



A instrumentação atual do SOAR

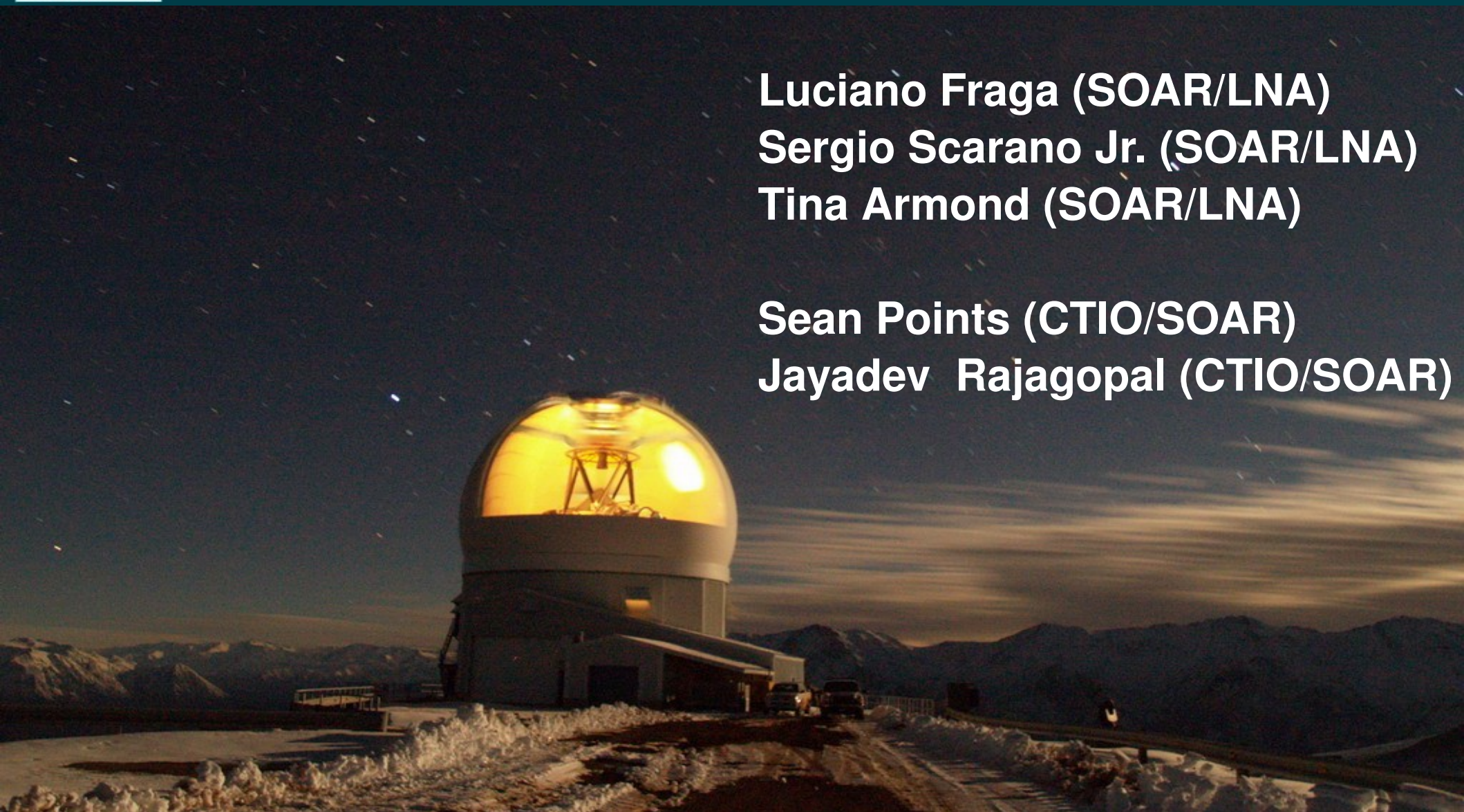
Luciano Fraga (SOAR/LNA)

Sergio Scarano Jr. (SOAR/LNA)

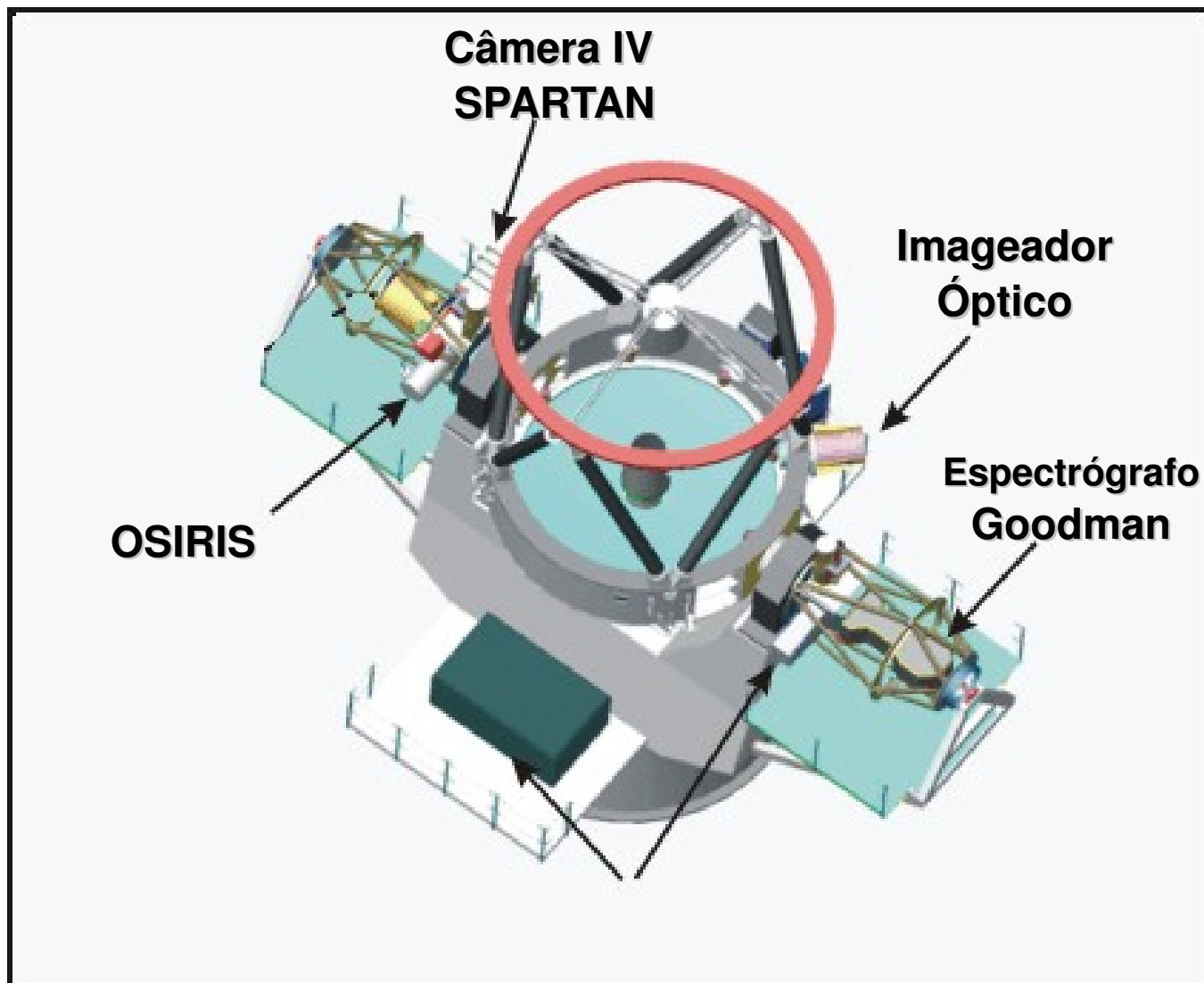
Tina Armond (SOAR/LNA)

Sean Points (CTIO/SOAR)

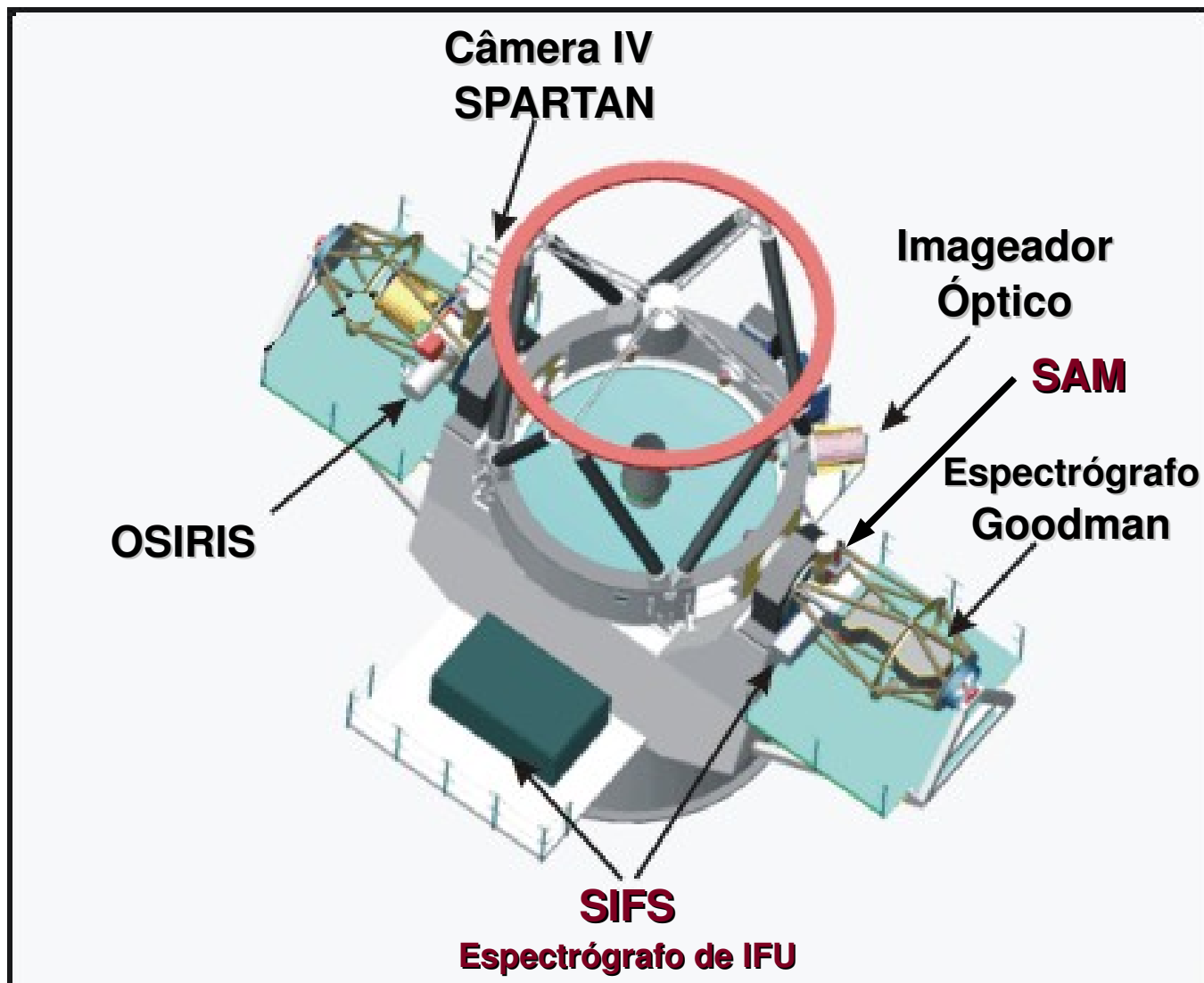
Jayadev Rajagopal (CTIO/SOAR)



