MAORI

Lisa Rightmire

Mentor: Marcos van Dam

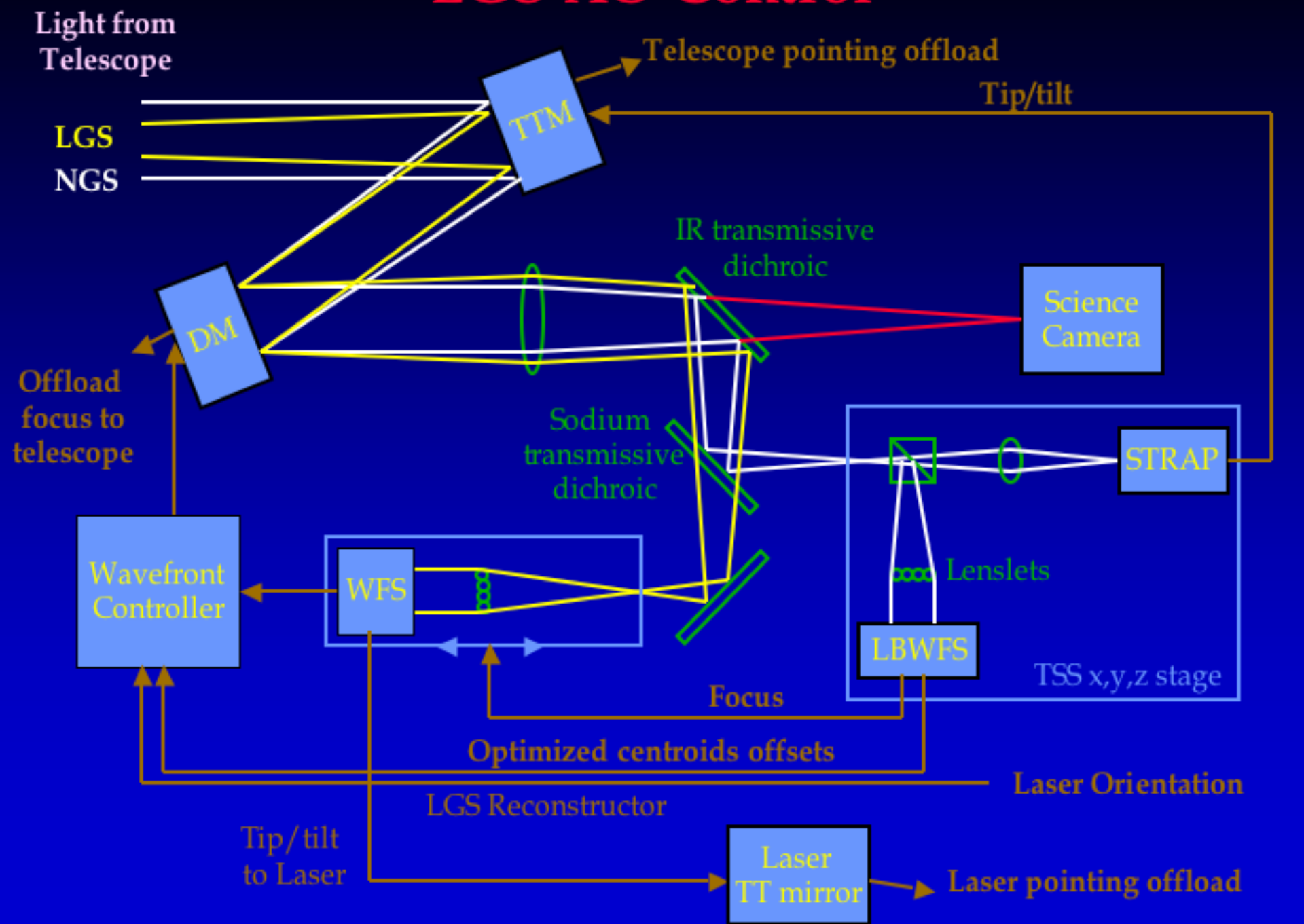
What is MAORI?

- The indigenous tribal people of New Zealand
- Marcos' Adaptive Optics
  Rectangular Interface

But what does it do?

