KUGRB – what we are doing

Gihan Hong

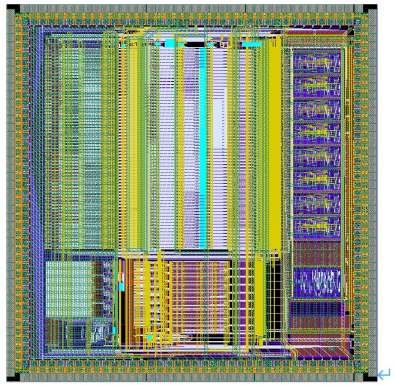
KUGRB team

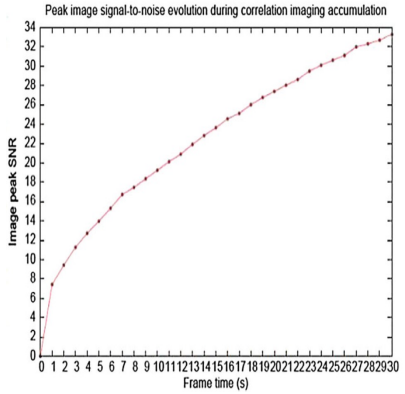
UBAT – MAPMT DAQ

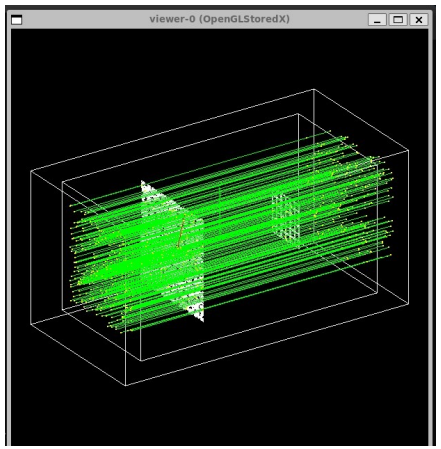
- MAPMT → MUX →FPGA
- 이벤트 트리거링
- UBAT 시스템 Geant4 시뮬레이션

