A quick guide to HIDES-F on the 188-cm at Okayama Astronomical Observatory - 2-nd edition -

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Edition History:

October 2010: generation of basic document (Beck, Kambe)

July 2014: modified for the new telescope system and improved control softwares (Kambe) minor update in January, 2015 (Kambe)

Preface

This manual is written for those who have learned how to use the HIDES-F at least once but want to remind it very quickly. New beginners should read the HIDES-F's operation manual, its home pages, and related manuals (mostly in Japanese) carefully before observations.

1 Computer Facilities and How to Prepare

1.1 Servers and their assigned functions

- **bizen** (via remote desktop) telescope control PC, everything related to telescope and dome (pointing, dome control, focus, mirror cover, ...). Located in the telescope control room.
- **coude** (via ssh) controller of HIDES-F and quick-look. Located in the instrument assembly room (Kumitate-Chosei Shitsu).
- hides5 (via ssh) controller for Messia V CCD detectors. Located in the coudé outer room.
- fbrag (via ssh) CCD control for autoguider. Mounted on the Cassegrain unit.

1.2 Available terminal computers and their possible usages

In an observing room, we typically have three terminal computers and six monitors for the telescope and HIDES-F operations. Roles for them may be

- PC1-M1 telescope and dome control (remote desktop of bizen)
- PC1-M2 guide telescope's view mounted on the 188-cm (wfv-n) monitor telescope and dome through webcams (from 'oaocam1 ' to 'oaocam5'; click on the webcam-output to repoint the cameras)
- PC2-M1 instrument control and set-up, data-aquisition (via ssh to coude/hides5)
- PC2-M2 focusing and auto-guiding (via ssh to fbrag)
- **PC3-M1** for quick-look (via ssh to coude, iraf and ds9 is used)
- PC3-M2 display OAO skymonitor images display other weather infos

1.3 Setting up GUIs

Nota Bene¹: Items marked with \circ are only necessary if terminal windows are closed. If they are kept open at the end of the night, only the action items, marked with \bullet have to be executed. Commands which have to be typed into the terminals are indicated as > command syntax and have to be confirmed with enter.

¹Throughout the document, well meant advices are marked as 'Nota Bene' (i.e. \sim keep in mind).

🛿 🖨 💷 Msa5Server (hides5.oao.nao.ac.jp)
i2c_addr = 0xa0, dev_addr = 0x21, w_data = 0x01 = 1
MSA)fiforeo w 0 1 0v18000 0v00005
i2c_addr = 0xa0, fpqa_id = 0x10, empty_offset = 0x18000, full_offset = 0x05
MSA>cpont_w 0 1 3
MSA>cpout_w 0 1 1 1 0
MSA>lcp 0 1
cpg.pattern 5.31 kword loaded. (32 kword assigned for CPMEM.)
spv.pattern 10 operations, 45 commands loaded, (1024 queue assigned.)
MSRXMSH MCONVERSE OF O
 MSN511 0 2 2
MSQ)lden 0.2
MSA)fiforeo w 0 2 0x10000 0x10000
i2c addr = 0xa4, fpga_id = 0x11, empty_offset = 0x10000, full_offset = 0x10000
MSA>sysreg_w 0 2 1 1 0x01
MSA>spv_com 0 1 wipe
MSA>check_busy 0 1 2
MSA>mf2_com /dev/ttyS0 0x1 pon_w 0xf7
MSAX

(a) contorl server status log window

800	MessiaServer (hides5.oao.nao.ac.jp)
My name i	is hides5.oao.nao.ac.jp: MessiaServer
MessiaSer	erver OK: 11777

(b) communication server window

Figure 1: Messia V CCD windows

... before setting up GUIs for HIDES-F

'Nota Bene': If night is close, preparation of dome and telescope in section 5.1 can be done here.

• (then, back in the observing room...) check if the telescope control software (ncont74) is running on one of termial computer monitors. If the 'Telescope_and_Dome_Controller GUI' main window (Fig. 6) is displayed, it is okay.

... open a new terminal window (for CCD):

- \circ > ssh -Y hides@hides5
- \circ > passwd (means standard password. Can be found in the observing room)
- > ./MessiaStartAll

A blue and then two white windows will appear on the display. If the CCD initialization process is finished, one of the white window will disapper.

