City Beacon

John Vallerga

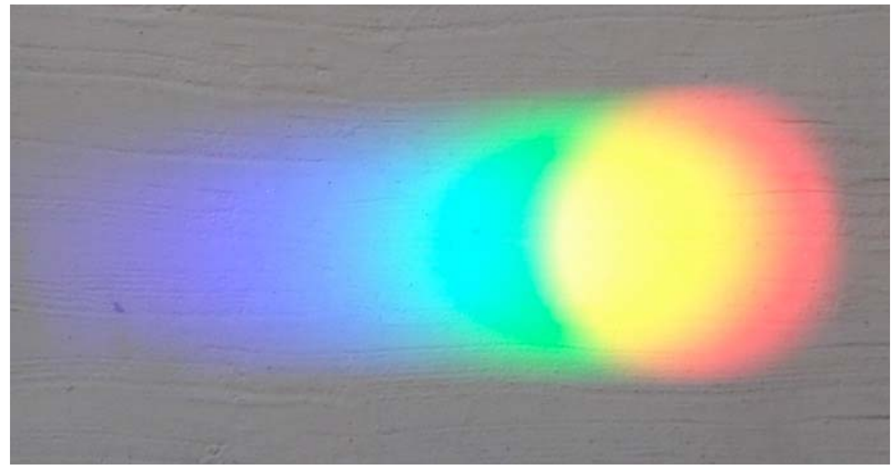
Liliane Lijn

Concept

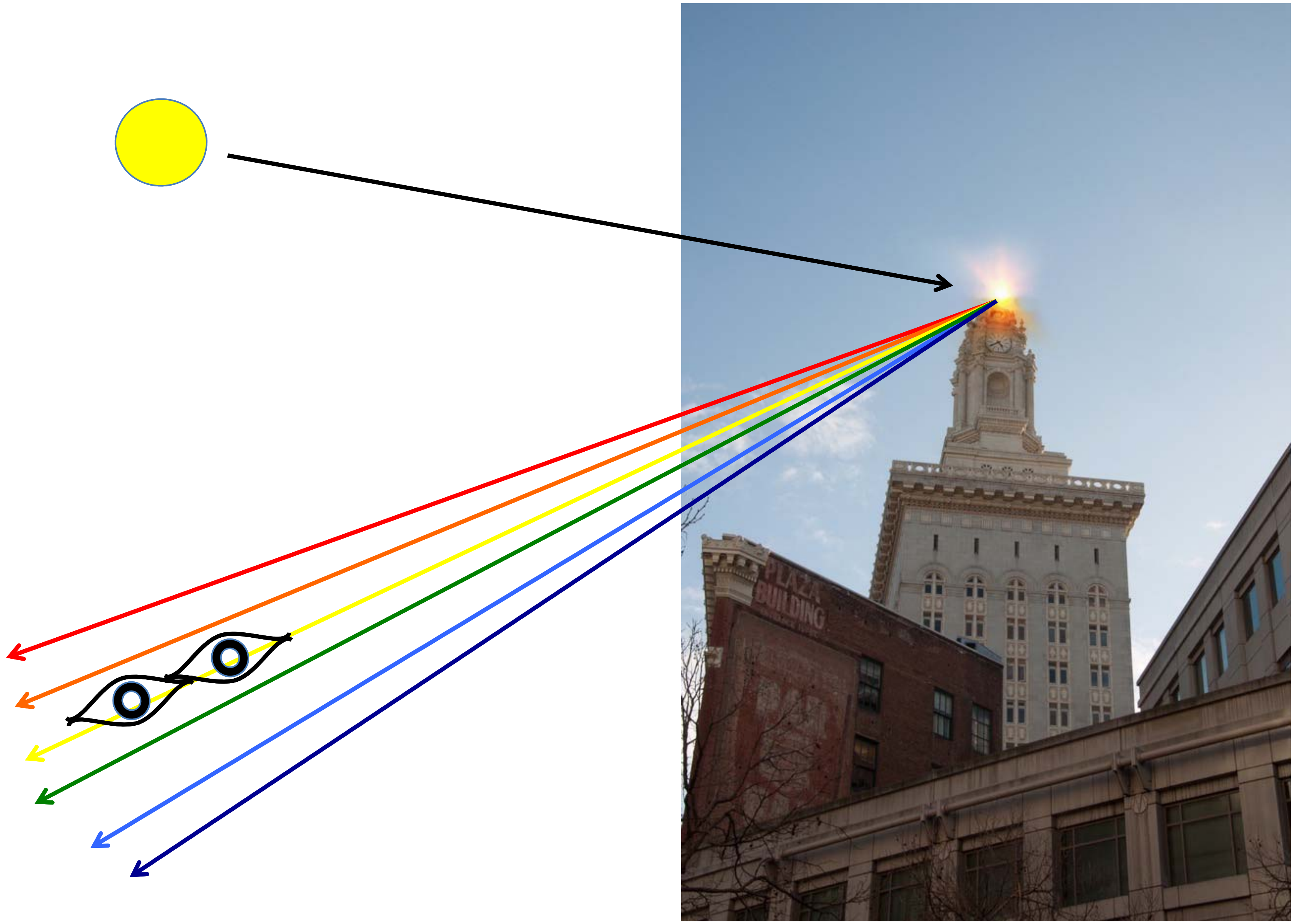
Install a spectro-heliostat atop Oakland City Hall to beam sunlight (refracted by prisms into colors) to observers around the city and the bay.