Instrumentos em serviço

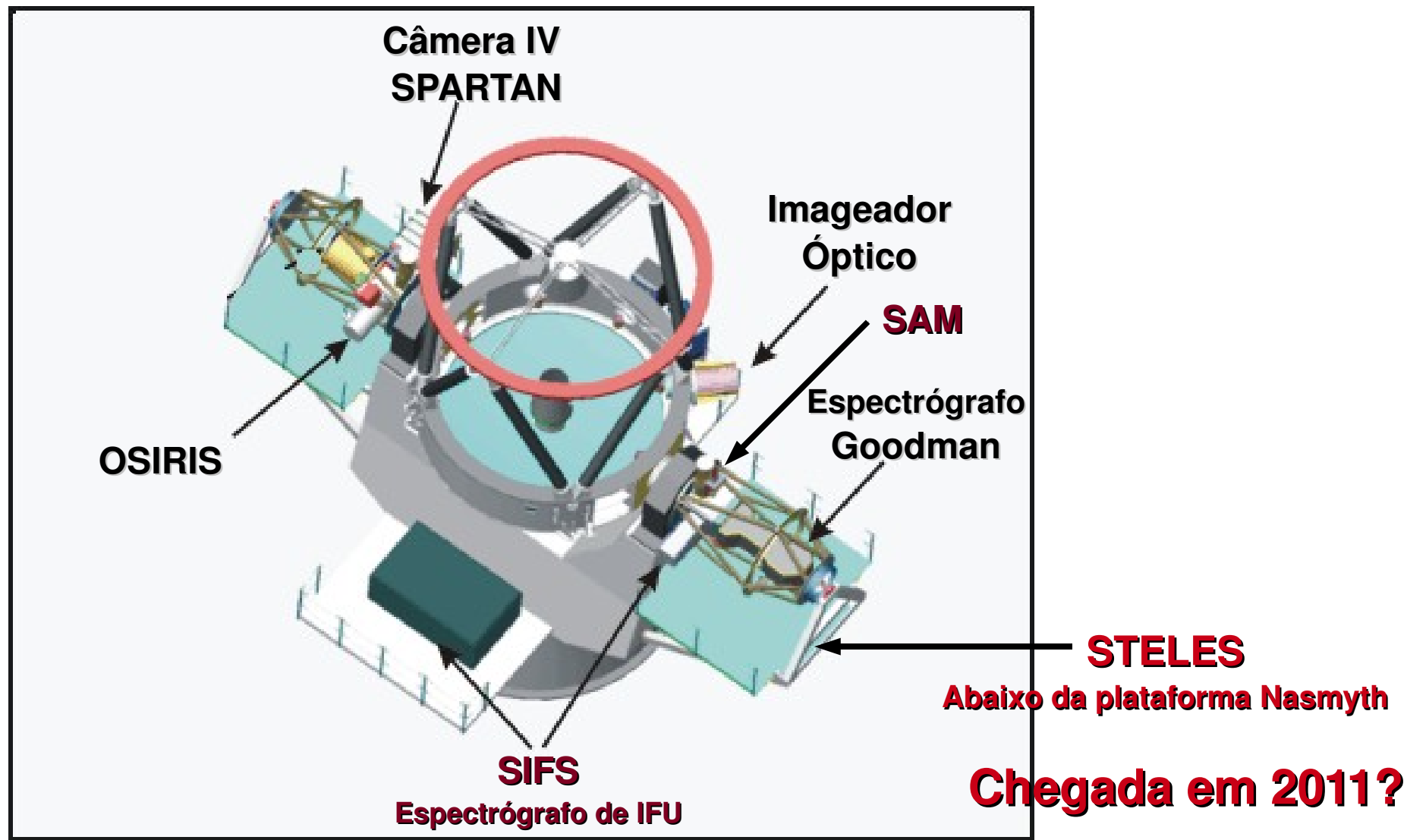


Instrumentos em serviço



Comissionamento em 2010

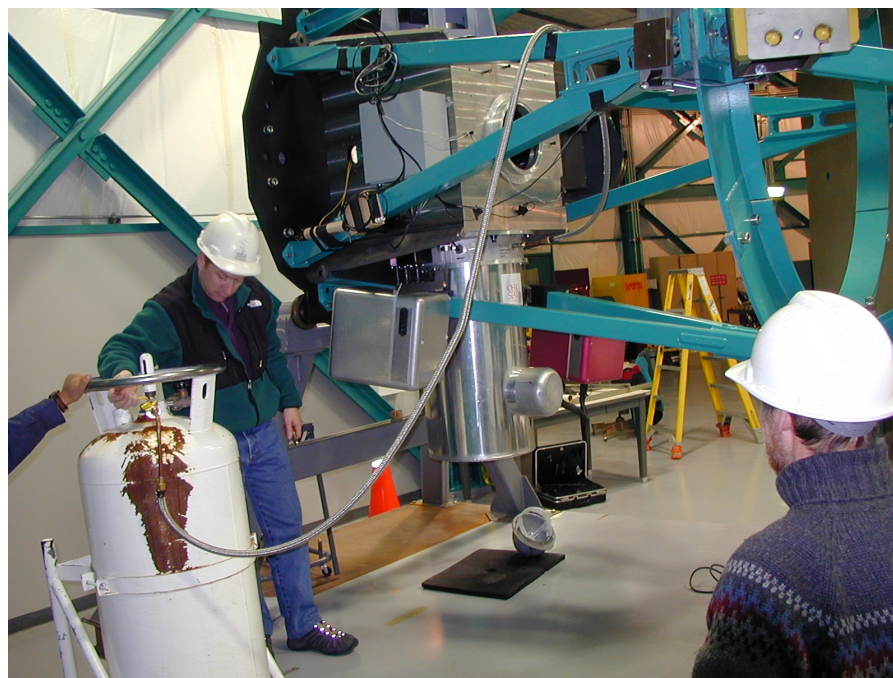
Instrumentos em serviço



Comissionamento em 2010

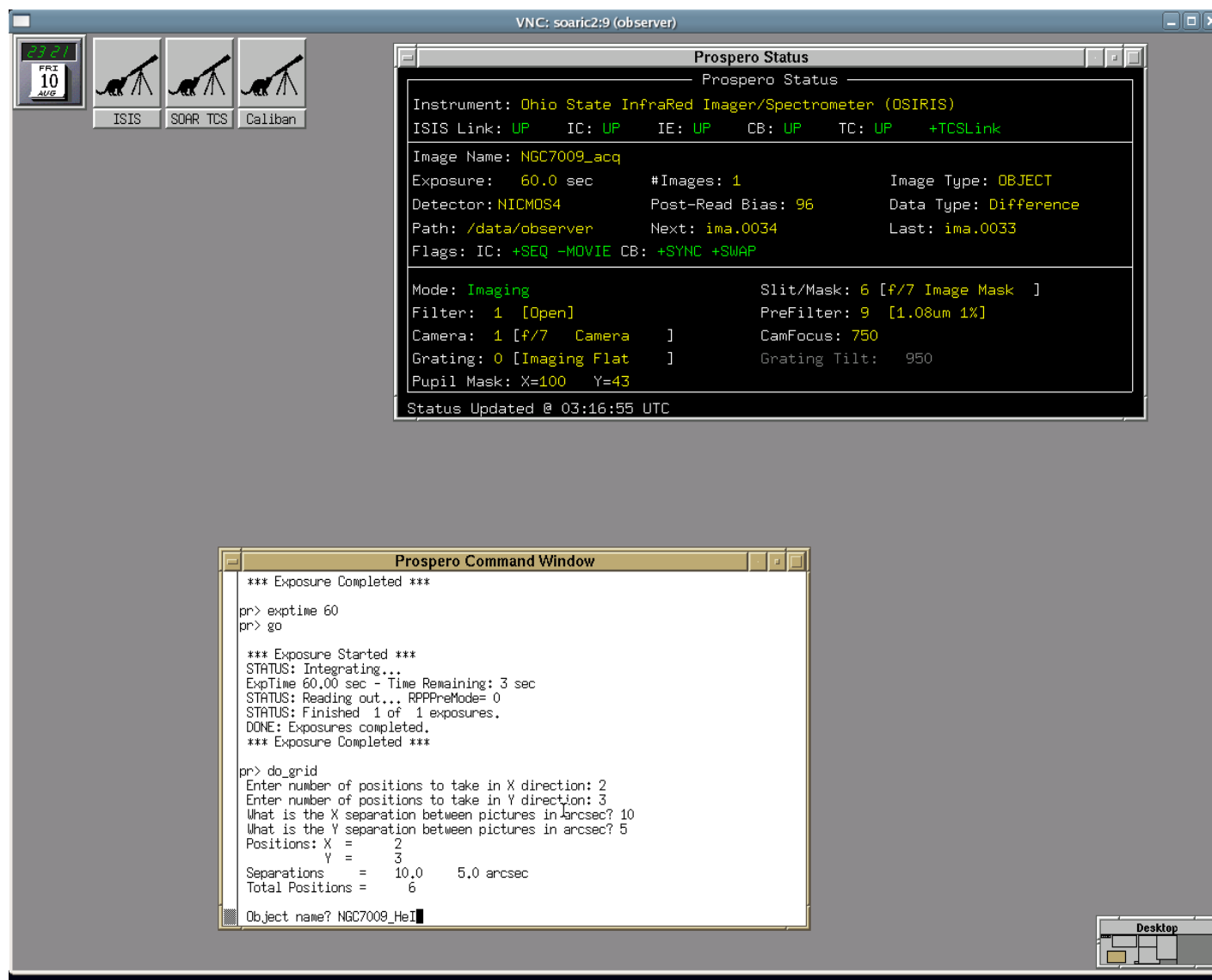
PI: D. Depoy (R. Blum)

- **1024x1024 HgCdTe array**
 - (~ 577 x 577 área útil)
- **Modo Imagem (f/7, 0.14"/pix)**
 - 1.3 x 1.3 arcmin FOV
- **Modos Espectroscópicos**
 - **Long slit Hi-Re (f/7)**
 - R ~ 3000 J, H, ou K band
 - 72" x 0.42" fenda
 - **Cross dispersed (f/3)**
 - R ~1200 J+H+K
 - 27" x 1" fenda

