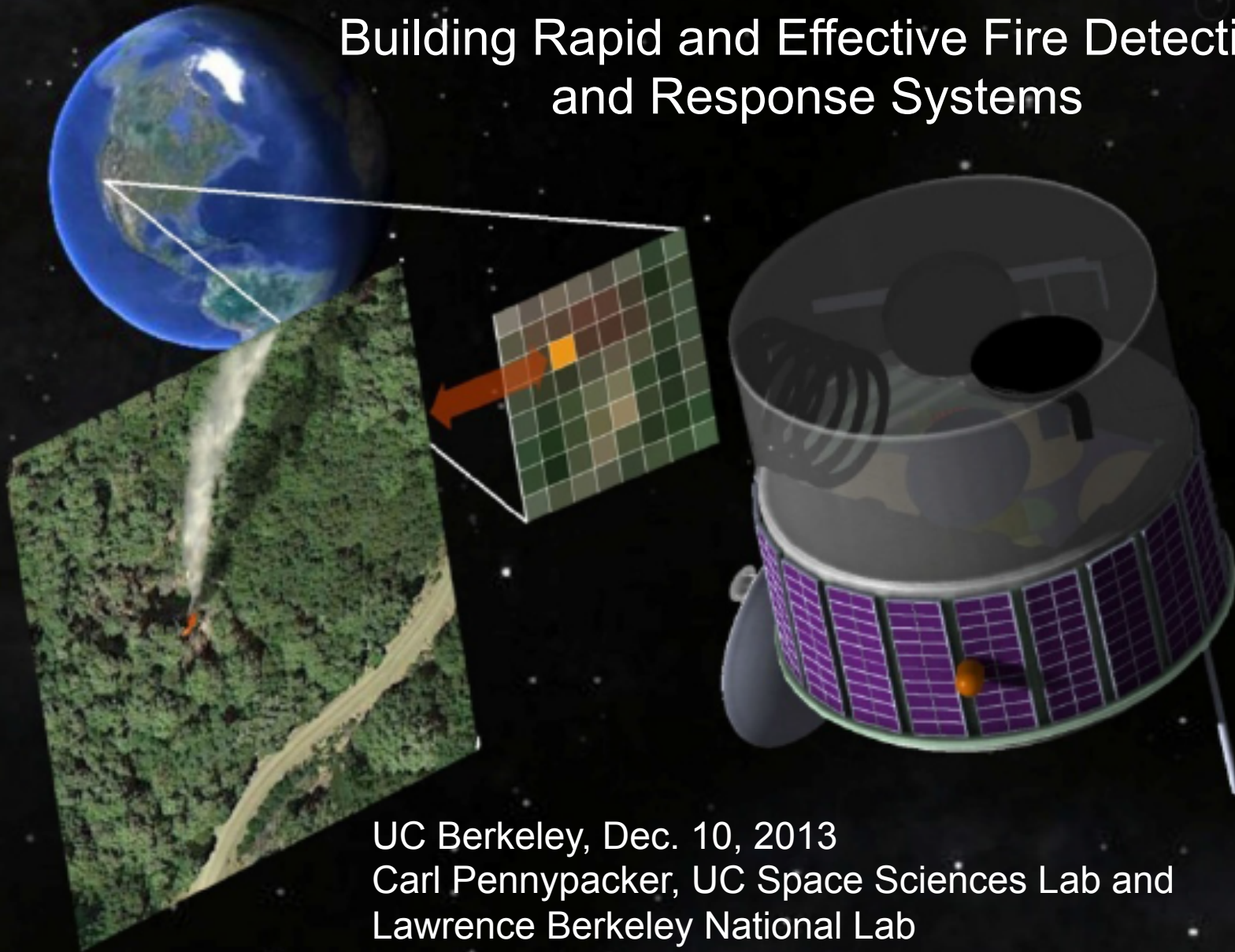


Building Rapid and Effective Fire Detection and Response Systems



UC Berkeley, Dec. 10, 2013
Carl Pennypacker, UC Space Sciences Lab and
Lawrence Berkeley National Lab

Thanks!

- UC Berkeley IPIRA and other UC Berkeley Offices (Industry Alliances, Intellectual Property, and Licensing Teams)
- Everyone for making the trek here!
- This is an amazing collection of people!

Purpose of Meeting

- Listen and learn from each other! There is a huge amount of talent, experience, creativity, passion, and wisdom in this room.
- Develop plans/roadmaps and mechanisms for this project to move forward – we at Berkeley are ready!!! We have near term plans in place!

