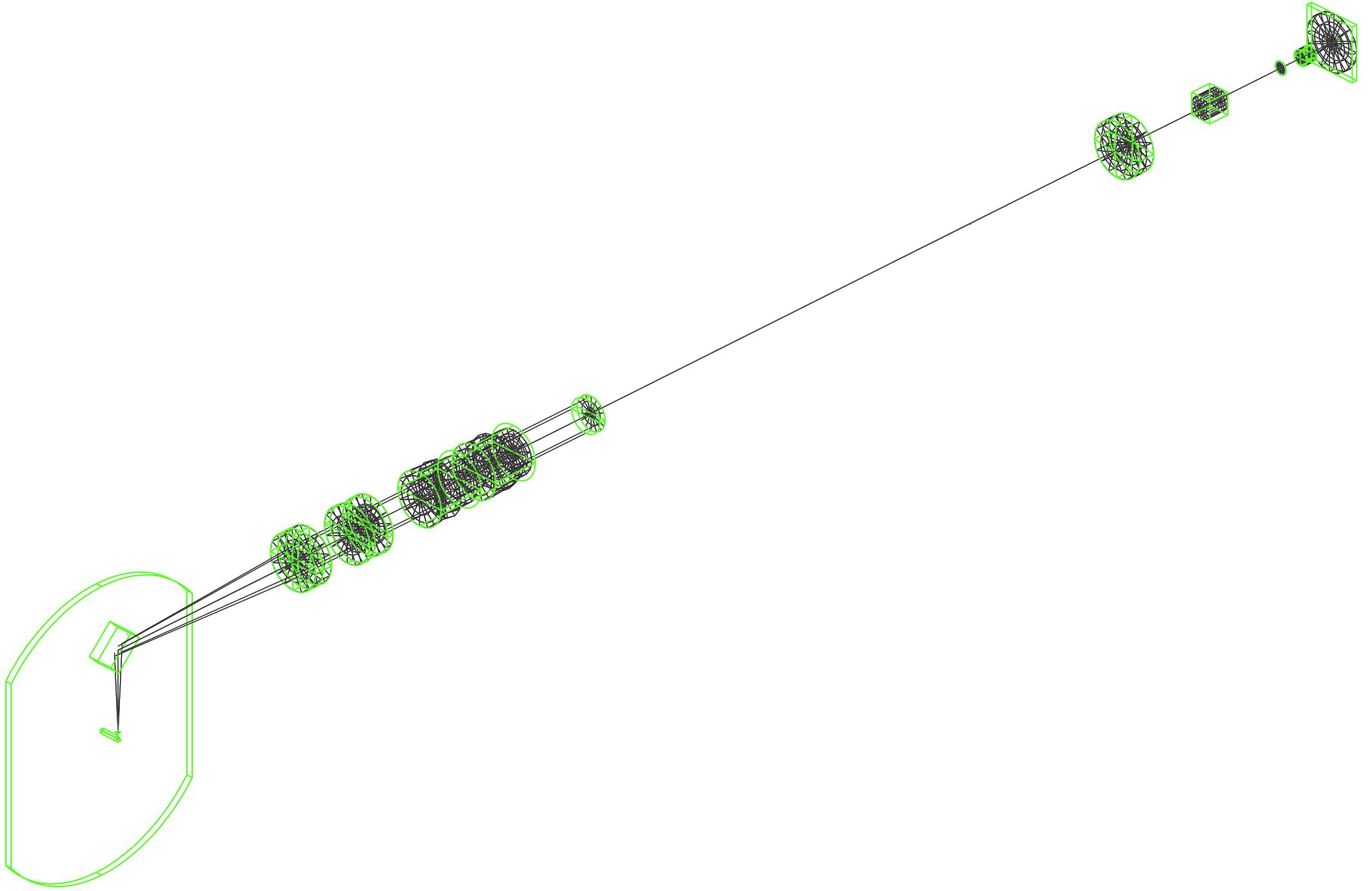


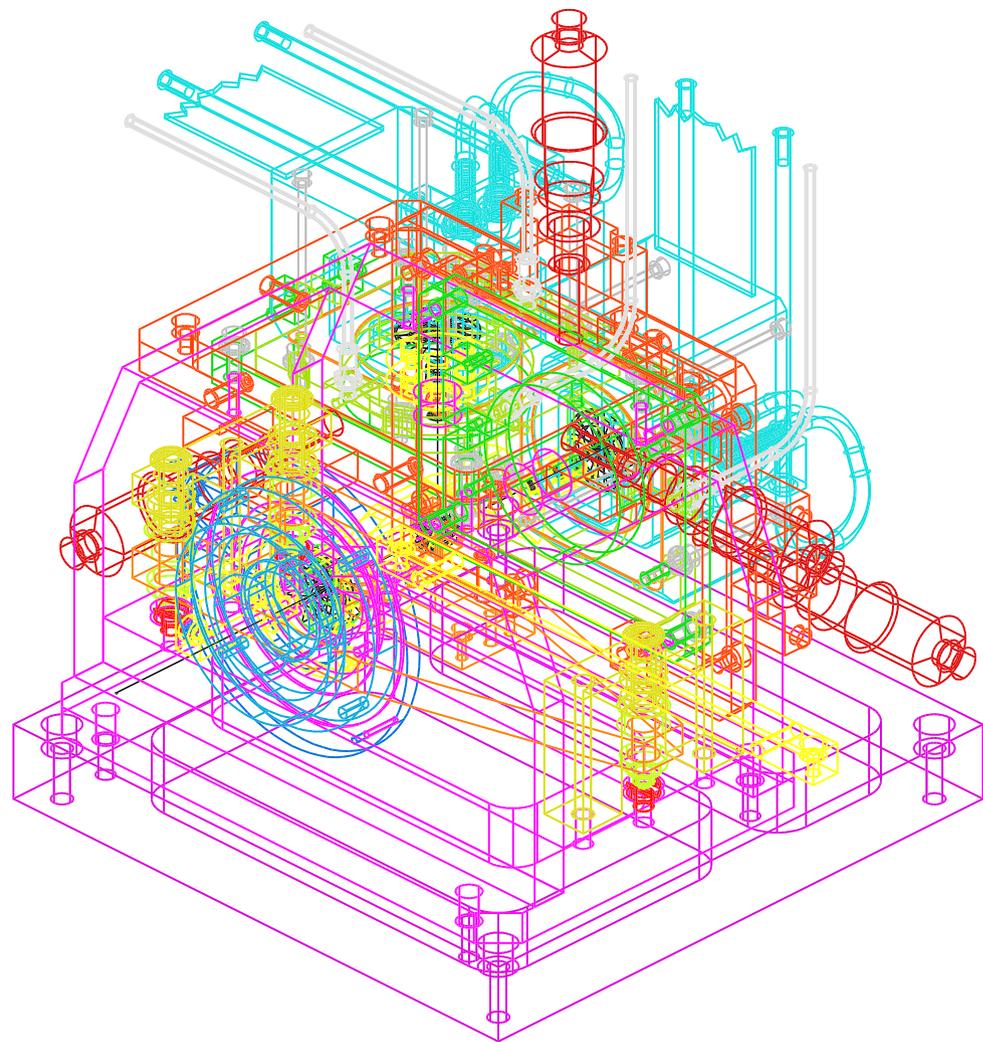


