ASTE:
THE ATACAMA SUBMILLIMETER TELESCOPE EXPERIMENT

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The ASTE Project

- Aims of the ASTE project

  Science: Explore the southern sky with sub-mm wavelength

  Technology: On site evaluation of new methods & technology

  Education: Provide opportunity to study observation & instrumentation to young astronomers

- ASTE team

  National Astronomical Observatory of Japan (NRO; Nobeyama Radio Observatory)

  Universidad de Chile

  The University of Tokyo

  Nagoya University

  Osaka-prefecture University

  Ibaraki University

  Hokkaido University

What is ASTE?

Diameter: 10m

Surface accuracy: 19μm

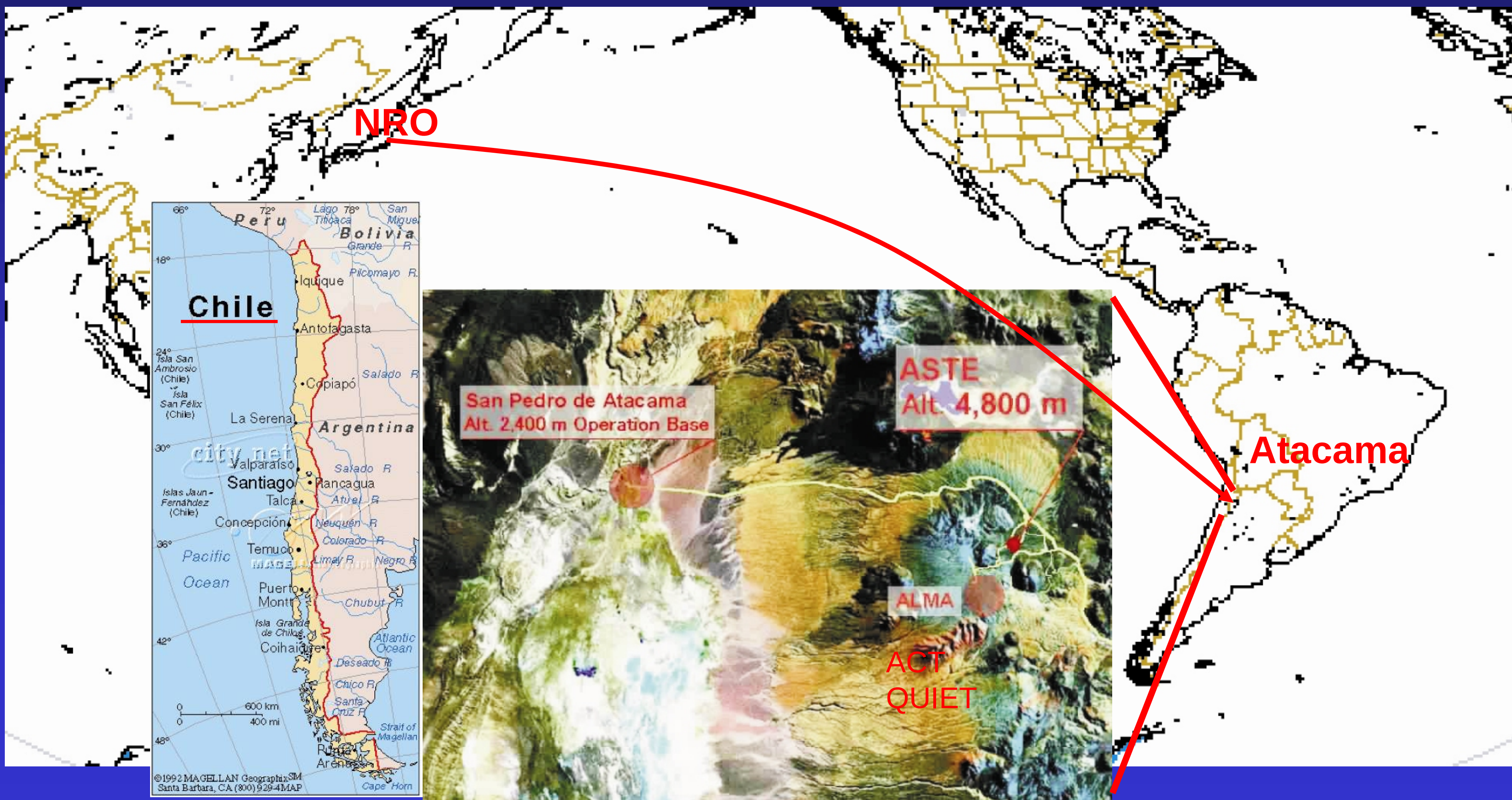
Main beam efficiency:
  0.6-0.7@850μm

Pointing accuracy: 2” rms

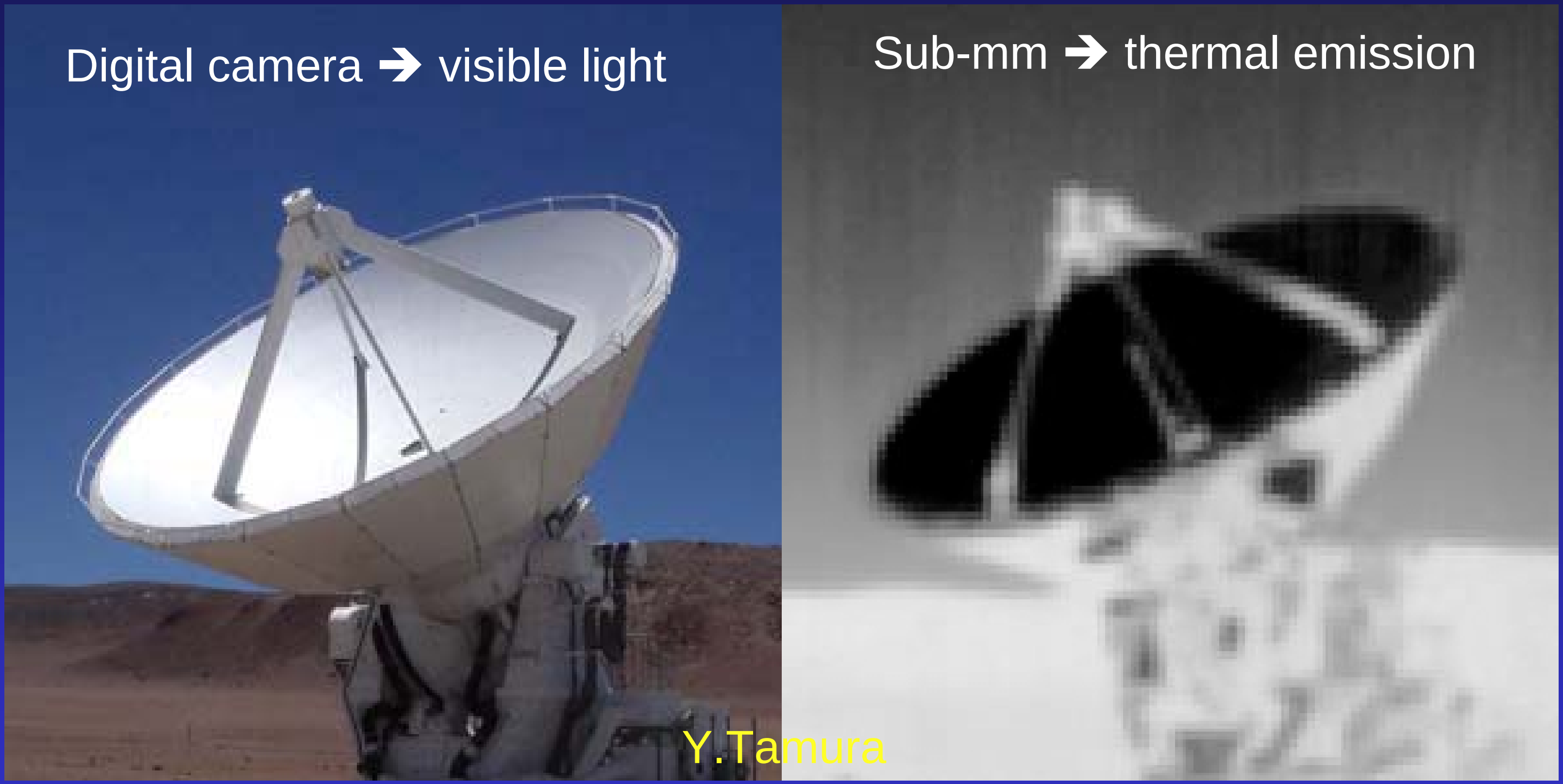
Beam size: 22” @850μm

Remote observation

2002 March
Finally at Pampa la Bola
@Atacama desert



Sub-mm?



