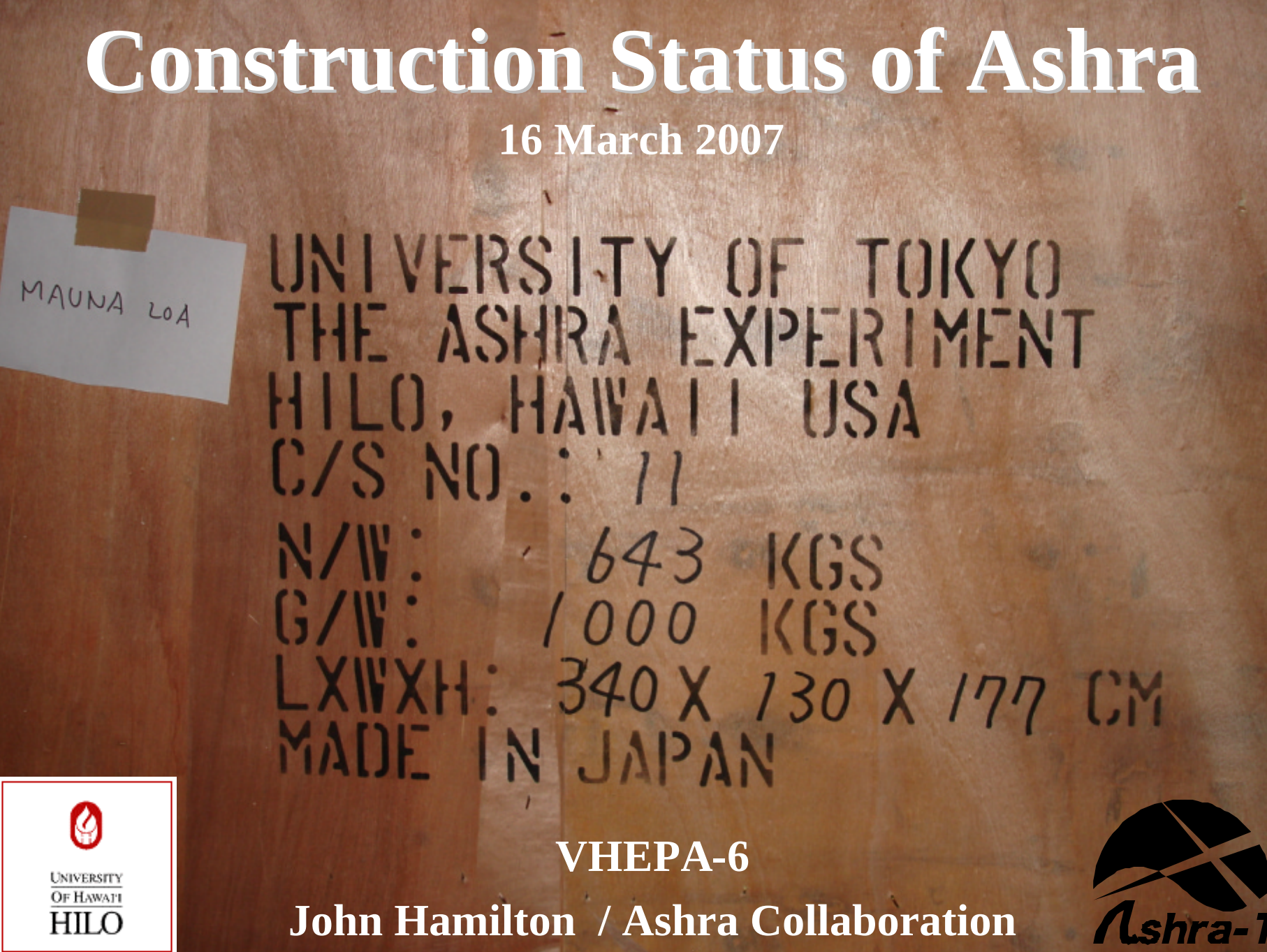
# Construction Status of Ashra

**16 March 2007**




**VHEPA-6**

**John Hamilton / Ashra Collaboration**

University Of Hawai'i HILO

# Ashra Collaboration

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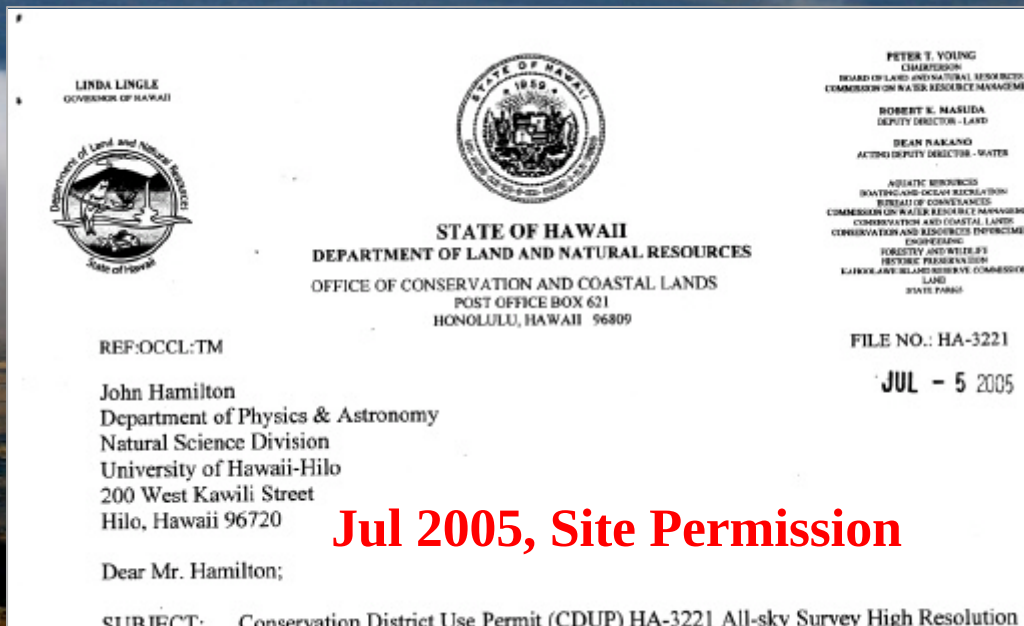
# Contents

1. Site Preparation
2. Construction of the Detector and Shelter
3. Test Observation
4. Summary

Mauna Loa from Mauna Kea

Mauna Loa Observatory

**Ashra Site**
**Hawaii Big Island, HI**
**Mauna Loa (3300m a.s.l.)**



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FILE NO.: HA-3221

JUL - 5 2005

John Hamilton
Department of Physics & Astronomy
Natural Science Division
University of Hawaii-Hilo
200 West Kawili Street
Hilo, Hawaii 96720

**Jul 2005, Site Permission**

Dear Mr. Hamilton;

SUBJECT: Conservation District Use Permit (CDUP) HA-3221 All-sky Survey High Resolution