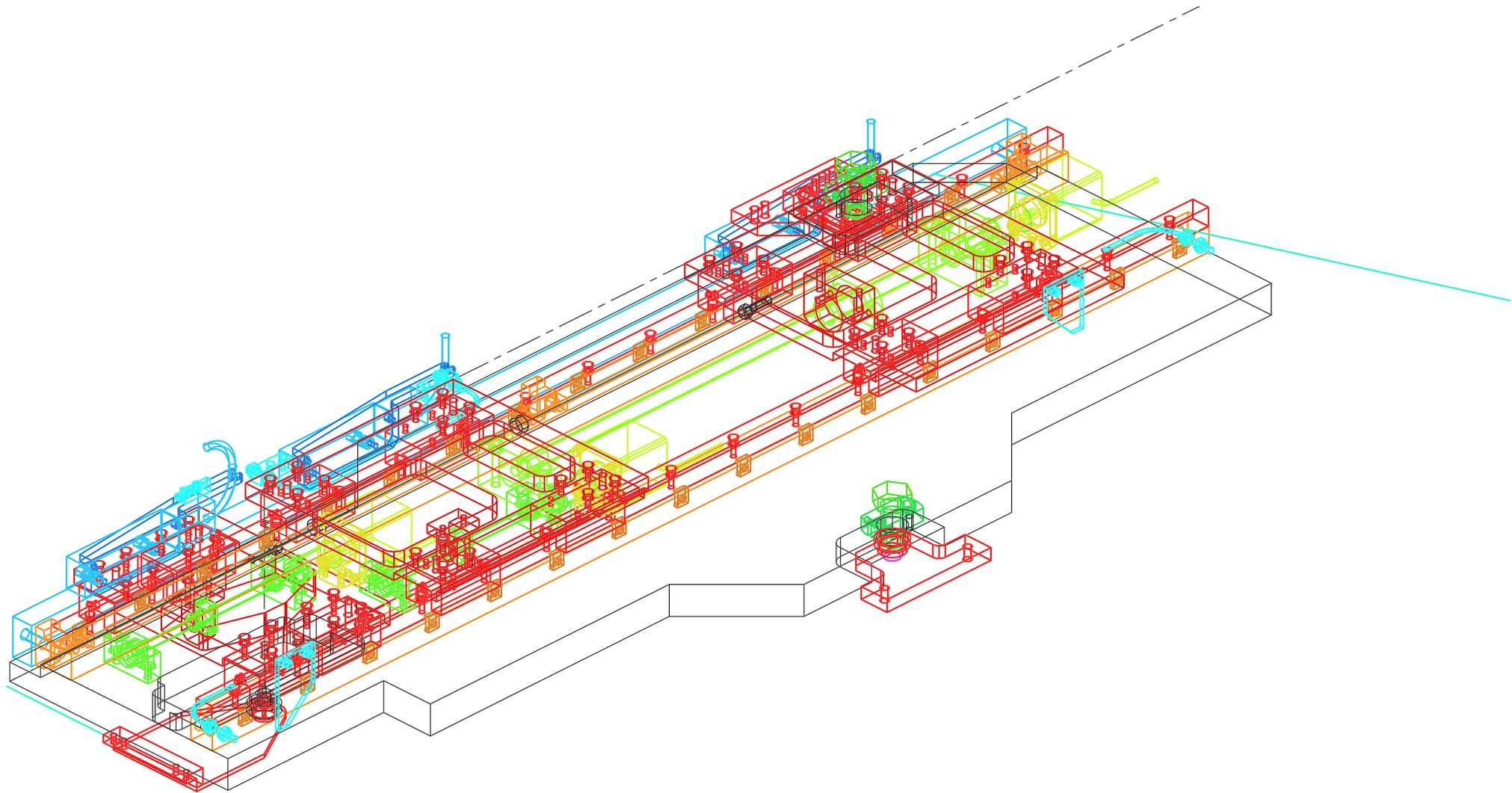


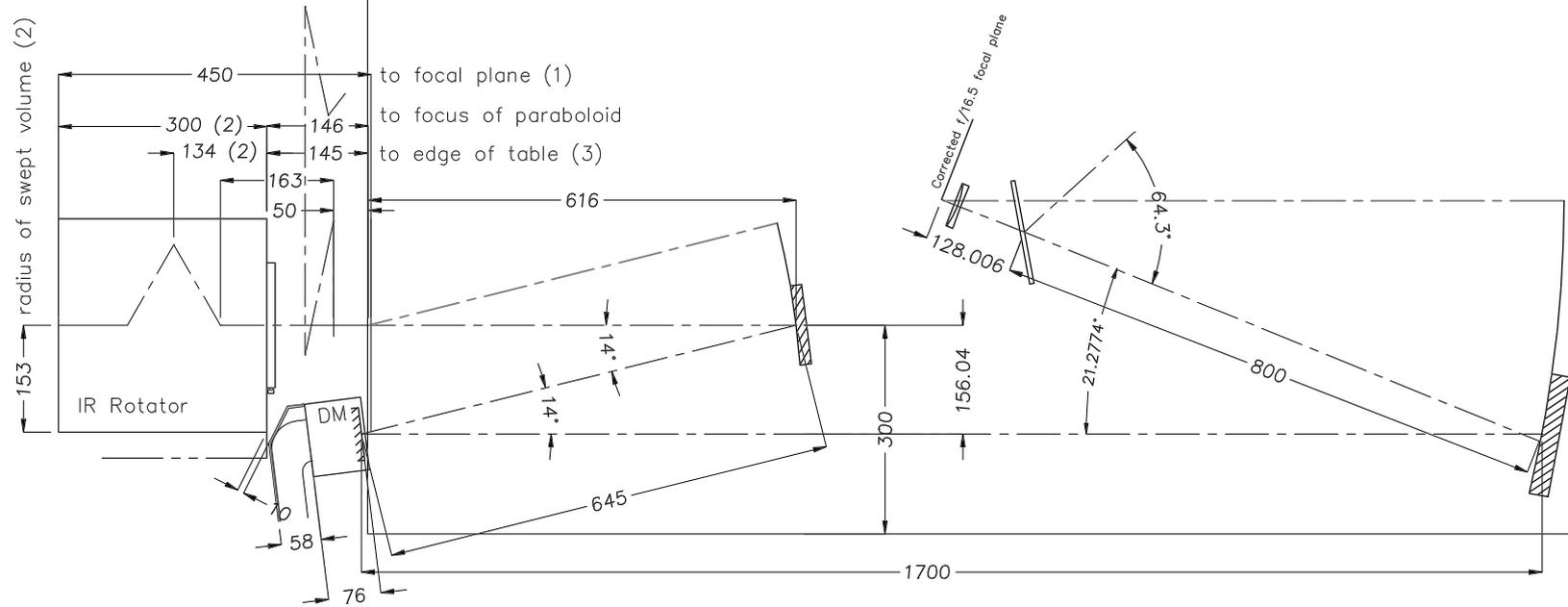


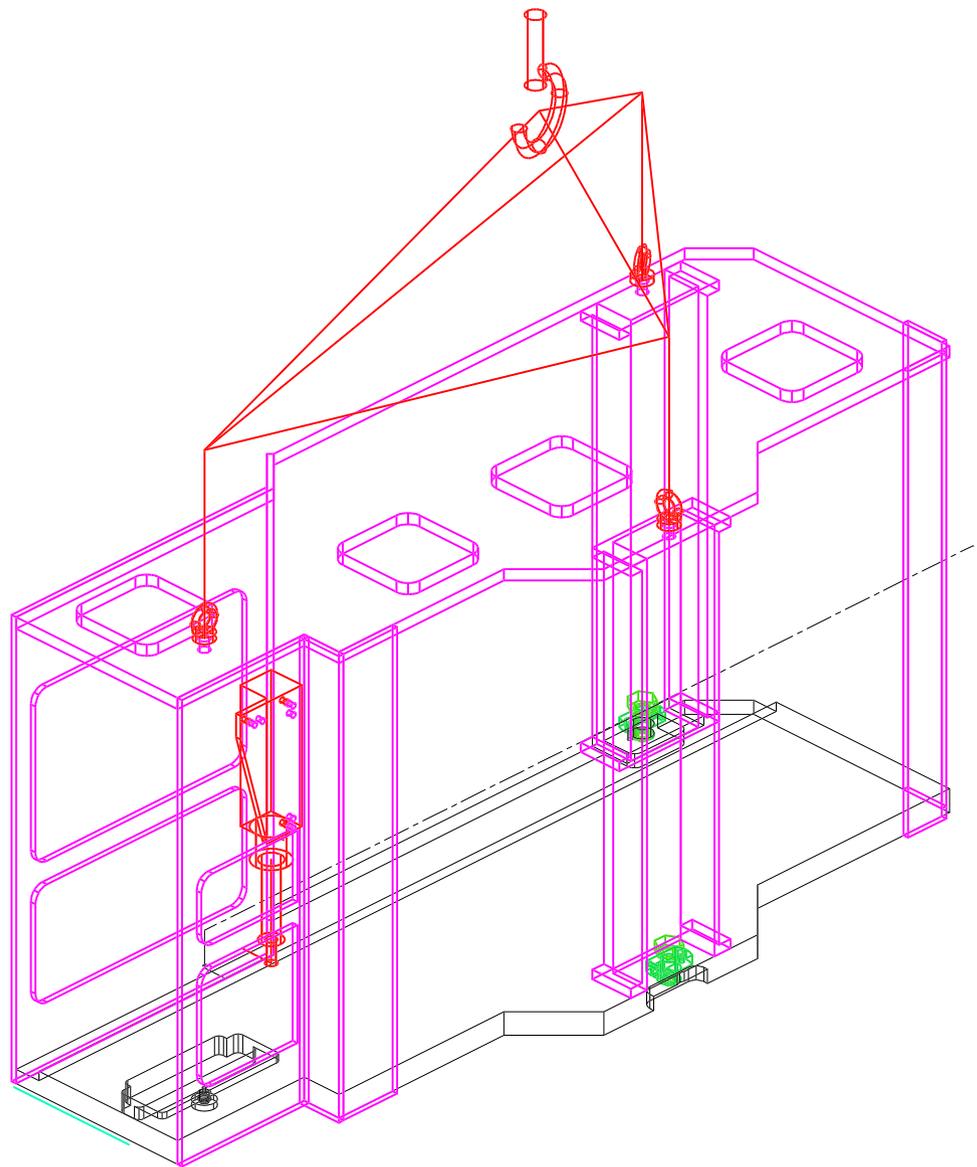