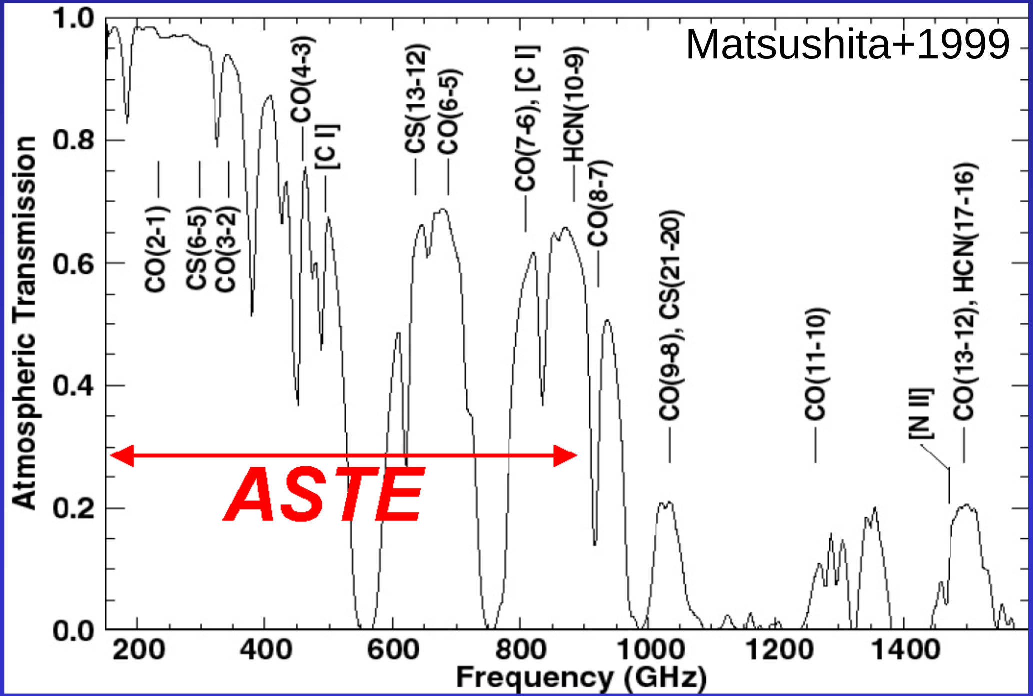
Ex) Imagine an IR camera
→Thermal emission
seen even in dark

Why Atacama?

- Absorption by water vapor etc.