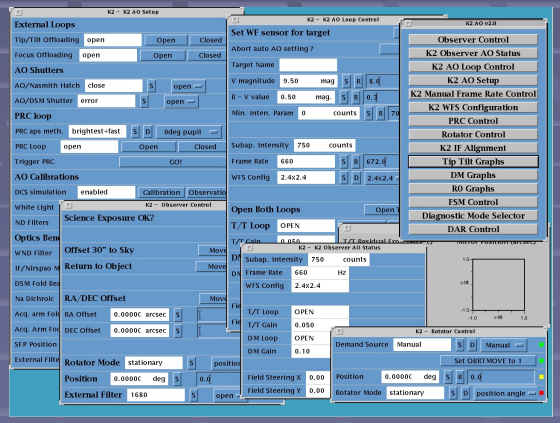
- Graphical User Interface (GUI)
- Used by Observing Assistants and Support Astronomers
- Controls and monitors the status of the Adaptive Optics system of the Keck Telescopes

LGS AO Control



Before MAORI

- Several GUIs to control each subsystem of the Keck AO systems
- Very little “real estate”



Goals

- Use Python to create a single GUI that would allow the user to view and control the status of each subsystem.
- Most important goal was to create an interface that was extremely compact, clear and easy to operate.

Key Conditions

- User Friendly
- Flexible
- Fast
- Easily Maintained
- Compatible with Keyword Interface

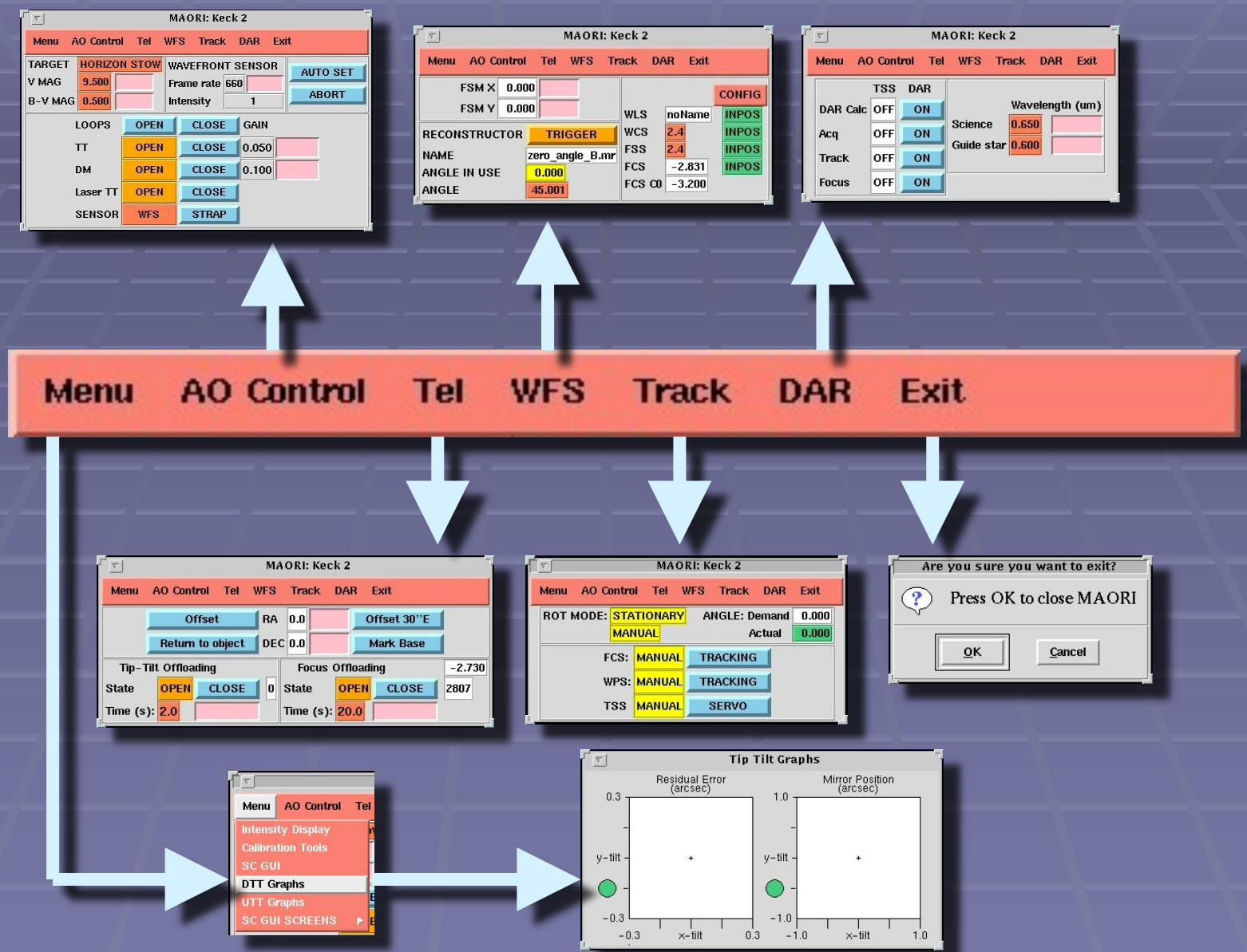
Why code in Python?

