



The CANGAROO-III Project: Status Report

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We report on the status of the construction of an array of four 10 m atmospheric Cherenkov telescopes for gamma-ray astronomy, near Woomera, in South Australia — the CANGAROO-III project [1]. The first telescope of this array is the upgraded version of the CANGAROO-II 7 m telescope and has been in operation since March 2000. The second telescope, an improved version of the first, is being constructed for installation in late 2001. Stereoscopic observation of sub TeV gamma-rays with the two 10 m telescopes will begin in 2002 and the full array will be operational in 2004.

1. First 10m telescope

- Upgraded from the 7m telescope [2] which was completed in 1999
- In operation since Mar 2000

	7m telescope (1999)	10m telescope (2000)
Focal length	8m	8m
80cm CFRP mirrors	60 (30m ²)	114 (57m ²)
Number of PMTs	512 (1/2")	552 (1/2")
Readout electronics	TDC	TDC & ADC
Point image size	0.15° (FWHM)	0.20° (FWHM)

- 552ch camera (Fig.2)
 - R4124UV (1/2", Hamamatsu)
 - Field-of-view 3°
 - Light guides
- Electronics
 - 16ch Frontend buffer amplifier
 - 32ch Discriminator board
 - 32ch CAMAC-TDC
 - 32ch VME-ADC (16-bit) (Fig.3)
 - Linux-based PC readout through PCI/VME interface