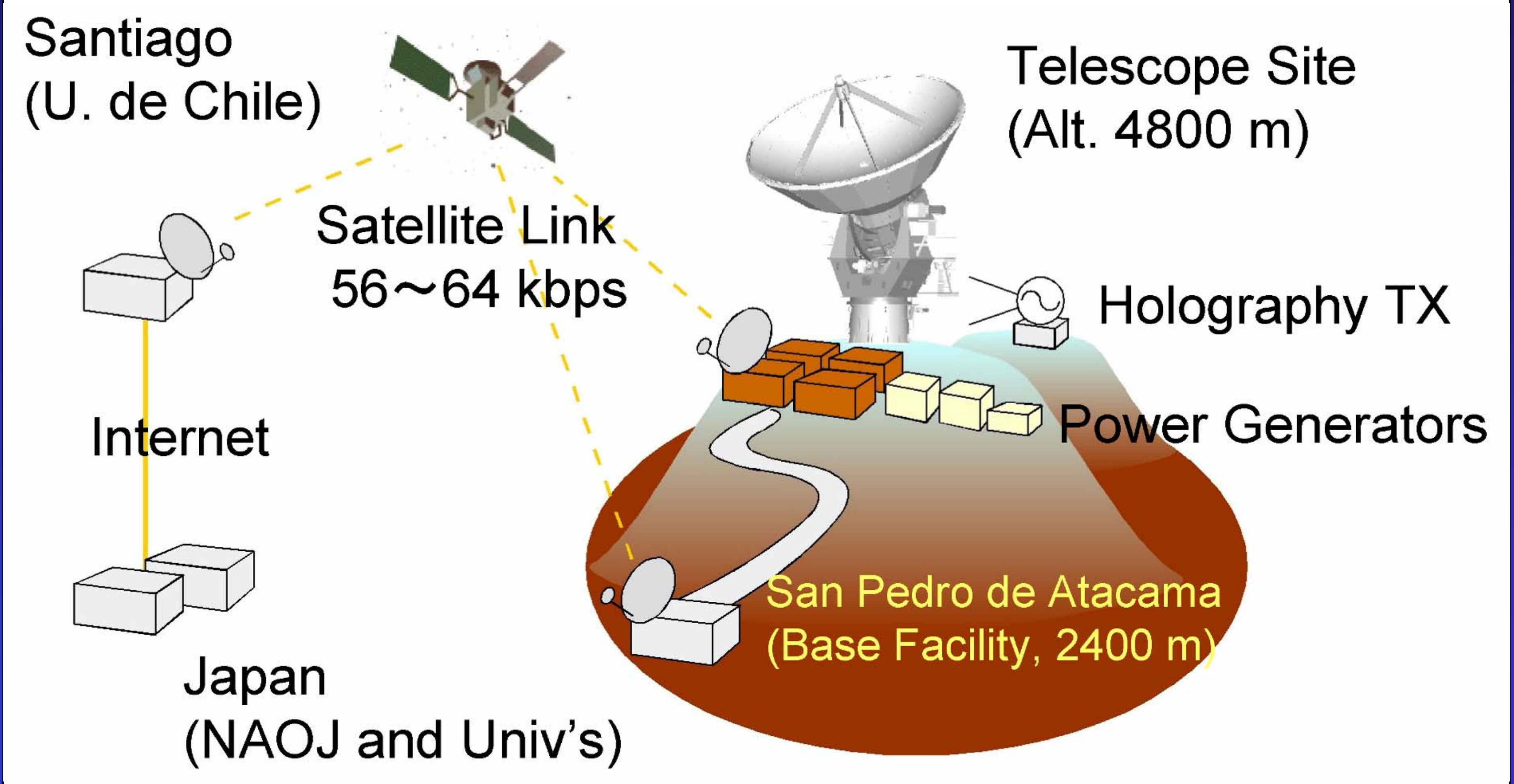
➔

Atmospheric transmission



ASTE is at the other side of the world,,, but,

REMOTE OPERATION!!

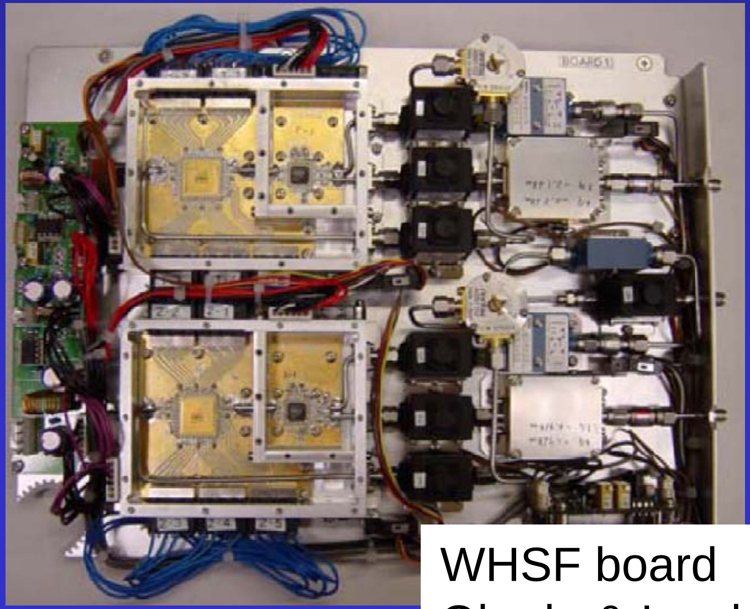


Recent Achievements

- Spectrometer receiver
- Continuum receiver

CATS345 + WHSF

- Developed by University of Tokyo, NRO/NAOJ
- 2007: First observation
- 2008, 2009: science run