Any observer who can see the top of City Hall can schedule an "appointment" (time and location) to have the beam point directly at them, and they can control its color and timing (depending on sun location).

Spectro-Heliostat



A heliostat is a device that orients a mirror to keep the Sun's reflection at a fixed location, even as the Sun's apparent position moves across the sky. A *spectro*-heliostat uses prisms instead of mirrors and, therefore, projects fixed rainbows of light over large distances


PLAZA
BUILDING

History

- Liliane Lijn awarded artist in residence at Space Sciences Laboratory in partnership with Leonardo Network and NASA (2005) – presents her work with prisms and light in first lecture.
- Astrophysicist John Vallerga brings her an idea of projecting sunlight with prisms using computer controlled mount.
- Initial spectro-heliostats tests funded by Arts Council England and Gulbenkian Foundation
- "*Solar Hills*" selected by City of Marseille (2011) to project light from Mt. Sainte Victorire.
- *Solar Beacon* mounted on Golden Gate Bridge towers for 75th anniversary celebration, using mirrors not prisms (May 2012)
- *Sather Beacon* (on UC Berkeley Campanile) still beaming.

History

Sather Beacon

Solar Beacon

Solar Hills -Marseille (below is an artist's concept)

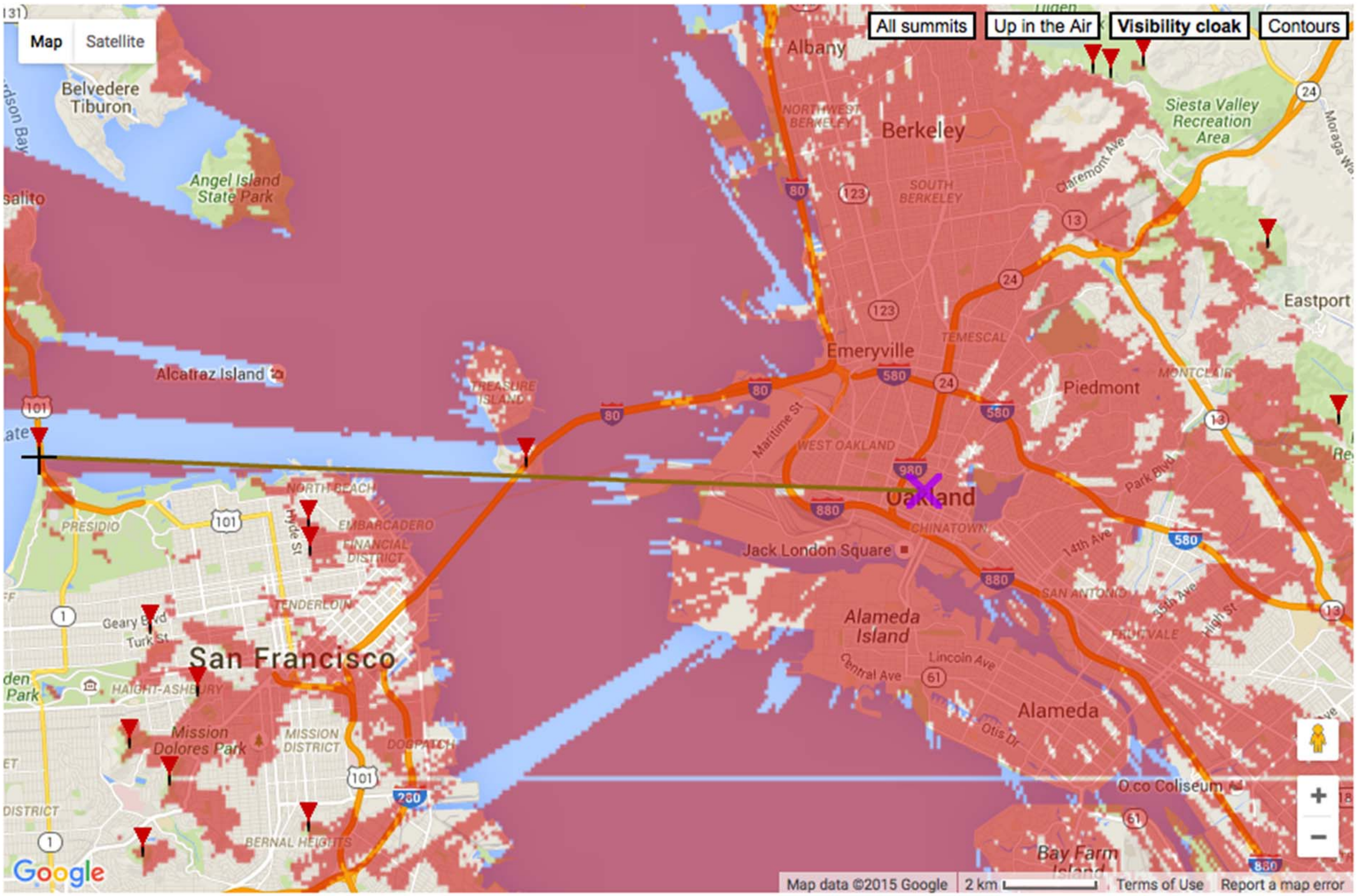
Solar Beacon from Mt. Diablo

Audience

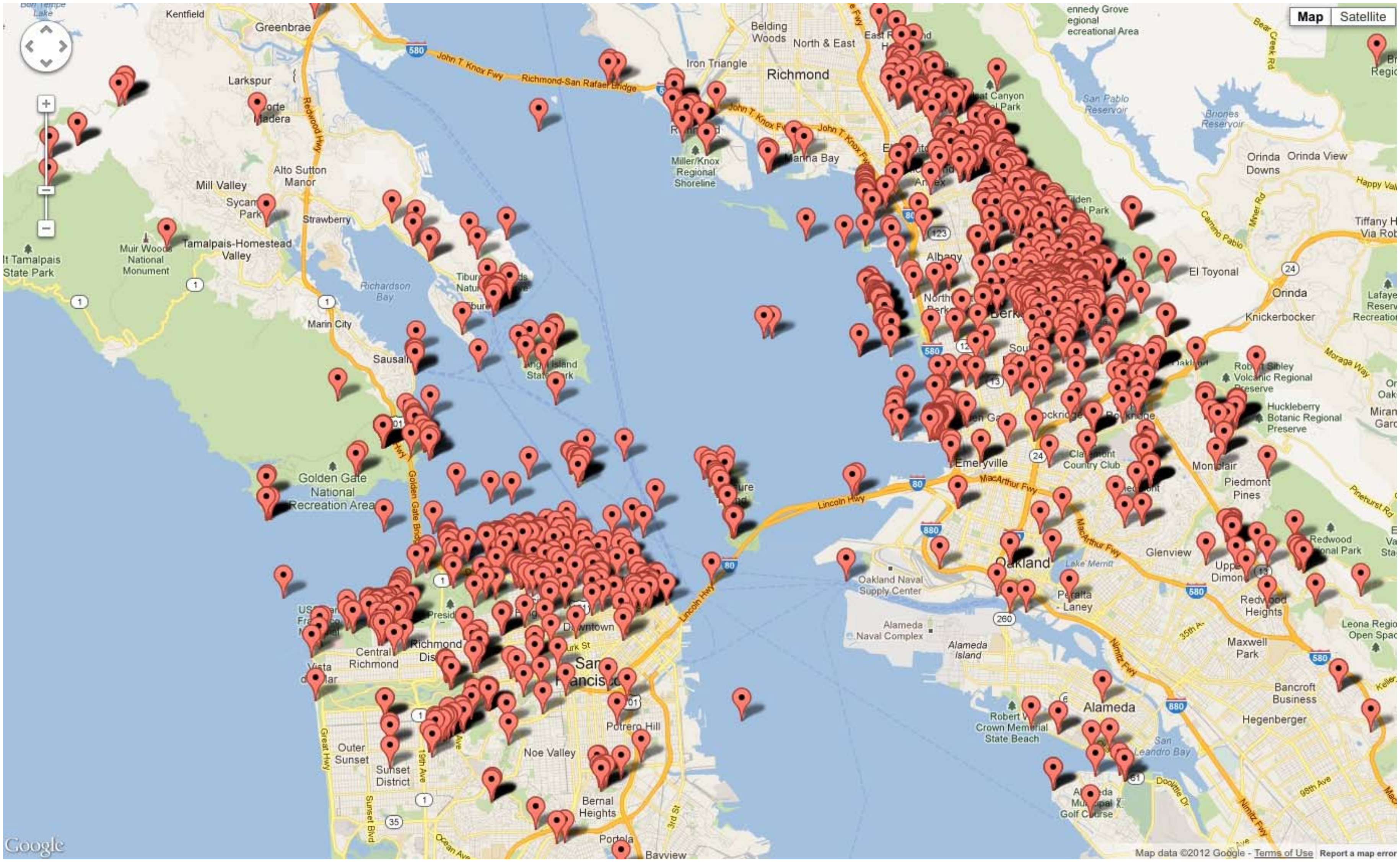
East Bay – morning and midday

West Bay – midday and afternoon

City Hall Visibility (red can see it)



Example – Solar Bridge Appointments



Liliane Lijn was born in New York, studied in Paris and has lived in London since 1967.

Lijn is a light artist whose research centred practice makes extensive use of new technologies in a variety of media and materials to create works that view the world as energy. Her work focuses on perception, its inherent ambiguities and contradictions, exploring reality as a complex web of relationships.

Internationally exhibited since the 1960's, with works in numerous collections including, Tate London, British Museum, V&A and FNAC, Paris, Lijn is best known for her work with language and light. During her ACE/NASA residency in 2005, Lijn began working with Aerogel, a material developed by scientists to collect interstellar dust. Recent exhibitions include Light Years at Sir John Soane's Museum, Gallery One, New Vision Centre, Signals and Indica at Tate Britain, Ecstatic Alphabets/Heaps of Language, Moma, New York and Cosmic Dramas, mima, Middlesbrough, Earth Body Art, Museo Santa Croce, Umbertide and Republic of the Moon, curated by ArtsCatalyst, The Bargehouse, London. Recent public commissions include Solar Beacon, a sci-art installation of heliostats on the towers of the Golden Gate Bridge and Light Pyramid, a beacon for the Queen's Jubilee, which was commissioned by Park Trust and MK Gallery, Milton Keynes. In 2014 Lijn was short-listed to produce a sculpture for the Fourth Plinth in Trafalgar Square.

Dr. John Vallerga is an astrophysicist at the Space Sciences Laboratory, Univ. of California, Berkeley. He specializes in the development of sensitive photon imaging detectors for astronomical telescopes, both in space and on the ground.