# The Very First

**May 2005: unexplored lava field**

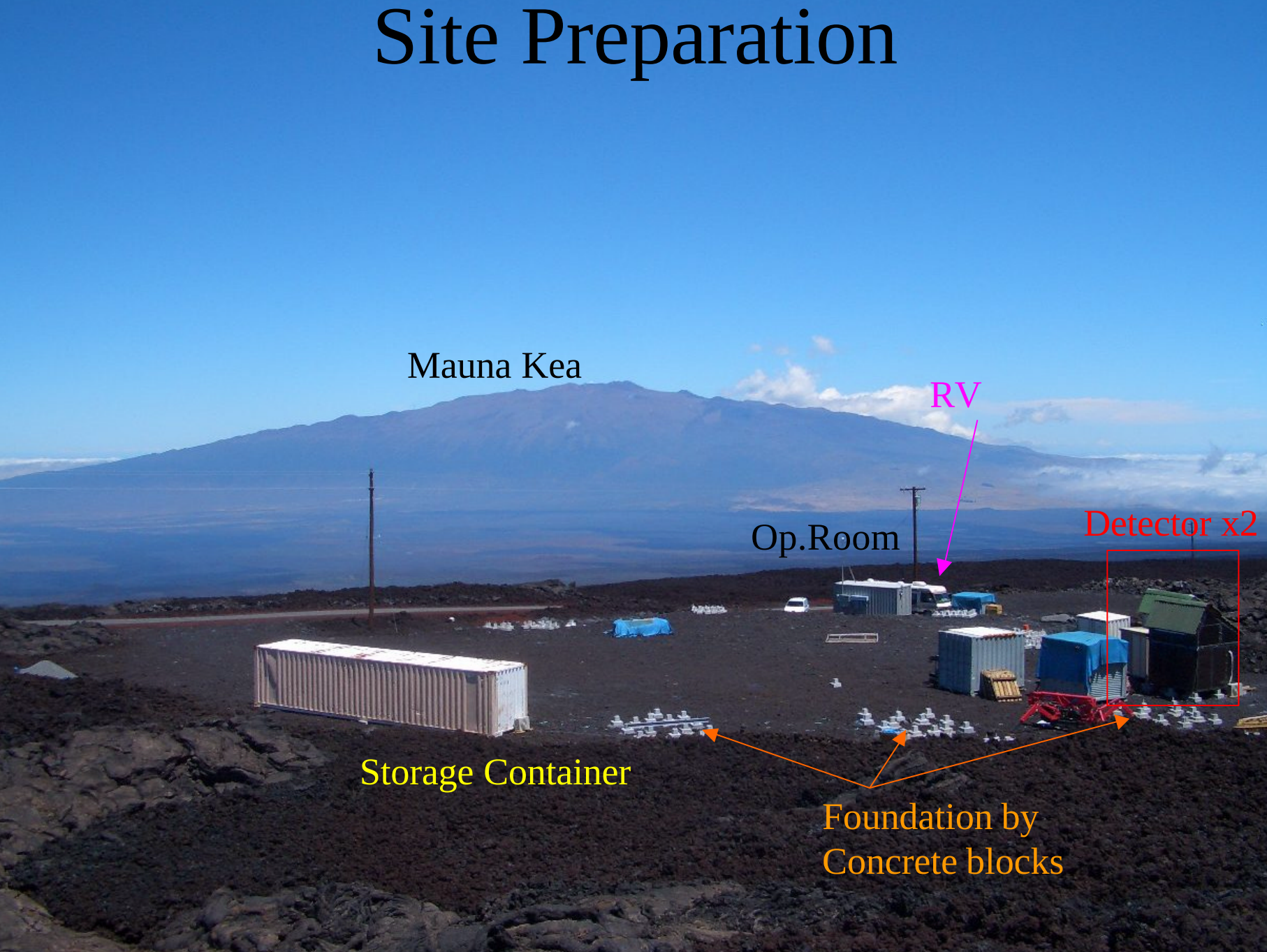
# Electricity

Hawaii Electric Light Company (HELCO) delivers power
Replaced power pole with larger one, installed transformer along with power drop and meter.
Usage became available on Sep. 22, 2005.