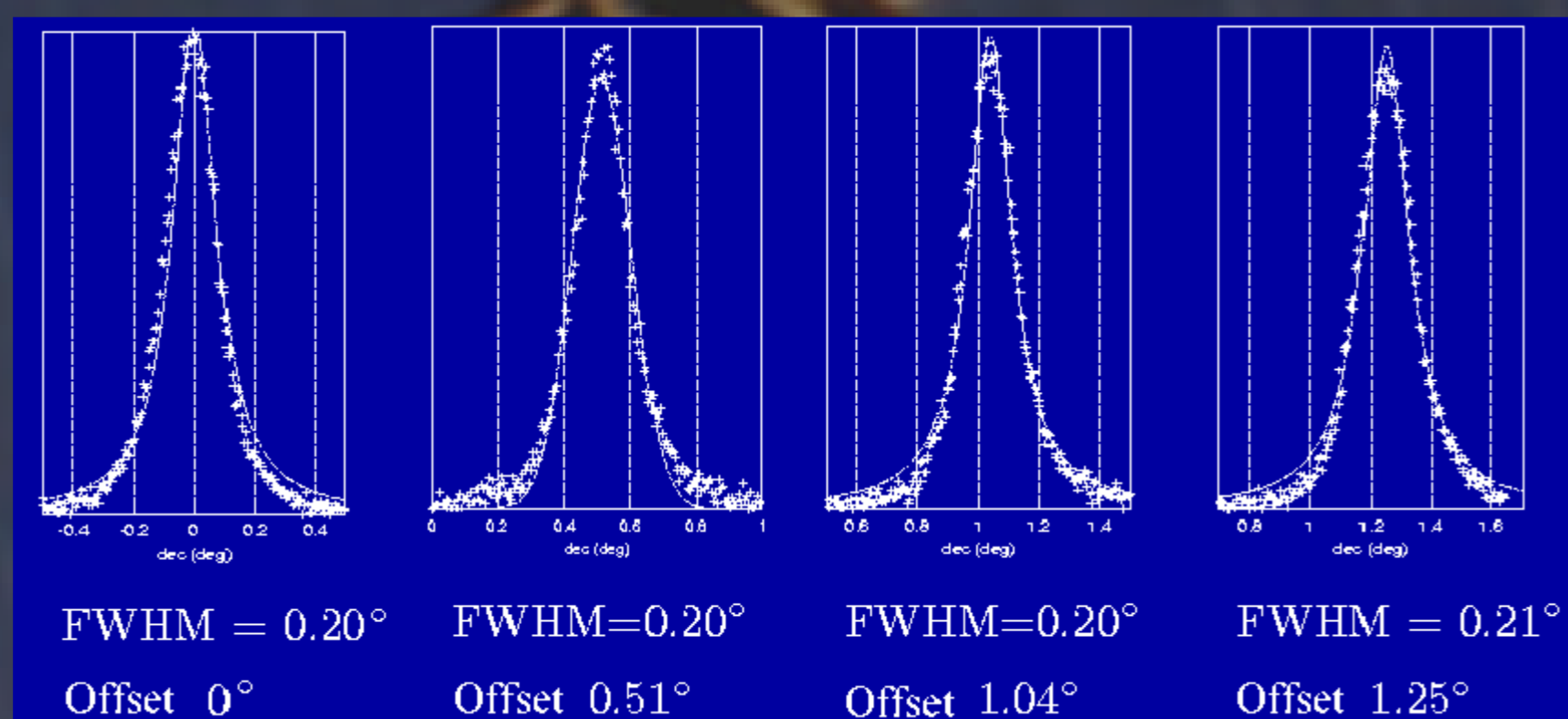


Fig. 1 Slices of star images at the focal plane

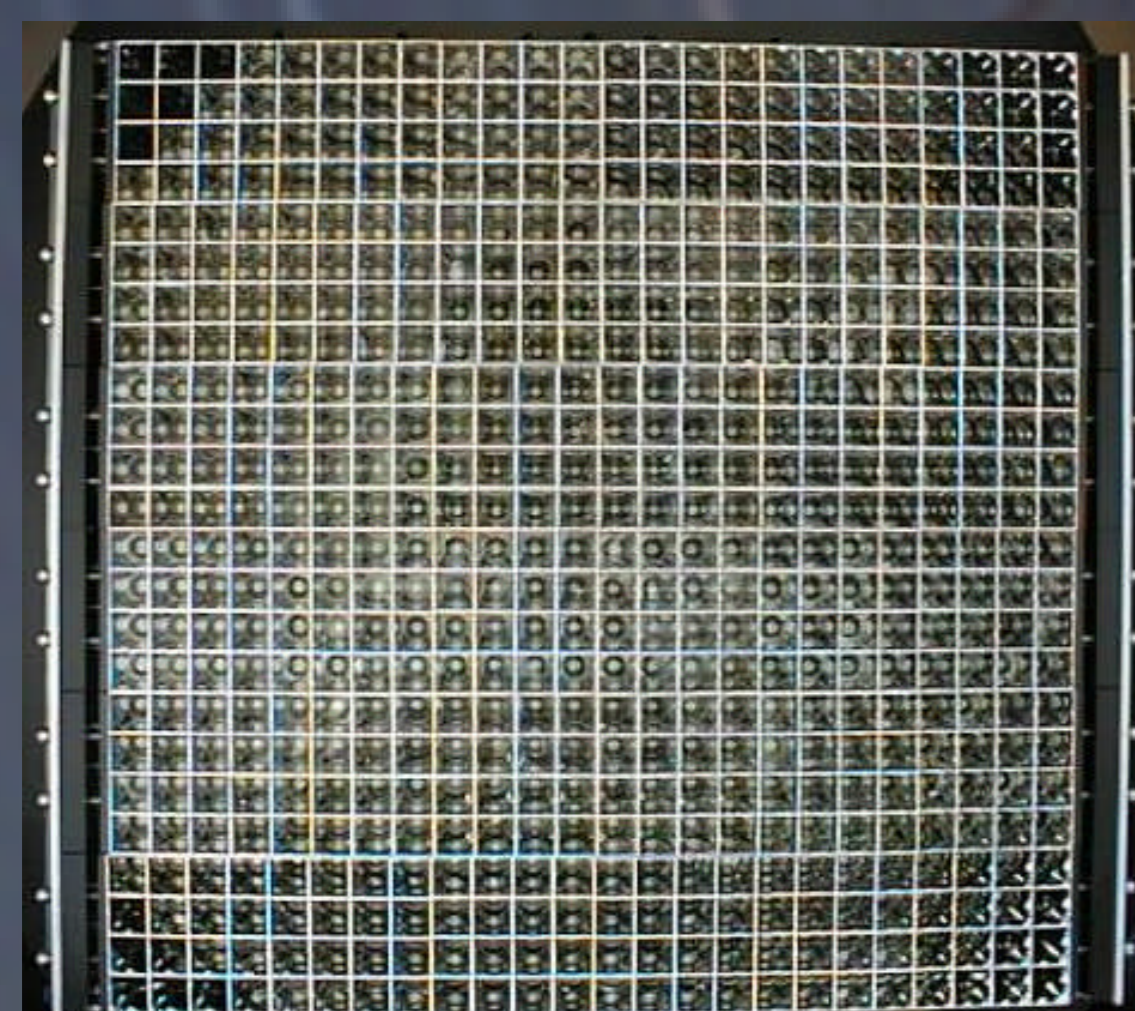


Fig. 2 552ch PMT camera



Fig. 3 32ch VME-ADC

References

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 - T. Tanimori, Proc. 26th ICRC (Salt Lake City) Vol.5, 203
 - R. Enomoto et al. (OG2.02); S. Hara et al. (OG2.02); J. Kushida et al. (OG2.02); K. Nishijima et al. (OG2.03); K. Okumura et al. (OG2.03), in this conference
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 - H. Kubo et al. (OG2.05), in this conference
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- ✪ CANGAROO Group URL: <http://icrhp9.icrr.u-tokyo.ac.jp>

2. New 10m telescopes

- Upgraded from the 7m telescope which was completed in 1999
 - In operation since Mar 2000
- See other reports [3] for results.

2.1 Reflector

- 114 CFRP-based 80cm mirrors [4] with improved quality (see Fig.5)

2.2 Telescope control

- Each telescope is controlled by Linux-based PCs (NTP synchronized) via network

2.3 Camera

- 427 PMTs (3/4", Hamamatsu R3479; Figs. 6,7) are arranged in hexagonal shape (Fig.8) to cover ~4 degree FOV.
- Equipped with light guides (Fig.9) [5]