1			Hid	esFiber G	ור			
File Exposure	Macro Mo	de						
Status & Manu	ial Control	Maintenance]r		
Cassegrain Foc	us Configur	ation				HIDES Optics		
Observation M	ode		Calibration So	urce		Cross Dispers	er	
set	I2Cell	selected	position	flat	selected	exchange	RED	selected
I2Cell temp	70.0		Comparison			scan	-1.703	degree
Fiber Position			НСТ	OFF		CCD Stage		
x position	14965.0	count	Flat Lamp			focus	-2.0	mm 🗧
y position	8580.0	count	flat lamp	OFF				
Calibration/Ob	servation		brightness	40.0	count			
Mirror Pos	calibration	selected				Photo Sensor		
Coude Focus Co	nfiguration	ı				power	OFF	
Slit Type			Shutter			CCD		
slide stage	24080.0	count	shutter	CLOSE		binning	set	lxl
rotation	7.499	count	Hartmann	OPEN	selected	temp. A +137	15 tem	np. B +248.92
			Filter			heat 049	tim	e 15:30:01.0
Exposuremete	r		filter	NONE	selected			
init	ок		filter2	NONE	selected	1		
1								

Figure 2: 'HidesFiber GUI' main window (on obs74-1)

Check if there is any error messages (something like 'does not respond') on the blue window (Fig. 1a).

... open a new terminal window (for HIDES-F itself):

```
\circ > {\tt ssh} -Y hides@coude
```

- $\circ > pwd$
- \circ > cd hidesfiber
- > ./HidesFiberMain This will launch up the 'HidesFiber GUI' main window (Fig. 2).

... open two new terminal windows (for guiding):

```
\circ~>{\tt ssh} -Y hides@fbrag
```

```
\circ \ > \texttt{pwd}
```

lovie Guide Fo	cus						
Movie	START	STOP	SET	View	& Filters		
Exposure Time:	1.0	sec	ОК	G	uide View	narrow	selected
				;	Filter1	NONE	selected
Disp Level: 4	X; 280	Y: 101	1: 13746		Filter2	BPB-53	selected
				Log			
Dec		Ē		5.0 si Exposi focus focus focus focus focus focus	Position = 3 ** Focusing S sure End -18.6 FWHM ** Focusing S sure End -18.6 FWHM Position = 3 Position = 3 ** Focusing S ec Exposure S	99.0 : 257.0 tarted ******* tart : 1.2032164 tarted ******* tart : 1.2020853 35.0 : 244.0 36.0 : 257.0 tarted ******* tart	•
				Error	Log		
				E 2	> ERROR : TC > ERROR : TC	0 FAINT II << 00 FAINT II <<	<pre><<<p><<<</p></pre>

Figure 3: pointing the telescope

 \circ > cd ALTACAMD

```
\circ > ./altad -p
```

It will print wait until the ./AutoGudierMain-command (next step) has been sent. If the response 'wait' does not appear, contact the observatory staff.

- \circ > ssh -Y hides@fbrag
- $\circ \ > \texttt{pwd}$
- $\circ~>$ cd U260
- \circ > ./altaobs.pl -t 5 This will set the CCD operation temperature to be 5 °C (in winter, the value can be 0 °C).
- \circ > cd ~/autoguider

• > ./AutoGuiderMain After that the 'AutoGuider GUI' will popup.

1.4 Trouble shooting

• if you get an error message while intializing the Messia CCD, check if it is powered on.

2 Preparing Observations

2.1 Preparing dome and telescope

- (on the second floor) if not yet done, follow the list of action items given in section 5.1 to start up the dome and the telescope.
- (in the observing room) open the dome slit and mirror covers, following the steps in section 5.2.