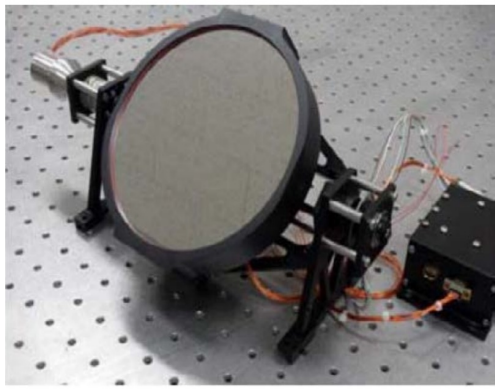
SMT – Mirror control

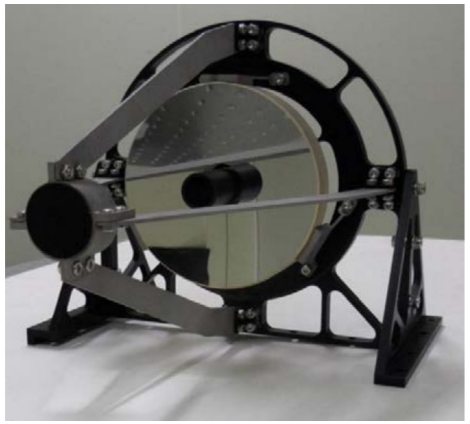
- 광학망원경
- Mirror gimbal control





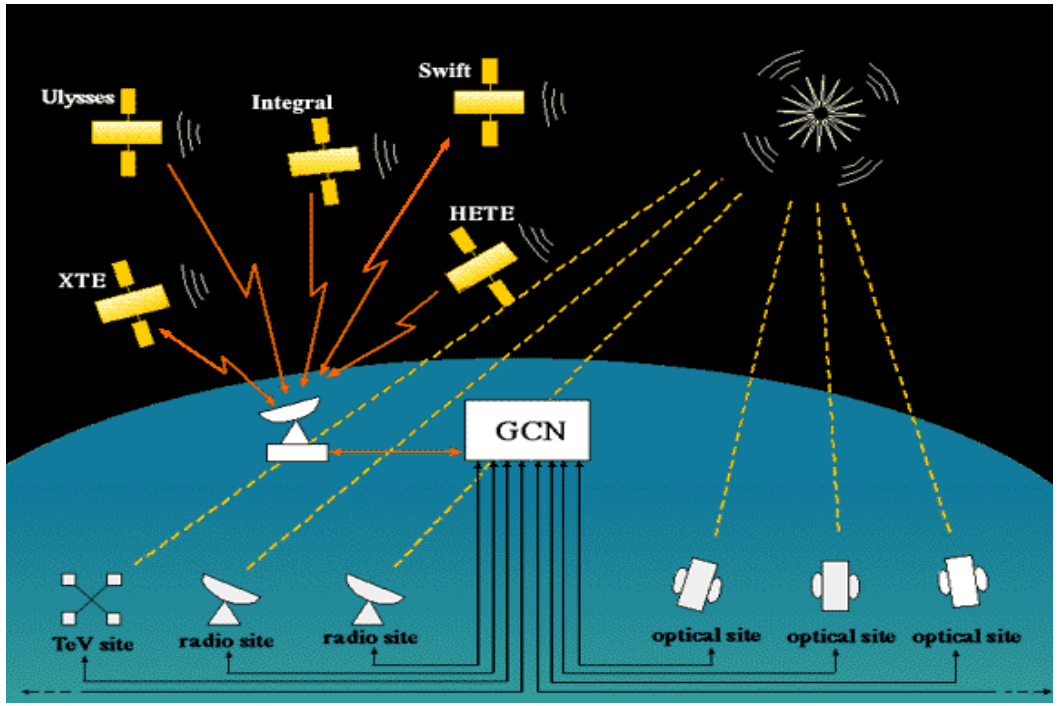






BOOTES telescopes

네트워크 광학 망원경 optical transient 관측장치



0.6m급 메인 광학계 + 자동화 짐벌

→ Robotic Autonomous Observatories

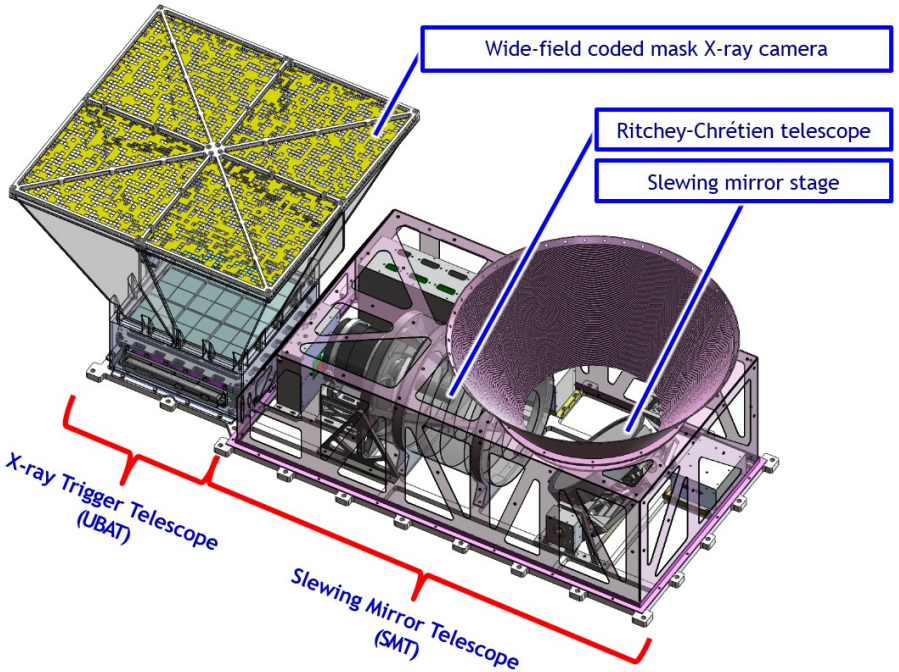
https://bootesnetwork.com/science-tech/

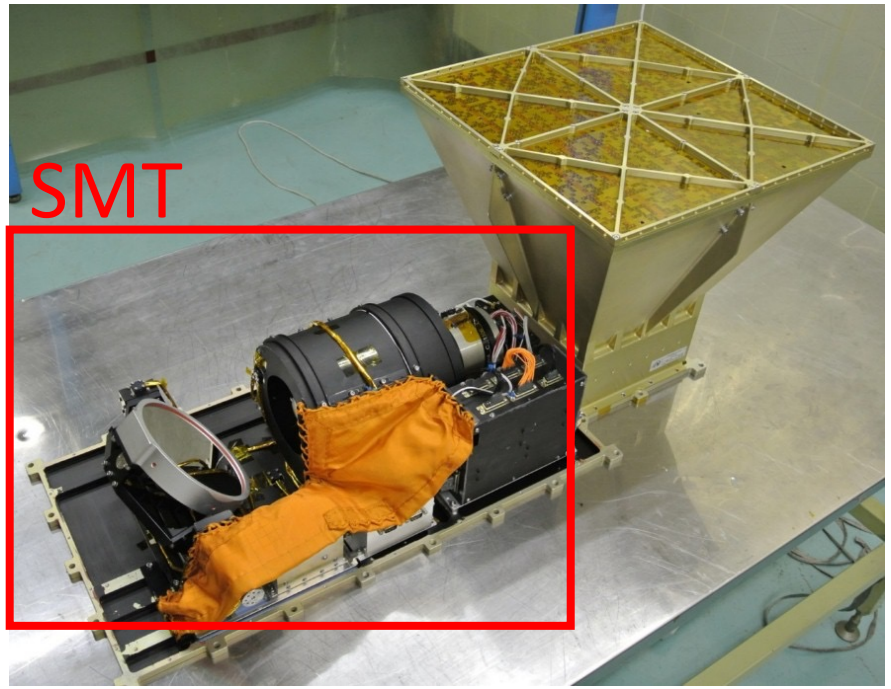
Slewing Mirror Telescope(SMT)