2.4 Electronics [6]

- All VME-based (6U&9U) modules (frontend, TDC, ADC) are read by Linux-based PCs

2.5 Monitors

- Cloud monitors, Weather monitors, Star field monitors

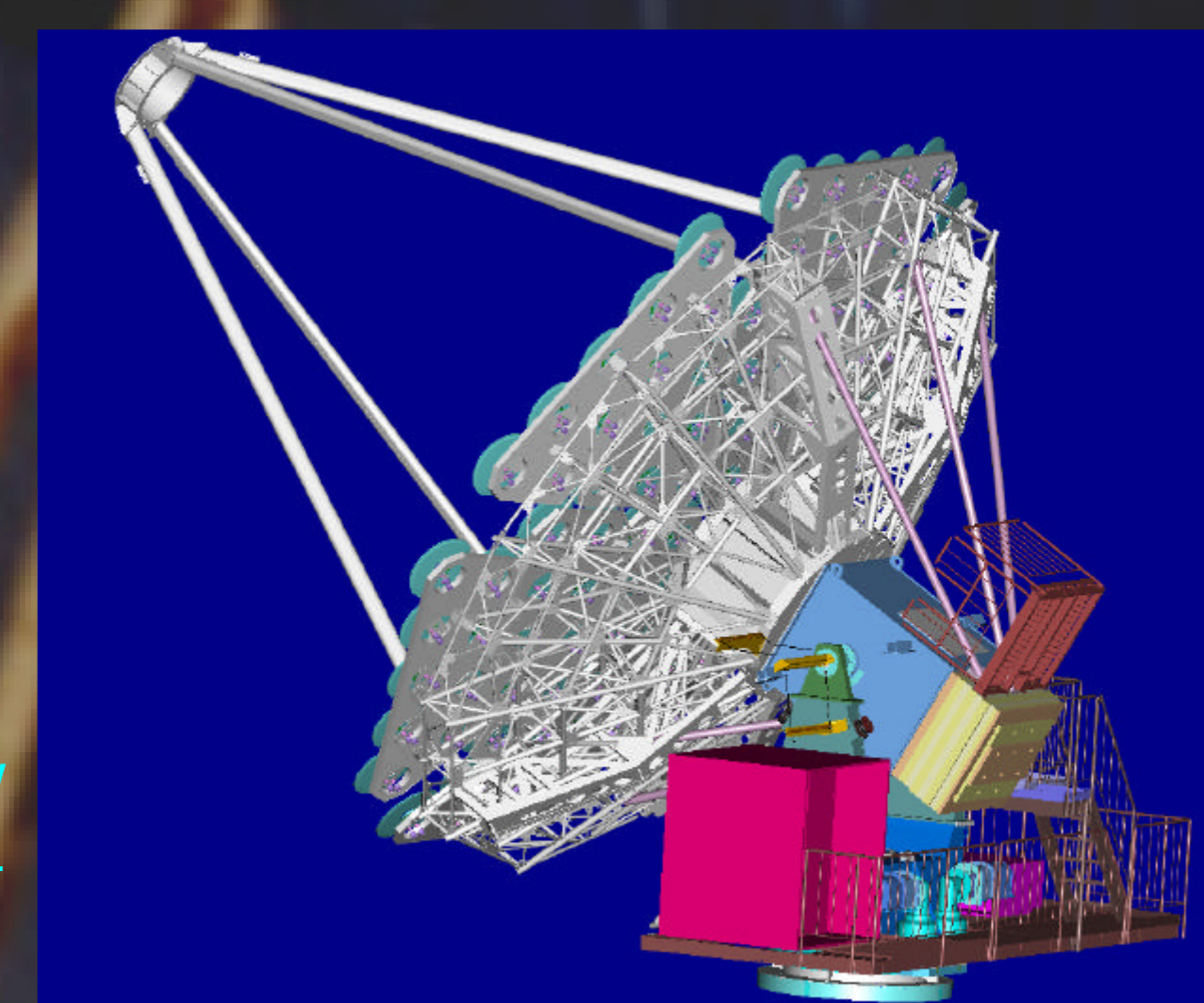


Fig. 4 Sketch of a new reflector

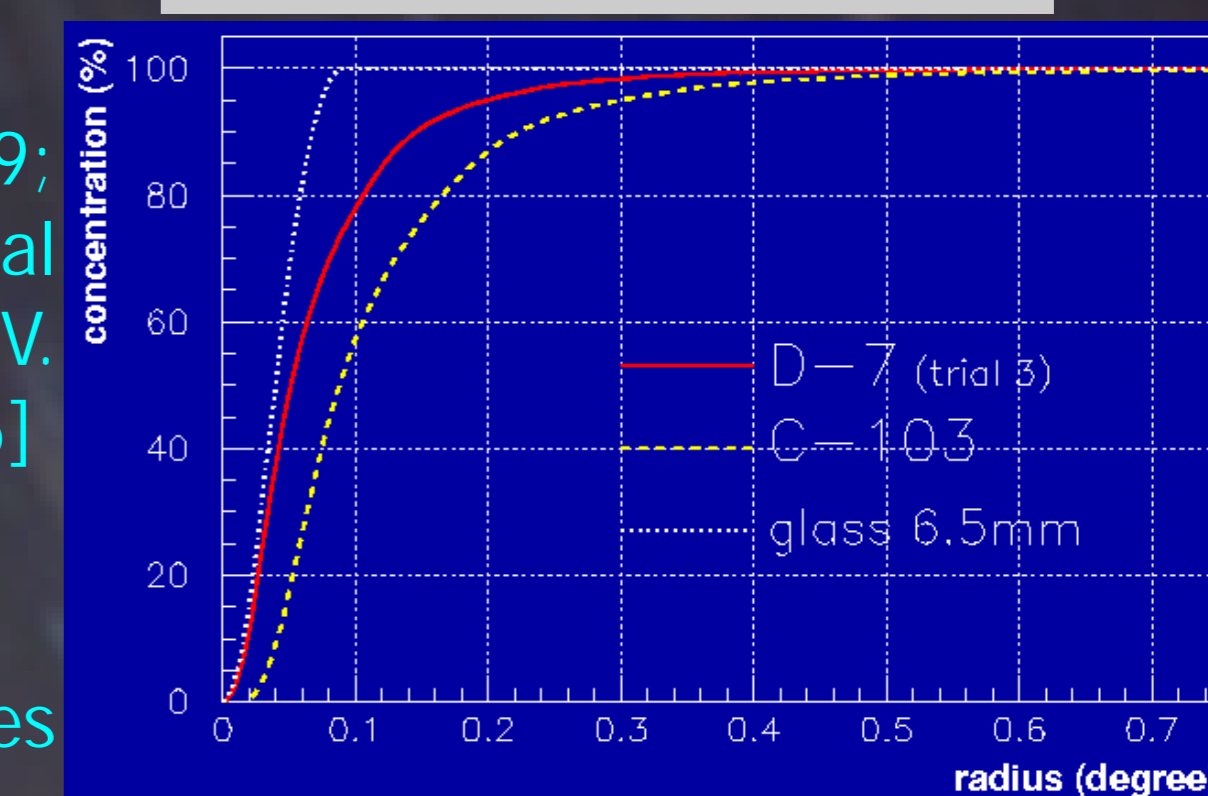