(this is a team effort and UC/we can't do it by ourselves, for multiple reasons...)

Our UCB Paper:

- I humbly acknowledge wealth of expertise in room in many subjects
- We are not the first to employ (a bit) or suggest such a system.

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Article

FUEGO—Fire Urgency Estimator in Geosynchronous Orbit—A Proposed Early-Warning Fire Detection System

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First, a 30-second introductions of our Group: Please include:

- Your institution(s) past or present...
- Your own areas of expertise and interest...
- Your interest(s) in FUEGO Roadmap?
- Anything else?
- Time-keeper?

Background on some UCB/LBNL Expertise

- We are good at finding small signals in noise
(from particles in Bubble Chambers to Supernovae at 12 billion light years to genes that can convert grass into car fuel to fixing old records so you can hear them...)
- Good at taking good ideas with a small team into a production scale process. Very interesting and supportive ecology for this.

Lots of Nobel Prizes

- 13 and probably more on their way...

1970's: Luie's Particular Nobel Prize Wisdom, which generated Three Nobel Prizes within a 40m radius:
(in addition to the other 10 NP's at our lab..)

- *Go after a big goal*
- *Take risk!*
- *There needs to be a "technology breakthrough/enabler before you attack an existing problem!*
- *Build a team of the smartest and hardest workers you could find*

Carl Pennypacker's Background:

1968-1972: Undergrad UC Berkeley, worked with Luie Alvarez Group, Senior Thesis: "Geomagnetic Cutoff of Cosmic Rays Near Palestine Texas," JGR

1972-78: Graduate School Physics, Harvard, on "Infrared Studies of Pulsars."
Built almost whole system – detectors, software, electronics myself.
Co-authored a paper on Interstellar Dust with Ed Purcell (Inventor of Nuclear Magnetic Resonance)

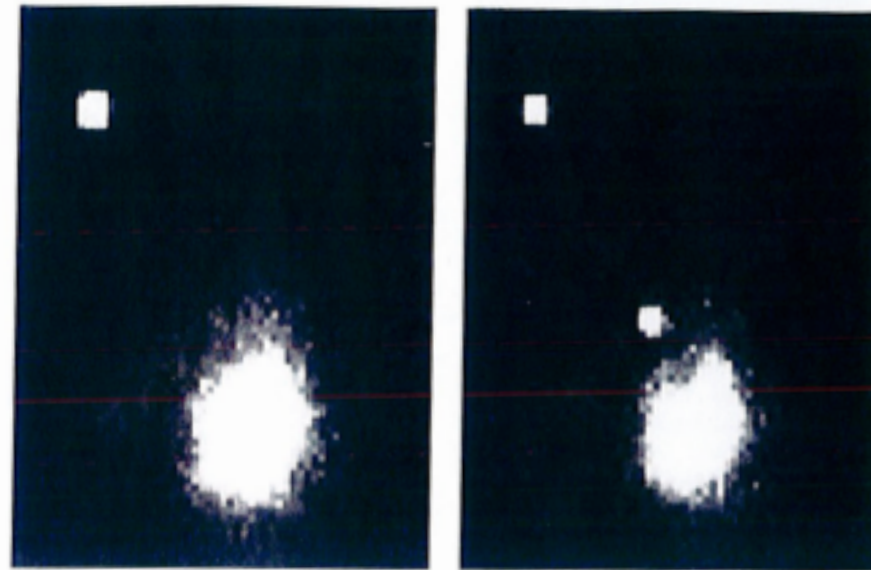
1978-present: Supernova Studies. Helped lead development of first working automated Supernova search system.

1982-1992: Lead developer of Distant Cosmological Supernova Search – turned management over to Saul Perlmutter. Led to discovery of Dark Energy.

1992-present: Leader of Global Hands-On Universe, a modern astronomy outreach system. Have reached 20,000 teachers worldwide.

What is a supernova?