Keyword Interface Compatible:
Java, IDL, Python

IDL:
- -NOT flexible
- -REQUIRES License

JAVA:
- -REQUIRES a software engineer to modify and maintain

PYTHON:
- -simple GUI creation
- -flexible
- -open source
- -easy to modify and maintain


MAORI: Keck 2
Menu AO Control Tel WFS Track DAR Exit
TARGET HORIZON STOW
V MAG 9.500
B-V MAG 0.500
WAVEFRONT SENSOR
Frame rate 660
Intensity 1
AUTO SET
ABORT
LOOPS OPEN CLOSE GAIN
TT OPEN CLOSE 0.050
DM OPEN CLOSE 0.100
Laser TT OPEN CLOSE
SENSOR WFS STRAP
FSM X 0.000
FSM Y 0.000
CONFIG
RECONSTRUCTOR TRIGGER
NAME zero_angle_B.mr
ANGLE IN USE 0.000
ANGLE 45.001
WLS noName INPOS
WCS 2.4 INPOS
FSS 2.4 INPOS
FCS -2.831 INPOS
FCS C0 -3.200
TSS DAR
DAR Calc OFF ON
Acq OFF ON
Track OFF ON
Focus OFF ON
Wavelength (um)
Science 0.650
Guide star 0.600
Menu AO Control Tel WFS Track DAR Exit
Offset RA 0.0 Offset 30"E
Return to object DEC 0.0 Mark Base
Tip-Tilt Offloading
State OPEN CLOSE 0
Time (s): 2.0
Focus Offloading -2.730
State OPEN CLOSE 2807
Time (s): 20.0
ROT MODE: STATIONARY MANUAL
ANGLE: Demand 0.000
Actual 0.000
FCS: MANUAL TRACKING
WPS: MANUAL TRACKING
TSS MANUAL SERVO
Are you sure you want to exit?
Press OK to close MAORI
OK
Cancel
Menu AO Control Tel
Intensity Display
Calibration Tools
SC GUI
DTT Graphs
UTT Graphs
SC GUI SCREENS
Tip Tilt Graphs
Residual Error (arcsec)
Mirror Position (arcsec)
y-tilt
x-tilt
0.3
-0.3
1.0
-1.0

Features

-a very compact design

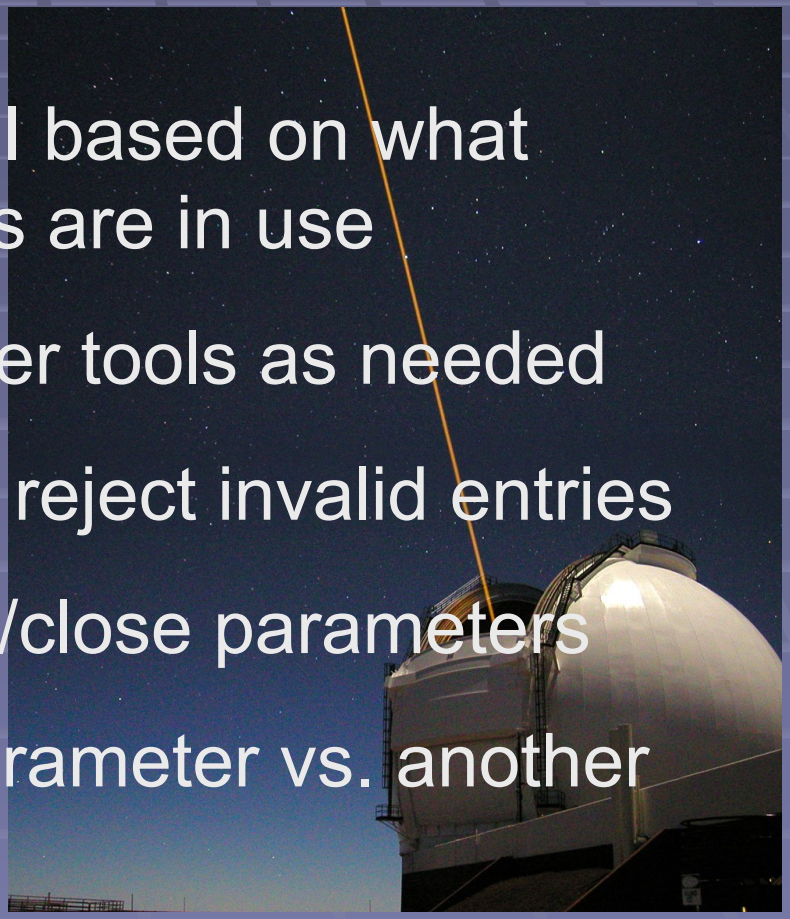
-logic to configure the GUI based on what telescope and instruments are in use