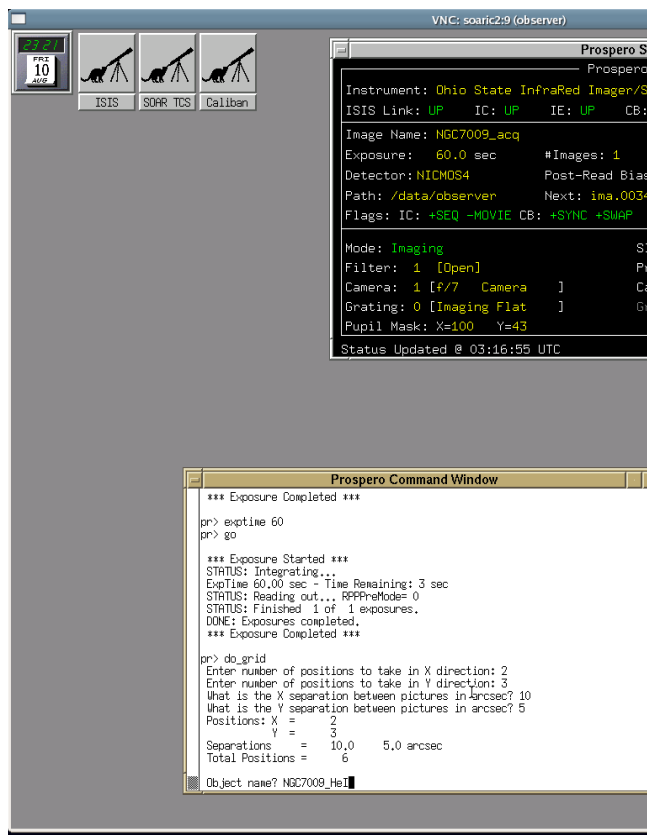


Em operação @ SOAR desde 2005B
... @ CTIO por muitos anos antes disto

Interface de usuário



Interface de usuário



Prospero Quick Reference Card for OSIRIS

(2005 September 8)

Typewriter font denotes command verbs and keywords.
Italics denote user-supplied arguments (numbers or strings).

Command Syntax

commands, keywords, & options
commands with numerical arguments
commands with string arguments

command keyword=value option
command *arg1* *arg2* ...
command '*an argument string ...*'

General Commands

start Prospero
quit Prospero
read help for commands
find command by keyword search
show the last few commands
repeat the last command
repeat last command matching *pattern*

prospero
quit
help *command*
apropos *keyword*
history
%
%*pattern*

Observing Session Startup

connect to the data-taking PCs
nightly observing run initialization

startup
runinit

Instrument Control

OSIRIS Modes:
Direct Imaging Mode
Spectroscopic Mode
Acquisition Mode (from *spmode*)

imode
spmode
acqmode

Filter & Pre-Filter Selection:
select a filter
select a prefilter
print the filter/prefilter table

filter *filter#*
prefilter *filter#*
print filter

Slit/Aperture Mask Selection:
select a slit
print the slit/aperture ID table

slit *slit#*
print slit

Camera Select & Focus:
select the camera lens
set the reimaging camera lens focus to *f*
set camera & focus
print the camera ID table

camera *cam#*
camfocus *f*
setcamera camera=*n* camfocus=*f*
print camera

Pupil Mask:
set pupil mask X position
set pupil mask Y position

xpupil *xpos* (default=0 4m , -50 1.5m)
ypupil *ypos* (default=45 4m , 49 1.5m)

Grating Tilt:
tilt grating (encoder units)

grating *tilt*

Motor Resets:
to reset motor
example:
for all motors:

ie '*motor reset*'
ie '*camfocus reset*'
ie '*reset*'

Data Acquisition

Instrument and exposure status are continuously displayed in the status window. Green flags are OK, Red flags signal error or non-default state.

Take Integration(s):
start a single integration
take multiple integrations
coadd a number of integrations
take multiple coadded integrations

go
go *#imgs*
avego *#coadds*
navego *#imgs #coadds*

Integration Setup:

set integration time to *t* seconds
set integration time to *t* minutes
this is an object named *xxx*
this is a flat field named *xxx*
this is a dark frame named *xxx*
this is a sky image named *xxx*
this is a zero image named *xxx*
this is a bias image named *xxx*
enable/disable exposure bell
put a comment in the image header

exptime *t*
exptime *t* minutes
object *xxx*
flat *xxx*
dark *xxx*
sky *xxx*
bias *xxx*
bias *xxx*
exbell
comment '*comment text*'

Image File Management:

change the image filename
change the filename extension number
print the name of the last file written
print the name of the next file
change the image directory path
enable/disable disk storage

filename *filename*
newext *nnn*
lastfile
nextfile
indir *path*
tdisk

Detector Control

start continuous readout mode
stop continuous readout mode
set IC real-time display scale

movie
-movie
icscale min= max= sat=

Telescope Control

print telescope pointing info
find the best telescope secondary focus
set the telescope secondary focus
send a raw TCS command

tcsstatus
focus *npics step foc*
change *focus foc*
tcs '*raw command*' twait=*t*

Move the telescope...

x arcsec E/W & *y* arcsec N/S
x arcsec north
x arcsec south
x arcsec east
x arcsec west

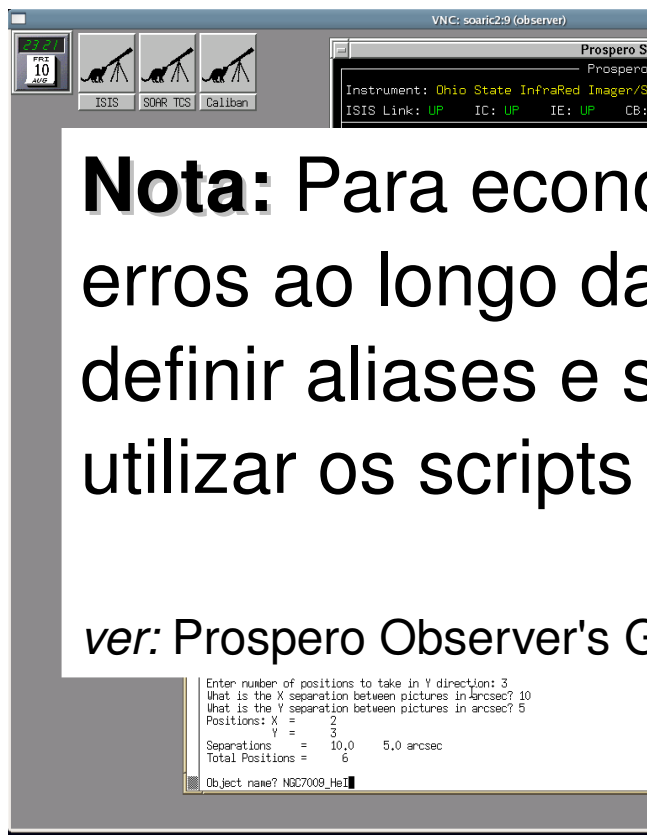
offset *ra# dec#y*
north *x*
south *x*
east *x*
west *x*

Guider Control (4m only)

enable guider
disable guider
position guide probe

+guider
-guider
guider *ra=hh:mm:ss.s dec=dd:mm:ss*

Interface de usuário



Nota: Para economizar tempo de observação e evitar erros ao longo da noite, é extremamente útil aprender a definir aliases e scripts em linguagem *Prospero* e/ou utilizar os scripts já existentes.

ver: Prospero Observer's Guide for OSIRIS na página de documentação do OSIRIS

Prospero Quick Reference Card for OSIRIS

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start a single integration
take multiple integrations
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take multiple coadded integrations

go
go #imgs
avego #coadds
navego #imgs #coadds

Integration Setup:

set integration time to *t* seconds
set integration time to *t* minutes

exptime *t*
exptime *t* minutes

select the camera lens
set the reimaging camera lens focus to *f*
set camera & focus
print the camera ID table

camera *cam#*
camfocus *f*
setcamera camera=*n* camfocus=*f*
print camera

x arcsec E/W & *y* arcsec N/S
x arcsec north
x arcsec south
x arcsec east
x arcsec west

offset *ra=x dec=y*
north *x*
south *x*
east *x*
west *x*

Pupil Mask:
set pupil mask X position
set pupil mask Y position

xpupil *xpos* (default=0 4m , -50 1.5m)
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enable guider
disable guider
position guide probe

+guider
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guider *ra=hh:mm:ss.s dec=dd:mm:ss*

Dicas para o planejamento das observações

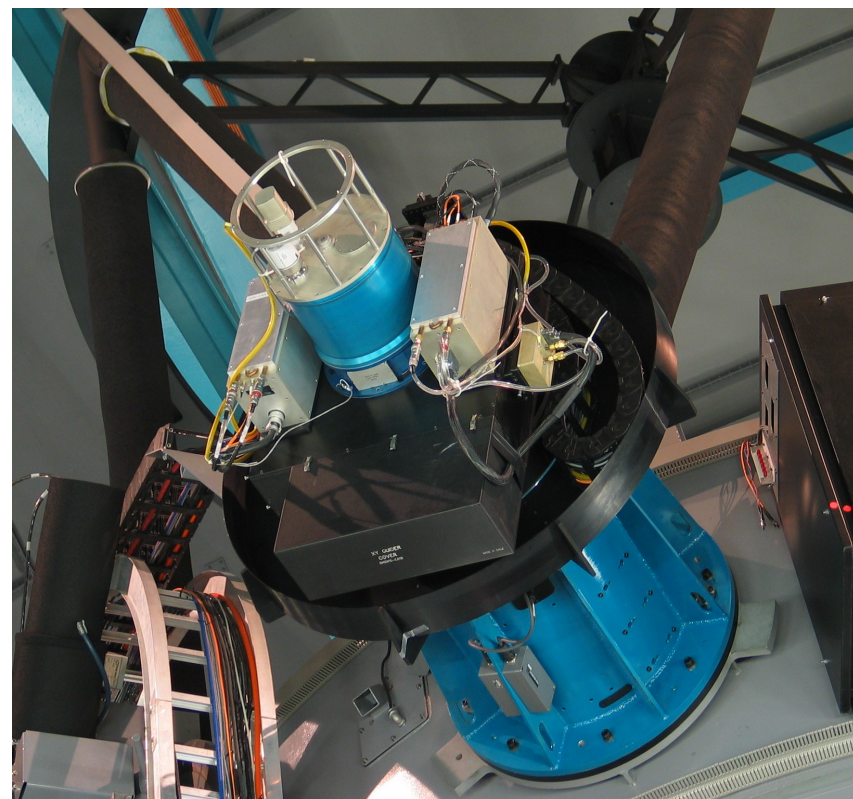
- **O céu varia e satura em minutos!**
 - Tempos de exposição individuais devem ser relativamente curtos.
 - < 4 min para espectroscopia e < 0.5 min para imageamento
 - S/N requerido deve ser atingido por uma combinação de n imagens
 - Diferentes posições de *dithering* combinadas para construir o céu
 - Linhas do céu variam de intensidade em minutos e com a massa de ar
 - Padrões telúricos devem ser observadas imediatamente antes e /ou após o objeto de ciência e com massa de ar similar.
 - Para observações longas, a melhor estratégia será intercalar as padrões telúricos com o objeto de ciência.