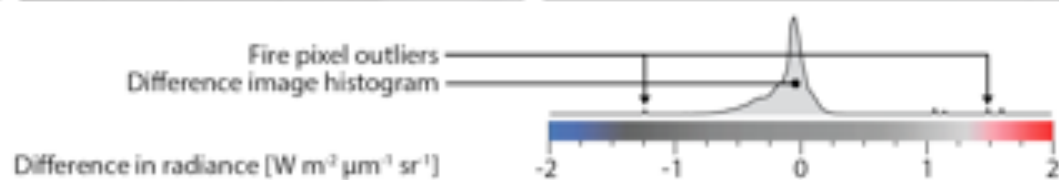
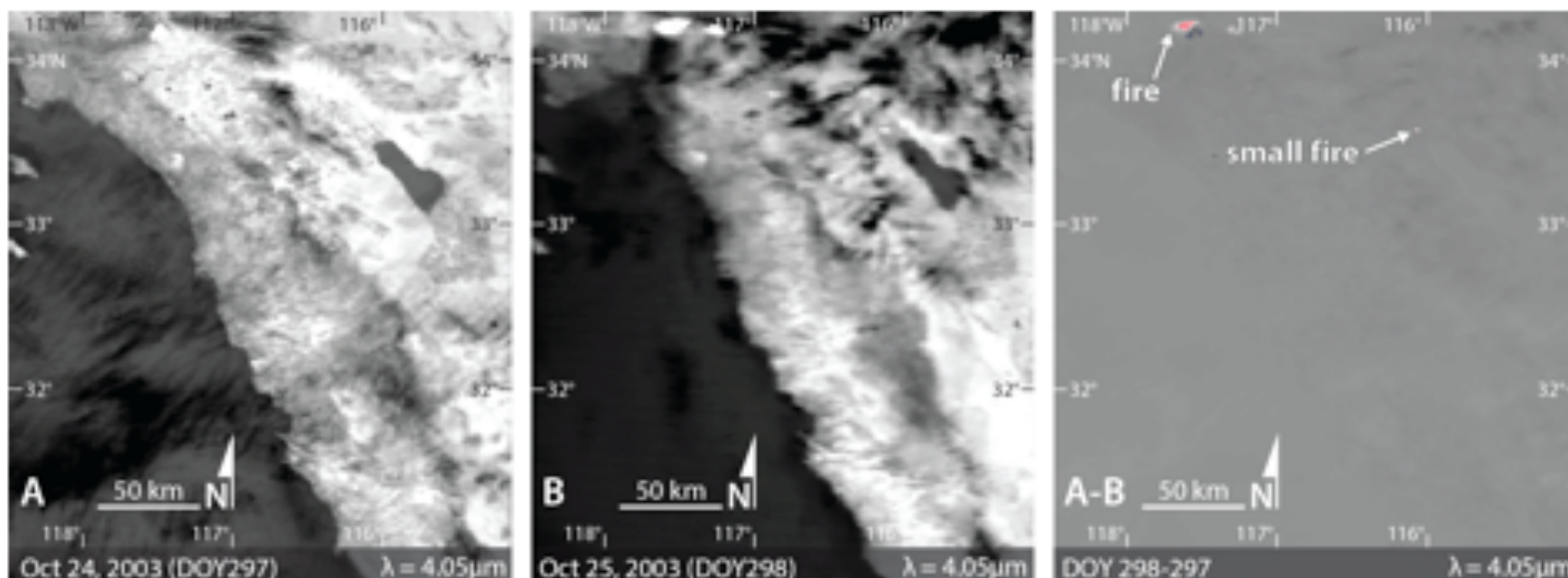
- End of a star's life, which can be seen across the Universe! Supernova can be as bright as a whole galaxy!