-the ability to bring up other tools as needed

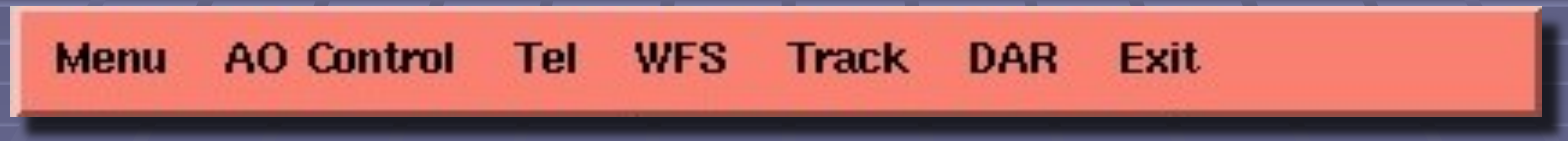
-uses pop-up warnings to reject invalid entries

-toggle functions for open/close parameters

-charts for plotting one parameter vs. another



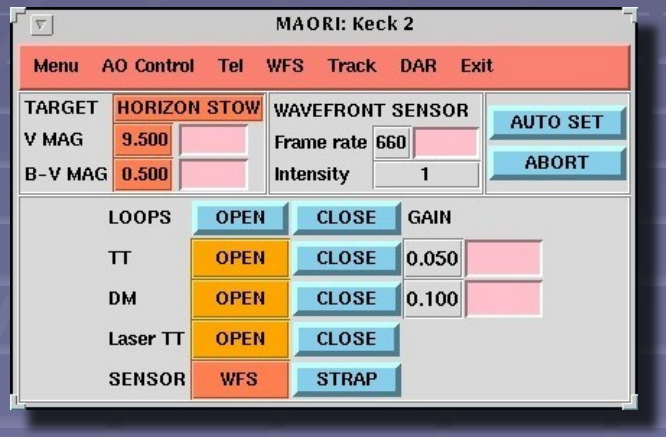
Compact Design



- Tabbed interface
- Switch between displays based on needed parameters
- Maximum info is a small space

