SPIRE Telescope Simulator: Hardware Equipment & Development List

Updated: **25/04/2002**
Compiled by: Marc Ferlet

Subsystems	Item name and ID or ref.	Quantity	Source or Manufacturer	CAD drawing available?	Status	Remarks
Optical benches and Baseplate	Optical table StableTop 250, 990307OPT267	1	Melles Griot	Y (from Melles Griot)	**In cryolab**	Main Tel.Sim. optical bench
	Leg/passive isolator Pump&Go, 990307OTI0144	4	Melles Griot	Y (from Melles Griot)	**In cryolab**	
	Optical breadboard PerformancePlus, 990307OBI0169	1	Melles Griot	Y (from Melles Griot)	**In cryolab**	Additional lateral optical bench
	Rigid frame, 99037OTL0106	1	Melles Griot	Y (from Melles Griot)	**In cryolab**	
	Optical ultralight breadboard 07OBG524	1	Melles Griot	Y (from Melles Griot)	**In cryolab**	Support Tel.Sim. central
Imaging component	Pupil mask M1 + mount	1	TBD	TBD	TBD (no priority)	Entrance pupil (transmissive mask) -> gives the F-number, not needed for STM
	Mirror M2	1	QMCI - Thomas Keating Ltd	Y (RAL/SSTD Design Office)	**In cryolab**	Mirror def. see SPIRE-RAL-NOT-000621v4
	Height-adjustable bracket for M2	1	RAL/SSTD Workshop	Y (RAL/SSTD Design Office)	**In cryolab**	Mirror mount for M2
Beam-steering system	Motion controller MM4006	1	Newport Ltd	NA but documentation	**In control room**	Instrumentation (electronic + opto-mech.) for beam scans + focus control
	Driver boards OPT7D	4	Newport Ltd	NA	**In control room**	
	Driver board OPT7J	1	Newport Ltd	NA	**In control room**	
	Translation stage M-ILS100CC	1	Newport Ltd	Y (from Newport)	**In cryolab**	
	Actuators 850G	4	Newport Ltd	Y (from Newport)	**In cryolab**	
	Multi-axis tilt plateform M37	2	Newport Ltd	Y (from Newport)	**In cryolab**	
	Fold mirrors F1, F2, F3	3	see next page	NA, spec. next page	**In cryolab**	
	Mirror mounts	3	2 from ISO-LWS project + 1TBD	Y basic	**In cryolab**	2 in cryolab + 1designed
Verification path	HeNe laser + support	1	Optics Group (TBC)	N	**In cryolab**	Instrumentation for verification path (scanning only, no focusing)
	Beamsplitter + support	1	From ISO-LWS project (TBC)	N	TBC	
	Screen (?) + CCD Video camera	1	Optics Group (from G56 microscope)	NA but documentation	**In cryolab**	
	Pinnacle DC30 Video capture card + BNC adaptator	1	Optics Group (?)	NA	**In cryolab**	
Tel Sim. alignment	HeNe laser + support	1	Optics Group	N	**In cryolab**	Temporary+permanent, for Tel. Sim. internal alignment
	Pinhole (type iris diaphragm) + support	2	Optics group + ISO-LWS project	N	**In cryolab**	Temporary+permanent, for Tel. Sim. internal alignment
	Pentaprism + support table	1	Optics group + GERB project	N	**In cryolab**	Temporary, for Tel. Sim. internal alignment
	Long bar for reference location+ thin PE support	1	Melles Griot, see next pages	Y (from Melles Griot)	**In cryolab**	Definitive, for Tel. Sim. internal alignment
	Micro-Alignment Telescope Taylor-Hobson 112/537-2243	1	Optics group	N but documentation	**In cryolab**	To be re-calibrated (~10 days away)
	Large flat mirrors	2	TBD, recycling a few from ISO-LWS	NA	**In cryolab**	Temporary, for Tel. Sim. internal alignment & Tel.Sim./SPIRE alignment
	Radius slide + electronics	1	Optics Group	N	**In cryolab**	Temporary, for Tel. Sim. internal alignment
Others	PC with LabView & IDL+ cards/drivers	1	Optics Group ?	NA	**In control room**	For overall acquisition/control
	Interface plates	TBD	RAL/SSTD Workshop or Optics Group	Y, Basic	**In cryolab**	See details next sheet

SPIRE Telescope Simulator: specification of required components

~~Long Bar~~

See next Spreadsheet

~~**Length**~~	~~~1500~~	~~(tolerance: 10)~~
~~**Cs side length**~~	~~25-50~~	~~(tolerance: 5)~~
~~**Material**~~	~~TBD~~	
~~**Source**~~	~~TBD, RAL (recycling old parts)~~	