2.2 Additional preparations in HIDES-F GUIs

- check 'temp A' and 'heat' in 'HidesFiber GUI'. If their background is red, contact to the observatory staffs.
- check 'xposition' and 'yposition' values in 'HidesFiber GUI'. If they are not around (24070, 8580), it is not HE-mode. Please contact to the observatory staffs.
- in 'HidesFiber GUI' (Fig. 2) set 'observation mode'. (The following options are available: 'normal' (just slit), 'I2Cell' (iodine) and 'cover')
- select and 'OK'
- popup an exposure control GUI ('Set & Go'; Fig. 4) by choosing, 'HidesFiber GUI' -> 'Exposure' Drop-down menu -> 'Set & Go'

2.3 Focus the telescope

- pointing the telescope to an appropriate star, following the steps in section 3.1.
- click 'START ' in the 'movie' tab of 'AutoGuider GUI' (Fig. 3).
- move the star next to (but not in) the green-box in the 'narrow'-field view. A single-click on the stellar position will bring the star to the center of the green guding box.
- 'STOP' the movie mode.
- do a left mouse button click on the star to select the focus target. Green box will shift.
- change to the 'focus' tab in 'AutoGuider GUI' (Fig. 5)
- use either 'EXPOSE' or 'START' to measure the current FWHM of the star's image.
- to expose once, click 'EXPOSE'.

Set	: & Go 🛛 🗙
Data Type	OBJECT 🗆
Select HCT	HCT 1 (Th-Ar)
Select FlatLamp	Flat Lamp 1
F.L. Brightness	40
	Set
Object Name	gamPsc
Exp. Time (sec)	300
Num of Exps	10
Photon Monitor	Auto 🗖
Image Save	Auto 🗖
Start Time	23:43:08.7
End Time	23:48:08.7
Remain Time	211
Remain Exps	4
Exposure	Start Stop
Dis	smiss

Figure 4: Exposure (sequence) control GUI ('Set & Go' in 'HidesFiber GUI')

- if you want make multiple exposures with changing telescope focus, set Init, Intv, Step, Repeat values and then click 'START'.
 You can stop the sequence by clicking 'STOP'. When stellar position shifts from the center during the sequence, click the stellar position for re-centering. The 'CLEAR' button will dismisses all measured values and clears the plot.
- Once you determine the focus value, set it from the 'Telescope' window (Fig. 8) .

Nota bene: Focus range is approximately from -18 mm (in summer) to -22 mm (in winter).

Nota bene: If the target is too bright, no value for the current FWHM will be calculated. Choose a different neutral density filter from the AutoGuider GUI (upper right). The insertion of a broad band filter may also useful (see section 3.2 in detail.)

in case of using of the Iodine cell:

• when I_2 is inserted into the optical path, decrease telescope focus by 0.4 (e.g. from -20.0 to -20.4).



Figure 5: Focus procedure with several exposures taken for the same focus settings

2.4 Calibration frames

taking wavelength calbration data ...

- in 'Set & Go' choose 'comparison' as data type and click 'set'.
- when in 'HidesFiber GUI' 'HCT' is displayed as ON (yellow field) the setup is ready
- check if I₂-cell is removed (no orange field saying 'I2Cell' is then displayed)
- take 1 exposure with 5 seconds

taking flat-fieldening reference data ...

- change data type to INSTFLAT for flatfields and 'set'. (HidesFiber: flat lamp on and yellow)
- take 30 exposures of 1 second each. They will be used to check the noise of the fiber
- **Nota bene:** Flat-fieldening data taken with conventional HIDES slit may be useful for flat-field correction.

taking bias data ...

- change data type to BIAS for bias and 'set'.
- take 10 exposures. They can be used to check CCDs. If the CCD temperature is high, hot pixels in the centeral CCD is very strong.

check order alignment and count level

- quick_show #thar-frame
- For typical I₂Cell observations, zoom into the center panel of the 3 CCDs and place the mouse curser on the middle of the three peaks of the PSF. If the position is close to 1190 \pm 1 px this is okay.
- quick_show #flat-frame
- implot #flat-frame_2
- if the level of the left-most order of the central CCD is around 7,000-8,000 counts it is okay.

The 'Brightness' may be increased slightly (~ 50) from its default value (40). If it is still too low, contact to the observatory staff

- inspect count level or frames
- quick_o hd004712 ov004712 (for overscan correction. ADU correction and removal of the overscan region ...)

3 Data Aquisition



Figure 6: The 'Telescope_and_Dome_Controller GUI' main window for the 188 cm Telescope

3.1 Loading target catalogue & pointing the telescope

- (on bizen) set Dome Rotation 'Auto' on in the 'Dome' window (Fig. 9).
- click 'Instrumet' in the 'Telescope_and_Dome_Controller GUI' to pop up 'Instruments' window (Fig. 7, select 'HIDES-F'), and then 'dismiss'.