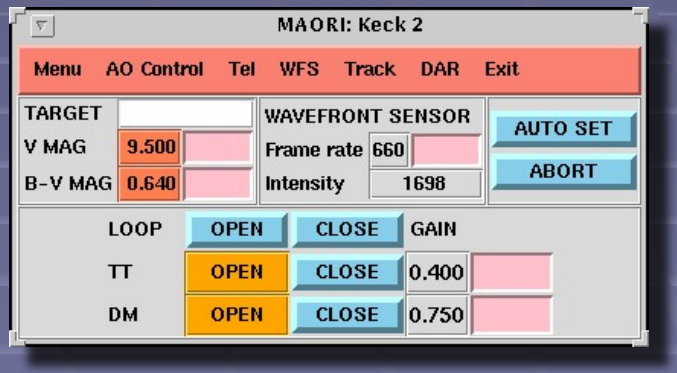
Self Configuring

LGS



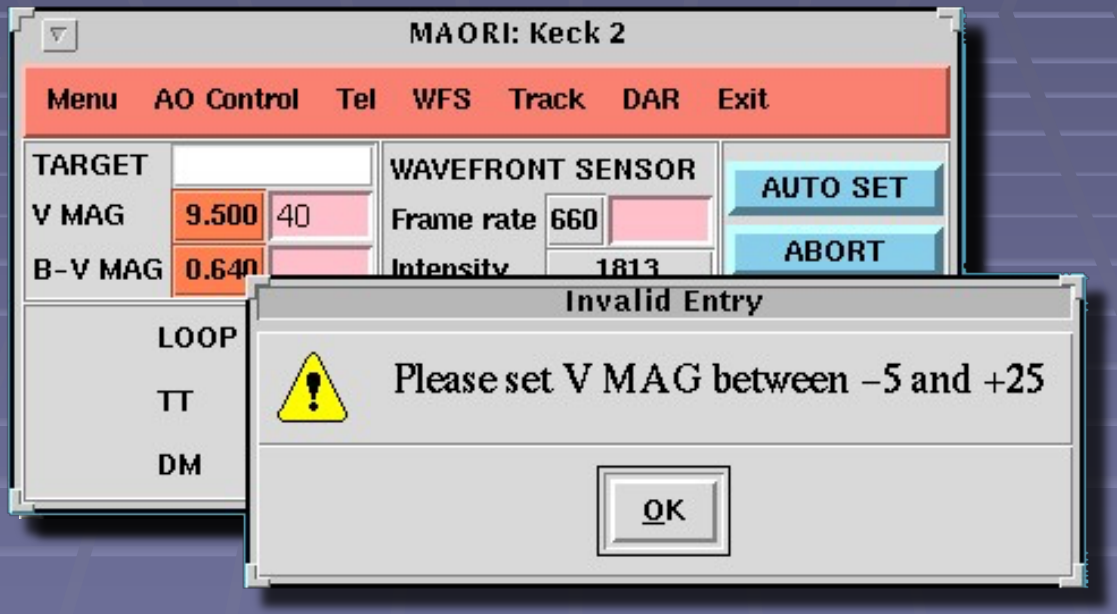
vs.

NGS