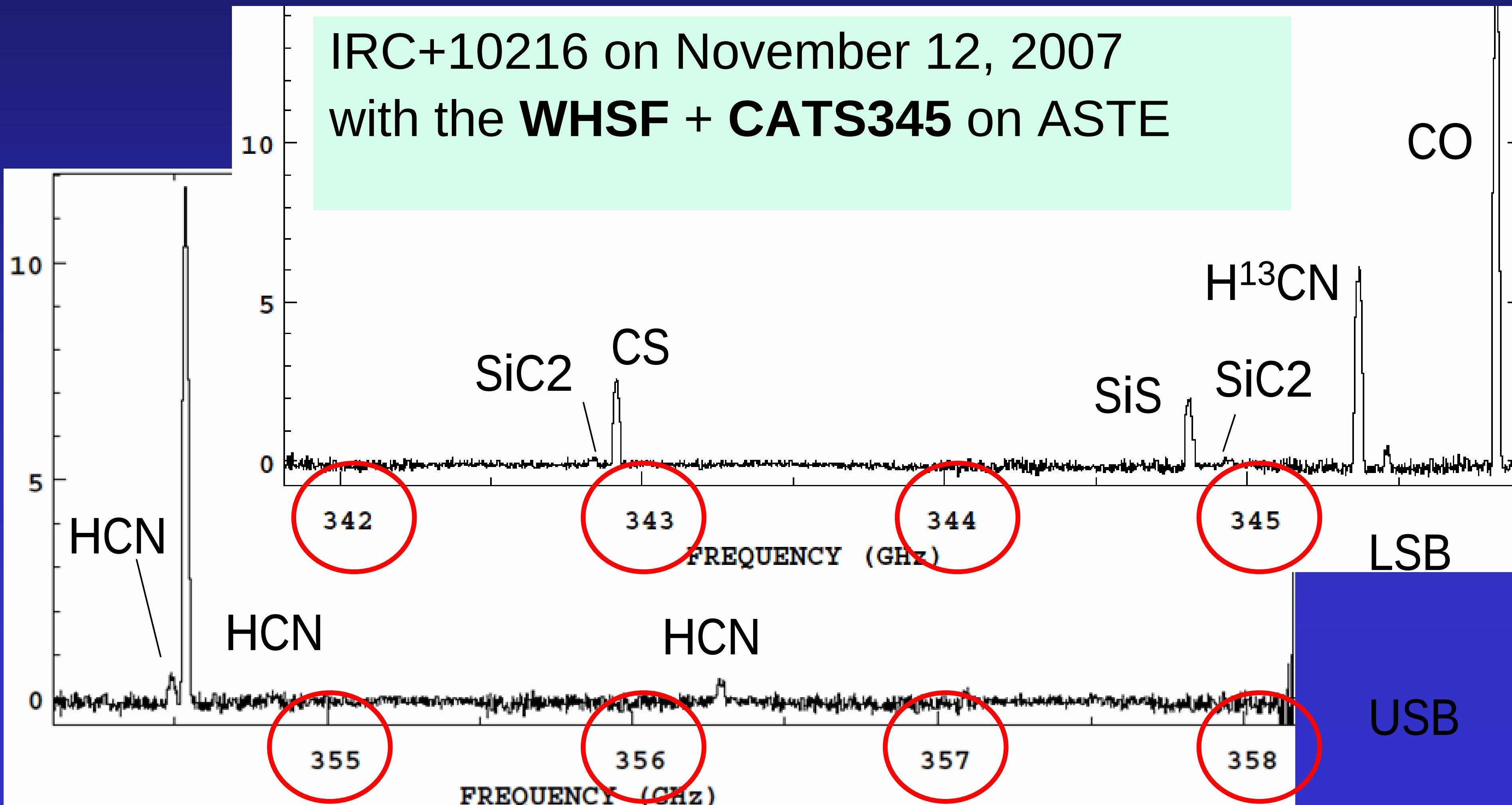


WHSF board
Okuda & Iguchi

CATS345 in the lab. of Univ. of Tokyo
Inoue, Muraoka, Sakai et al.

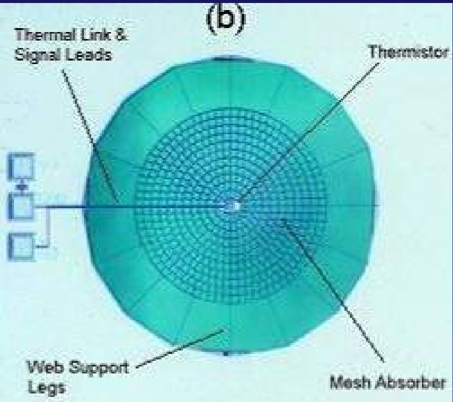
4096MHz x 2 = 8192MHz !!