Fig. 5 Plot of light concentration within specific radius. "D-7": a new sample mirror, "C-103": one used in the first 10m telescope. Also plotted a sample glass mirror of 6.5mm thickness.

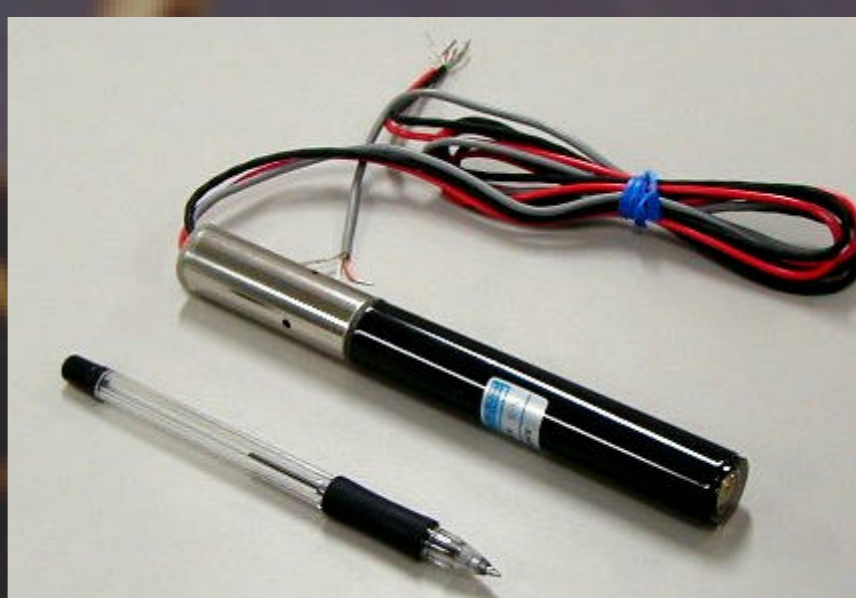


Fig. 6 New PMT assembly (3/4", Hamamatsu R3479UV) with a preamplifier inside.