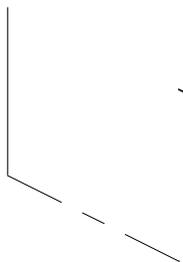
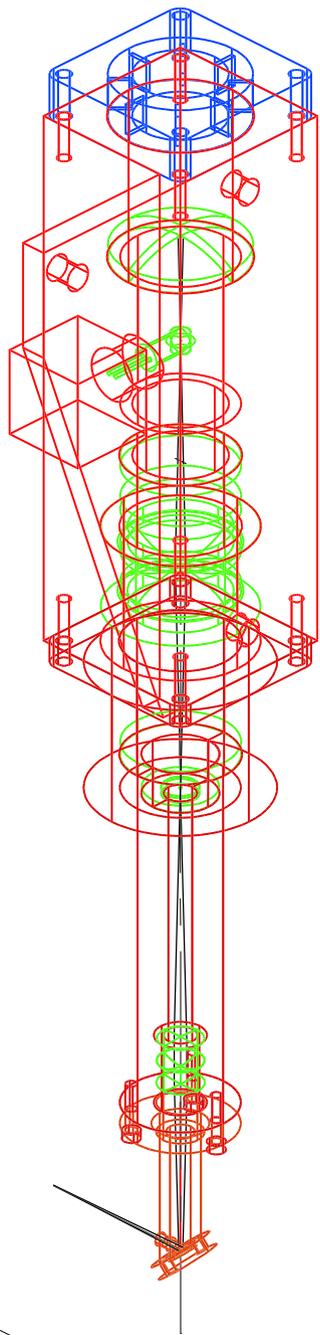