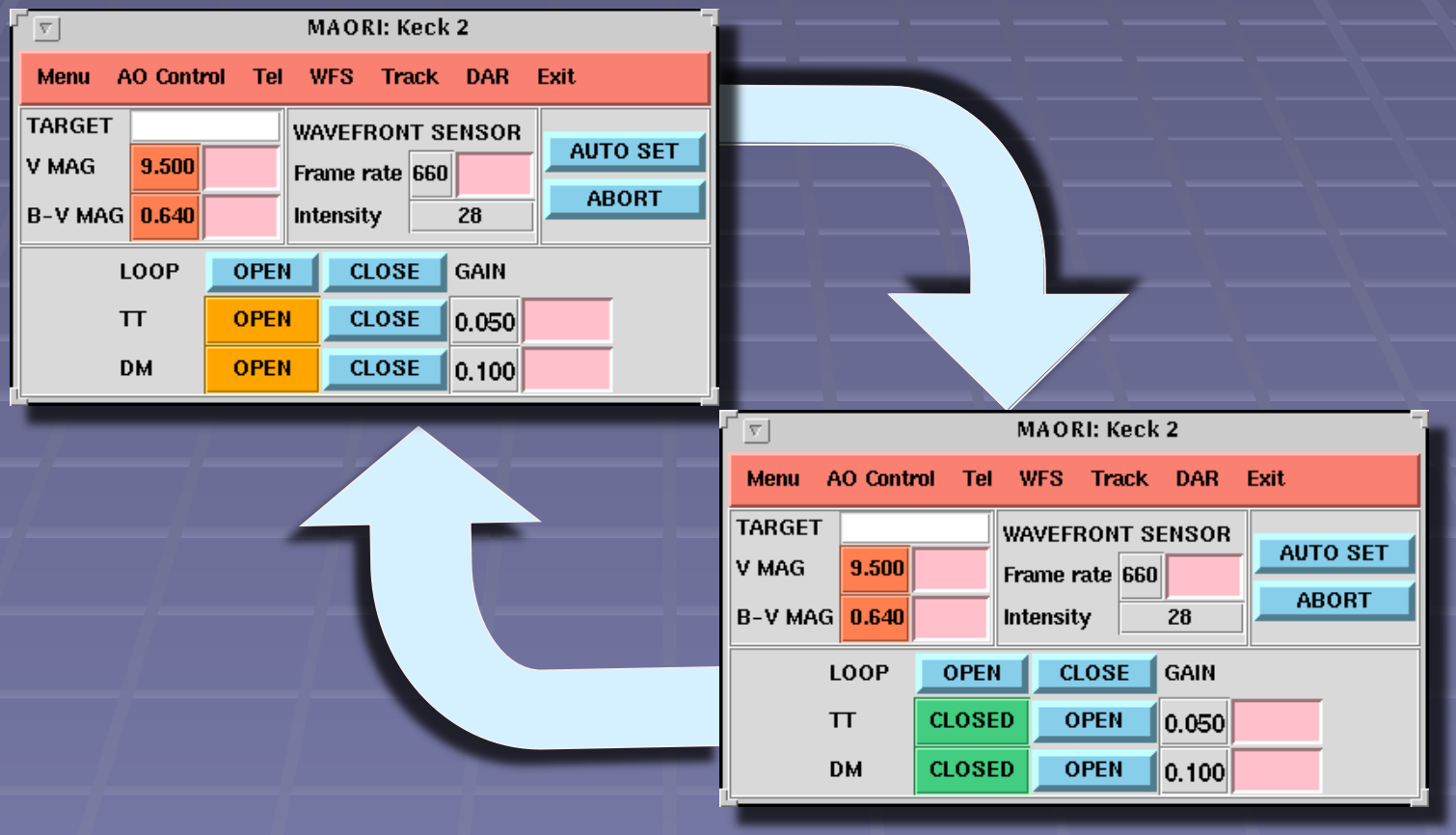
- Based on telescope and instruments
- Multiple frames that disappear or reappear