Ultra-Fast Flash Observatory Pathfinder

X-ray와 UV/visible 디텍터를 탑재한

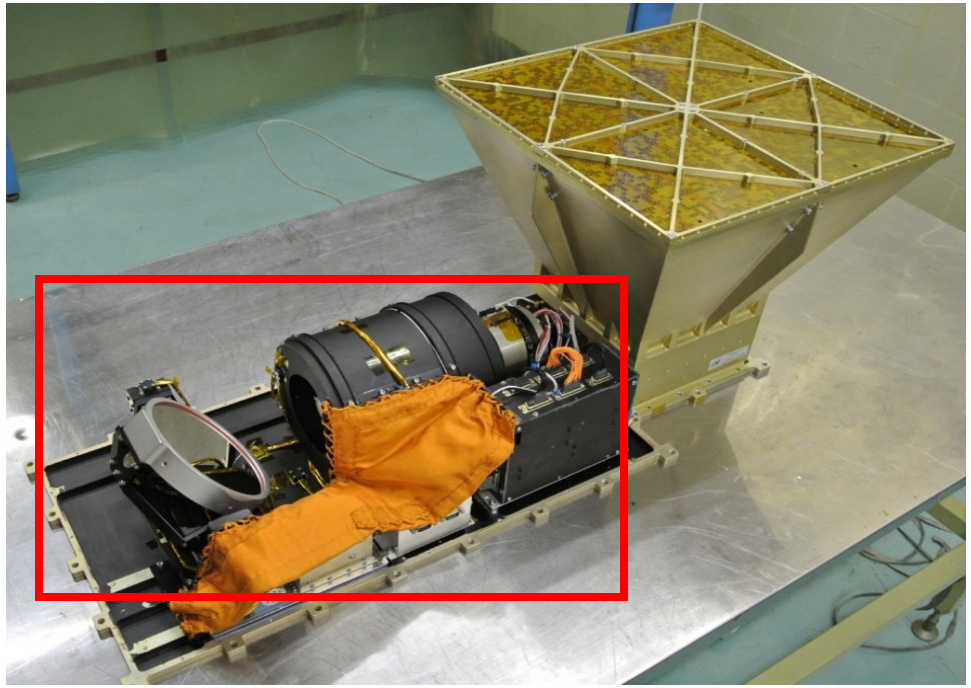
Gamma-ray burst (GRB)를 관측하기 위한 장치





Slewing Mirror Telescope(SMT)