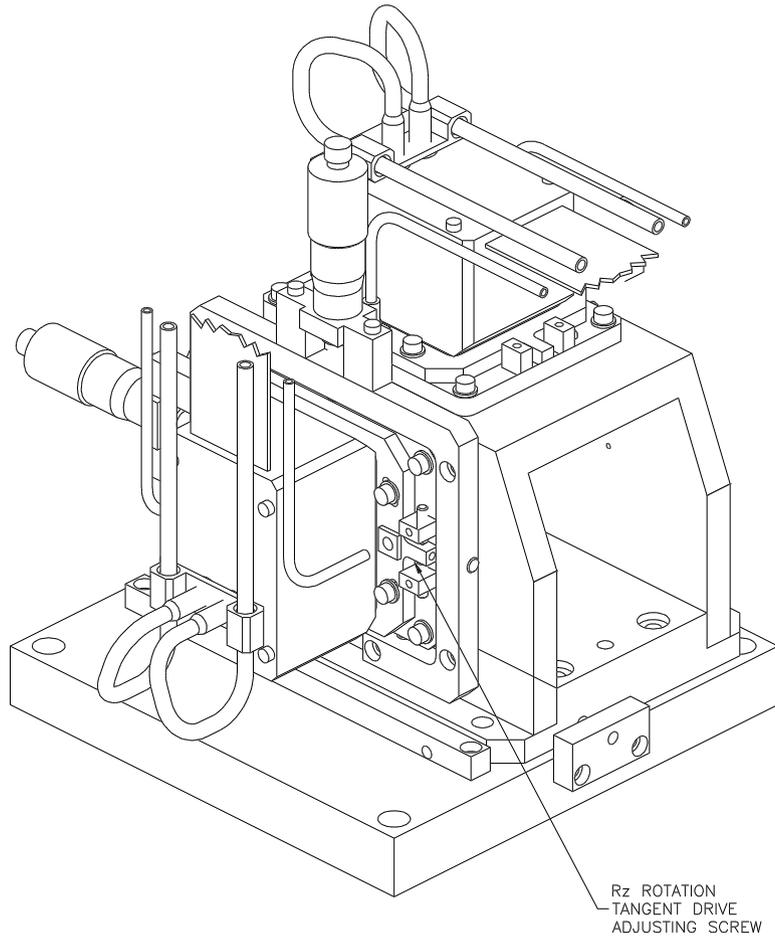
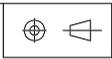