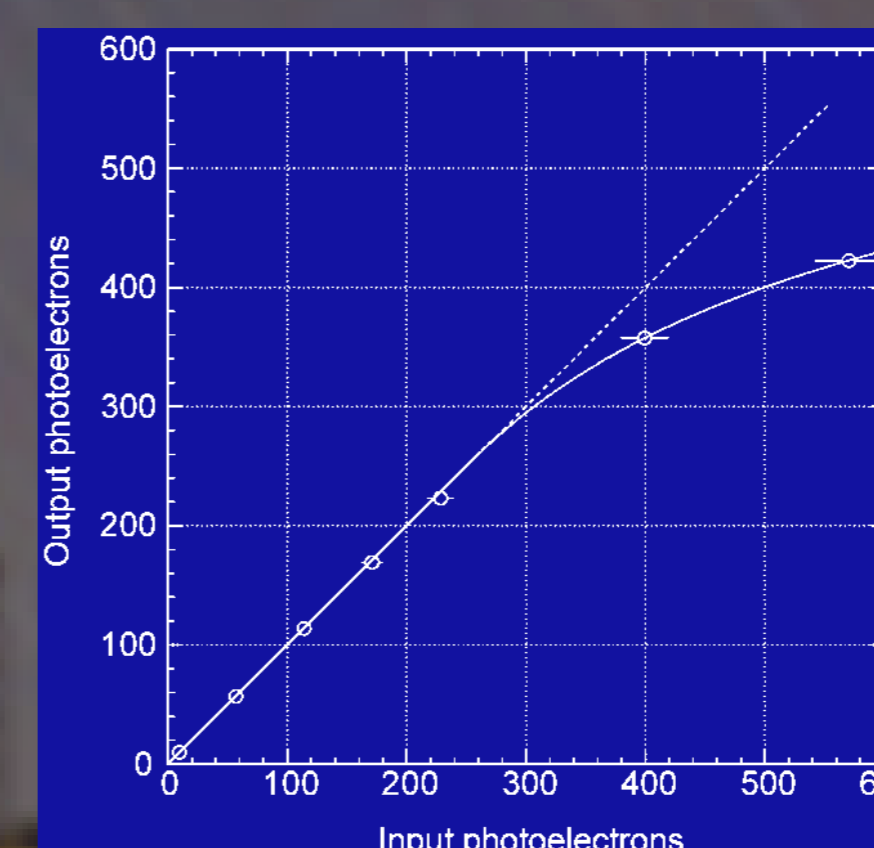


Fig. 7 Linearity of the new PMT assembly