https://doi.org/10.1142/9789814449373_0024



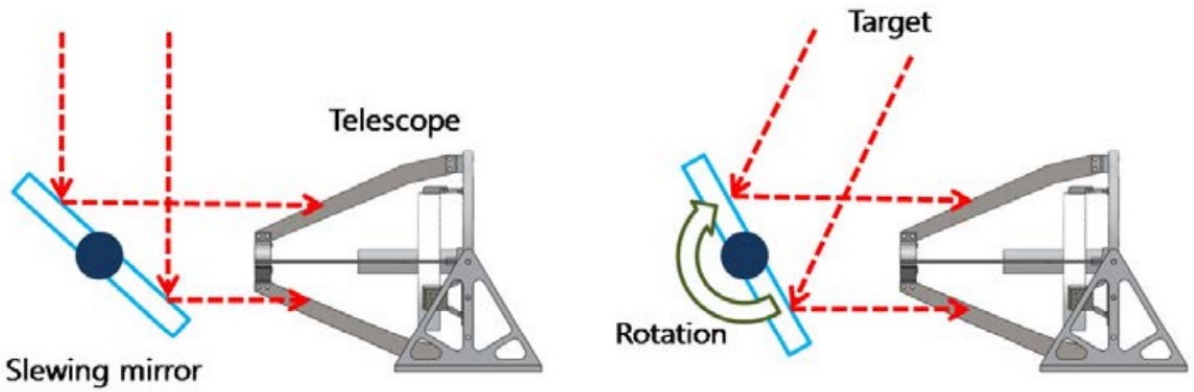


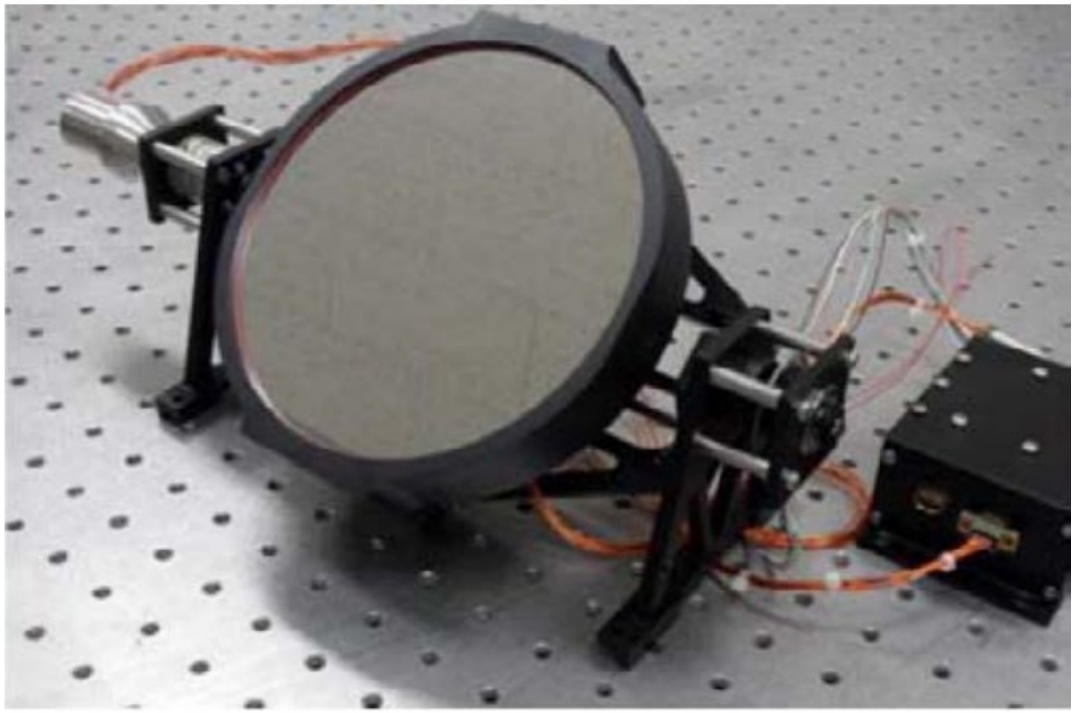
Table 1. SMT Characteristics.

Instrument Type	RCT with Slewing Mirror
Mass	11.5 kg
Power Consumption	Average 10 Watt
RCT Aperture Size	D=10 cm
F-Number	11.4
RCT FOV	17 arcmin x 17 arcmin
Slewing Mirror Size	D=6 inches
Motor Rotation Minimum Step	4.05 arcsec (Mechanical)
Slewing Speed	15 deg/sec (Mechanical)
ICCD Gain	10^3-10^6
ICCD Number of pixels	256 x 256
ICCD Quantum Efficiency	5-20 % in 200-650 nm
CCD Dynamic Range	62 dB
Image Frame Time	2 ms

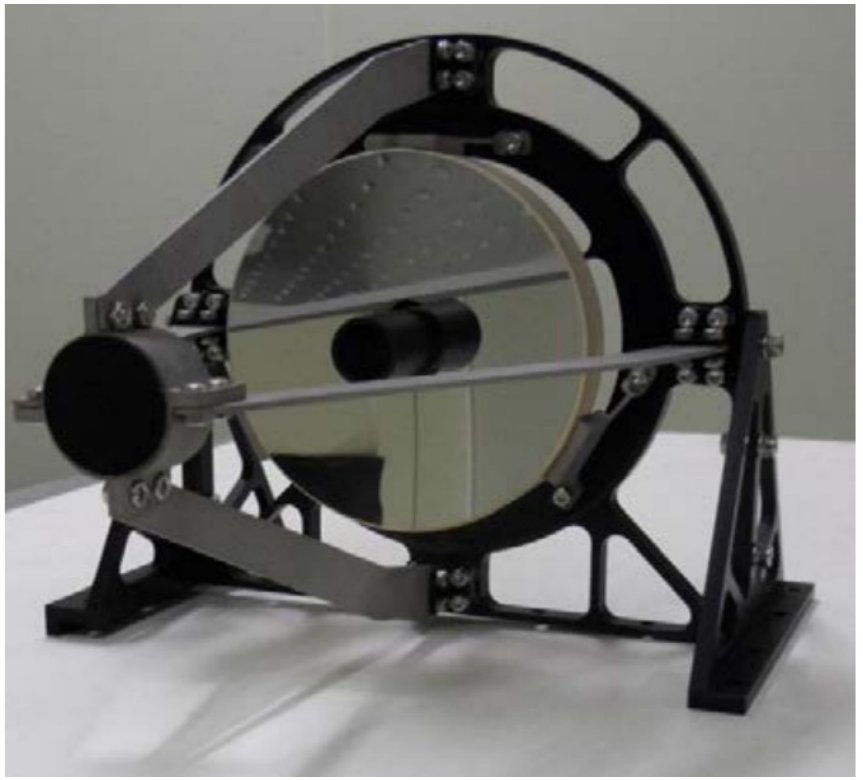
Slewing Mirror Telescope(SMT)