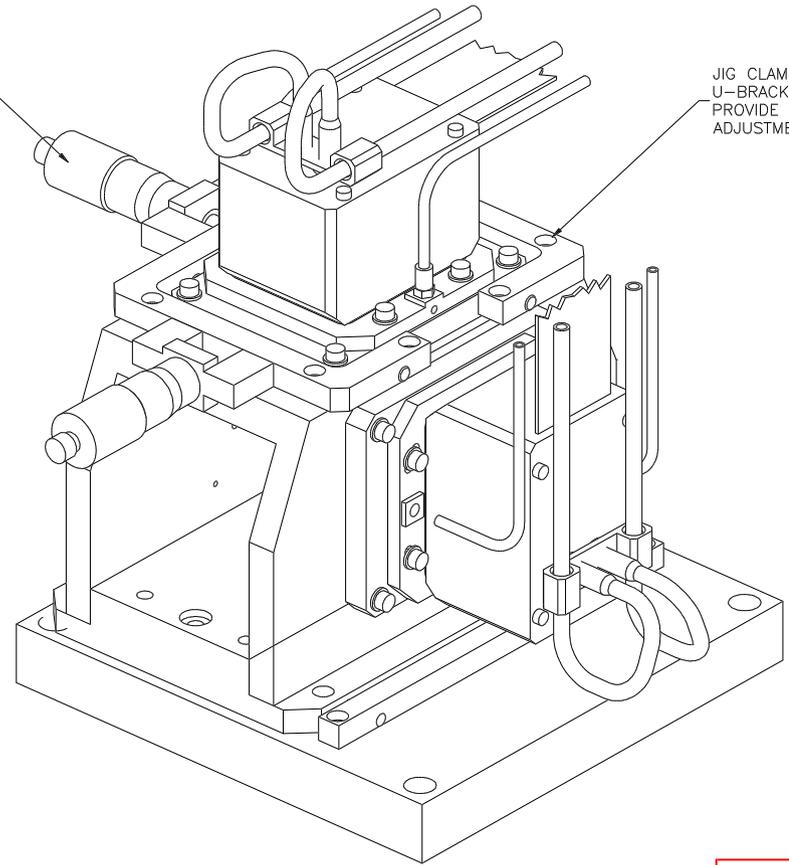






CENTRING JIG ON CCD NO.1

DIFFERENTIAL MICROMETER

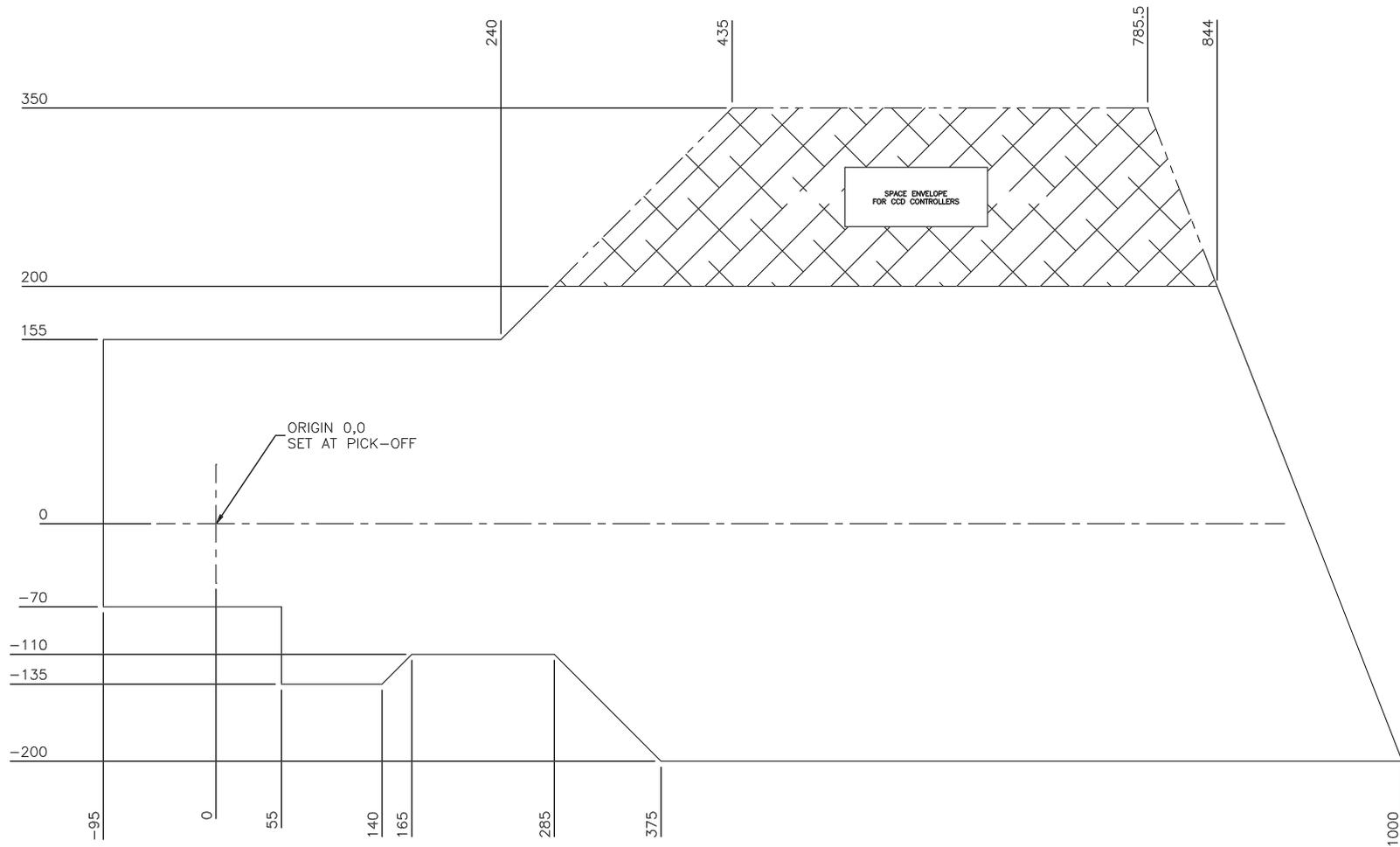
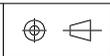


