instrument	item	frequency	SA/IA	InstDiv tech	daycrew	S13A	S13B	S14A	S14B	note
SpCam	filter exchange	every observing run	1d			3	4	4	2	
	vacuum pumping				1h					
	cooling		1h							
	scheduling etc.		0.5d							
	install to POpt				3x0.5d					
	instrument exchange (TUE, POpt)		0.5d		3x1d	3	4	4	2	
	filter changer maintenance	every year	7d	7d	2dx3					
FOCAS	vacuum pumping/cooling	every observing run	0.5d			5	2	3	3	
	filter/grism exchange, alignment		1d							
	scheduling etc.		0.5d							
	mask cutting			0.5d						
	instrument exchange (CUE)			1d	3x1d	5	2	3	2	
	instrument exchange (TUE, CsOpt)				3x1d	2.16=0.25*2		3	3	2	
	mask exchanger maintenance	every 4-5 years	5d	5d						
HDS	cooling	every observing run	1h		1h	5	3	5	5	
	focusing/linearity check		1d							
	instrument exchange (TUE, NsOpt)				3x1d	5	33.33=0.33(I	3.41=0.25+0.33*2+0.5(IR)+2(NsO		
	cold-head/adsorber hot-swap	every ~4 years	2d	2x1d						
IRCS+AO188	focusing/mapping	every NsIR exchange	0.5d			2 (5)	4 (8)	5 (14)	4 (9)	change to IRCS (total)
	NsIR exchange		2h	3x0.5d						
	LLT install		1h		3x0.25d	3	4	6	5	
	instrument exchange (TUE, IR)		1h		3x1d	1.16=0.25*2	2.66=0.5*2	3.16=0.5*3	1.41=0.25+0.33*2+0.5	
	hot-swap	every ~1.5 years								
	warm-up		5x1h	2x1d						
	disassemble IRCS		1d	3x1d						
	hot-swap		1d	3x1d						
	reassemble IRCS		1d	3x1d						
	cool-down		1d+8x1h	2x2d						
	check detector		1d							
COMICS	instrument exchange (CUE)	every observing run	1h	1d	3x1d	4	3	1	5	
	instrument exchange (TUE, IR)				3x1d	2.5=0.25*2+	2.16=0.33*	0.83=0.33+	1.91=0.25+0.33*2+0.5*2	
	hot-swap	every ~1.5 years								
	warm-up		1h							
	hot-swap			3x1d						
	cool-down		3d+5x1h	3d						
MOIRCS	mask cutting	every observing run		1d		5	3	6	6	
	scheduling etc.		0.5d							

	mask install		0.5d	2x0.5d					
	instrument exchange (CUE)		0.5d	1d	3x1d	4	4	2	5
	instrument exchange (TUE, IR)				3x1d	1.16=0.25*2	1.16=0.33*	2.66=0.33*	2.25=0.25*1+0.33*3+0.5*2
	main dewar hot-swap	every 1.5 years							
	scheduling etc.		1d						
	warm-up		1h						
	hot-swap			2x1d					
	prepare for cooling			2x1d					
	cooling		1d	1.5x4d					
	monitoring			12d					
	shutdown cooling		0.5d	2x1d					
	carousel hot-swap	every 1.5 years	0.5d	2x1d					
FMOS	mode change/check	every observing run	1d			2	4	5	2
	instrument exchange (TUE, PIR)		0.5d		3x1d	2	4	5	2
	cold-head hot-swap IRS1	every 1.5 years	1d+1d	2x1d					
	cold-head complete exchange IRS2	every 1.5 years	1d+1d	2x1d					

risk for unexpected troubles

#1 (high)	FMOS
#2	SpCam, MOIRCS
#3	IRCS, AO188
#4 (low)	HDS, FOCAS, COMICS