https://doi.org/10.1142/9789814449373_0024

1. Mirror control

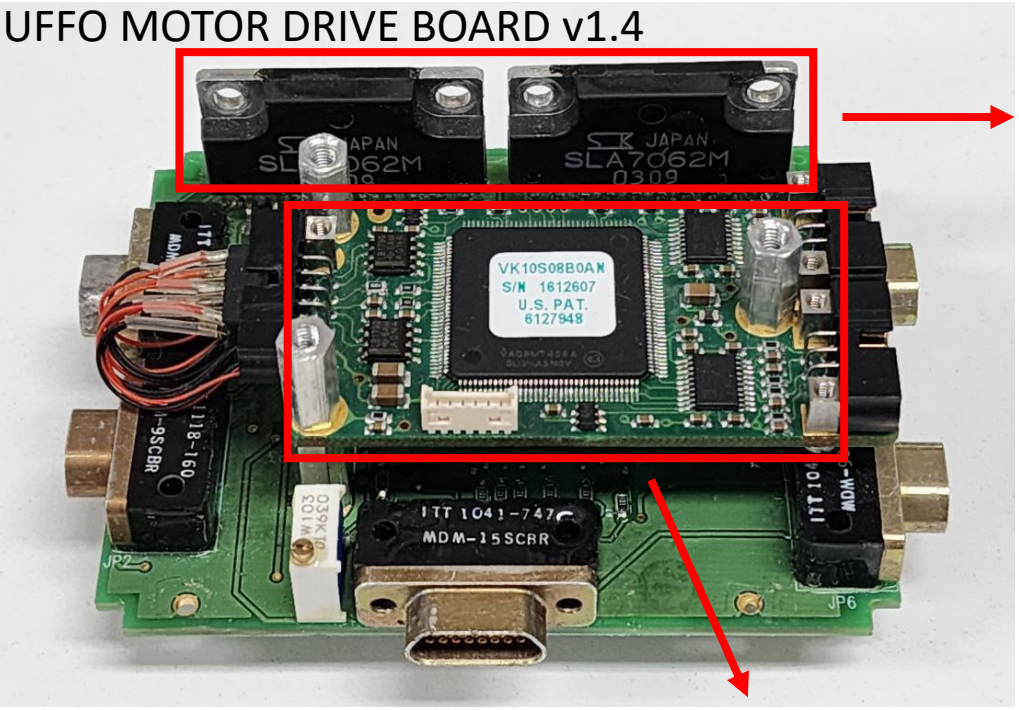


2. Image Data acquisition



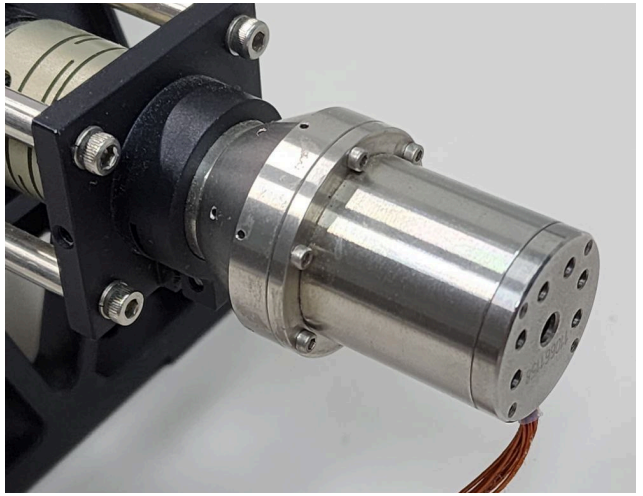
SMT - Mirror gimbal control

UFFO MOTOR DRIVE BOARD v1.4

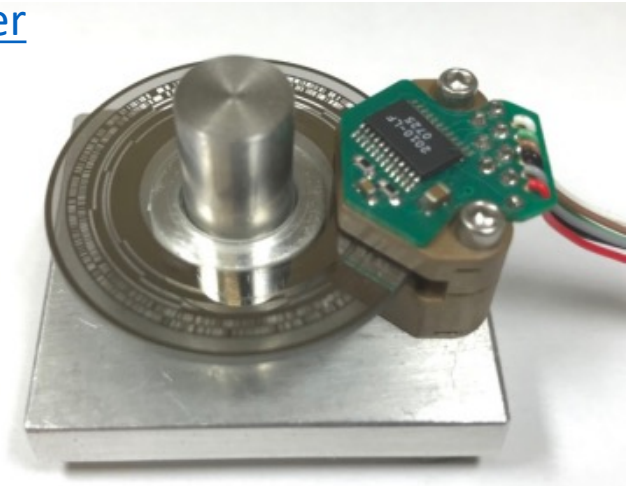


모터드라이버

모터 ?

