B02 : Status Reports - HiZ-GUNDAM

High-z Gamma-ray bursts for Unraveling the Dark Ages
and Extreme Space Time Mission

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HiZ-GUNDAM pre project candidate team

3rd Annual Meeting on Multi Messenger Astrophysics @ Naruko Kanko Hotel, Naruko (2025/11/18 – 20)

6 oral presentations, 7 poster presentations

HiZ-GUNDAM	Overview	Daisuke Yonetoku (Oral)
EAGLE: Wide Field X-ray Monitor	EAGLE	Makoto Arimoto (Oral)
	LEO Optics	Hatsune Goto (Oral)
		Issin Nagataka (Poster)
	pnCCD	Tatsuro Kanenaga (Poster)
	BGD	Akito Kutsumi (Poster)
MONSTER: Optical and Near Infrared Telescope	MONSTER	Hideo Matsuhara (Oral)
	Köster Prism	Tomoya Hori (Oral)
	Thermal Design	Rinon Kageyama (Poster)
Onboard Software And Network	MPU	Takumi Togashi (Oral)
	Network	Keito Watanabe(Poster)
	MONSTER	Haruaki Niinuma (Poster)

HiZ-GUNDAM (High-z Gamma-ray bursts for Unraveling the Dark Ages Mission)

Mission : Time Domain Astronomy

"**Multi-messenger astronomy**" and "**Exploration of the early universe**"

Observation strategy
(1) Discovery of GRBs/transients with the EAGLE (t = 0 sec)
(2) Automatic repointing (t < 300 sec)
(3) Identification of counterpart with the MONSTER (t ~ 1000 sec)
(4) Alert message (t ~ 0 sec, t ~ 30-60 min)
(5) Spectroscopic observation with large area telescopes (t ~ 1.5 hr)

Togashi's Talk

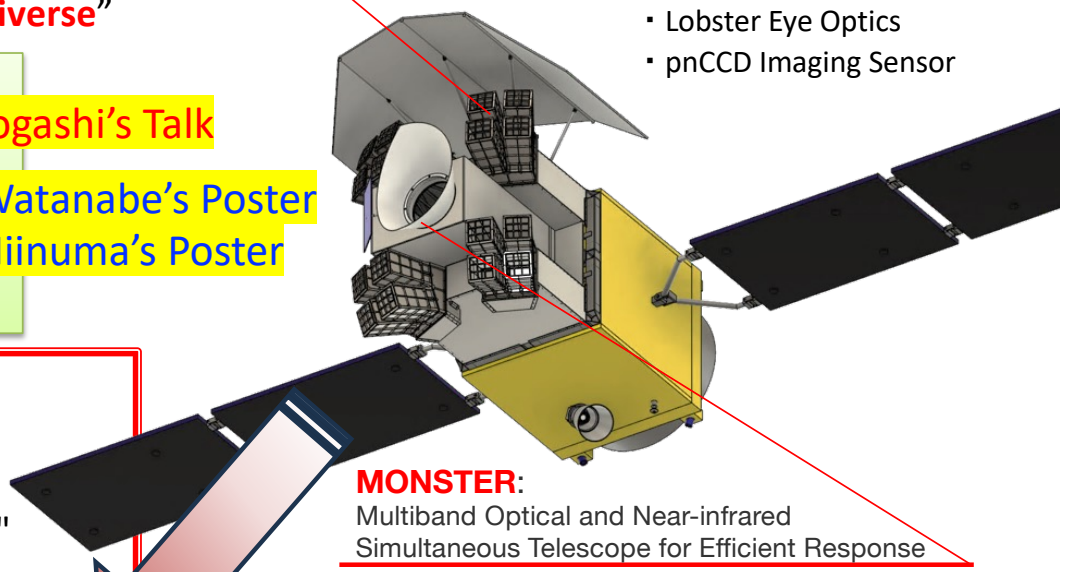
Watanabe's Poster

Niinuma's Poster

We will discover treasured targets from a large amount of transient sources, and provide important observation targets to large area telescopes.
We will promote "early space exploration" and "MM astronomy" with all the power of astronomy.

