

The Ground-Based O/IR System

Introduction, Status, and Challenges



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Origin of the System

- Decadal surveys have limited their recommendations to publicly-funded facilities
- How to compete with ‘unified’ European effort
- How to take on projects too costly for NSF
- **“U.S. ground-based optical and infrared facilities, radio facilities, and solar facilities should each be viewed by the NSF and the astronomical community as a single integrated system drawing on both federal and nonfederal funding sources. Effective national organizations are essential to coordinate, and to ensure the success and efficiency of, these systems. Universities and independent observatories should work with the national organizations to ensure the success of these systems.”**

AASC recommendations

- Policy – roles for NOAO and independent observatories in strategic planning and in providing an optimum suite of capabilities
- GSMT – a joint public/private 30-m telescope
- LSST – a telescope with large $A\Omega$ to carry out a ten-year survey and create a publicly accessible archive of time-domain data
- TSIP – a grants program to fund large facility instruments for the large telescopes of the independent observatories and provide time on those telescopes to the community
- NVO – the development of standards, interfaces, protocols, and tools to federate astronomical archives and enable new types of research

What is innovative about the system viewpoint?

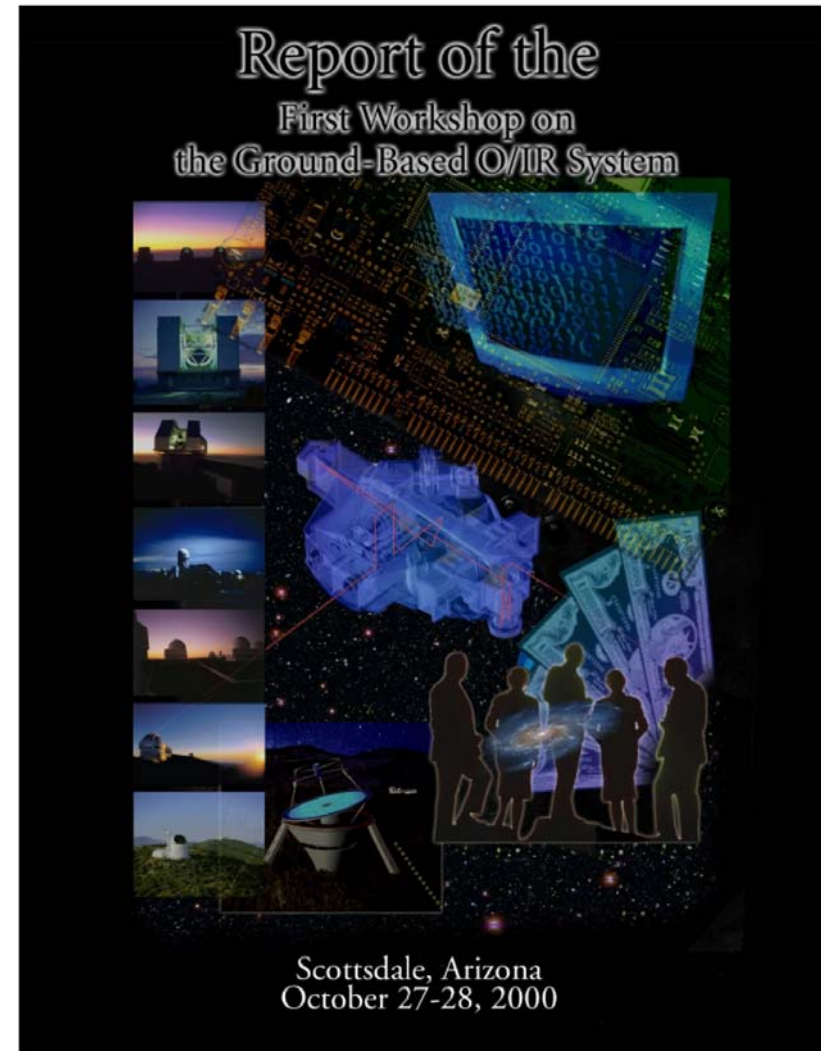
- Multiple capabilities, used together, make up the system
- Sharing can be more efficient
- The system is a community-wide concept
- Funding at the margin can have a dramatic impact
- The system can be implemented in a way that recognizes and maintains the strengths of US ground-based efforts

Why a community workshop?