# ‘Recreational’ Vehicle

20 Jan 2006 - delivery of RV to the Ashra-1 site

# Site Preparation



# Construction of Detector and Shelter

Improvements of structure and construction method

⇒ construction in shorter period of time

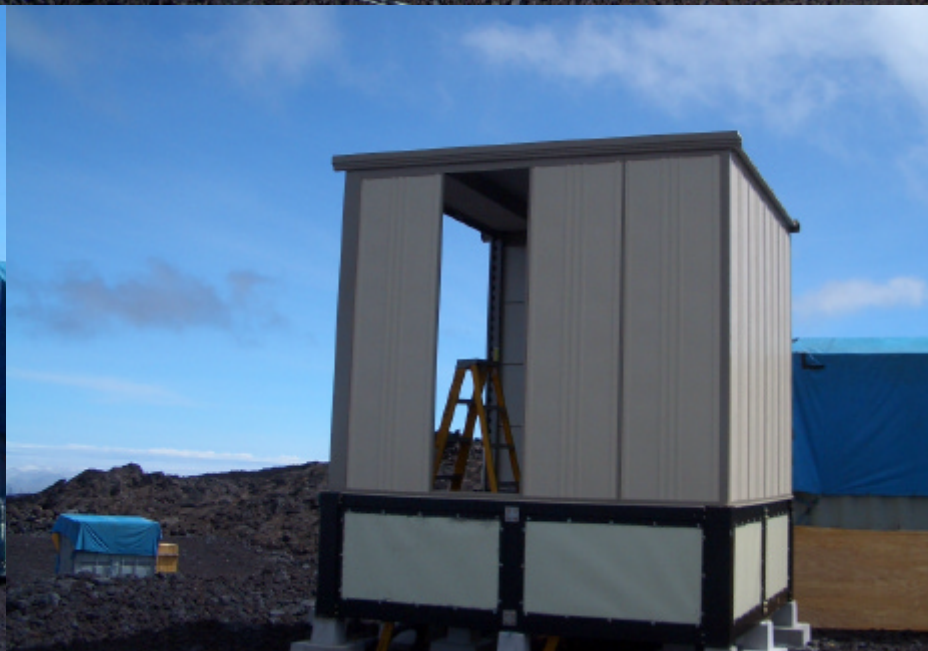
Construction of the nearest detectors