PI: A. Walker, H. Schwarz

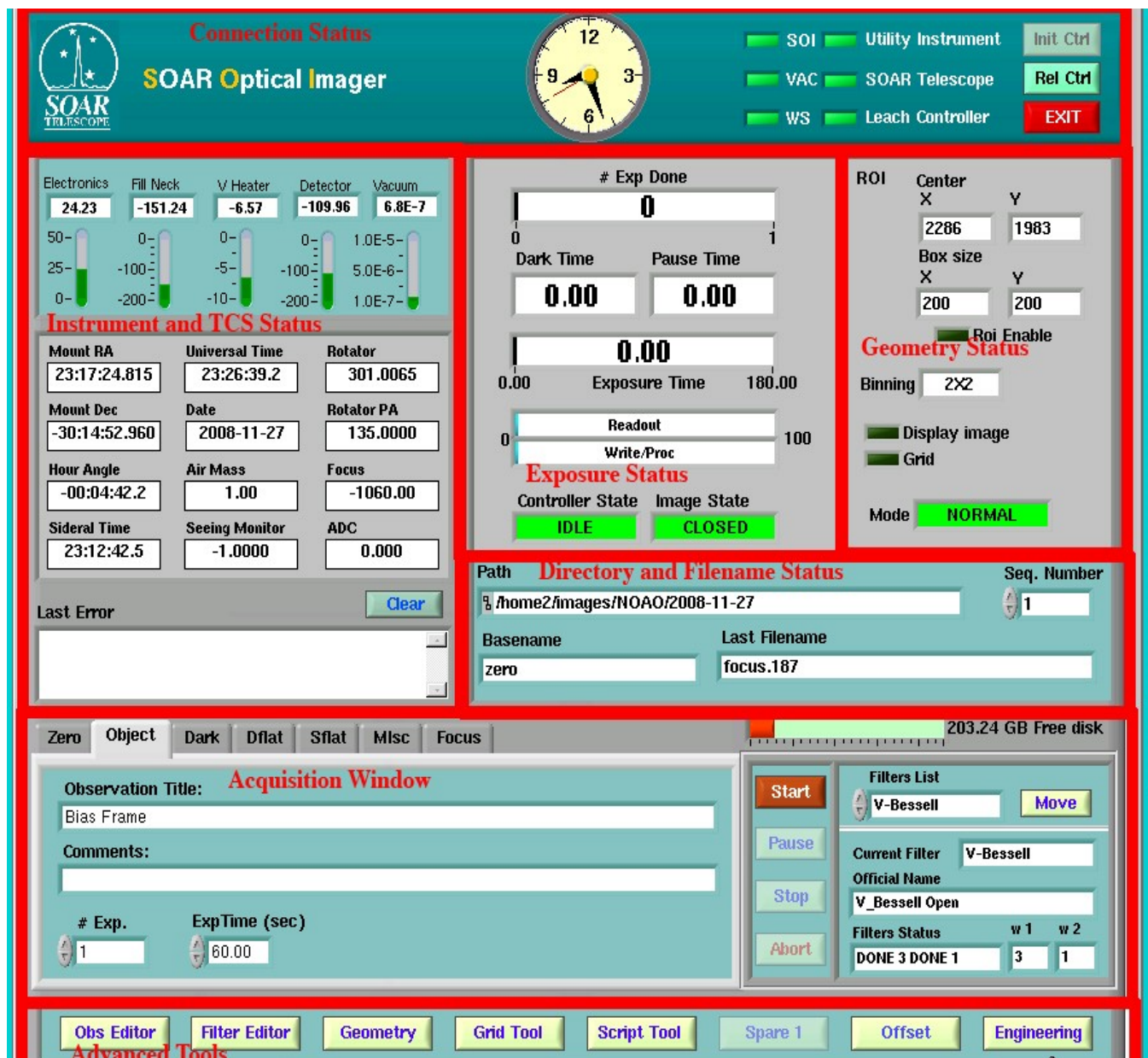


- 5.5 x 5.5 arcmin FOV, 0.08"/pix
- Óptica otimizada para o azul e UV
 - 320 – 1100 nm
 - ADC do tipo trombone
 - f/16 → f/9 redutor focal
- Duas rodas de filtro (4 + clear, cada)
 - Johnson-Cousins UBVRI
 - SDSS uvgri
 - Strömgren uvby filter sets
 - Narrow band shared with CTIO
 - Tamanho padrão 4x4"
- Detector
 - 4k x 4k Mini-Mosaic of E2V CCDs
 - **Logo será substituído por um único 4kx4k E2V CCD**