- Involve the community in exploring the concept of the system and understanding its elements
- Structure community discussions of O/IR-related science goals for the next decade and develop the flowdown to the required capabilities
- Identify needed capabilities that do not currently exist (or are in short supply)
- Contribute to the process of developing a strategic plan for the system – including recommendations about programs such as TSIP, GSMT, LSST, NVO, and the planning process itself

The First Workshop

- Needed instrumental capabilities
 - Wide-field imaging
 - Medium resolution optical & NIR spectrographs
 - WF optical & NIR multi-obj spectrographs
 - High-res optical & NIR spectrographs
 - DL imaging & IFU spectroscopy
- Other recommendations
 - Software for data acquisition, reduction, analysis
 - Archiving & the NVO
 - GSMT & ground-based interferometry
 - Access to non-traditional observing modes
 - New model for instrumentation, operation, & access to small telescopes

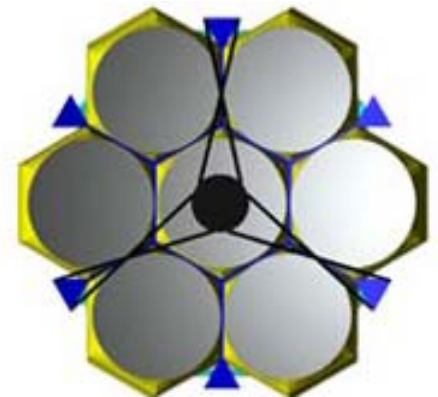
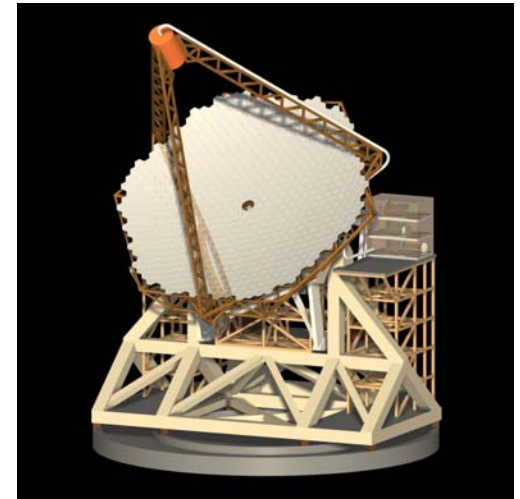


Progress since the first workshop

- TSIP
 - In 3rd year at \$4M/yr
 - Funded
 - OSIRIS – IFU-coupled NIR spectrograph behind AO on Keck
 - Design of KIRMOS – large format NIR MOS for Keck
 - MMIRS – NIR imager/MOS for MMT and Magellan
 - MODS (in negotiation) – Optical MOS for LBT
 - Telescope time for community
 - 53 nights on Keck
 - 26 nights on Magellan
 - 26 nights on MMT
 - 24 nights on LBT

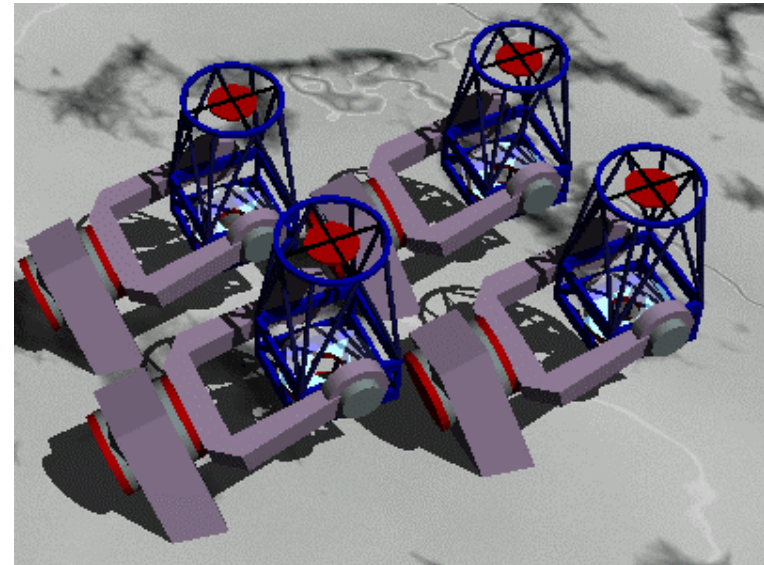
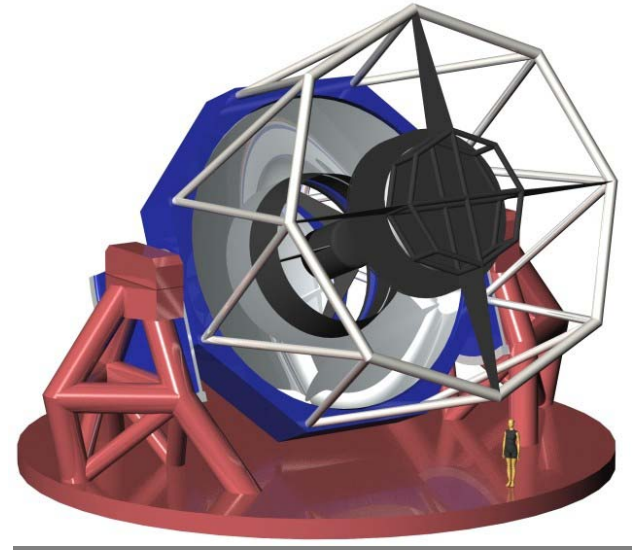
Progress since first workshop