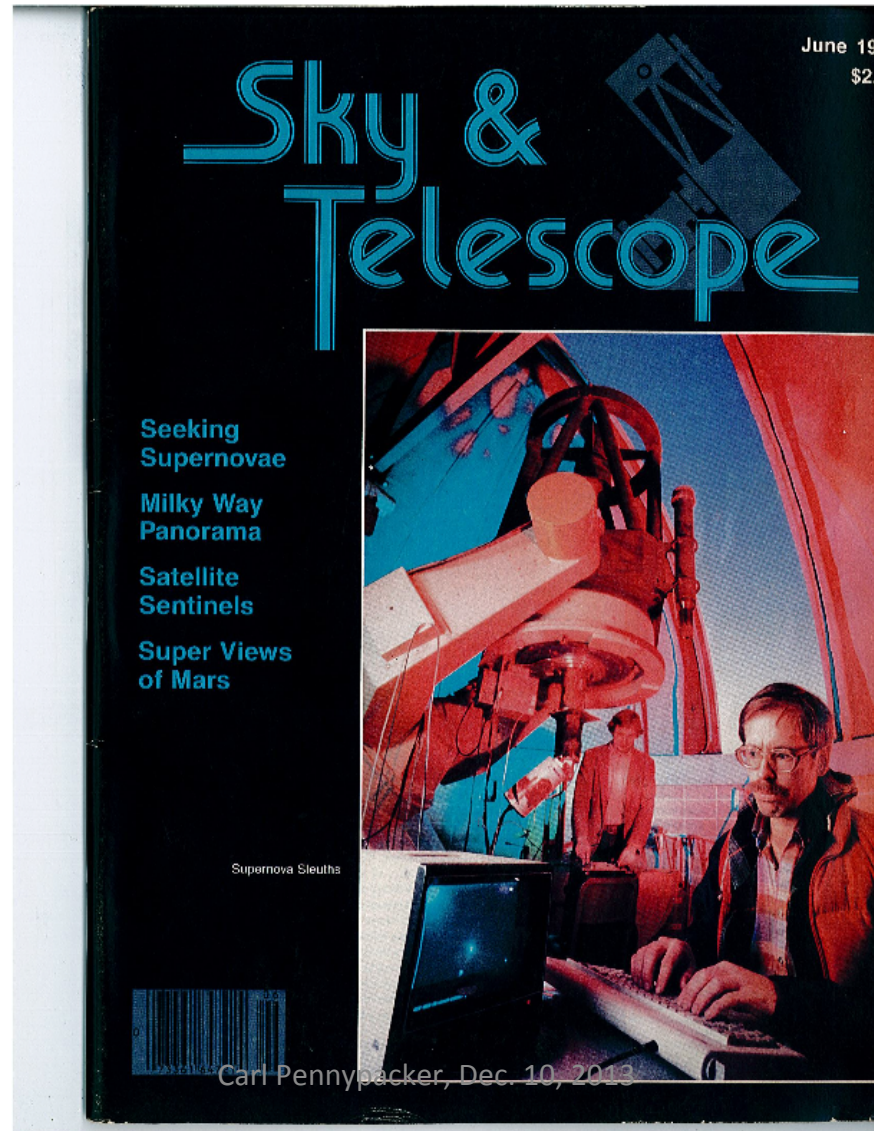
Left: A photograph of M99 taken on May 8, 1986, by the Berkeley group shows no signs of any unusual activity. Right: An image made nine days later reveals the unmistakable evidence of a supernova.

This was the first supernova we saw, in M99 galaxy.

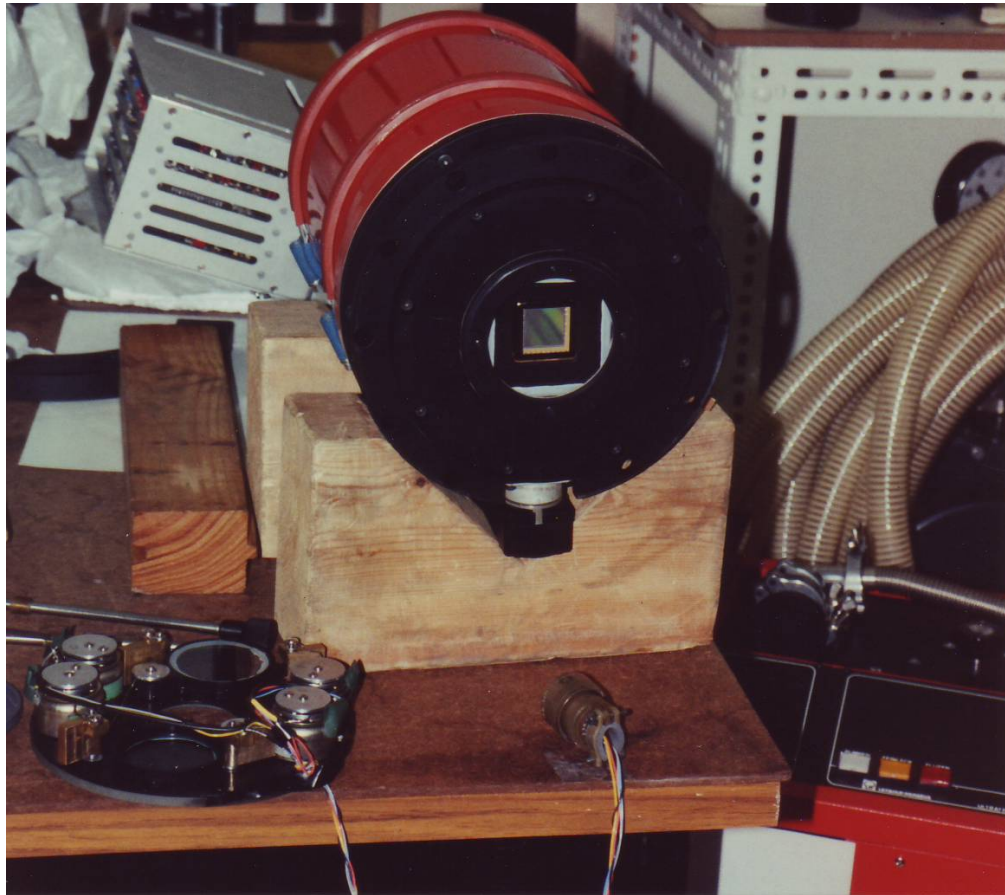
Look ahead to fire subtractions...



