Interferometer Workshop
Cost Modeling for Arrays

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Interferometer Workshop
Cost Modeling for Arrays

Three Models to Examine

1. Classical Array
   - 24 4m Telescopes 1-2.5 micron w AO
   - 1000m baseline

2. ELT Alternative
   - 16 8m Telescopes 1-2.5 micron w AO
   - 100m baseline

3. 20-20
   - 2 20m Telescopes 1-2.5 micron w AO
   - 20m baseline
Interferometer Workshop

Costs to Consider

1. Number of Telescopes
2. Diameter
3. Maximum Separation 1 km
4. Wavelength of Operation
5. Adaptive Optics - yes
6. LGS – yes
7. Optical Fiber Beam Transport
8. Moveable Telescopes
Enclosure Cost vs. Nominal Diameter

Costs shown are adjusted to 2002 (add ~15% to ~2008 construction date)

Other Enclosures
- Co-rotating
- Roll-off
- Rectangular
- Prismatic
- Cylindrical
- Geodesic
- Calotte concept

Mark Wagner – ATST
Jeff Barr - LSST
Construction Cost Index

% increase from base year
SOAR Site & Facility Cost Breakdown

Design & Consulting
- M3 Engineering $U.S. 265 K
- Geotécnica Consultores 155
- Site Testing 28

Early Site Work
- Leveling platform 155
- Extend Utilities from Gemini 38
- Foundation Excavation 26
- Original Contract (civil) 851

PUMA Contracts
- Electrical 130
- Mechanical 101
- Change Orders 96
- U.S. procured materials 340
- Shipping 40

AOSS
- Management & support ~120
- Construction & purchases ~60

$U.S. 2,405 K not including SOAR labor

Final cost for the building is ~$230/ sq.ft. (based on the standard method of calculation). This is on the low side for observatory facility construction.

These were ~50% higher than expected

46 to date, ~50 pending

Based on adjusted early estimates by E. Figueroa

$U.S. 265 K
<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scaled cost of 1 4m telescope</td>
<td>27.4</td>
</tr>
<tr>
<td>20 4m telescopes at .7 cost</td>
<td>383.6</td>
</tr>
<tr>
<td>AO - 300k 1st + 19*200k</td>
<td>4.1</td>
</tr>
<tr>
<td>Continuous Delay Lines - $2k/m *500m</td>
<td>1.0</td>
</tr>
<tr>
<td>2km of Vacuum Pipes * 500k/km</td>
<td>1.0</td>
</tr>
<tr>
<td>Beam Comptressors/Optics - 20@100k</td>
<td>2.0</td>
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<tr>
<td>BCL</td>
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<tr>
<td>Site Development</td>
<td>10.0</td>
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<td></td>
<td>403.7</td>
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