⇒ the most difficult case

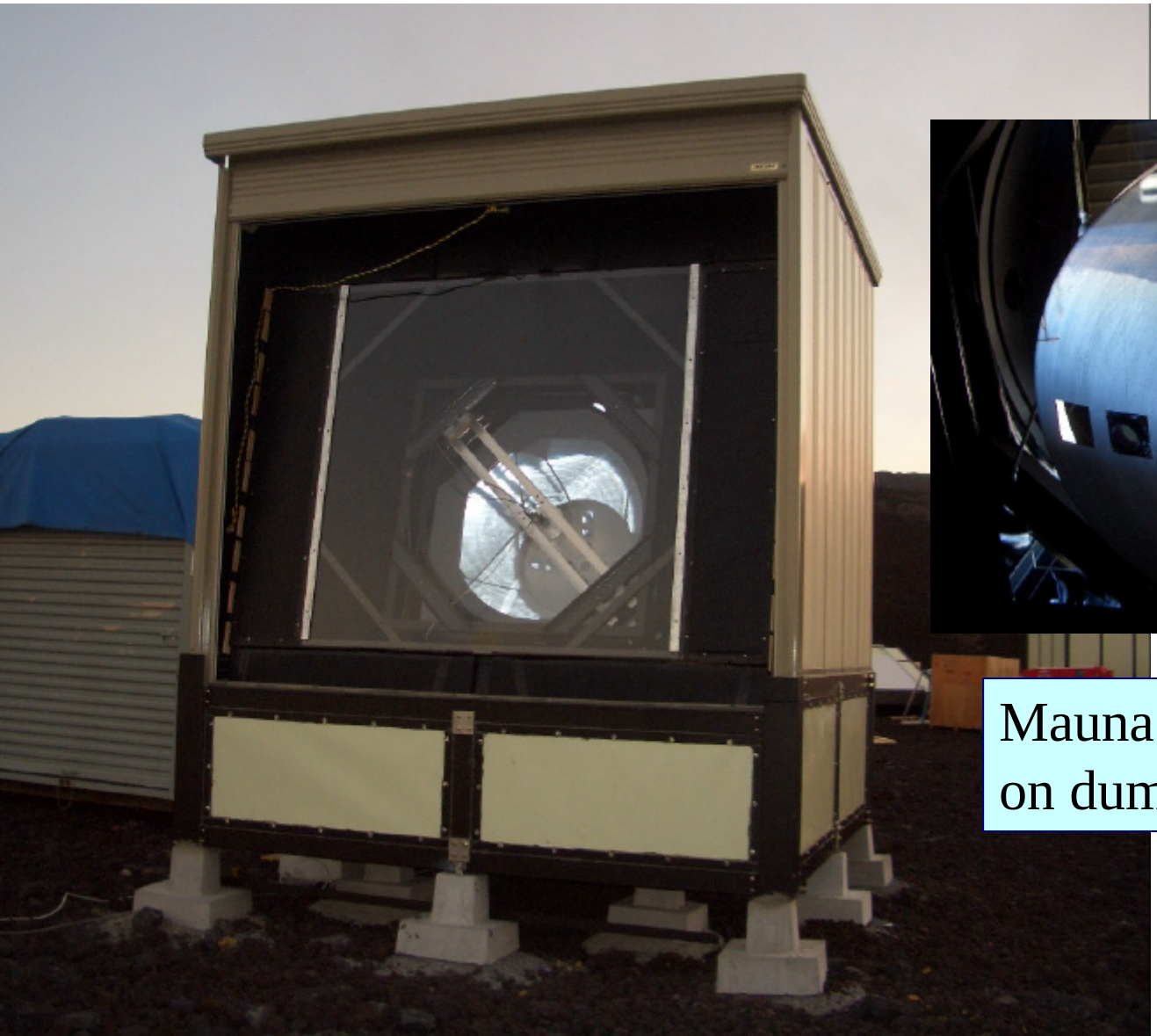
Trigger house installation ⇒ for trigger of the same FOV detectors

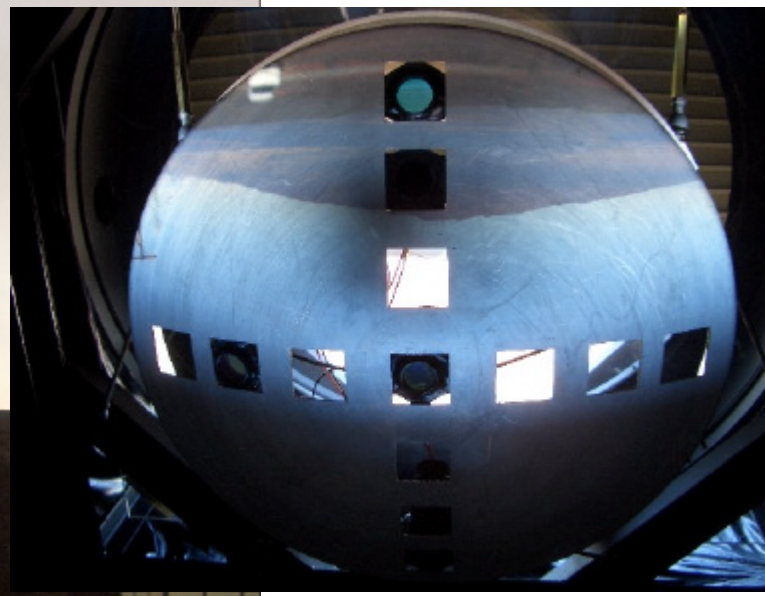
# New Arrivals (Oct. 2006)

# Construction of 75° Shelter



# Completed 75° Detector





Mauna Kea is focused on dummy focal surface.