- GSMT
 - Thirty Meter Telescope (TMT):
CELT, NOAO/AURA, ACURA
 - Giant Magellan Telescope (GMT):
Carnegie, Harvard, SAO, MIT, U.
Arizona, U. Michigan
 - Both projects beginning
design/development phase using
private and public funds
 - Public funds being sought through
NOAO/AURA proposal to NSF



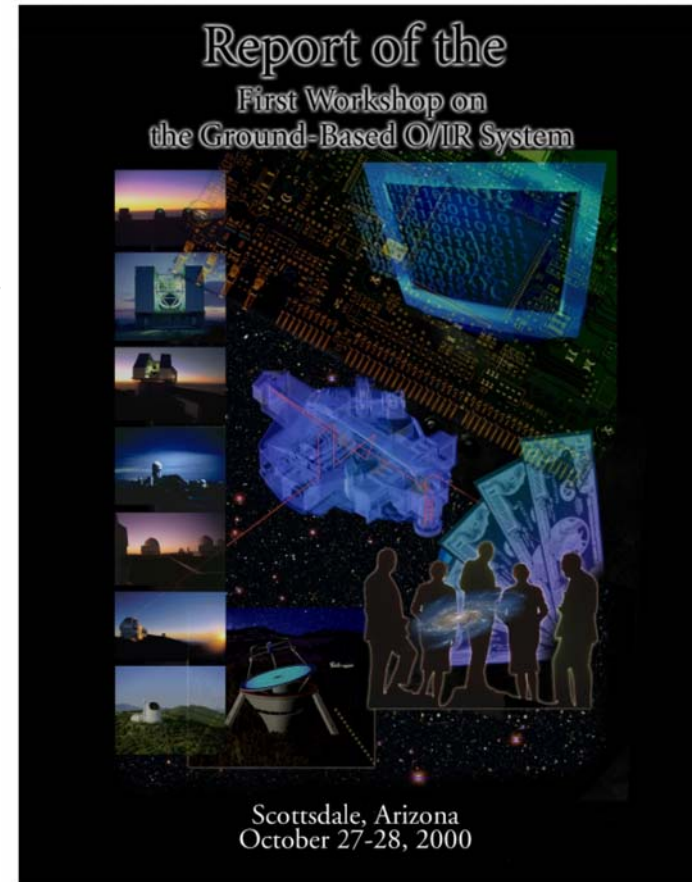
Progress since first Workshop

- LSST
 - Corporation formed to begin development of single mirror concept (LSST Corp)
 - Research Corp., U. Az., NOAO, U. Washington, DOE Labs
 - NSF proposal pending
- Pan-STARRS
 - Funding through USAF to develop 4 X 1.8m array
 - U. Hawaii (IFA), SAIC, MHPCC
- Other large-scale imaging surveys under development



The First Workshop (revisited)

- Needed instrumental capabilities
 - Wide-field imaging (**Megacam, ODI, Dark Energy Camera, NEWFIRM, Pan-STARRS, LSST**)
 - Medium resolution optical & NIR spectrographs (**GNIRS, GMOS, MODS**)
 - WF optical & NIR multi-obj spectrographs (**DEIMOS, IMACS, Hectospec, KIRMOS, Flamingos**)
 - High-res optical & NIR spectrographs (**Hectochelle, MIKE**)
 - DL imaging & IFU spectroscopy (**NIRC2, OSIRIS, NIRI**)
- Other recommendations
 - Software for data acquisition, reduction, analysis
 - Archiving & the **NVO**
 - **GSMT** & ground-based interferometry
 - Access to non-traditional observing modes
 - New model for instrumentation, operation, & access to small telescopes



Goals of this Workshop

- Revisit priorities that came from first workshop
 - Communities interests have evolved
 - New capabilities have become available
- Provide updated guidance to TSIP
 - Consider slightly different directions
 - e.g., capabilities for instrument upgrades or smaller telescopes
 - Have instrument-building programs been saturated?
- Broaden implementation of system
 - Smaller telescopes, instrumentation partnerships, software/archives, observing modes
 - Recommendations for new programs (e.g., PREST)

Workshop Format

- Welcome/introduction (organizers and NSF)
- Talks/discussion on elements of the system
- Talks/discussion on science areas
- Breakout sessions
- Breakout groups report and plenary discussion

Organizing Committee

- NSF and AURA have encouraged NOAO to establish a “Committee for the Development of an Integrated System”
 - Help synthesize workshop discussion into report
 - Provide ongoing perspective of community-representative group
- Committee will stay on to begin report Saturday morning

Pat Osmer (OSU – chair)

Charles Alcock (U. Penn.)

Todd Boroson (NOAO)

Debra Elmegreen (Vassar C.)

Tom Greene (NASA)

Garth Illingworth (UCSC)

Chris Stubbs (Harvard U.)