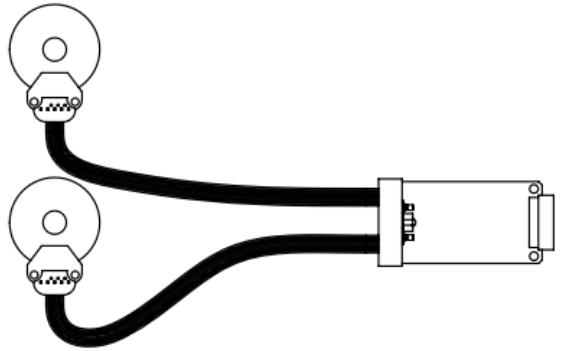


Encoder



Decoder VK SSI ? (VK10S08B0AN)

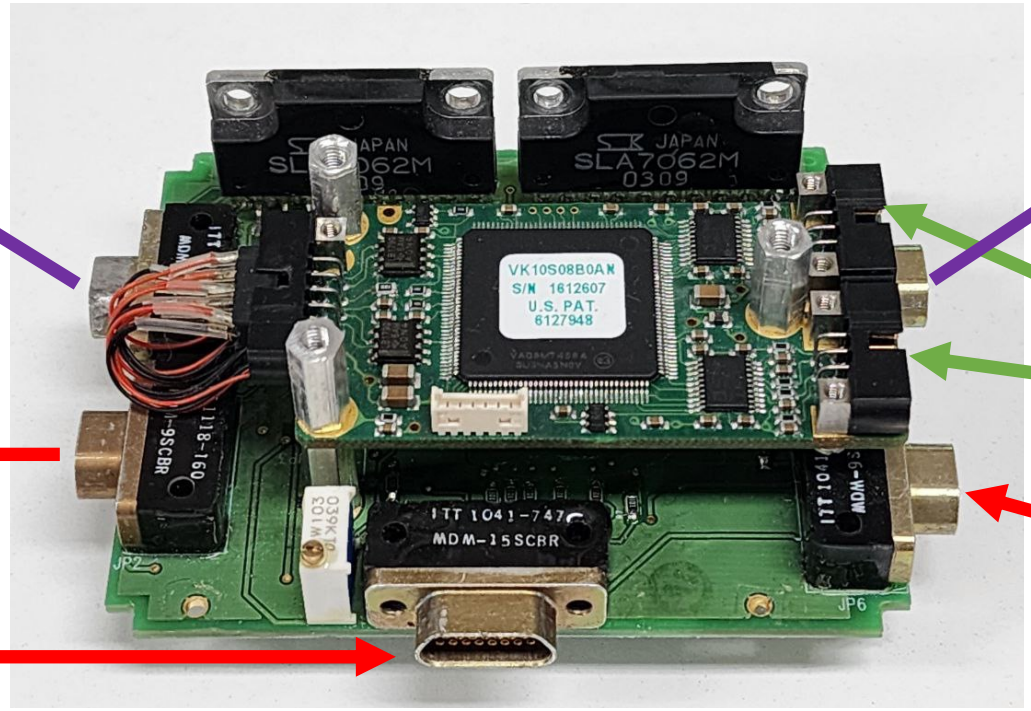
7700 with VK SSI dual input decoding electronics



Reading two separate readheads & disc/hub assemblies into one VK decoder. Good for Az & El gimbal applications