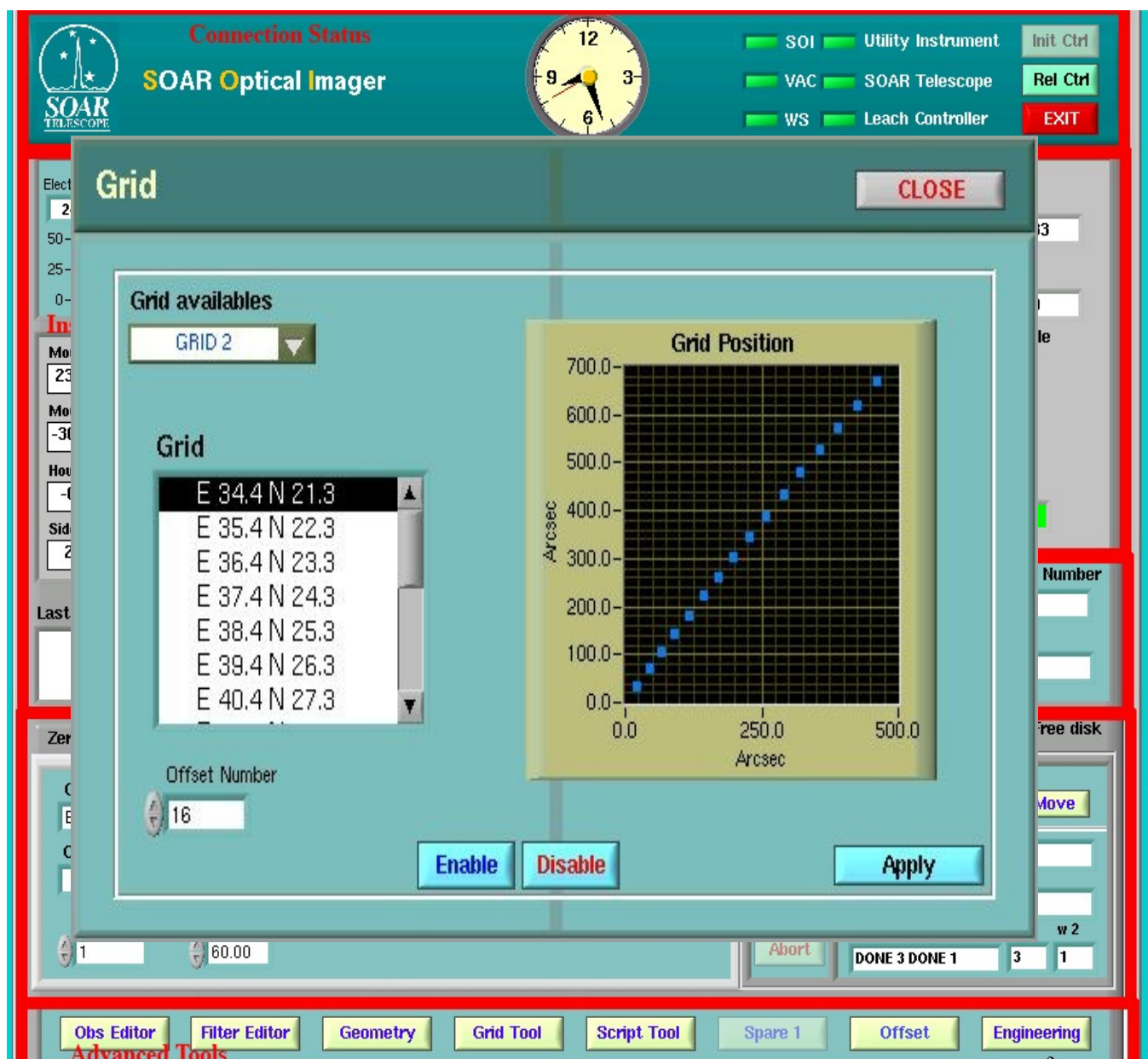
em operação desde 2004



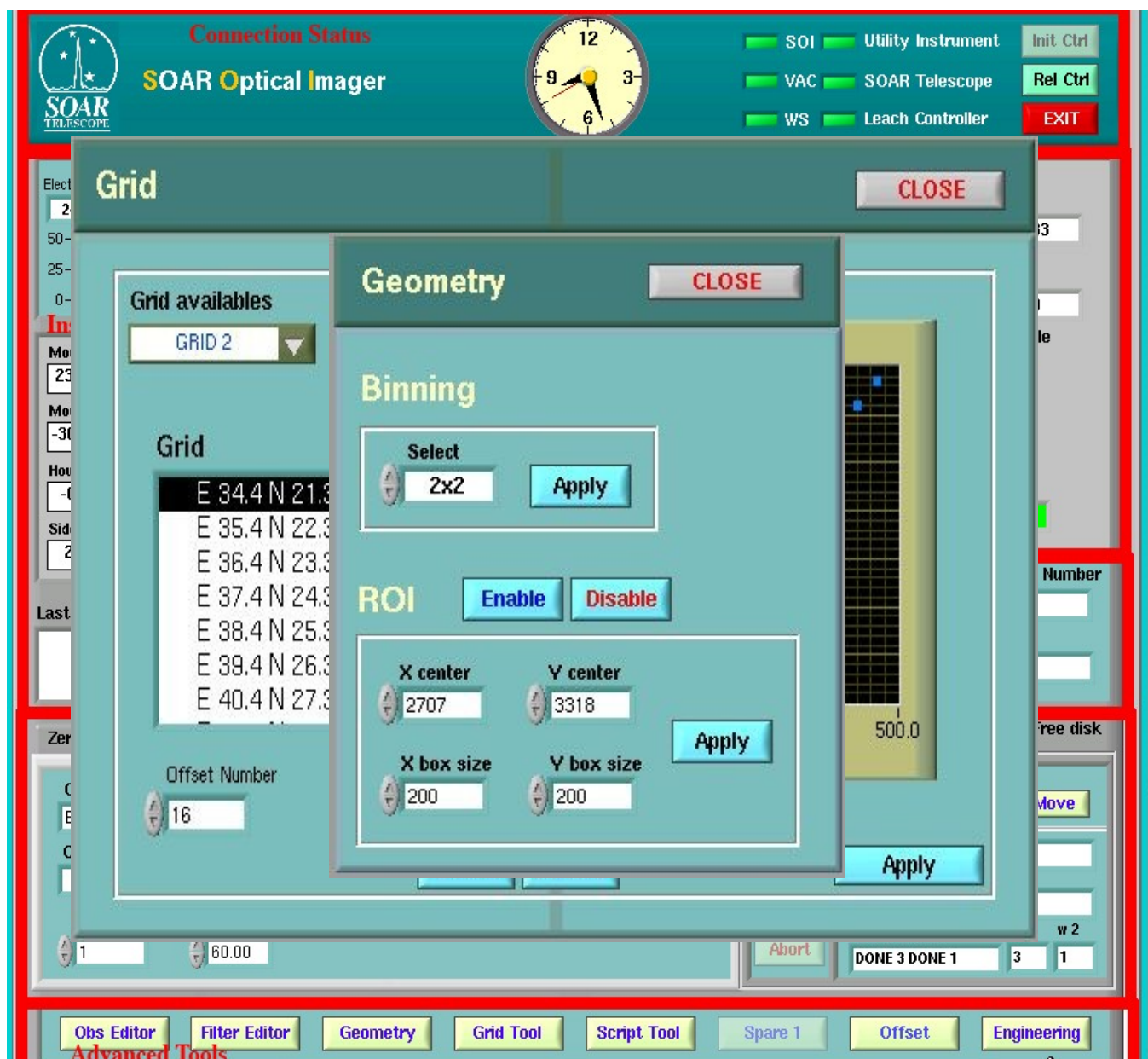
Interface Gráfica do Usuário



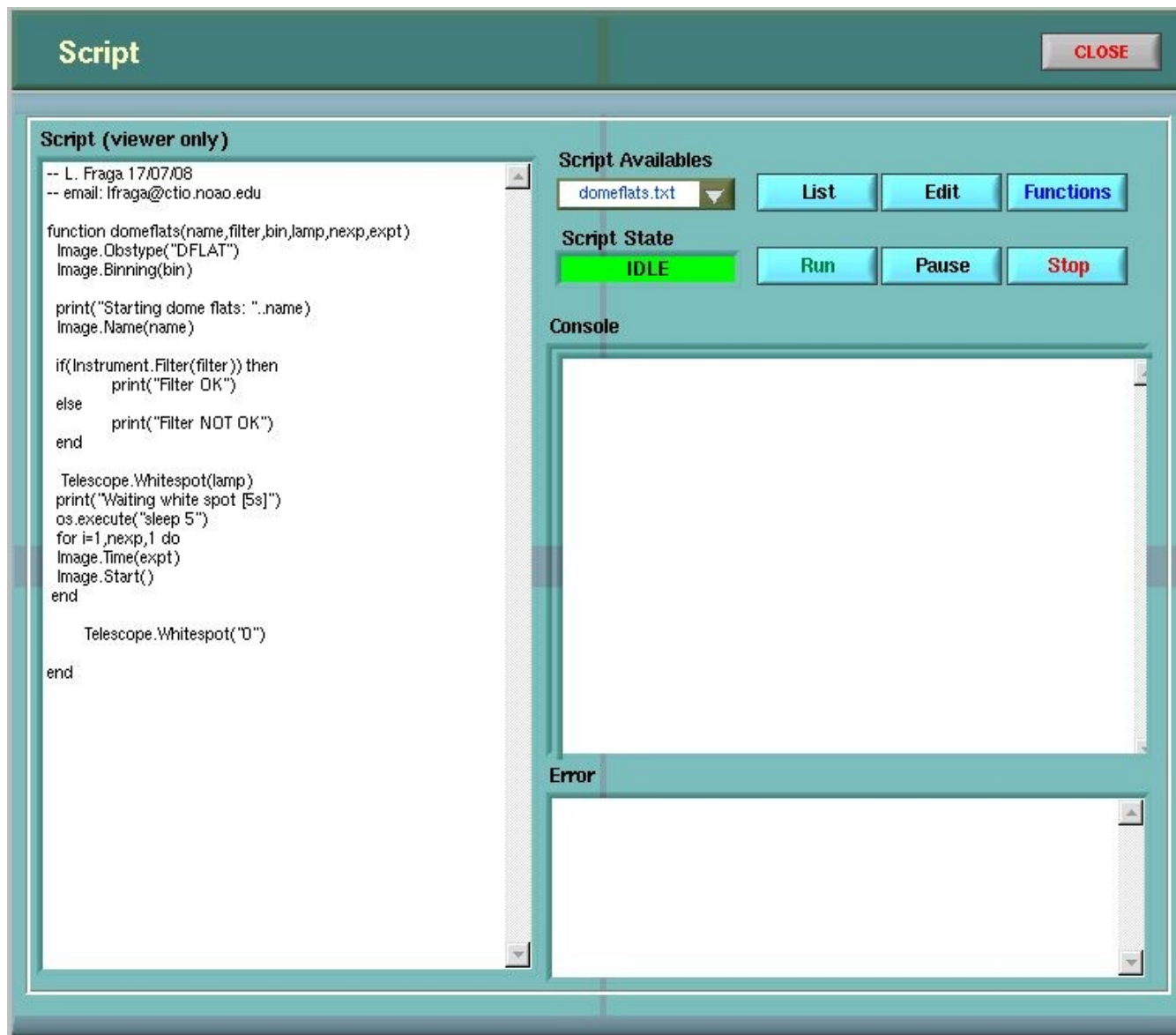
Interface Gráfica do Usuário

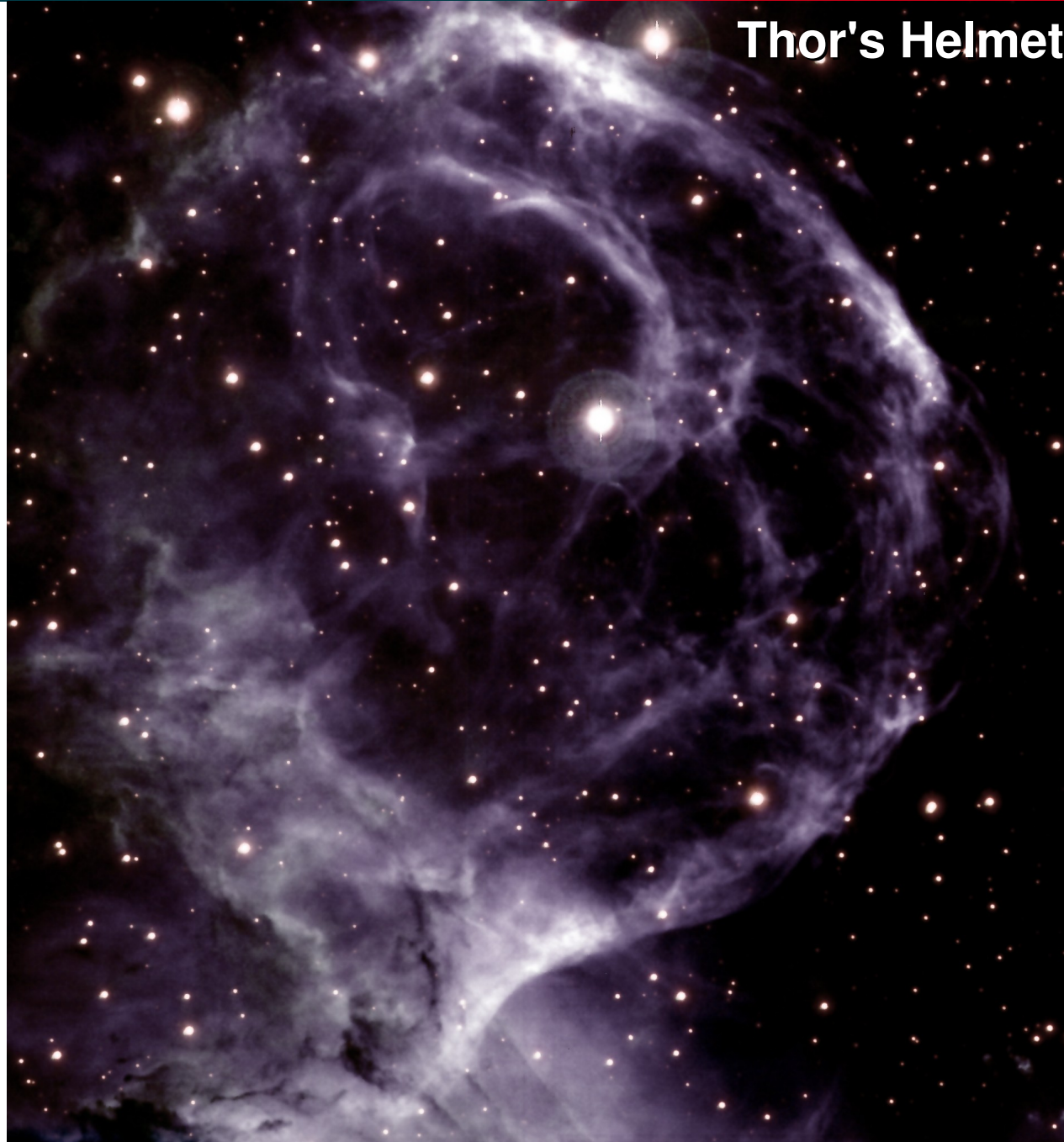


Interface Gráfica do Usuário



Script Tool (Linguagem LuaView)





PI: Chris Clemens

- **Modo Imageamento**

- FOV 7 arcmin (diâmetro) @ 0.15"/pix
- Filtros Kron-Cousin: U,B,V, R e Ic.