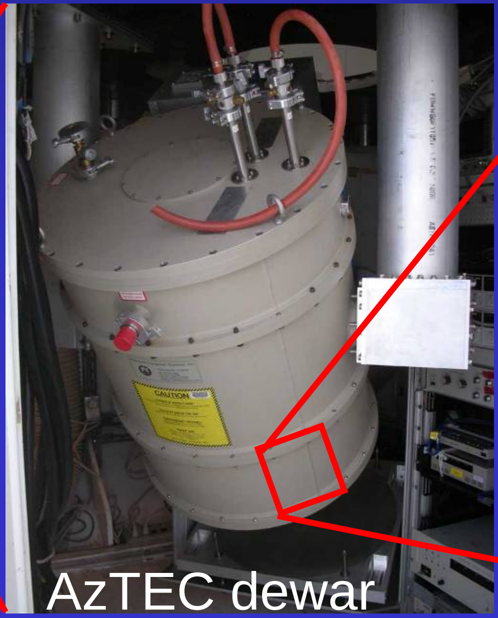
- The widest instantaneous spectral coverage at submm
- Very flat baseline



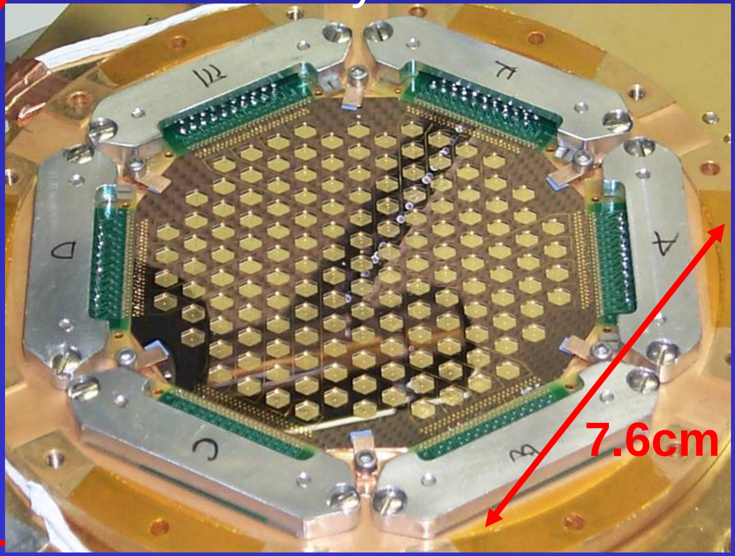
AzTEC on ASTE (2007-2008)

- AzTEC continuum receiver
  - 144 bolometer array for 270 GHz
  - Developed for LMT
- Collaboration with
  - UMass (G. Wilson, M. Yun), INAOE (D. Hughes), et al.