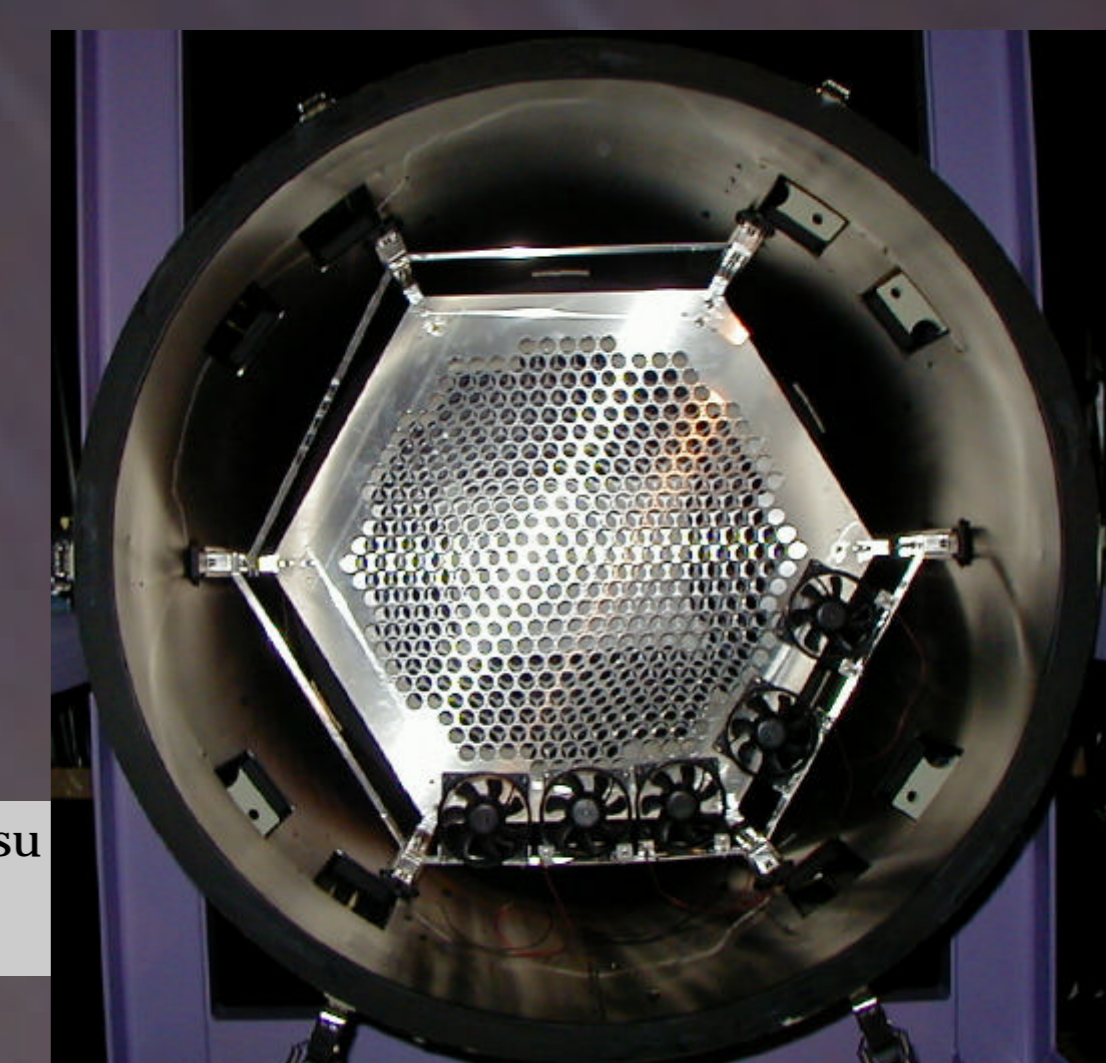


Fig. 8 New imaging camera before installation of PMTs.