- **Modo Espectroscópico**

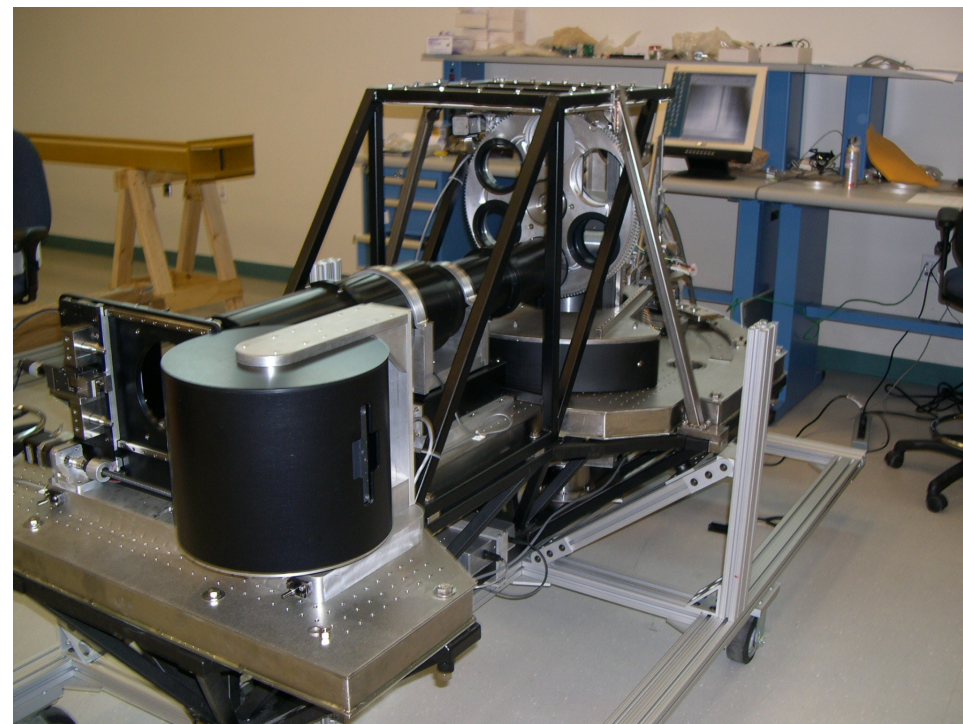
- **Fenda Longa**

- 3 Redes VPH: 300, 600, 1200 l/mm
- $R \sim 1400 - 6000$
- 355nm - 910nm
- Fendas: 0.46", 0.84", 1.03", 1.35", 1.68", 3", 10" e 40".
- Filtros: GG-385, GG-455, GG-485 e OG-570

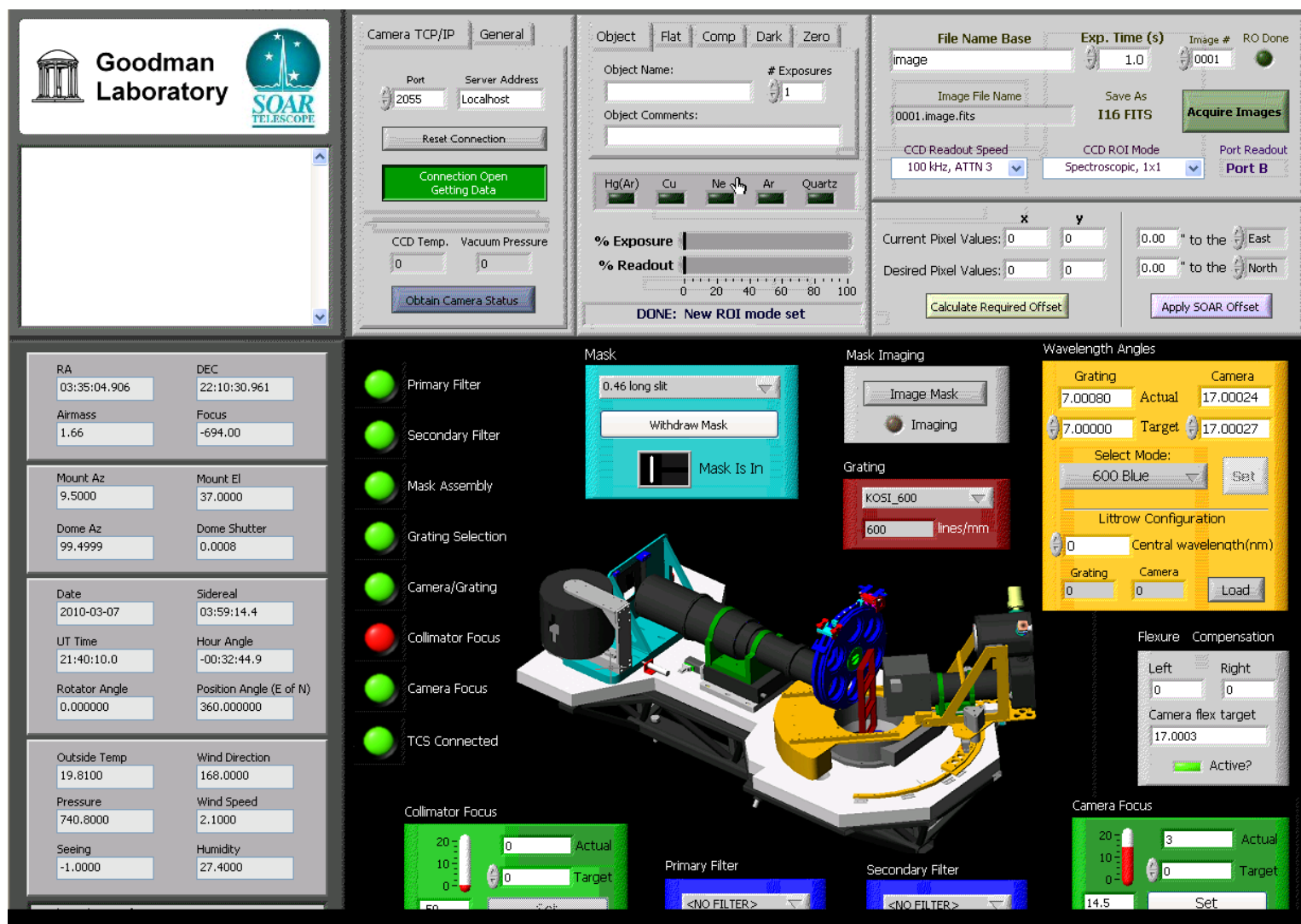
- **Modo Multi-Objeto (ainda sem previsão para comissionamento)**

- Laser Slit cutting machine compartilhada com Gemini

Fenda longa desde 2008B



Interface Gráfica do Goodman



Goodman Laboratory **SOAR TELESCOPE**

Camera TCP/IP General
Port: 2055 Server Address: Localhost
Reset Connection
Connection Open Getting Data
CCD Temp: 0 Vacuum Pressure: 0
Obtain Camera Status

Object Flat Comp Dark Zero
Object Name: # Exposures: 1
Object Comments:
Hg(Ar) Cu Ne Ar Quartz
% Exposure
% Readout
DONE: New ROI mode set

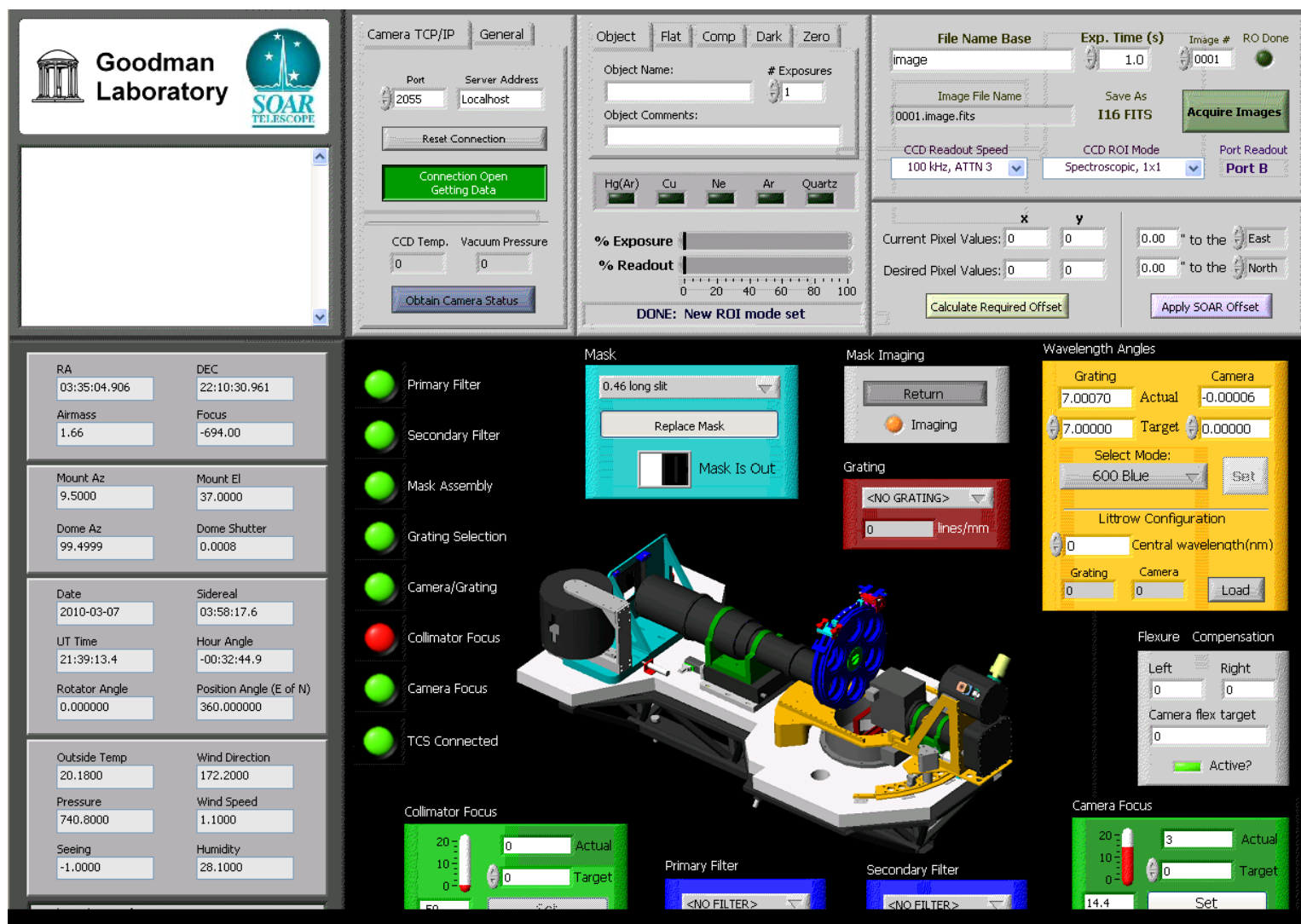
File Name Base Exp. Time (s): 1.0 Image #: 0001 RO Done
Image File Name: 0001.image.fits Save As: 116 FITS
Acquire Images
CCD Readout Speed: 100 kHz, ATTN 3 CCD ROI Mode: Spectroscopic, 1x1 Port Readout: Port B
Current Pixel Values: x: 0 y: 0 0.00 " to the East
Desired Pixel Values: x: 0 y: 0 0.00 " to the North
Calculate Required Offset Apply SOAR Offset

RA 03:35:04.906 **DEC** 22:10:30.961
Airmass 1.66 **Focus** -694.00
Mount Az 9.5000 **Mount El** 37.0000
Dome Az 99.4999 **Dome Shutter** 0.0008
Date 2010-03-07 **Sidereal** 03:59:14.4
UT Time 21:40:10.0 **Hour Angle** -00:32:44.9
Rotator Angle 0.000000 **Position Angle (E of N)** 360.000000
Outside Temp 19.8100 **Wind Direction** 168.0000
Pressure 740.8000 **Wind Speed** 2.1000
Seeing -1.0000 **Humidity** 27.4000