SMT - Mirror gimbal control

UFFO MOTOR DRIVE BOARD v1.4



To motor A
4 line for control,
1 line for 12V power

To motor B
4 line for control,
1 line for 12V power

From encoder A&B

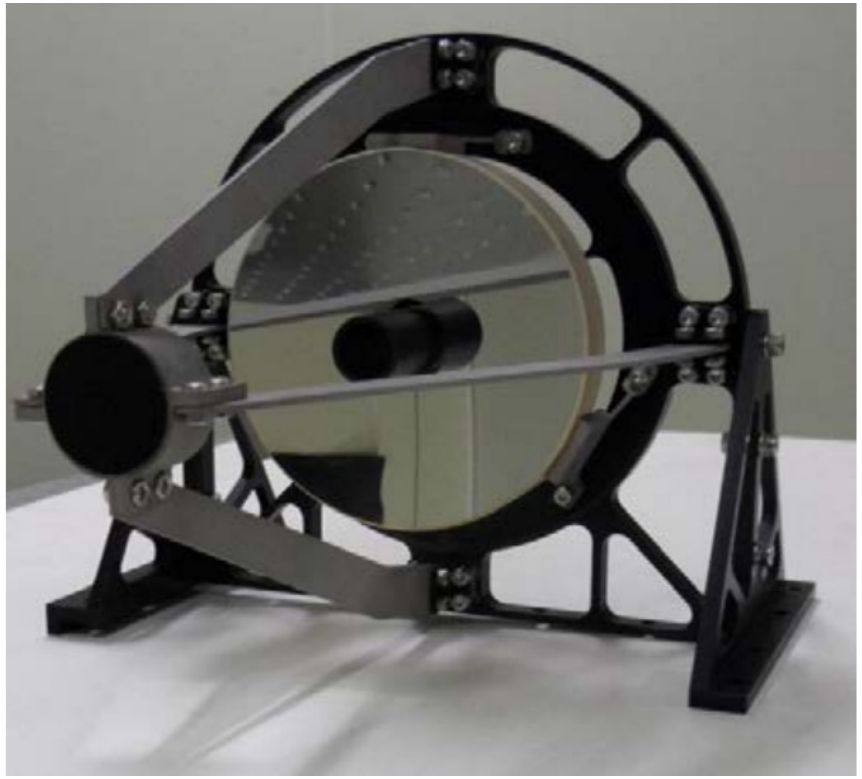
Power from power board
12v,5v

SMT
Decoder data
SMT control

SMT - Image Data acquisition

Plan

1. 광학센서 기성품 구입. (~~혹은 SMT의 ccd센서를 사용~~)
2. 광학계와 센서 정렬, 테스트

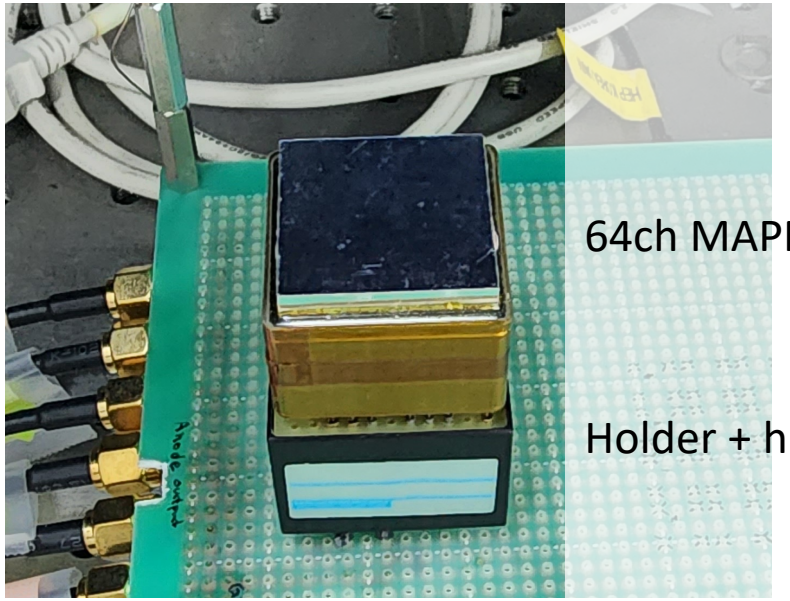


MAPMT test

목표: MAPMT의 멀티 채널 시그널을 받아보자.