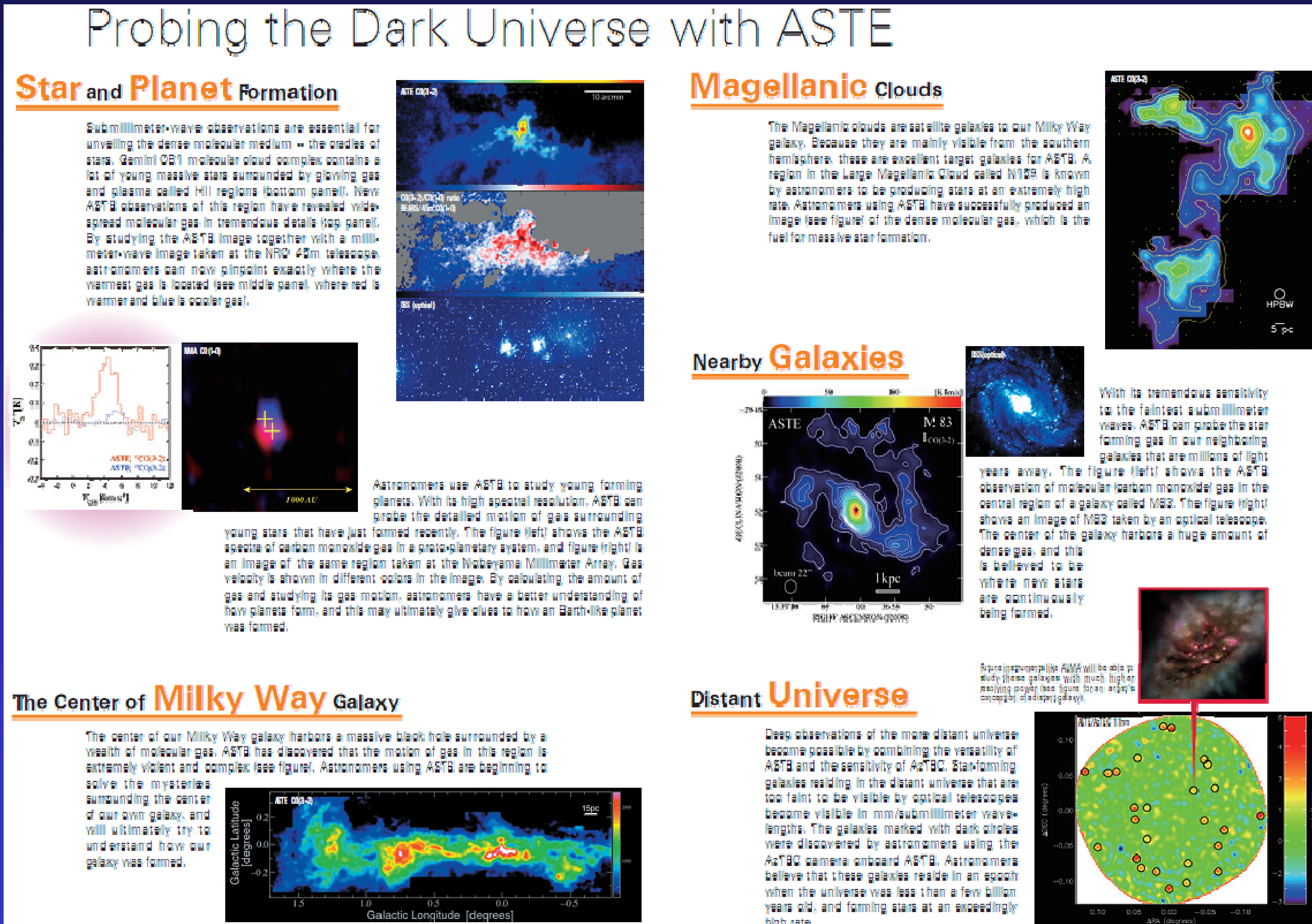




AzTEC array



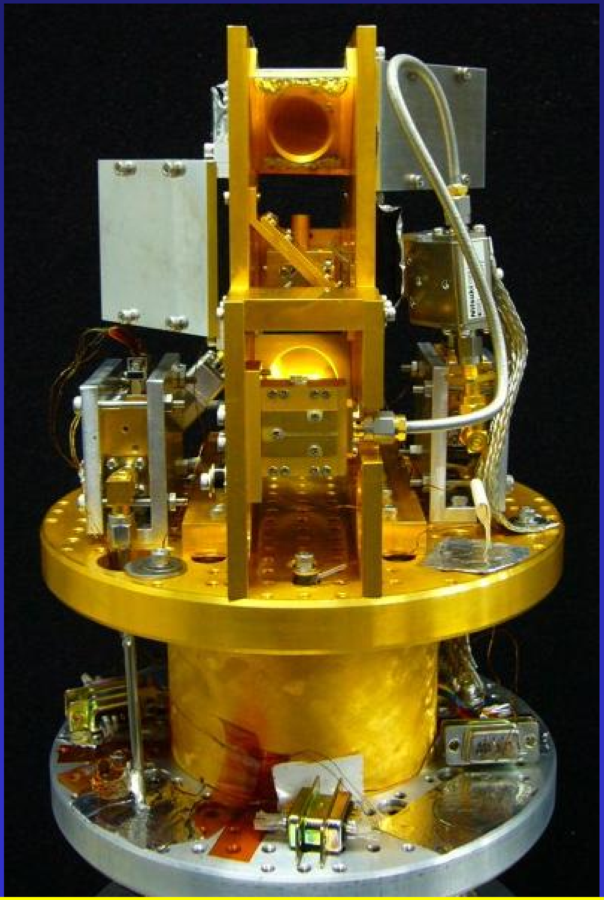
What do we observe?



Future

Future Plans

- Spectroscopy
  - Explore higher frequencies
    - 500GHz, 800GHz



800GHz receiver “AERO”

- Continuum Observations
  - Multi-color bolometer camera development
    - 1.1mm, 850μm, 450μm
    - Over 400pixels!!

Continuum camera