Mask 0.46 long slit
Withdraw Mask
Mask Is In
Mask Imaging Image Mask Imaging
Grating KO51_600 600 lines/mm
Wavelength Angles Grating: 7.00080 Actual: 17.00024 Target: 7.00000
Select Mode: 600 Blue Set
Littrow Configuration: 0 Central wavelength(nm)
Grating: 0 Camera: 0 Load
Flexure Compensation Left: 0 Right: 0 Camera flex target: 17.0003 Active?
Camera Focus 20 3 Actual: 14.5 Target: 0 Set

Collimator Focus 20 0 Actual: 0 Target: 0 Set
Primary Filter <NO FILTER>
Secondary Filter <NO FILTER>

Interface Gráfica do Goodman



The screenshot displays the Goodman Laboratory SOAR Telescope GUI, which is organized into several functional panels:

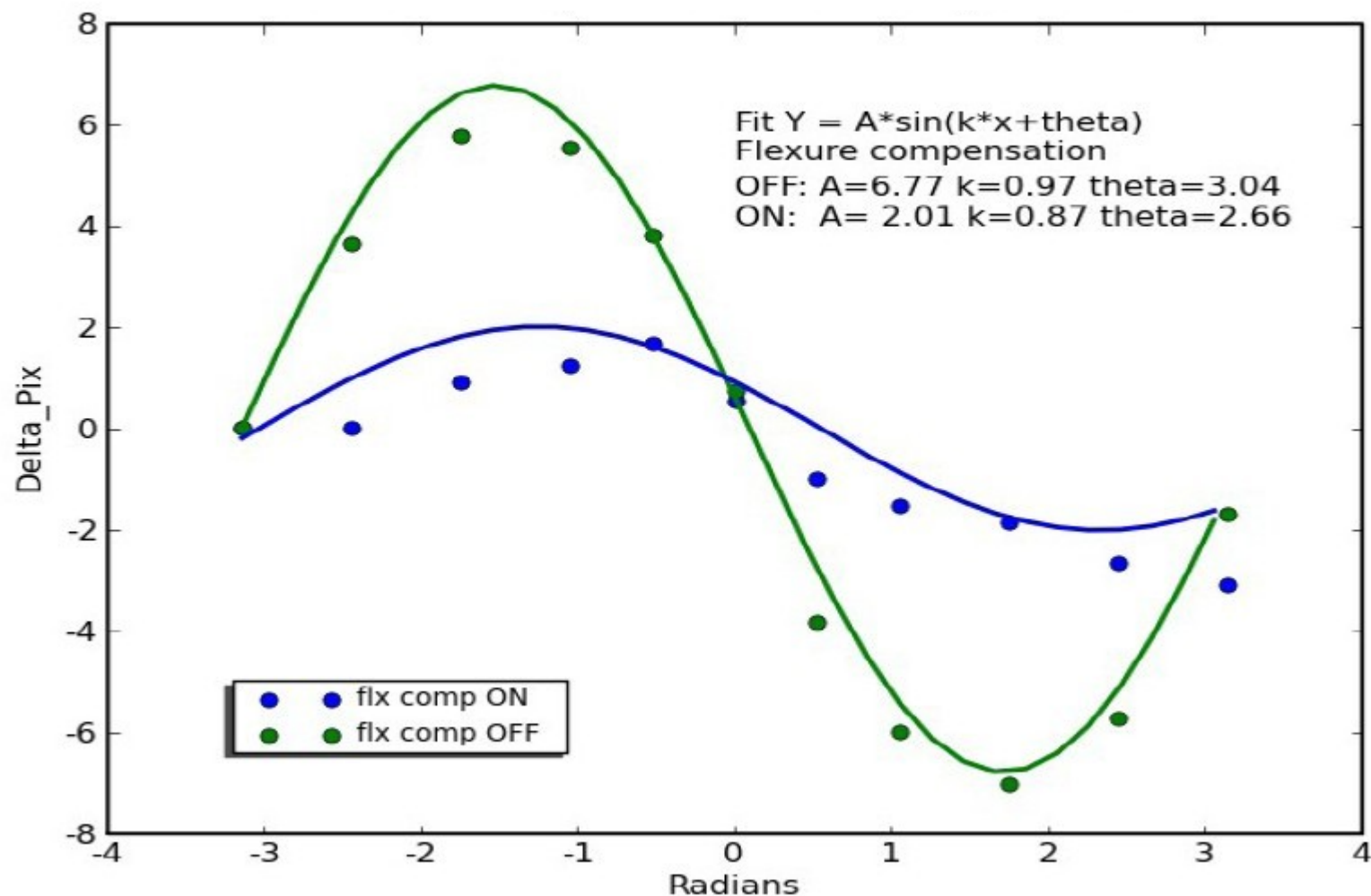
- Top Left Panel:** Contains the Goodman Laboratory logo and a large empty window for image viewing.
- Top Center Panel (Camera TCP/IP):** Includes fields for Port (2055) and Server Address (localhost), a 'Reset Connection' button, and a 'Connection Open Getting Data' button. It also shows 'CCD Temp.' and 'Vacuum Pressure' as 0.
- Top Right Panel (Object):** Features tabs for Object, Flat, Comp, Dark, and Zero. It includes fields for Object Name, # Exposures (1), and Object Comments. Below are buttons for Hg(Ar), Cu, Ne, Ar, and Quartz, along with '% Exposure' and '% Readout' sliders. A status bar at the bottom indicates 'DONE: New RDI mode set'.
- Top Far Right Panel (File Name Base):** Contains fields for File Name Base (image), Exp. Time (1.0), Image # (0001), and Image File Name (0001_image.fits). It includes a 'Save As' button, a 'Port Readout' dropdown set to 'Port B', and an 'Acquire Images' button.
- Bottom Left Panel (RA/DEC):** Displays RA (03:35:04.906), DEC (22:10:30.961), Airmass (1.66), and Focus (-694.00). It also shows Mount Az (9.5000), Mount El (37.0000), Dome Az (99.4999), and Dome Shutter (0.0008).
- Bottom Center Panel (Mask):** Includes a 'Mask' dropdown set to '0.46 long slit', a 'Replace Mask' button, and a 'Mask Is Out' indicator. Below is a 3D model of the telescope's internal components.
- Bottom Right Panel (Wavelength Angles):** Features a 'Grating' dropdown set to '600 Blue', a 'Select Mode' button, and a 'Littrow Configuration' section with a 'Central wavelength(nm)' field set to 0. It also includes a 'Load' button.
- Bottom Far Right Panel (Flexure Compensation):** Includes a 'Flexure Compensation' section with 'Left' and 'Right' fields set to 0, a 'Camera flex target' field set to 0, and an 'Active?' checkbox.
- Bottom Center Panel (Collimator Focus):** Includes a 'Collimator Focus' section with a 'Collimator Focus' slider set to 0, and 'Actual' and 'Target' fields.
- Bottom Far Left Panel (Camera/Grating):** Includes a 'Camera/Grating' section with a 'Camera' dropdown set to '0' and a 'Grating' dropdown set to '0'.
- Bottom Far Right Panel (Camera Focus):** Includes a 'Camera Focus' section with a 'Camera Focus' slider set to 14.4, and 'Actual' and 'Target' fields.

Dicas para o planejamento das observações

- **Ver documento preparado por Sergio Scarano Jr. em:**
 - LNA em Dia #11 e na página do SOAR no LNA.
- **Calibração em comprimento de onda é importante**
 - Intercalar lâmpadas de comparação (ex. HgAr, Cu) sem que a configuração do espectrógrafo seja alterada (ângulo de rede, ângulo de câmera e posição da fenda).

Testes com o compensador de flexão

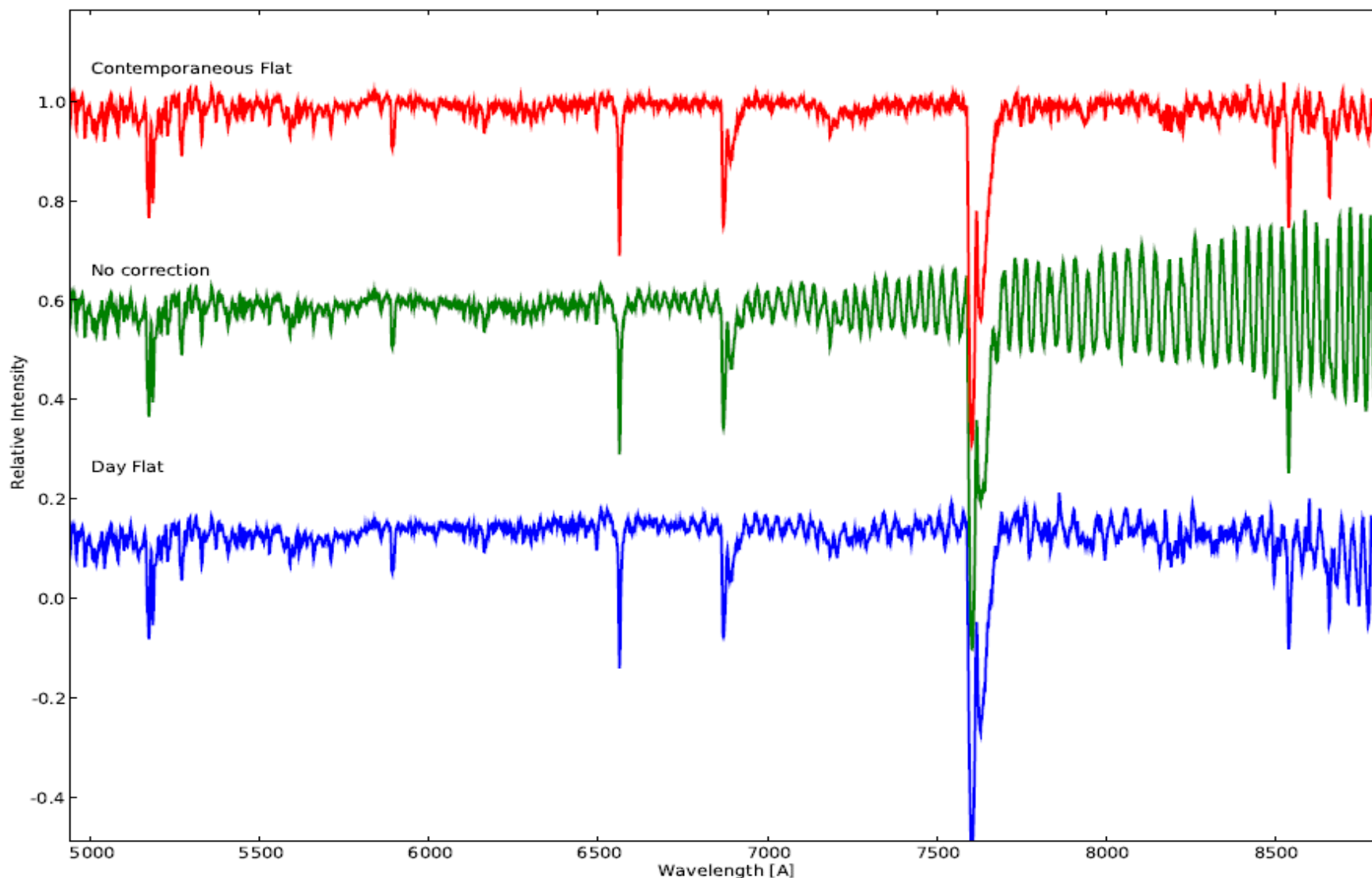
Lâmpadas de HgAr obtidas em diferentes ângulos do rotator



Dicas para o planejamento das observações

- **Ver documento preparado por Sergio Scarano Jr. em:**
 - LNA em Dia #11 e na página do SOAR no LNA.
- **Calibração em comprimento de onda é importante**
 - Obter lâmpadas de comparação (ex. HgAr, Cu) antes e/ou depois do espectro de ciência, sem que haja alteração da configuração do espectrógrafo (ângulo de rede, ângulo de câmera e posição da fenda).
- **Remoção de franjas**
 - Obter uma lâmpada de quartzo antes e/ou depois do espectro de ciência, novamente, sem que haja alteração da configuração do espectrógrafo.