- 작동되는 MAPMT 선별
- MAPMT 시그널에 대한 레퍼런스 수집

장치 구성



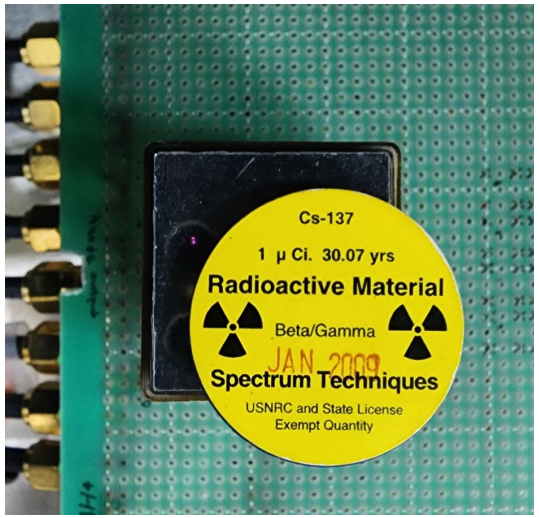
64ch MAPMT with YSO

Holder + high-voltage distributer

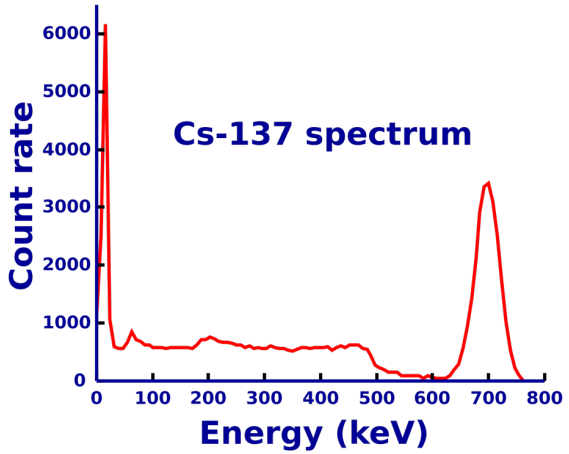
DT5742
16Ch Digitizer

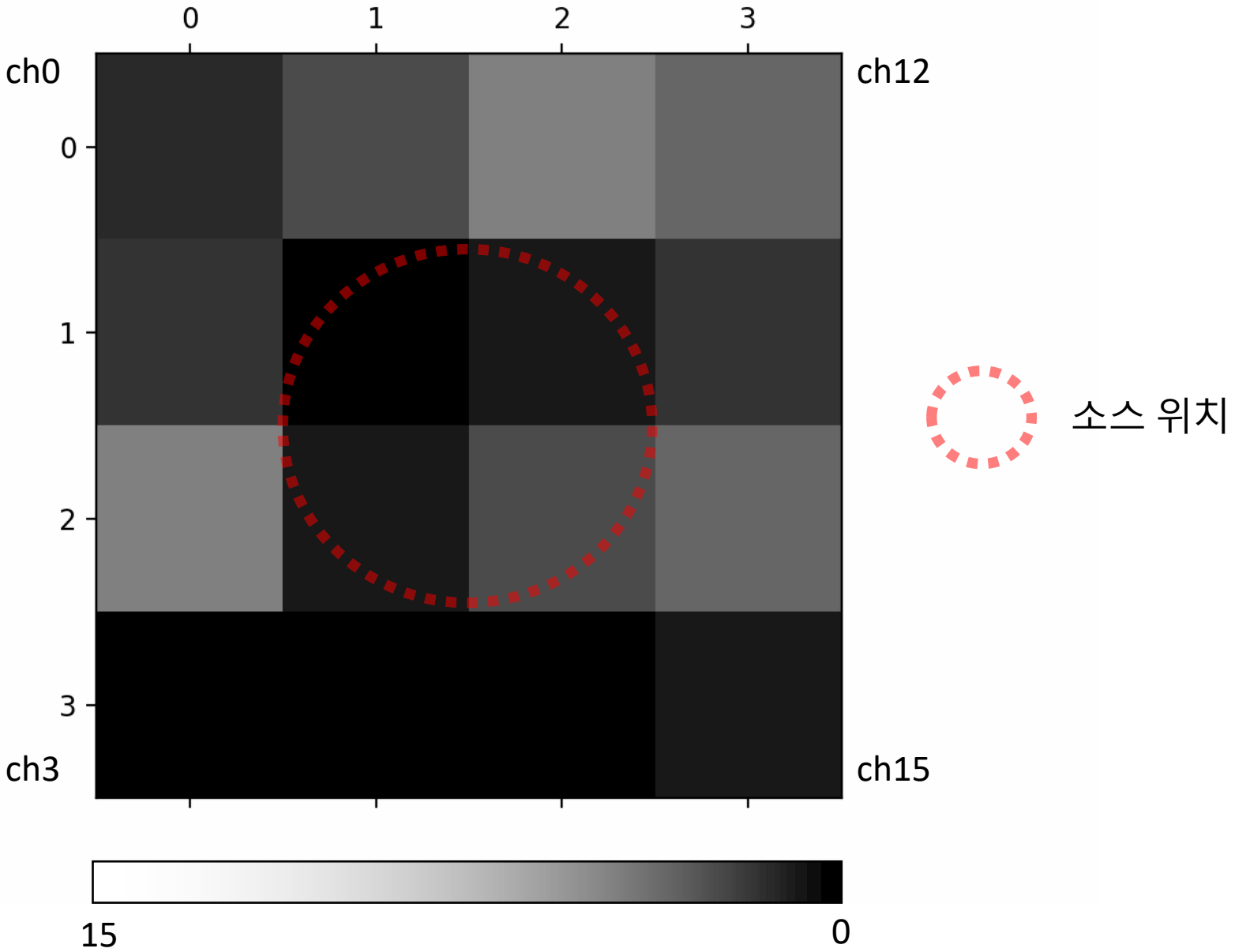
MAPMT test

Multi-channel readout



^{137}Ce, ~0.7µCi





결론

1. 기존 UFFO SMT에 사용된 부품을 이용해 지상관측 시스템을 준비중
2. 학부연구생의 연구를 통해 비슷한 컨셉의 지상관측 시스템 제작 예정
3. 관측장비의 자동화를 목표로..