🛓 Instrur	nents	×
Instruments		
O HIDES-S	○ ISLE	
• HIDES-F	© KOOLS	
Other	Dismiss	

Figure 7: Instrument select window

S Telescope	_ 🗆 ×
Main Sub	
RA 11.04.25.35	Rest
0 · · · · · · · · · · · · · · · · · · ·	Zenith
DEC _30 : 26 : 11.6	Home
PM_RA["/c] PM_DEC["/c] Epoch 2000.0	HWork
Go to Position 🗹 withTracking	Stop
dRA [arcsec] dDEC [arcsec] -3.10 23.90	Offset
Focus [mm] Cass. Rotato	r [deg]
-18.800 GO 091.44	GO
Primary Mirror Cover Tertiary Mirr	ror Cover
Open Close Open	Close

Figure 8: Telescope GUI for mirror covers, focus, manual positioning and etc.

- in the 'Telescope_and_Dome_Controller GUI', click 'Catalogue' to popup the 'Catalog' window (Fig. 10), then select 'User Defined' and enter path provided by collaborator
- 'Refresh' & 'Star Plot', then 'Star Plot' window will popup (Fig. 11)
- either select a target star in the list or in the map (object name will be displayed in the Object text field in the 'Star Plot' window), and then click 'go to position'.
- keep checking telescope and dome while pointing.
- in the 'AutoGuider GUI', change to 'movie' tab and 'START' to see if star is visible.

Nota bene: if star is not found, follow the procedure listed in section 3.4

	D		
	Dome	Rotation	2
Auto	Move	090 ^{deg}	Stop
	Don	ne Slit	
Open	Close	0%	Stop
ower Con	trol in Do	me	
LowerLigh	nt 🔻	ON	OFF

Figure 9: GUI for dome orientation and dome slit

	Cuturog										
	Select:	Object	· · · /	/home/cont74/c	bject/objec	t_kambe.da	at				
ID	Name	Epoch	RA	DEC	mu_RA	mu_Dec	H.A.	ZD	mag	comment	Т
0000	alpCMi	2000.0	07:39:18.1	+05:13:30	0.0	0.00	+00:06	29.4			Ĩ
0002	betVir	2000.0	11:50:41.7	+01:45:53	0.0	0.00	-04:05	65.6			1
0004	27371	2000.0	04:19:47.53	+15:37:39.7	0.0	0.00	+03:25	49.7	3.65		1
0005	57727	2000.0	07:23:28.55	+25:03:02.2	0.0	0.00	+00:22	10.7	5.04		1
0006	61363	2000.0	07:41:12.45	+48:07:54.7	0.0	0.00	+00:04	13.6	5.60		1
0007	80499	2000.0	09:19:46.40	-11:58:29.6	0.0	0.00	-01:34	51.6	4.78		1
0008	81688	2000.0	09:28:39.99	+45:36:06.5	0.0	0.00	-01:43	22.5	5.41		1
0009	93291	2000.0	10:46:25.35	+14:11:41.3	0.0	0.00	-03:00	45.5	5.5		1
0010	113226	2000.0	13:02:10.76	+10:57:32.8	0.0	0.00	-05:16	74.9	2.83		1
0012	11Com	2000.0	12:20:43.09	+17:47:33.6	0.0	0.00	-04:35	62.8	4.74		1
0014	theTau	2000.0	04:28:34.5	+15:57:43.9	0.0	0.00	+03:16	47.7	3.85		1
0017	lamEri	2000.0	05:09:08.8	-08:45:15	0.0	0.0	+02:36	57.0	4.3	B2IVne	1
0019	28T au	2000.0	03:49:11.2	+24:08:12	0.0	0.00	+03:56	51.8	5.1	B8Vpe	1
0020	19Tau	2000.0	03:45:12.5	+24.28.02	0.0	0.0	+04.00	52.5	43	BGIV	1

Figure 10: 'Catalog' window. Target stars read into 'Telescope_and_Dome_COntroller GUI'. Only currently visible targets are displayed.

Nota bene: choosing the 'Offset Clear' option on in the 'Catalog' windows will not use the offset information in the last pointing (currently we are not sure which options gave better telescope pointing result...).