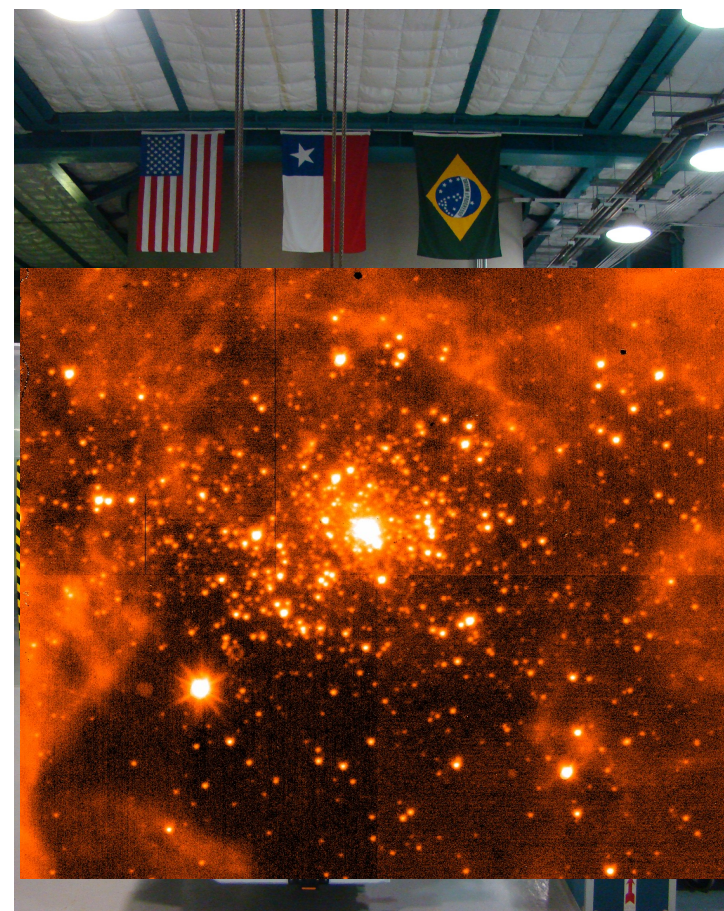
Correcção de franias utilizando uma lâmpada de quartzo



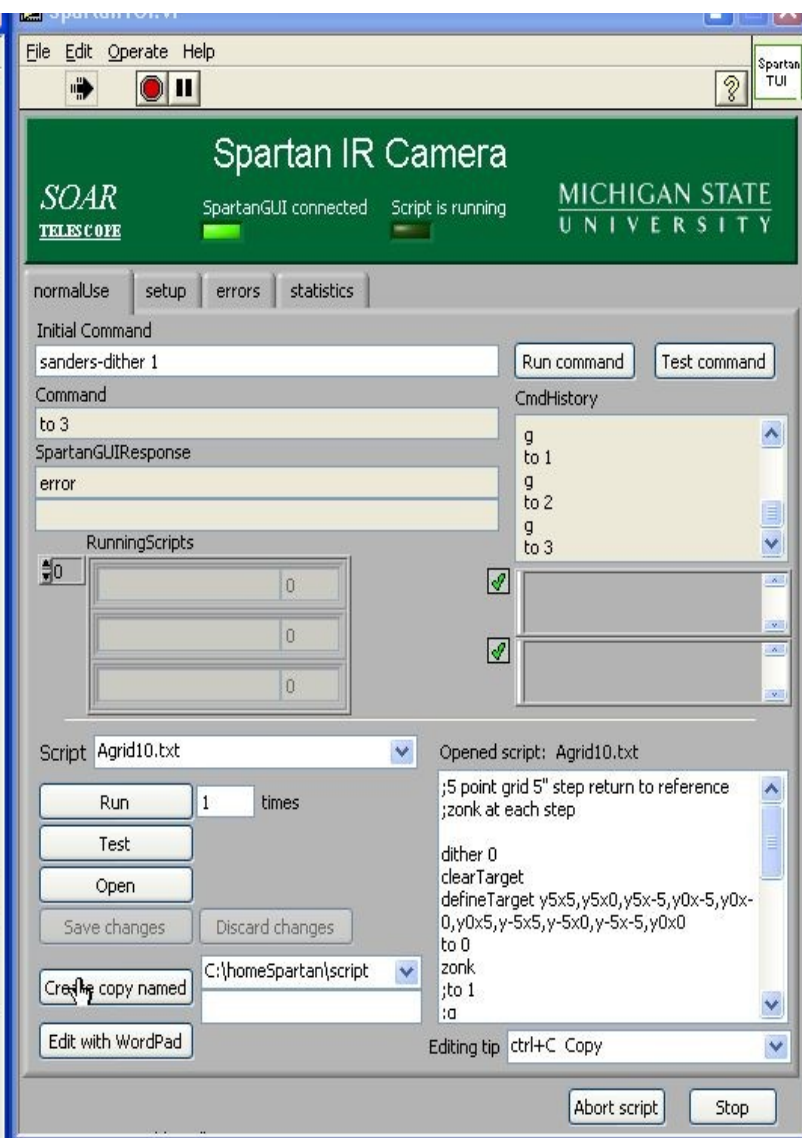
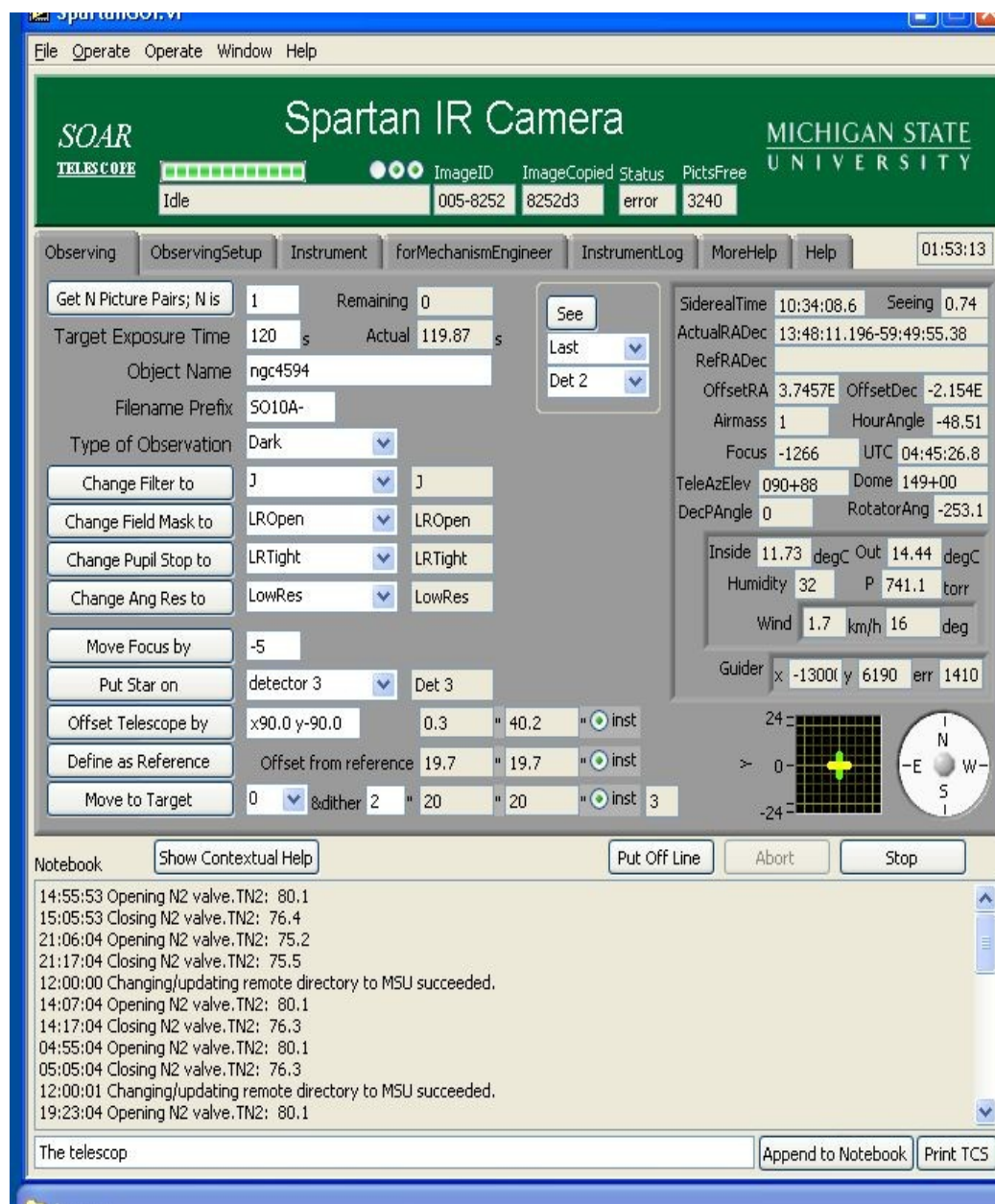
- **Oferecido em 2010A em modo de “risco compartilhado”**
- Duas escalas de placa:
 - f/21: 3.0'×3.0' with 0.041" pixel (HiRes)
 - Amostra o limite de difração na banda H
 - f/12: 5.0'×5.0' with 0.068" pixel (LoRes)
- Quatro detectores:
 - 4K x 4K HgCdTe Mosaic
 - 1 deles ainda detector de engenharia
- Filters:
 - Y, J, H, K
 - HeI, H₂, [FeII], Bry, CO, CIV, cont.



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SPARTAN GUI



Mais perguntas: soar.suporte@lna.br

