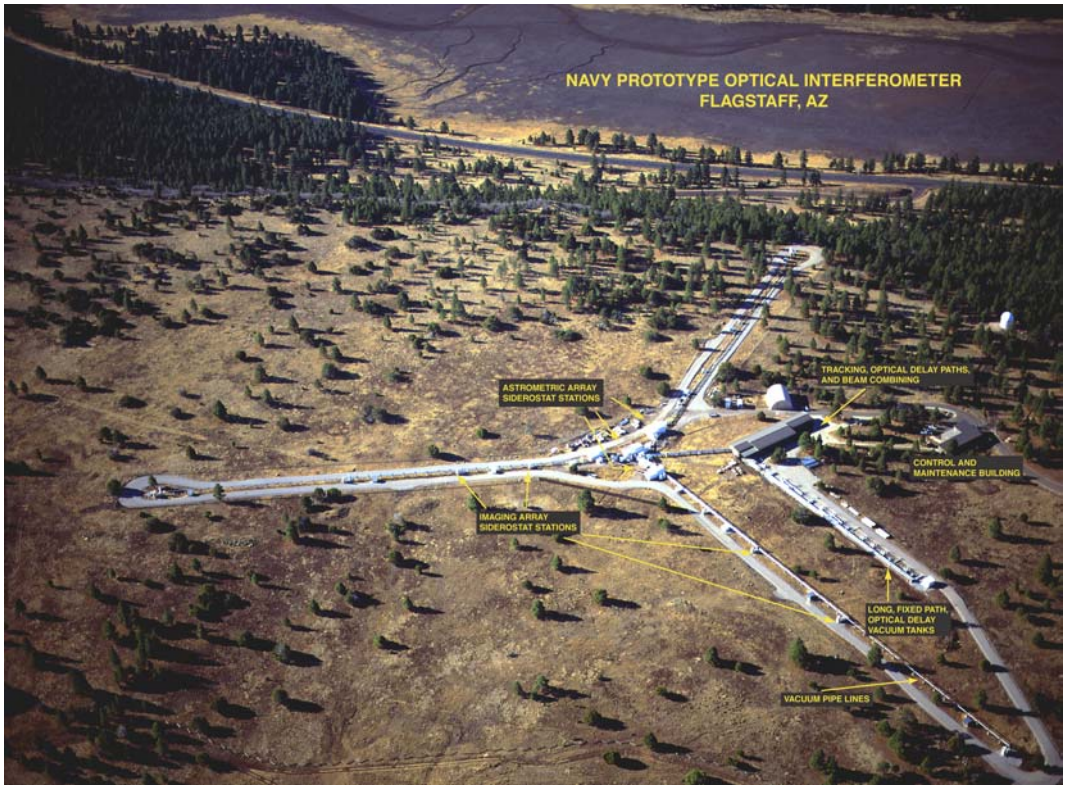
Navy Prototype Optical Interferometer



The Navy Prototype Optical Interferometer (NPOI), a major facility of NRL's and the U.S. Naval Observatory, is actually two collocated instruments for making high-angular-resolution optical measurements of stars. Light from widely separated individual siderostats is combined simultaneously to synthesize the angular resolution of a telescope tens to hundreds of meters in diameter. Six relocatable siderostats can be placed out to distances of 250 m from the array center and used to construct very-high-resolution images of stars. These images provide fundamental astrophysical information on stellar structure and activity. Four siderostats are placed in an array with extremely accurate metrology to enable very-high-precision measurements of stellar positions (wide-angle astrometry). These measurements are used by the U.S. Naval Observatory to refine the celestial reference frame, determine Earth rotation parameters, and thus satisfy Navy requirements for precise time and navigation data. They also provide determinations of basic astrophysical parameters, such as stellar masses and diameters. When complete, the NPOI will be the most advanced high-resolution imaging optical interferometer in the world. Its longest baselines of 437-meters result in angular resolution more than 100 times better than Hubble Space Telescope on objects as faint as 7th magnitude.

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