NB: Need extra pad of PE to allow displacement without metal/metal friction

OK delivered & in cryolab

Fold mirrors

	Length	Height (min.)	Thickness
F1	348 (350)	246 (250)	<10
F2	310 (310)	220 (220)	<10
F3	280 (280)	198 (200)	<10
	(tol. : ~2)	(tol. : ~2)	(tol. : <2)

Material	Cheap crown glass + basic Al protected	R>85% at visible and R>95% at FIR
Planarity	<3-5lambda over 25mm	(at 633 nm)
Quality	80-50 or better (i.e. 60-40)	
Source	TBD (Newport and Linos Photonics refused / Replies from Edmund Optics and Melles Griot / Waiting for Optical Surfaces Ltd)	

NB: Thinner mirror reduces weigth but more difficult to achieve planarity

	EO items ref. and dim.	**Qty**	**Remarks**
Ordered 5 trial mirrors from Edmund Optics (cheap, lightweigth but ~5lambda TBC)	40067 (mirror 254x204x6)	x1	for F3 (TBC) and alignment/system prototyping trials, arrived 02/04/2002
Ordered 28/03/2002	85036 (mirror 254x356x6)	x1	for F1, arrived 02/04/2002
	32248 (mirror 254x313x6)	x3	for F2 and F3 (TBC) and alignment/system prototyping trials, arrived, 25/04/02

Interface plates

Translation stage/F1+F2 table ~~Pre-design underway -> to be given to Mech./Draw. Office for design/analysis~~

Attempt to design it directly — main constraints: compactness, weight, thickness, stiffness, unconstrained translation…

Schematic drawing (from file: TelSim_Baseplate_F1F2Stage_v1.doc) given to Ian Vokins for manufacture -> 08/03/2002

OK delivered & in cryolab (estimated weight of the manufactured baseplate: ~2.6kg)

~~**Basplate/M2+F3**~~

See next Spreadsheet

OK (delivered, built, in cryolab)

Support to compensate for translation stage thickness			
Dimensions (Lxlxh)	~300	~300	~50-60
Extra features	Holes (to fit M6 in baseplate) + adapt to F3 and M2 brackets		

~~**MAT/Radius-slide**~~

Attempt without an interface plate

TBD, under investigation to maintain MAT LOS at constant height (ultimately defined by cryostat: ~850 above floor)

Mirror mount for one of the fold mirror L-bracket on the model of the others existing (reduced width to reduce weight), standard Al alloy

Schematic drawing (from file: TelSim_Lbracket_F1_v1.doc) given to Ian Vokins for manufacture -> 25/03/2002

OK delivered & in cryolab (measured weight of the manufactured L-bracket: 1.32kg)

SPIRE Telescope Simulator: opto-mechanical components needed for M2 Alignment Procedure

List of items in complement of previously listed/already existing components (i.e. M2, benches, MAT, pentaprism, laser, ...)
See ref.: SPIRE-RAL-NOT-000734 v1

Items (with Melles Griot & Newport Ltd ref.)	Qantity	Status	Function and remarks
M-BC-3 universal table clamps	4	ok	Accessories to clamp/fix compo
Metric Accessory Kit 07AKT501	1	ok	Accessories to clamp/fix compo
Optical Rail 50mm (2m long) 07ORN011	1	ok	Stands as the bar for alignment+support multiple pinholes/laser
Optical Rail carriers 07OCN503	3	ok	Support interface rail/pinholes and laser
Solid Al Optical Mounting Plate 07BLP502	1	ok	Support plate for M2+F3
Pillars 07PSP514	4	ok	Increase height of M2+F3 to compensate for translation stage height under F1+F2
Clamping forks 07PSF501	4	ok	Maintain pillars on main Tel. Sim. baseplate
SB-TPS-M base clamp for pillart post	1	ok	Maintain pentaprism pillar on main Tel. Sim. baseplate
TPS2-M pillar post system	2	ok	Support pentaprism table
TA-M4M6 thread adaptator	2	ok	For assembly of the (pentaprism & multi-purpose) pillar post system
Pillar mounting plateform 07PSM501	1	ok	Interface pentaprism table/supporting pillar + can be used between the rail carrier and
M-ID-1.0 iris diaphragm	1	ok	Second pinhole for flatness+ intermediate ref. check and image of the main one
M-SP4 standard post	1	ok	Post to support directly iris diaphragm
M-VPH-4 standard post holder	1	ok	Allows basic height adjustement for pinhole