Vallerga did his undergraduate work at Berkeley in Physics and received his Ph.D. in Astrophysics from M.I.T. in 1982. He has participated in many NASA astronomy missions, including the Extreme Ultraviolet Explorer, Cosmic Origins Spectrograph on the Hubble Space Telescope, the Far Ultraviolet Explorer, ALICE on the New Horizons Spacecraft to Pluto, the Chandra X-ray Observatory, the Galaxy Evolution Explorer and many more. Recently, he has been awarded a multi-year grant by the National Science Foundation to develop high-speed optical detectors for use with adaptive optics systems. Adaptive optics systems allow large ground-based telescopes to correct for atmospheric turbulence in real time, resulting in images and spectra as good as the Hubble Space Telescope, but with much larger collecting area.

City Beacon Summary

- *Heliostat with prisms mounted above City Hall*
- *Simple mounting structure attaches to existing steel retrofit found below masonry top. Structure extends through flagpole hole.*
- *Attachments to building are temporary and will leave no trace.*
- *Remote controlled Heliostat only requires 120V AC power and connection to Internet.*
- *Installation of Heliostat requires a rigger to climb to top of tower via outside access. No other rigger access required until removal.*

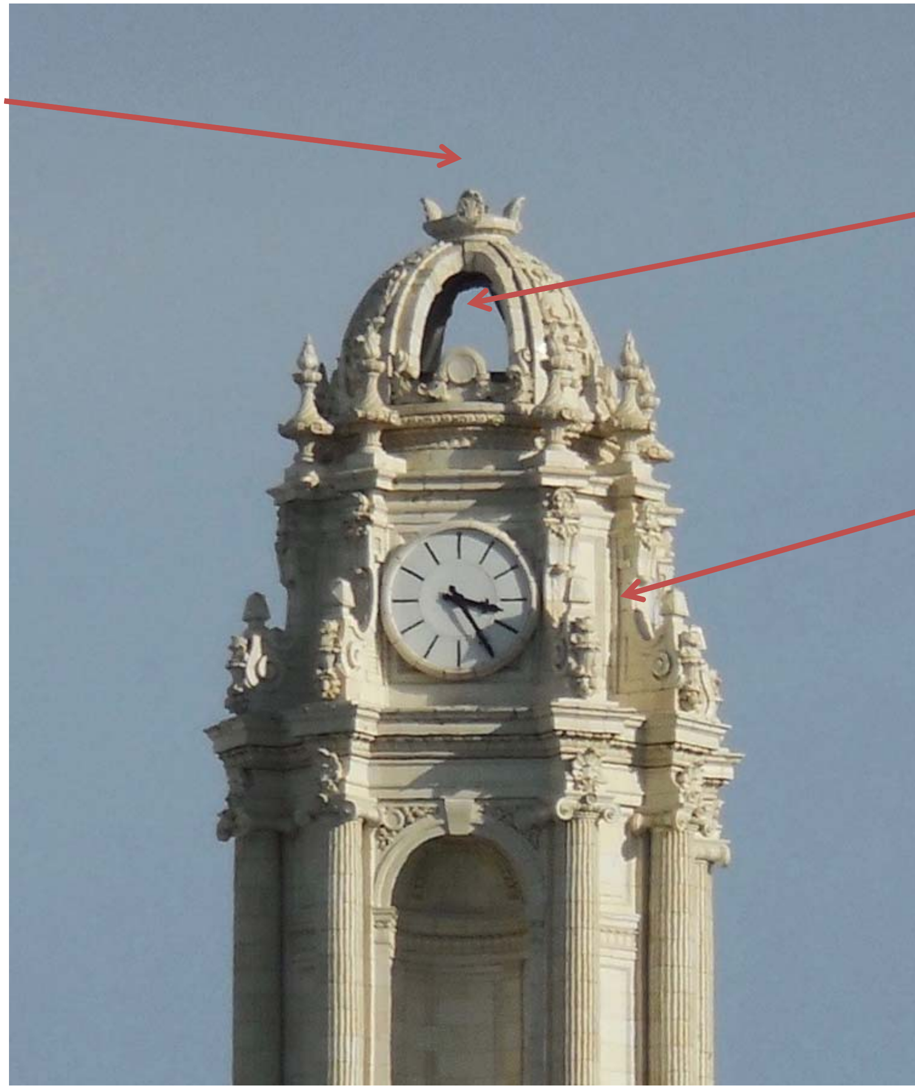
Solar Beacon on GG Bridge

Close up view of Heliostat. Engineered to withstand 100 mph winds and fog/rain.

