The “BASICS”

- **NOI** = Navy Optical Interferometer (formerly NPOI)
- Major funding by Oceanographer of the Navy and Office of Naval Research
- NOI is collaboration b/w USNO & NRL, in association with Lowell Observatory
- Lowell is science partner & contractor to USNO (infrastructure & ops)
The NOI Team:

USNO:
- Ken Johnston
- Paul Shankland
- Don Hutter
- Jim Benson
- Mike DiVittorio
- Bob Zavala

NRL:
- Richard Bevilacqua
- Tom Wilson
- Tom Armstrong
- Jonathan Andrews
- Ellyn Baines
- Jim Clark
- Bob Hindsley
- Sergio Restaino
- Henrique Schmitt

Lowell:
- Jeff Hall
- Gerard van Belle
- Caryn Fitch
- Floyd Drinkard
- Joel Dugdale
- Lisa Foley
- Jason Sanborn
- Susan Strosahl
- Steve Winchester
- Ron Winner

AZ Embedded Sys:
- Tim Buschmann
- David Allen

TSU:
- Matt Muterspaugh
- Askari Ghasempour
- Mike Williamson

NMT:
- Anders Jorgensen

29 February 2012
Current Capabilities:

- Simultaneous, group-delay fringe tracking on multiple baselines (6 stations)
- Bandpass 550-850nm in 16 channels (R ~ 30-50)
- Single-baseline fringe tracking to $m_v = 6.7$
- Multi-baseline fringe tracking w/closure phase to $m_v = 6.0$
- Operated by one observer, scheduled ~355 nights/year
NOI Update

Upgrades in Progress:

- **1.8 m telescopes:**
  - Nov 2010: gifted to Navy (USNO Flagstaff) by CARA
  - **Special Use Permit** expected from US Forest Service ~ April 2012
  - **Infrastructure plans** finished ~ April 2012
  - Navy funding (FY12/13) at **$9.88M** “95% certain” for mid-2012 construction start
  - FY14/15 funding “at several $M” has good prospects
  - **Additional funds** being sought (DARPA, etc.)

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Upgrades in Progress (2):

- NRL “CPP” program:
  - Complete 6-station “imaging” (portable) siderostat array
  - New enclosures for star acquisition & tip-tilt optics under construction
  - New domes under construction for last 3 imaging siderostats
  - Complete integration of Long Delay Lines (optics & control)
  - Last 3 imaging stations, installed & commissioned in FY 12
  - Baselines to 437m
Upgrades in Progress (3):

- **PC-based siderostat controllers (SIDcons)** for astrometric stations
  - Includes new 250kHz metrology

- **PC-based Fast Delay Line (FDL) & New Fringe Engine in FY12:**
  - Based on real-time Linux, 90% off-shelf components
  - New 2MHz metrology detection & (delay dither) piezo electronics
  - New stellar fringe engine implementation
    » will allow increased bandpass (450-850nm, 32 channels)
    » will allow use of all beam combiner outputs
Upgrades in Progress (4):

• **VISION** beam combiner:
  
  – NSF funded, PI: Matt Muterspaugh (Tennessee State Univ.)
  – 6-beam, visible-light analog of MIRC
  – fiber inputs tested at NOI in March 2011
  – final installation at NOI beginning April 2012
USNO – NOI Astrometric Catalog (UNAC):

- **Goal:** Catalog of >1000 stars with positions accurate to < 16 mas (tied to ICRF).

- **Pipeline improvements** over last year (full NOVAS implementation, fringe frame SNR weighting, improved atmospheric corrections & statistically robust position fitting) have yielded positions believed accurate at ~ 8 mas (~76 sources, δ > -10°).

- **Need to:** complete simultaneous 6-baseline solutions for first ~115 stars, check NOI positions of radio stars.
Stellar Diameters:

Review Article (wide- and narrow-angle astrometry):
- *Ground-based Optical Interferometry*, Hutter 2012, Scholarpedia, under review

Coherent averaging / limb darkening:
- Jorgensen et al.: γ Sagittae, ξ Cygni,

Narrow-angle astrometry:
- Schmitt et al.: γ Leonis A + B

Geosatellites:
- Air Force CP3 (active illumination of satellite)
- DARPA Galileo (passive detection)
- Another NOI glint run?