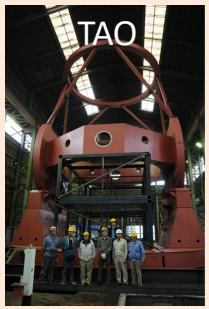
EAGLE: Exploration of Ancient GRBs with Lobster Eye

- Lobster Eye Optics
- pnCCD Imaging Sensor

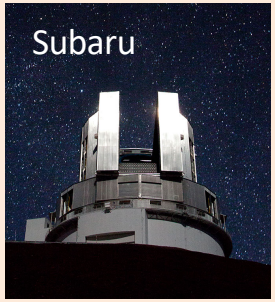


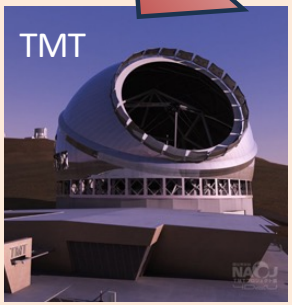
MONSTER:
Multiband Optical and Near-infrared Simultaneous Telescope for Efficient Response

- 5-band simultaneous photometry

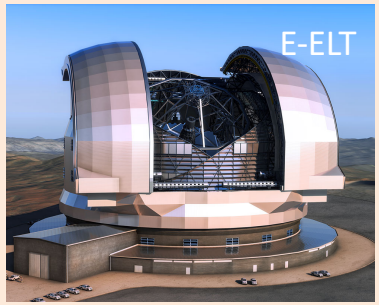


Space telescope





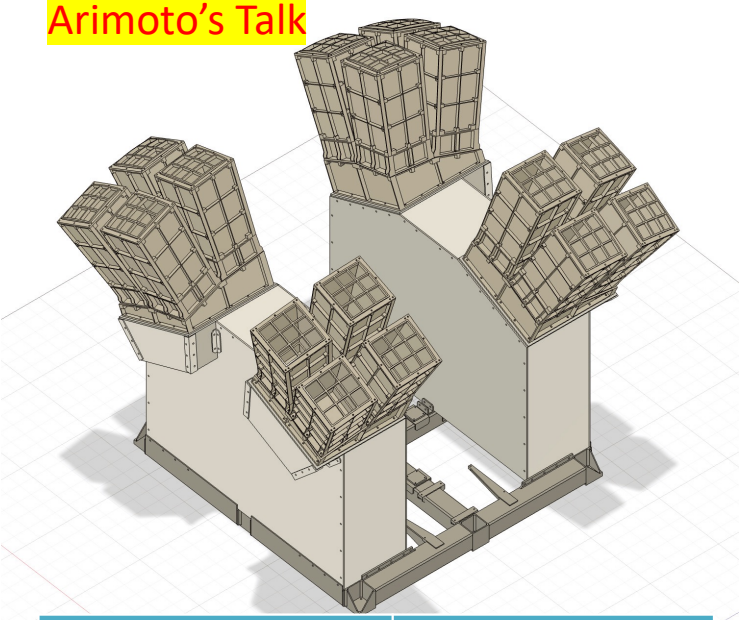
8m-class



Future 30m-class

EAGLE (Wide Field X-ray Monitor)

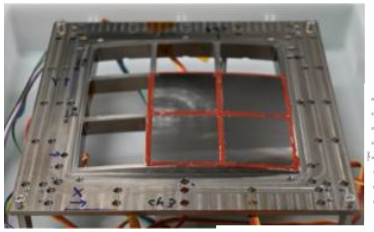
Arimoto's Talk



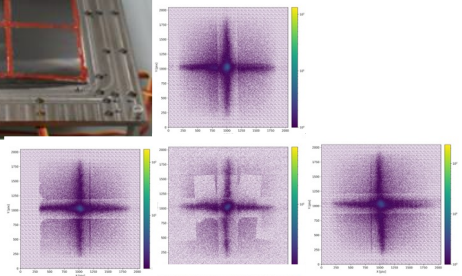
Items	Parameters
Energy band (keV)	**0.4 – 4 keV**
Telescope type:	Lobster Eye Optics
Optics aperture	240 x 320 mm^2
Number of Unit	6
Field of View	**0.53 str (6 units)**
Focal length	300 mm
Focal plane detectors	pnCCD array
Number of modules	16
Sensitivity	**= 1e-10 (erg/cm2/s) For 100 sec**
Position accuracy	3 arcmin