www.solarbeacon.org

Top of City Hall

Heliostat goes here

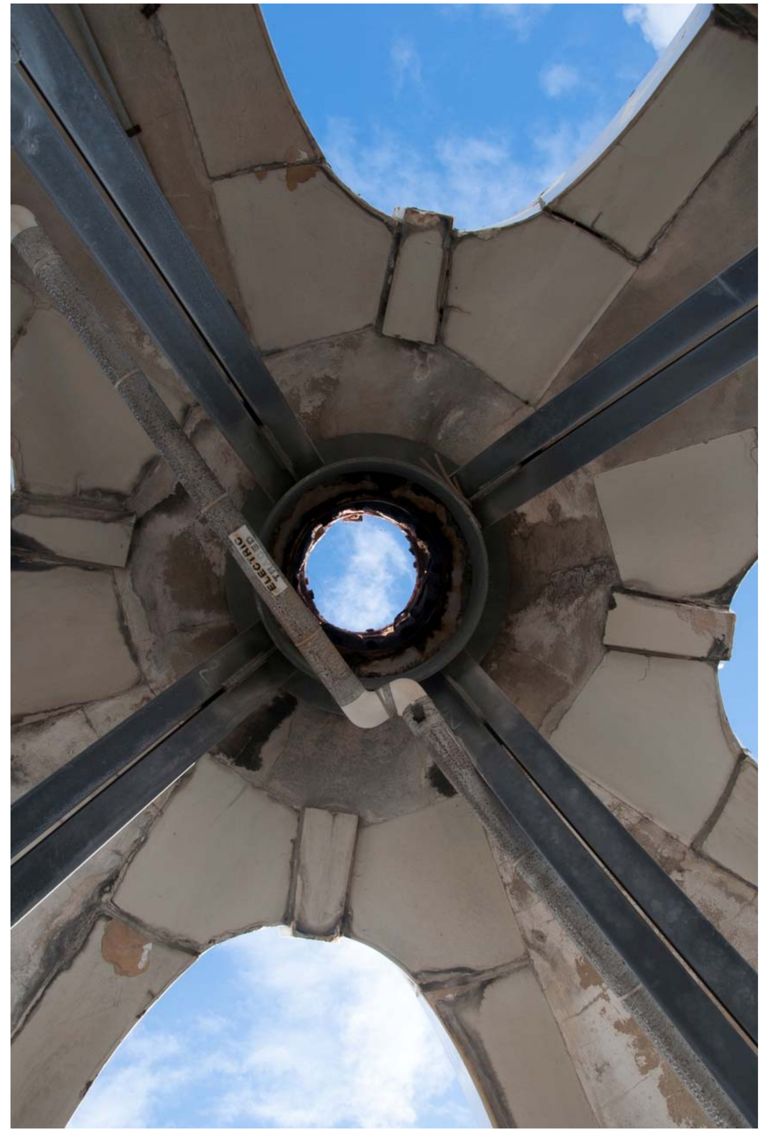


Mounted to Steel through flagpole hole

Internet Router on waterproof floor

Top of City Hall

Views of steel retrofit structure on 18th floor "attic". Steel pyramid rises to circle just below flagpole hole. Our mount will attach to the steel pyramid and will hold a large aluminum pipe that will extend through the hole to above the top of the tower. Heliostat will be carried to the mount via the side openings by a professional rigging crew. No attachments to masonry.