CENTRING JIG ON CCD NO.2

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REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE
1	ORIGINAL DESIGN	AJW			ST	09/12/97
ISSUE DESCRIPTION						

UNLESS OTHERWISE STATED		MATERIAL		 ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM			
DIMENSIONS ARE IN mm GENERAL TOLERANCE: ± ANGULAR TOLERANCE: ± SURFACE FINISH: (MICRONS) ✓ REMOVE ALL SHARP EDGES		FINISH		TITLE			
				WHT NAOMI WFS CCD ALIGNMENT JIG PREPARED FOR CDR			
		USED ON		ORIGINAL SHEET	LOCATION	DWG. No.	REV
				A1	BN	BN053	1
DO NOT SCALE THIS DRAWING				ORIGINAL SCALE	NTS	SHEET 1 OF 1	

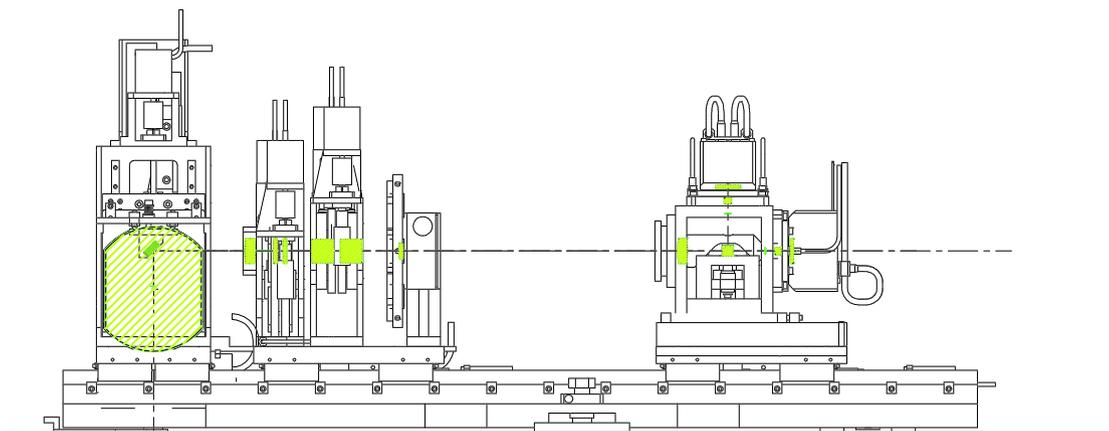
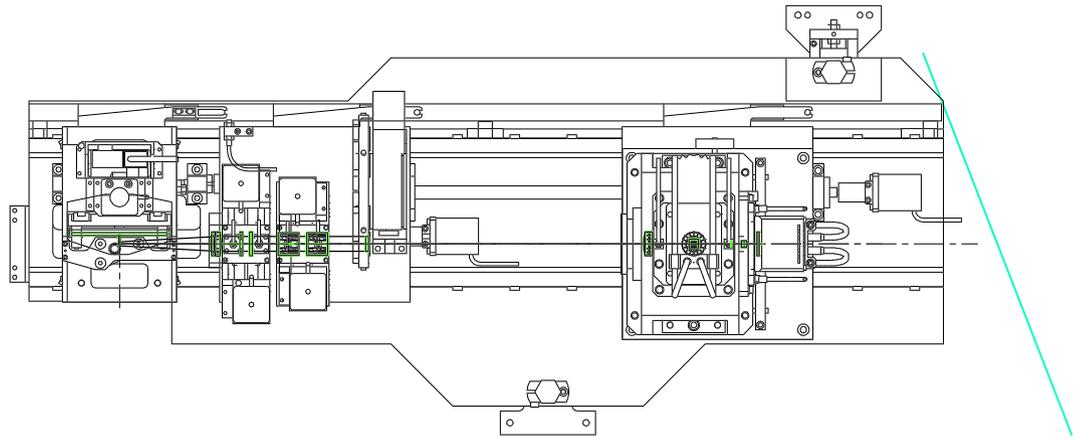


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REV	DESCRIPTION	DRAWN BY	CHECKED	APPROVED	STATUS	DATE
1	ORIGINAL DESIGN	AJW			ST	15/12/97
ISSUE DESCRIPTION						

UNLESS OTHERWISE STATED
 DIMENSIONS ARE IN mm
 GENERAL TOLERANCE: ±
 ANGULAR TOLERANCE: ±
 SURFACE FINISH: (MICRONS) ✓
 REMOVE ALL SHARP EDGES
 DO NOT SCALE THIS DRAWING

MATERIAL	ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM					
FINISH	TITLE WHT NAOMI WFS SPACE ENVELOPE TO BE READ AS PART OF ICD					
USED ON	ORIGINAL SHEET A1	LOCATION BN	DWG. No. BN060			REV 1
	ORIGINAL SCALE	1:2				SHEET 1 OF 1