3.2 Guiding

- in the 'movie' tab, 'START' the movie, do a left mouse button click on the stellar position for fine adjustment of telescope pointing (this will bring the stellar image into the green guide box). Then, 'STOP' the movie.
- go to 'guide' tab in 'AutoGuider GUI' and click 'START'. (reinitialize for each new pointing)
- if the white cross does not mark the center of the fiber, click 'STOP' and do a left mouse click on the apperent center of the fiber-hole and click 'START' again. Guiding will then update the new position with the next exposure.



Figure 11: 'Star Plot' window: color legend: red lines: (outer) sec z=3 or $z \sim 71^{\circ}$, (inner) sec z=2.5 or $z \sim 66^{\circ}$, thick green lines: (outer) sec z=2 or $z \sim 60^{\circ}$, (inner) sec z=1.5 or $z \sim 48^{\circ}$, red and yellow areas: no pointing possible

• guiding is using the wings of the PSF for centering the star on the fiber. Use neutral density filters (ND1, ND2, ND3 or NONE) to avoid saturation and reflections. There is no ADC installed. If you want to select a certain wavelength range to guide on choose a color filter: BPB45(λ_0 =450nm; IR leak), BPB53 (530nm), BPB60 (600nm).

Nota bene: use the flux level (from psf-wings) to get an estimate of the weather conditions.

Nota bene: if auto-guiding frequently fails, select 'noguide' from the 'Mode' menu. Then, do guide manually from TelPad dialog in the telescope GUI.

3.3 Exposure (Sequence)

- if yet, popup the 'Set & Go' window by choosing, 'HidesFiber GUI' -> 'Exposure' Dropdown menu -> 'Set & Go'
- in 'Set & Go' select the object type, edit exposure time and number of consecutive exposures
- if you use photon monitor, initialize the exposure meter in 'HidesFiber GUI'.
- it will take about 10 seconds and a 'Photon Monitor' window (Fig. 13) will popup.

Cuide	STADT	STOP		View & Filters		
Julue	31/481	stor		Guide View	narrow	selected
Exposure Time:	5.0	sec	ОК	Filter1	NONE	selected
		Intensity:	244277.4	Filter2	BPB-53	selected
	Sec. 1	Peak:	13173.0	100		_
	Contraction of the	FWHM:	1.09842	Guide Position = 3	09.0 : 257.0	
1000 C	State of States	Sky:	1062.964	5.0 sec Exposure	Started ****** Start	**
1000		X Error:	-0.107498884	Exposure End	4:12032164	
	1000	Y Error:	-0.9930978	5.0 sec Exposure	Started ******	**
	100 ACC		R Error: 0.998899 Exposure End focus: -18.6 FWHM: 1.2			
		R.A. Error:	-0.032249663	Guide Position = 3	35.0:444.0	
		Dec. Error:	-0.29792935	Guide Position = 3	61.0 : 250.0	**
		Guide Status:	GOOD	5.0 sec Exposure	Start	
4.00E5 3.50E5 3.00E5 2.00E5 20.00 30.0		Guide J 1.00 -1.00 20.0 30.0	Gror 40.0 50.0 60.0	Error Log >>>> ERROR: T >>>> ERROR: T >>>> ERROR: T >>>> ERROR: T >>>> ERROR: T >>>> ERROR: T	00 FAINT II < 00 FAINT II <	<<< <<< <<< <<< <<< <<<
4.00 3.00 2.00 1.00 0.00 20.0 30.0		Sky Le 1050.00 1050.00 1040.00 20.0 30.0	40.0 50.0 60.0	>>>> ERROR : TI >>>> ERROR : TI	00 FAINT II < 00 SIGNAL II <	<<< <<< <<< <<< <<< <<< <<< <<< <<< <<

Figure 12: Auto guider user interface

- set 'photon monitor' to 'Auto' in 'Set&Go' (the photon monitor will give you an estimate of the current flux level and will help you to compute the effective midpoint of the exposure; in exchange of 10 % light loss....)
- to save CCD images in sequantial numbers, set 'Image Save' to 'Auto'.
- start by clicking 'Start'.
- Nota bene: Exposuremeter can be also used manually in between exposures to check the brightness of the star. To do so, click 'shutter' open in the 'HidesFiber GUI' and then in the'Photon Monitor' window, 'PMT' 'on' and click 'Start'. Do not forget to 'Stop' exposure and 'close' the shutter, when starting the next exposure. NEVER put 'PMT' on under strong illumination lights.
- **Nota bene:** if you have to stop an exposure-sequence, do it just while readout to prevent the next one. otherwise multiple exposures will start and something messy will happen. If you have to abort an exposure while integration, ask observatory staff to restart the CCD controller software.