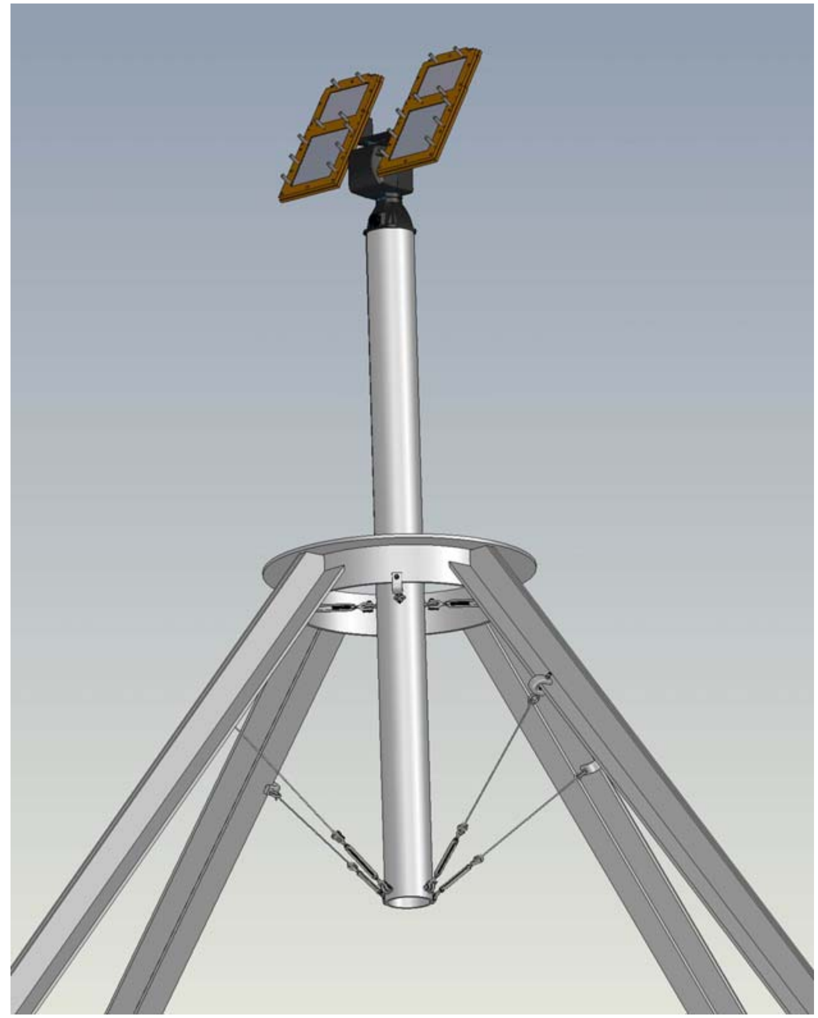
Support concept uses clamps and gravity for a hard mount to the pyramid structure. Aluminum pipe will attach directly to this platform to create stable base for heliostat above top of tower. Steel turnbuckles and clamps to the to steel circle piece will be used to center and level pipe

Since Heliostat cannot fit through hole, professional riggers will scale to top to install heliostat on pipe mount.

Easily installed and attached without modification to existing steel structure.