Pop-Up Warnings

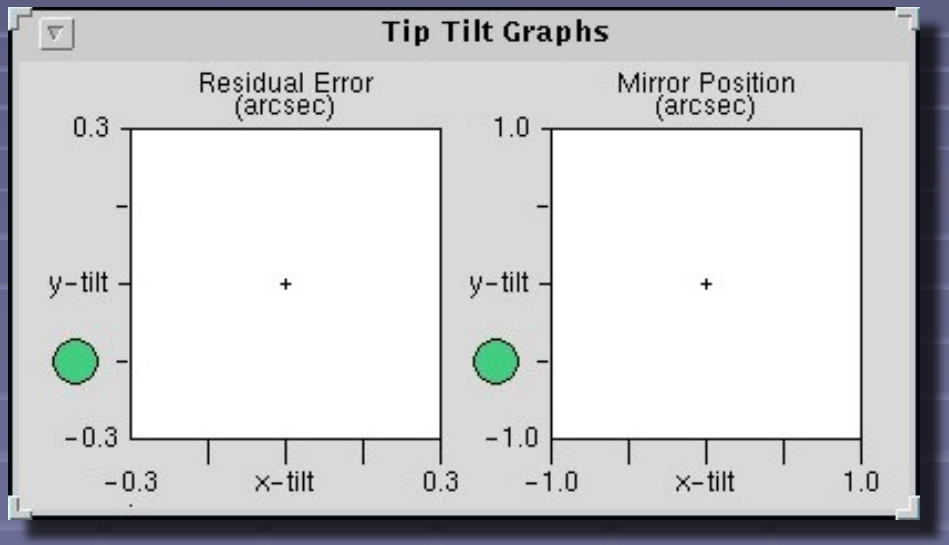


- Rejects invalid entries
- Notifies user what values are acceptable

Toggle Functions



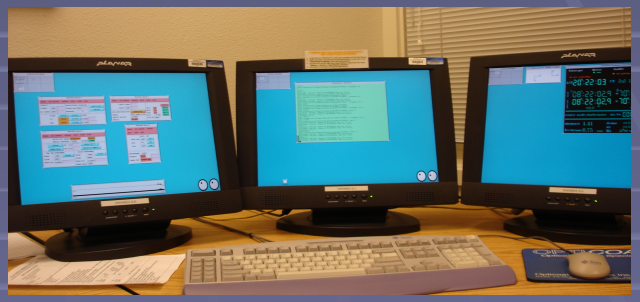
Charts

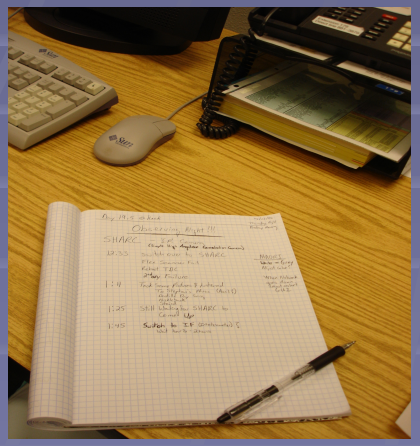


- Plots one parameter vs. another
- Continuously updates with live data
- Traffic light style warning

Testing

- The Keck Observatory sets aside engineering nights specifically for the purpose of testing new software.

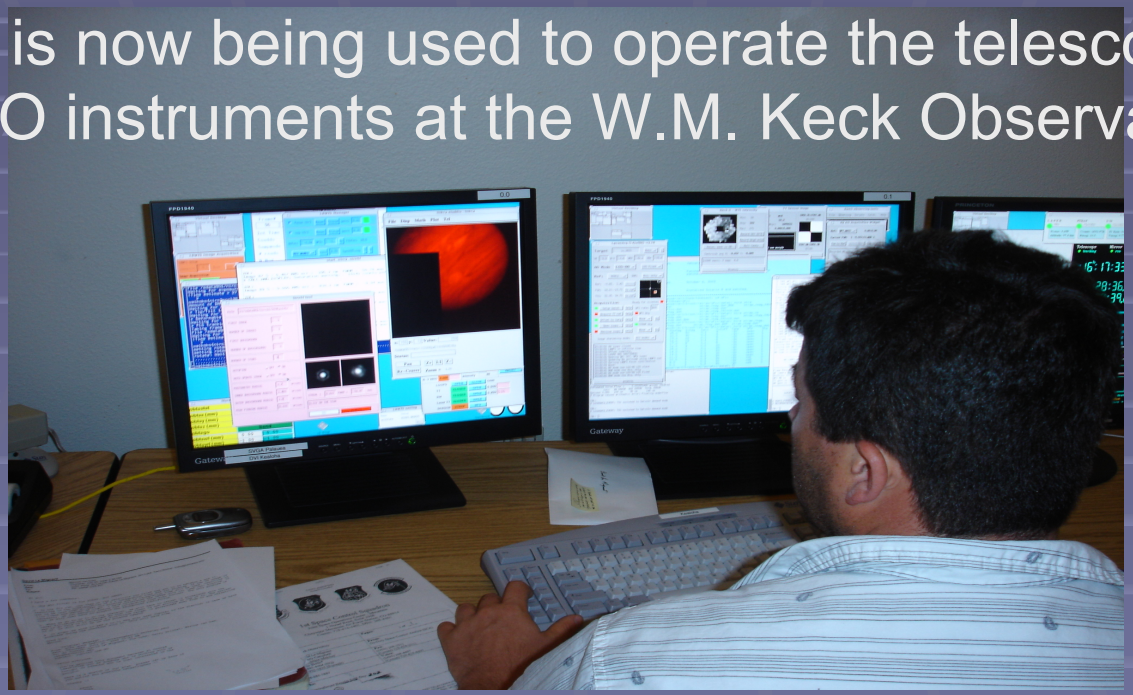




- MAORI was tested on two engineering nights.
- Observing assistants were asked to test and give feedback on MAORI.
- MAORI officially went online the end of July 2006.

Conclusion

MAORI is now being used to operate the telescopes and AO instruments at the W.M. Keck Observatory.



Scheduled to be in operation for the next five to ten years, MAORI will provide the observing assistant with a compact tool for viewing and modifying AO parameters as needed by astronomers observing with the Keck telescopes.

Acknowledgements

Special thanks to Marcos van Dam for being an amazing mentor!

Thanks to Shui Kwok and Jimmy Johnson for all their help with Python.

Thanks to Malika Bell, Sarah Anderson, and David Le Mignant for all their guidance and support.

W.M. Keck Observatory
Center for Adaptive Optics

This project is funded in part by the National Science Foundation and Technology Center for Adaptive Optics, managed by the University of California at Santa Cruz AST# 9876783.