FRONT VIEW

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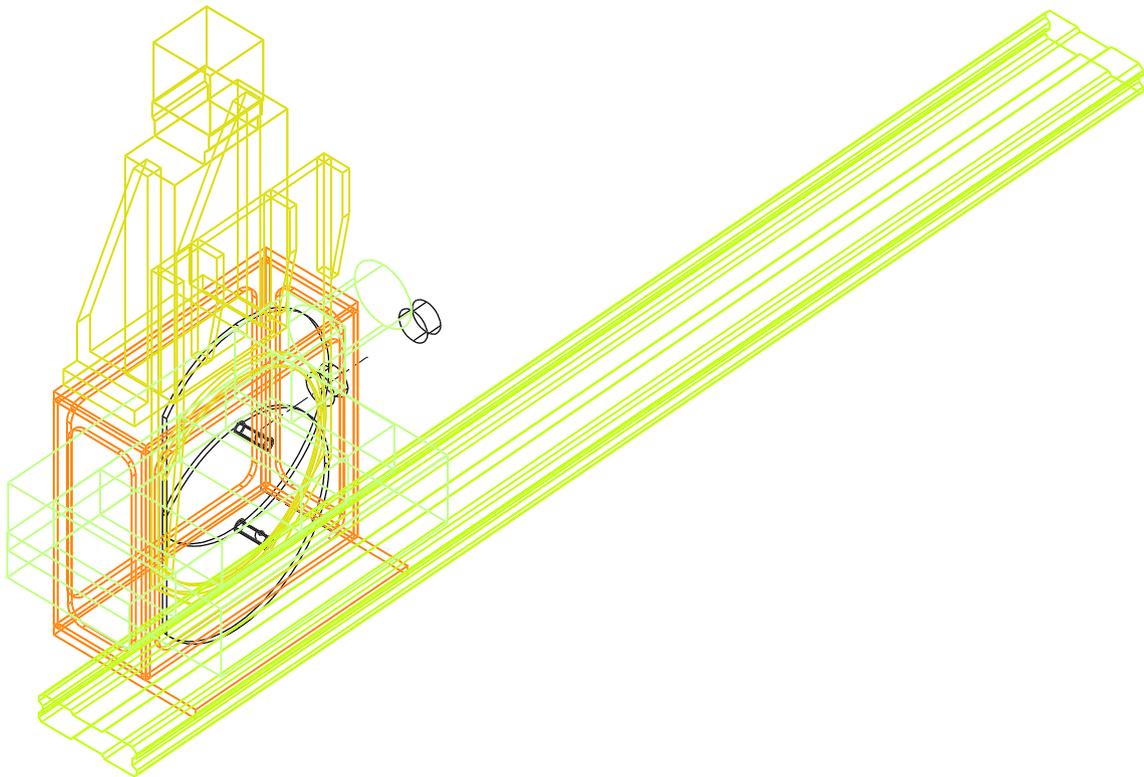
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	ISSUE DESCRIPTION					

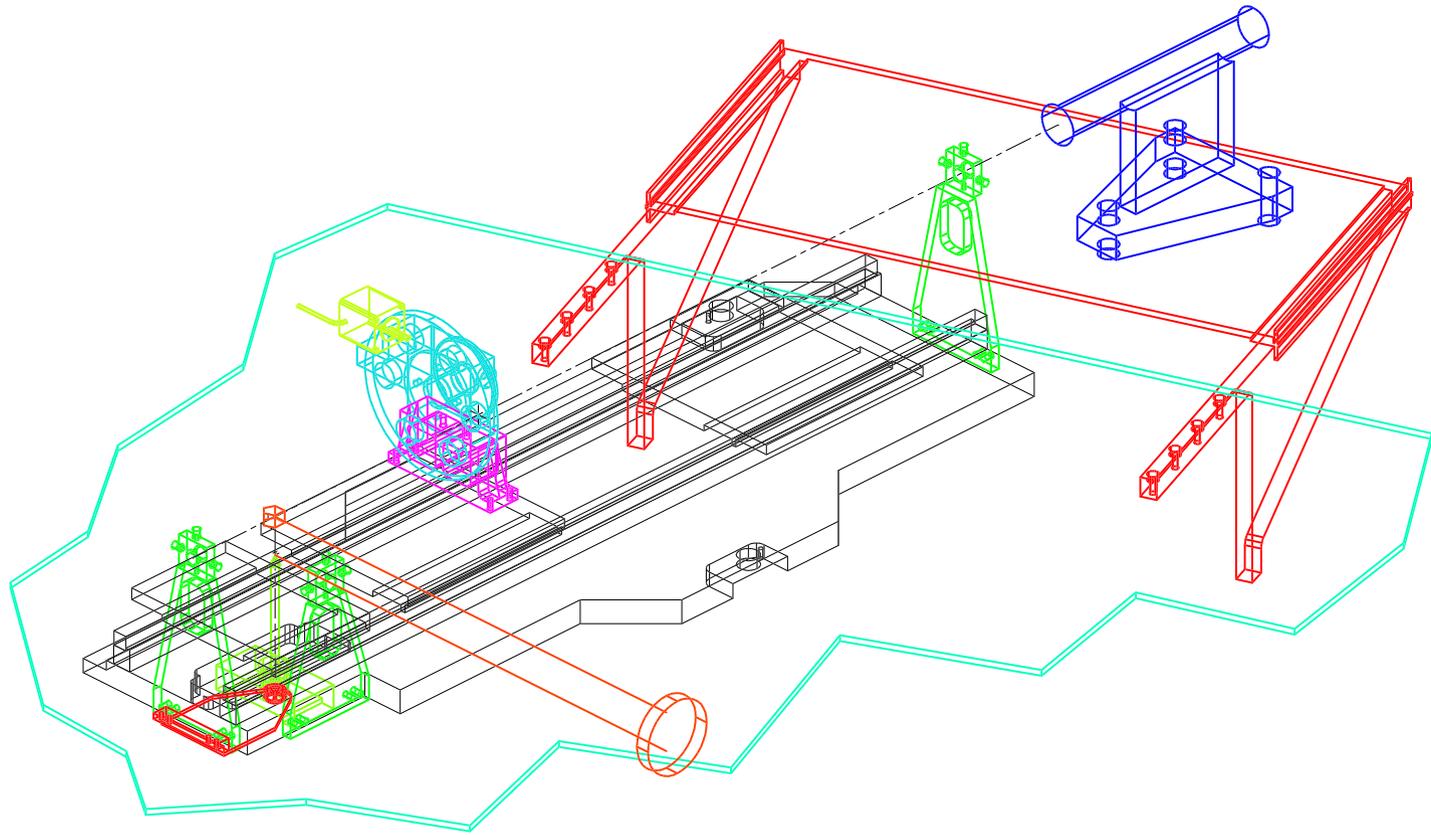
UNLESS OTHERWISE STATED
 DIMENSIONS ARE IN mm
 GENERAL TOLERANCE: ±
 ANGULAR TOLERANCE: ±
 SURFACE FINISH: (MICRONS) ✓
 REMOVE ALL SHARP EDGES
 DO NOT SCALE THIS DRAWING