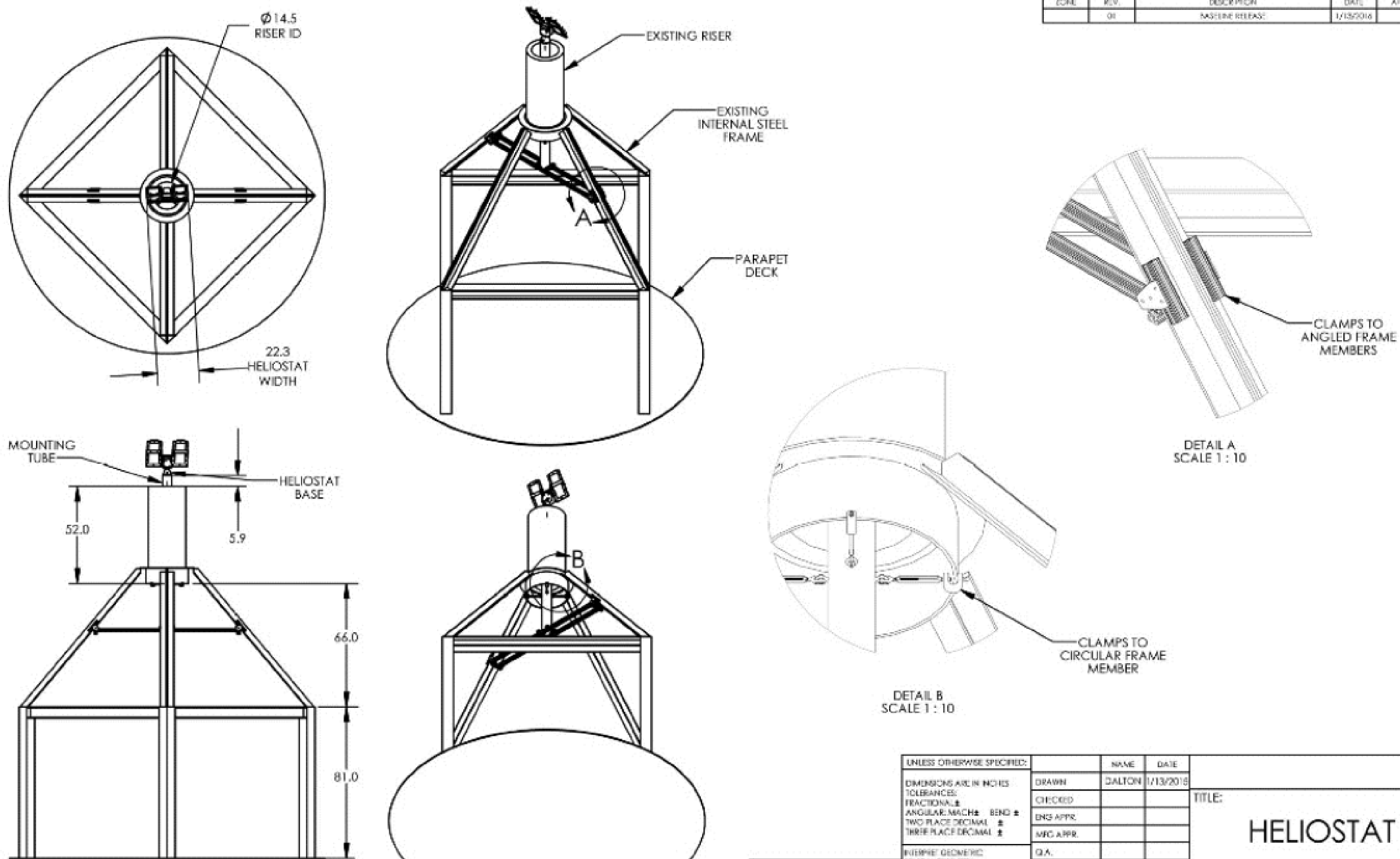
No trace left when removed.

Wind loads will be modeled, as we did for GG Bridge installation where the requirement was to withstand 100 mph windspeeds



Initial sketchup of aluminum tube mounting concept. Detailed drawing on next slide uses hard mounts rather than cable.

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	01	BASELINE RELEASE	1/13/2016	GC



UNLESS OTHERWISE SPECIFIED:		NAME	DATE	
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± ANGULAR: MACH ± BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±	DRAWN	DALTON	1/13/2016	
	CHECKED			TITLE:
	ENG APPR.			HELIOSTAT
	MFG APPR.			
INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.			
MATERIAL	COMMENTS:			SIZE B
FINISH				DWG. NO. OCH-MEC-001
				REV 01
DO NOT SCALE DRAWING				SCALE: 1:50 WEIGHT: SHEET 1 OF 1

Power Requirements

- Computer controlled Pan-Tilt mount requires single phase AC power (120V) which already exists in the attic level (18th floor).
- Very little power required (~ 50 W)
- Simple waterproof extension cord to Heliostat control box through aluminum pipe, as was done on Golden Gate Bridge.

Internet access

- As the Heliostat will be controlled remotely (U.C. Berkeley based computer) we will need an interface to existing City Hall network.
- “Ethernet through power lines” to access network that exists on 15^{th} floor. This was done successfully on the UC Berkeley Campanile. Fixed IP address preferred.
- Alternative is cellular modem (not 100% reliable) as was done on the GG Bridge.

Proposed Schedule (after approval)

- February
  - Fabricate prism mount.
  - Acquire hardware for flagpole mount.
  - Update software/website for City Hall location.
- March
  - Assemble Heliostat.
  - Calibrate and test at Space Sciences Lab.
- April
  - Test fit mounting at City Hall (1 day)*
  - Install Heliostat using professional riggers (1 day)*
  - Final calibration (1 week)
- May
  - Opening first week

* Requires access to top of City Hall