# Another 3 Detectors Completed

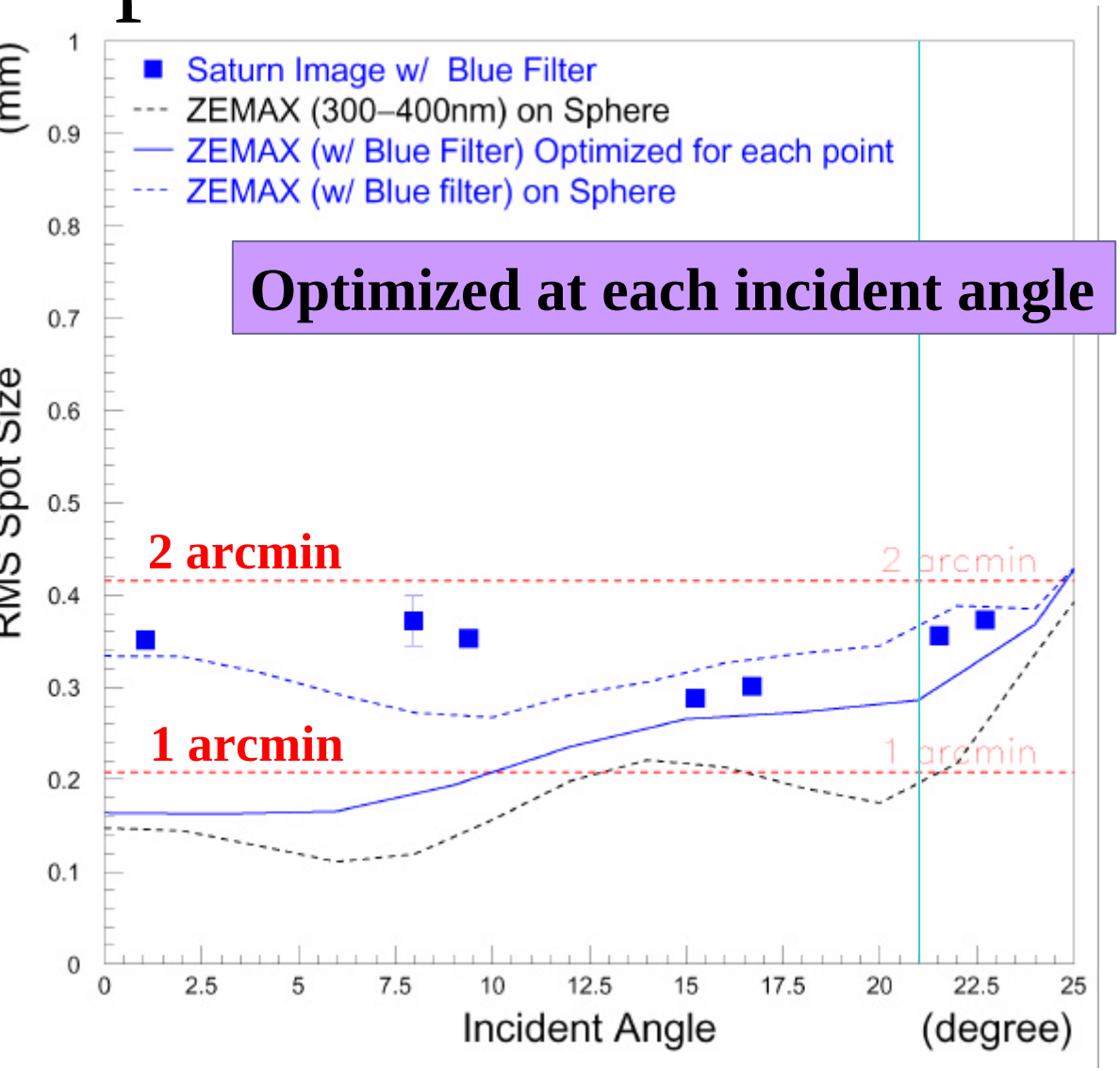

**Construction completed:**

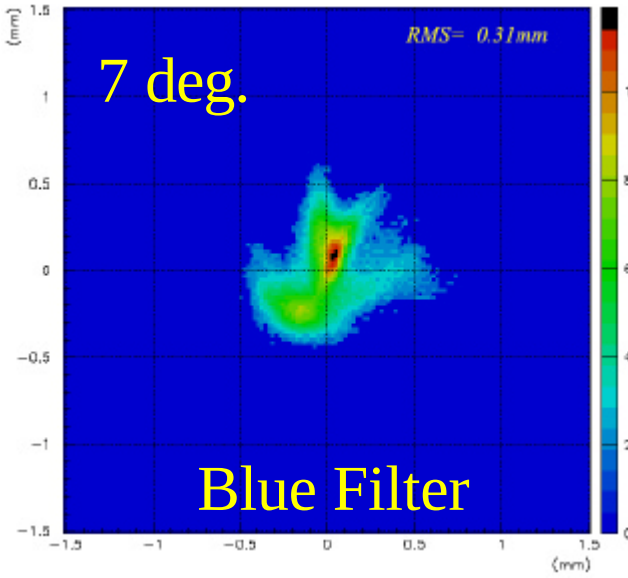
- **5/12 in FOV**
- **6/28 in LCs**

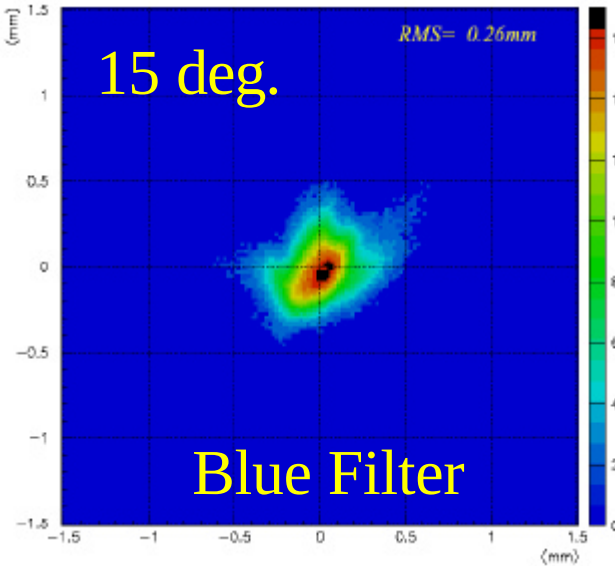
# Testing Optical Resolution

1. **Constrained on On sphere**
   - 3 digital cameras were mounted on focal sphere
   - Incident angles: 18° ,4°,12°
   - **Confirmed that the focal surface was on sphere.**
2. **Optimized at each point**
   - Moved CCD around focal surface while using dummy focal surface as a guide.
   - Measured resolution as a function of incident angle by allowing Saturn to track across