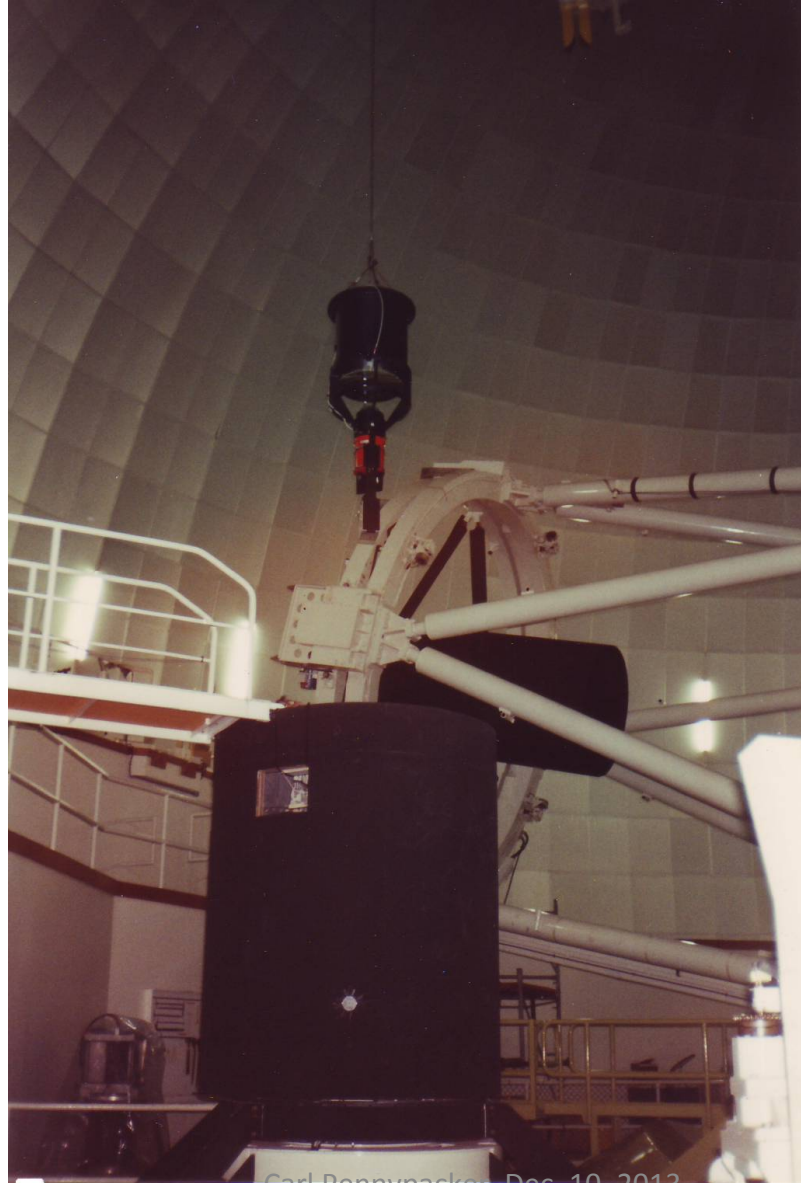
Leuschner Observatory: 1980's: First Working Automated Supernova Search



The CCD: Thomson (French -- 1K x 1K) – big detectors,
more distant supernovae..



Putting It All Together on AAT 4meter Telescope:



Carl Pennypacker, Dec. 10, 2013



Congratulations Saul!



Stockholm



Carl Pennypacker, Dec. 10, 2013