NB: The 4 pillars below M2+F3 should be able to stand the ~2 bar (each) vertical pressure from the load

Basic CAD drawing from Newport Ltd and Melles GRIOT catalogues available for all components
Components ordered: 18/02/2002 -> Delivery date: 08/03/2002 max expected (in green above, the compo. delivered)
Total cost ~1k£ **OK, all items delivered and checked on 11/03/2002**

SPIRE Telescope Simulator: opto-mechanical components needed for F1+F2 positioning

List of items in complement of previously listed/already existing components (i.e. Translation stage, F2 mount, ...)

Items (with Melles Griot & Newport Ltd ref.)	Qantity	Status	Function and remarks
Interface plate 600x200x8 (source: RAL)	1	ok	Support F1+F2 (drawing in file:TelSim_Baseplate_F1F2stage_v1.doc)
Optical Rail carrier 07OCN503	1	ok	Support interface rail/pinholes and laser
Sliding base (Optical rail 50mm L=0.25m 07ORN001)	1	ok	Dovetail rail as (lateral) supporting sliding base ~~May come from item in M2 alignment spreadsheet (re-cut of 2m long rail)~~
Pillars (25mm, M6-M4) TPS1-M	4	ok	Support interface plate (~below F1)
Thread adaptator TA-M4M6	4	ok	For pillars (adaping them to rail carrier)
Mirror mount for F1 (source: RAL)	1	ok	L-bracket for F1 (drawing in file:TelSim_Lbracket_F1_v1.doc)
Extra equipement (small items):			
TA-M4M6 thread adaptator	2	ok	For assembly of the (pentaprism & multi-purpose) pillar post system
TPS2-M pillar post system	1	ok	Extra support for for mounting with heigth flexibility
M-ID-1.0 iris diaphragm	2	ok	Extra pinhole (images of the main ref. one)
M-SP4 standard post	2	ok	Post to support directly iris diaphragm
M-VPH-4 standard post holder	2	ok	Allows basic height adjustement for pinhole
Extra equipment (F1 adjustment, TBC):			
Tilt/Rotation plateform M36 or M37 for F1	1		1or 2-axis plateform for adjustement of F1 (TBC, not included in first prototype)

NB: *Basic CAD drawing from Newport Ltd and Melles GRIOT catalogues available for all components*
Components ordered: 06/03/2002 -> Delivery date: 08/04/2002 max expected (in green above, the compo. delivered)
Total cost ~350£ excluding compo. designed at RAL and extra equipement related to F1
OK, all items delivered and checked

SPIRE Telescope Simulator: opto-mechanical components needed for FIR beam injection

List of items in complement of previously or elsewhere listed/already existing components (i.e. Patrick Collins's experiments, ...)

Items (with Melles Griot & Newport Ltd ref.)	Qantity	£	Function and remarks
02MFG009 Protected Al Mirrors /011 L=100 mm	2	**ok**	Flat square mirrors (lambda/4) for beam-guiding between FIR and Tel.Sim. benches
07DUP513 Stable Rod L=624 mm with base.	1	**ok**	Long stable post to maintain both flat mirrors
07DST001 Stable Rod Platform.	2	**1, ok**	Interface between post and mirror mounts
07DPC001 Stable Rod Collar.	3	**ok**	Reference for vertical movement of plateforms along post
Angle bracket 45deg 360-45	3	**ok**	Angle brackets at 45deg as support to mirrors (english models only)
Rod M-40	1	**ok**	Standard large pillar to mount extra mirror before Tel.Sim.
07DSQ003 StableRod carriers	2	**ok**	Interface between post (recycled from RAL) and bracket for extra mirror before Tel.Sim.
Extra equipement (small items):			
Accessory kit (metric model) M-SK-6A	1	**ok**	Assortment in metric size, general purpose
Accessory kit (english model) SK25A	1	**ok**	Assortment in english size, for bracket mounting/fixing (to adapt to Angle bracket 45deg 360-45 above)

NB: *Basic CAD drawing from Newport Ltd and Melles GRIOT catalogues available for all components*
Components ordered: 06/03/2002 -> Delivery date: 08/04/2002 max expected (except for the flat mirrors=>~mid April)
Total cost ~1.5k£ Problem with order or delivery: only 1 Stable Rod Plateform arrived => only one is going to be used in the prototype system
OK, all items delivered and checked on 11/04/2002