DMT	OFF		
PINIT	UFF		
ulse Counte	r		
Gate	1	sec	
Interval	3	sec	
Start	Stop		

Figure 13: Exposuremeter (photo monitor) user interface

E cont74@bizen:~/cont74 _ □	
ファイル(F) 編集(E) 表示(V) 検索 (S) 端末(T) ヘルプ(H)	
RECEIVED: 0000000170,20140724120235.843,0A0188CM,00021844,HIDES ,CD ,CD,	E
BJECT SOCKET.OPEN=CLOSE SOCKET.SERVER=133.40.62.134 SOCKET.PORT=22229 SOCKET.SE	R
DES	
reisterCommandToCEM = 0000000170,20140724120235.843,0A0188CM,00021844,HIDES ,	C
CD, EXEC CD OBJECT SOCKET.OPEN=CLOSE SOCKET.SERVER=133.40.62.134 SOCKET.PORT=222	2
. SERVERID=HIDES	
Socket open: server = 133.40.62.134 portNo = 22229 serverID = HIDES	
Socket client successfully removed.	
**** Currently registered clients ****	
FBRAG ==> 133.40.62.11422230	
RECEIVED: 0000000169,20140724120239.198,OAO188CM,00021846,HIDES ,CD ,CD,	E
BJECT SOCKET.OPEN=OPEN SOCKET.SERVER=133.40.62.134 SOCKET.PORT=22229 SOCKET.SER	V
ES	
reisterCommandToCEM = 0000000169,20140724120239.198,0A0188CM,00021846,HIDES ,	C
CD, EXEC CD OBJECT SOCKET. OPEN=OPEN SOCKET. SERVER=133.40.62.134 SOCKET. PORT=2222	9
SERVERID=HIDES	
Socket open: server = 133.40.62.134 portNo = 22229 serverID = HIDES	
HIDES ****	
Connection established to 133.40.62.134 22229	
**** Currently registered clients ****	
HIDES ==> 133.40.62.13422229	
FBRAG ==> 133.40.62.11422230	

Figure 14: a window where ncont74 is launched

3.4 Troubleshooting

there's no star ...

- check the guide telescope (wfv-n) image to see if star is visible there.
- If not, check if dome slit is opened. Note that the guider telescope view is sometimes obstructed by the dome slit.
- if you are sure that the telescope pointing is good, check telescope mirrors
- also, check the filters and set the display level to higher value in 'AutoGuider GUI'.
- if still not, change to 'wide' field view. If you see star, move it near the red '+' mark ((x,y)=(330,330)), about one finger below the original green marker; this position corresponds to the guide position in the 'narrow' field view), by just doing a left-mouse button click on the stellar position, then back to 'narrow' field view.
- if still not there,uum, contact to observatory staffs.

no telescope responce

• check if 'HidesFiber GUI' is communicated with 'Telescope_and_Dome_Controller GUI' by checking the terminal in which the latter is started (Fig. 14).

AutoGuider hang up ? (now it should be rare case...)

- if the autoguider on 'fbrag' apparently hang up, contact to the observatory staff. [or kill server (altad) and GUI; go to dome, disconnect power-supply cable from camera and USB from the computer.] First connect the cable of the guiding the power-supply of the CCD and wait for confirmation via the red light blinking. Then connect USB cable (to the right lower left plug!)]
- when the ethernet connection to 'fbrag' is lost, consult the observatory staff

4 After Observations - End of the Night -

- don't forget to pull a calibration lamp off
- close telescope mirror covers and dome slit, following the steps in section 5.2.
- set 'observation mode' (in 'HidesFiber GUI') to 'cover'
- close 'HidesFiber GUI' and 'AutoGuider GUI' via exit (File > Exit; not with upper right x)
- also send the command ./MessiaEndAll in the same window where the MessiaStartAll command was sent. The CCD softwares should be shutdown everynight.
- shutdown telescope and dome, following the steps in section 5.3
- backup data, following the steps in section 6

5 Dome and Telescope

• to operate dome functions from the TelescopeDomeControl GUI, you need to choose 'manual'-mode on one of the dome control touch panels in the telescope room.