MATERIAL
 FINISH
 USED ON

 ROYAL GREENWICH OBSERVATORY MADINGLEY ROAD, CAMBRIDGE CB3 0EZ, UNITED KINGDOM			
TITLE WHT NAOMI WFS ASSEMBLY			
ORIGINAL SHEET AO	LOCATION BN	DWG. No. BN050	REV 1
ORIGINAL SCALE 1:2	SHEET 1 OF 1		







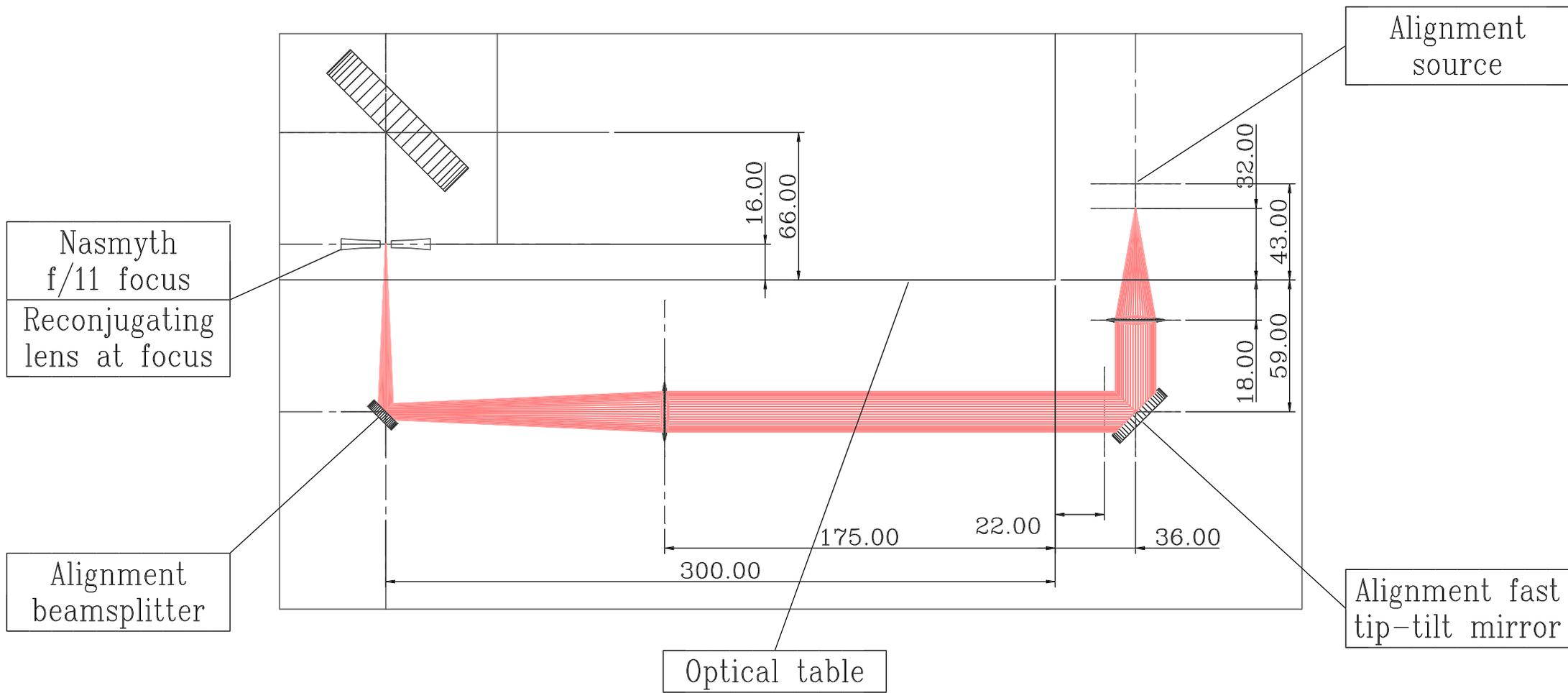


Figure 5.1.6