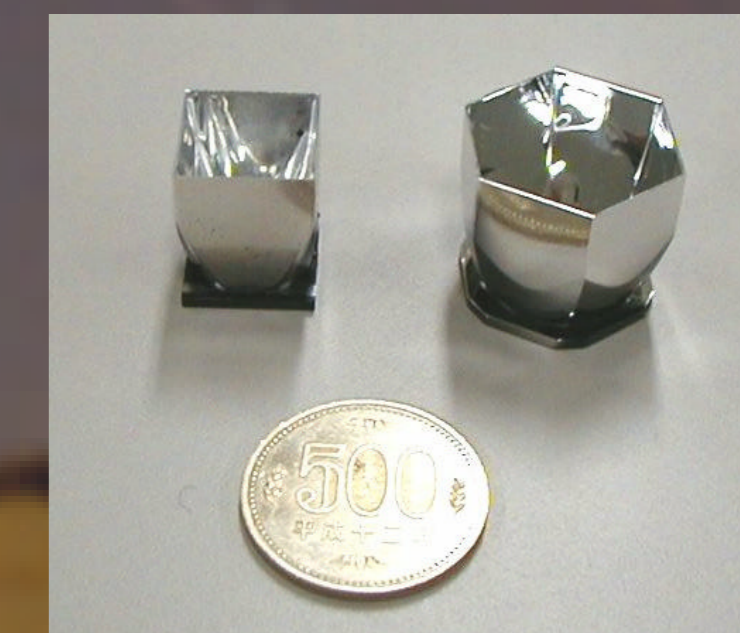
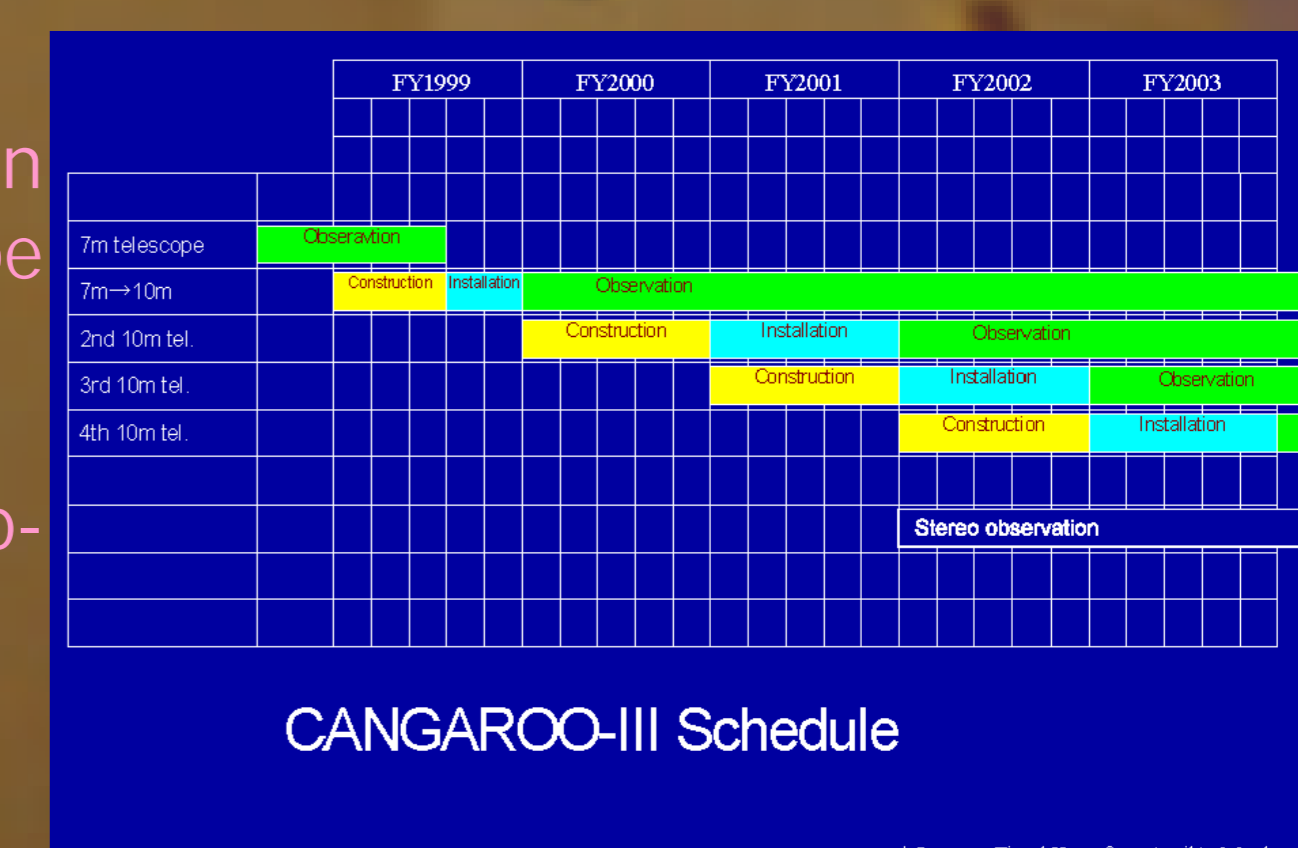


Fig. 9 New light guide

3. Schedule

- 2002: 2nd 10m telescope installation (100m apart from the first telescope [7])
- 2003: 3rd telescope installation
- 2004: Four telescope array start operation



CANGAROO-III Schedule

* Japanese Fiscal Year: from April to March



Synthesized image of the CANGAROO-III array