5.1 Starting up dome and telescope

- in the telecope control room (Bouenkyo Seigyo shitsu), put the telescope's motor drive power-supply button on, then wait until all the buttons turn to green ... (do not touch telescope controller button; it should be kept on all the time.)
- put dome power-supply button on at the dome control panel in the telescope control room.
- in the telescope room, turn off the 3 air-conditioners and a dehumidifier (unless humidity is high)
- on one of dome control touch panels, make sure to select 'observing mode' ('Kansoku mode)'

The button will trun to yellow. Without this mode, dome cannot be controlled from GUIs.

• turn off lights in the visitor-aquarium and dome (upper), using one of touch panels or manual switches at the south-west wall in the telescope room (the lights can be controlled later from the Dome Control window in TelescopeDomeControl GUI).

5.2 Open/close the dome and mirror covers

- in the 'Telescope_and_Dome_Controller GUI', click 'Err. Reset' once
- click 'Telescope in the 'Telescope_and_Dome_Controller GUI' to popup the 'Telescope' window (Fig. 8)
- from the 'Telescope' window send telescope to 'Rest' position Before moving the slit, at least make sure that the mirror covers are closed and that the telescope's zenith angle is larger than 35°.
- to open/close the dome slit: (on bizen) in the 'Telescope_and_Dome_Controller GUI', select 'Dome' to popup the 'Dome' window (Fig. 9).
- click 'Open' (or 'Close') for dome slit.
- opening/closing will take 10 minutes.
- Nota bene: Observers should only use the 'Telescope_and_Dome_Control GUI' (but not any of touch panels on the 2nd floor) to move the dome slit. Note that the 100 % does not mean it is fully opened, but it should be enough (so, don't worry).

- Nota bene: If the circuit brakers for the trolley are off, "Dome: F044 error" may appear on the 'Telescope_and_Dome_Control GUI'.
 - from 'Telescope' window (on bizen; Fig. 8), open/close the miror covers: 'Primnary Mirror Cover' and 'Tertiary Mirror Cover'
 - turn off (or on) dome illumination (lower) lights from the 'Dome' window.

5.3 Closing down and end of night

- if not yet done, move the telescope to the 'Rest' posiiton from the 'Telescope' window (Fig. 6)
- rotate the dome to its rest position (180°) from the 'Dome' window.

on the 2nd floor:

- turn off CCD-detector manually (in the coudé-room)
- turn on the 3 air-conditioners and the dehumidifier
- power off telescope motor drive and dome power-suppy button (in telescope control room)
- for day-time visitors: turn on lights in the visiter-aquarium and dome illumination (both upper & lower)

5.4 Troubleshooting: dome rotation and slit

check audio-visually: i.e., if no movement is visible on the screen and no (loud) noise is coming through the speakers, the dome rotation/slit is not moving in this case.

- if you hear any unusually large moise, stop operations and contract to the observatory staff
- check 'manual' ('Shudou') or 'observation' ('Kansoku') mode on the touch panels. Also, check the Auto Dome status in the 'Telescope_and_Dome_controller GUI' (upper left corner in the view graph).

6 Data Backup

After the exposures, data are written in quick-look directory. C opy the data to the backup directory (disk) at the end of the night. We also recommend to do so from time to time during the night using the workstation obs74-3. The original files should also be moved to a temporally archive space at the end of each night.

- ssh -Y hides@coude
- pwd
- cd quicklook
- mkdir /backups#/obsdata/20140725_test_observation/ The '#' is the number of the backup disk.
- rsync -aHvc hd* /backups#/obsdata/20140725_test_observation/

at the end of night,

- mkdir /Hides/20140725_test_observation/
- cd ~/quicklook
- mv hd*.fits /Hides/20140725_test_observation/

7 Weather Limits

- maximum humidity: 95% for outside humidity; 90% for mirror humidity
- $\bullet\,$ maximum wind: 15 m/s

In case of (expected) rain: send the dome (via the 'Dome controll') to - 40° . This will avoid too much rain dropping onto the telescope.