X-ray Optics (Lobster Eye)

Goto's Talk Nagataka's Poster



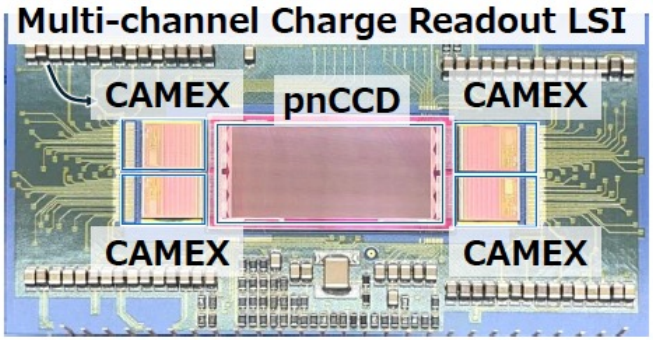
Alignment Methodology



- Imaging Performance
- Angular Response
- Effective Area

Focal Plane Detector (pnCCD)

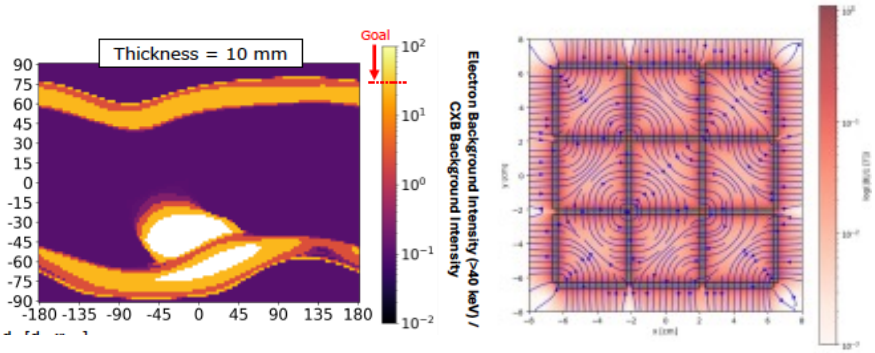
Kanenaga's Poster



- Electric Circuit Boards
- X-ray Readout
- Spectroscopic Performance

Electron Diverters (Background Estimation)

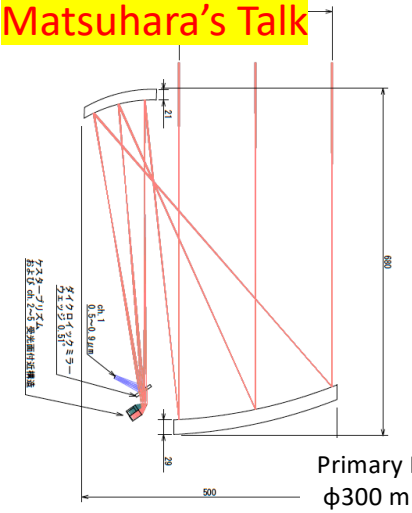
Kutsumi's Poster

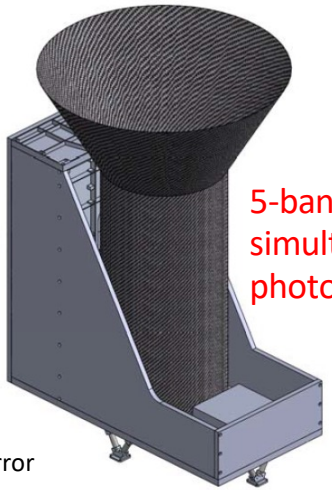


- Geant4 simulation
- A few Models of Magnetic Field based on EP/SVOM
- Thickness of Instrument Body (~ 10mm thickness)

MONSTER (Optical and NIR Telescope)