# Optical Resolution vs Incident Angle

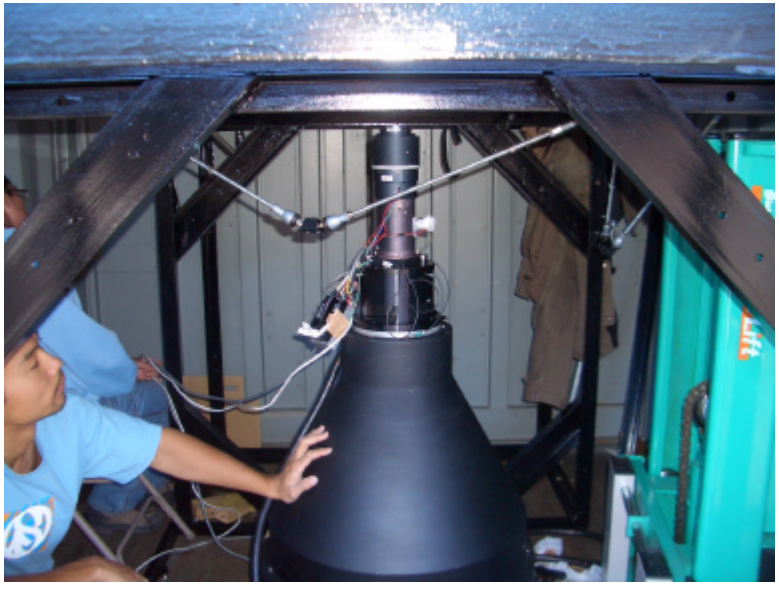


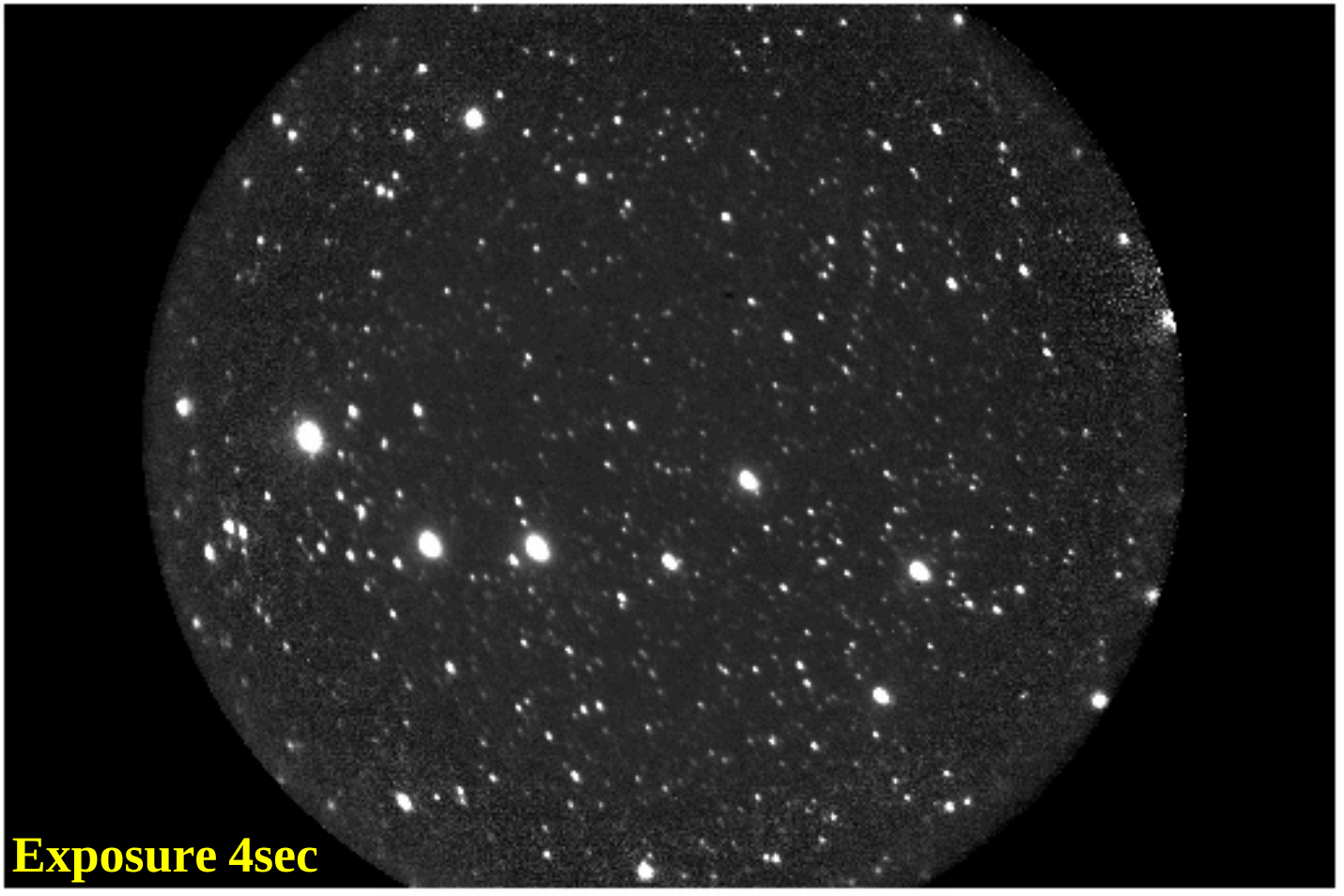




**We have confirmed that optical resolution (RMS) including lens and mirrors is less than 2 arcmin.**

# Installation of Photoelectric Imaging System

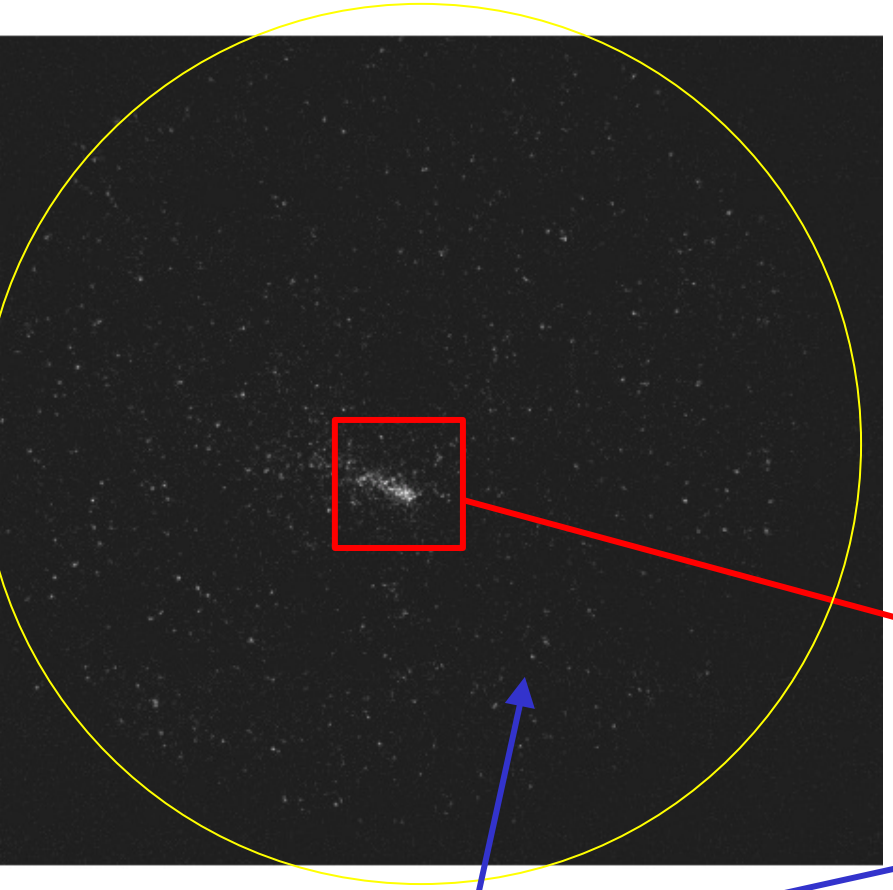


# Star Images with Ashra Telescope




Star image with Ashra telescope through CMOS camera.
42° FOV and high resolution have been achieved.

# Test Observation of Cherenkov Showers

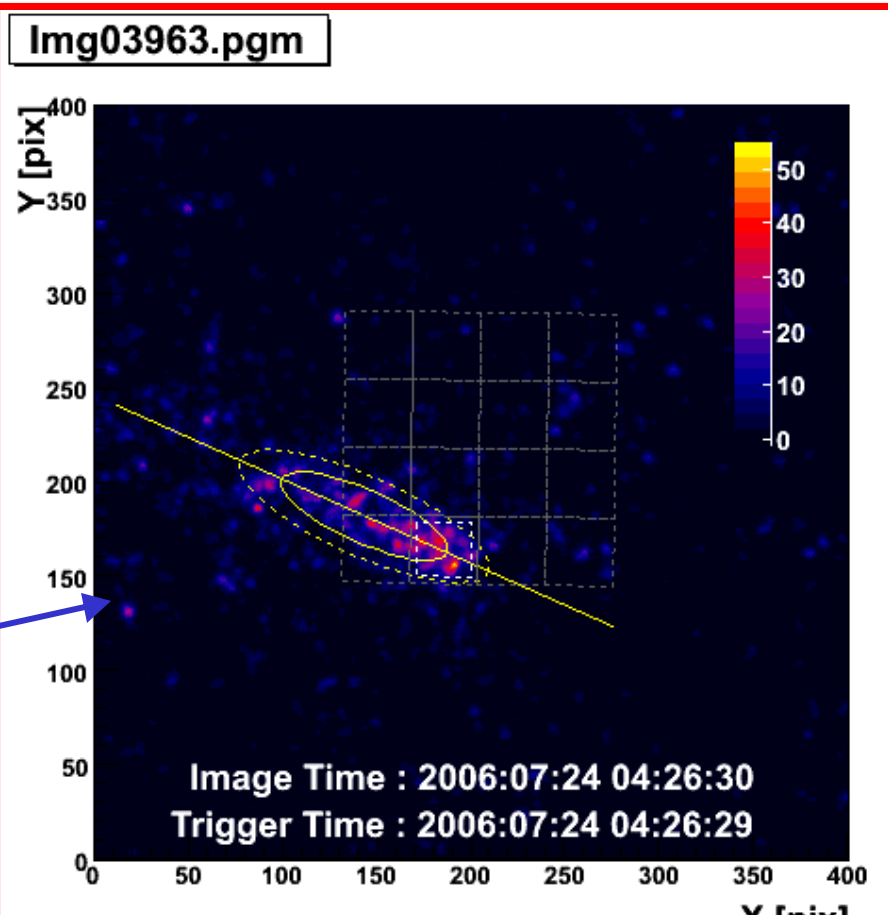


xposure: 200 ns

Each spot corresponds to individual incoming photon.

**Succeeded in self-triggering**

**Proton Shower Candidate**



# Summary

- The Ashra Mauna Loa site is operationally ready.
- New detector and shelter were constructed. Construction process was optimized taking advantage of previous experience.
- Basic performance of optical and photoelectric imaging system was confirmed through various test observations.
- Currently 6 detectors are available.
- We will start observation as soon as possible after finishing construction of detectors.