Matsuhara's Talk





5-band simultaneous photometry

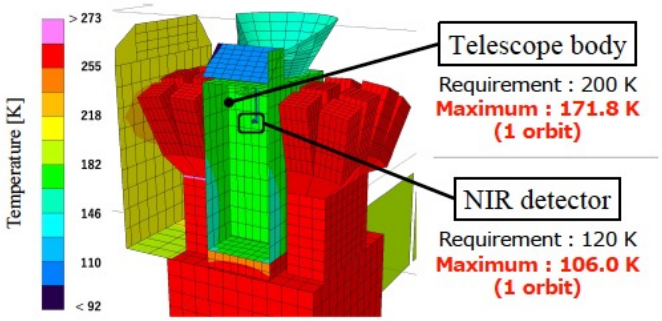
Primary Mirror
ϕ300 mm

Items	Parameters				
Telescope type	Offset Optics				
Aperture size	**30 cm**				
Focal length	183.5 cm				
F number	F6.1				
Field of view	15 arcmin × 15 arcmin				
FoV per pixel	2 acsec × 2 arcsec				
Image size	3 pixel × 3 pixel				
Integration time	10 minutes (2 minutes x 5 frames)				
Observation Band (μm)	0.5–0.9	0.9–1.3	1.3–1.7	1.7–2.1	2.1-2.5
Limiting Magnitude mag (AB)	21.4	21.3	21.4	20.8	20.7
Focal detector	HyViSi	HgCdTe (H1RG)			

Thermal Design

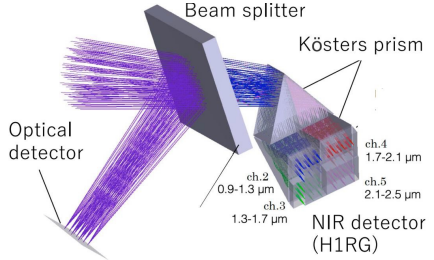
Kageyama's Poster

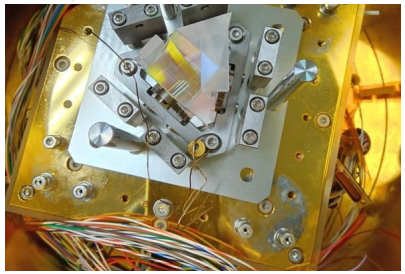
Worst Case



- Feasibility study of follow-up obs. for worst-case thermal scenarios

Köster Prism Hori's Talk

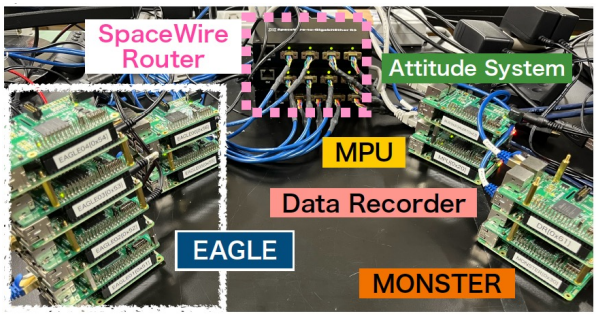




- BBM test for structure and Optical/NIR performance

Mission Processor

Togashi's Talk Watanabe's Poster Niinuma's Poster



Command/Data Processing
- Space Wire Networking

Onboard Analysis
- X-ray Transient Search
- Opt/NIR Analysis
- Identification of Counterparts With Machine Learning

Renewal of Satellite Bus System

- Simple Design, Higher Performance, Less Cost
- Satellite bus designs that meet the requirements of the HiZ-GUNDAM and LAPYUTA

Optical & NIR UV

Current Status & Future Schedule

Fiscal Year	Plans and Milestones
Current	Development of BBM (front loading)
FY2026	Down Selection Review for 3 candidates (HiZ-GUNDAM/Silvia/Lapyuta)
FY2027	Mission Definition Review, Establishment of Pre-Project Team
FY2028	System Definition Review Establishment of Project Team → Engineering Model
FY2029	Preliminary Design Review
FY2031	Critical Design Review → Flight Model
FY2034	Launch