Korean Participation to SPICA

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On behalf of FPC Team, KASI and Korean Infrared Astronomy Working Group

Space Science Symposium
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Related Institutes

- Korea Astronomy and Space science Institute [KASI]
  - Major institute for astronomy & astrophysics
  - Proposer of the FPC, a Korean instrument to SPICA

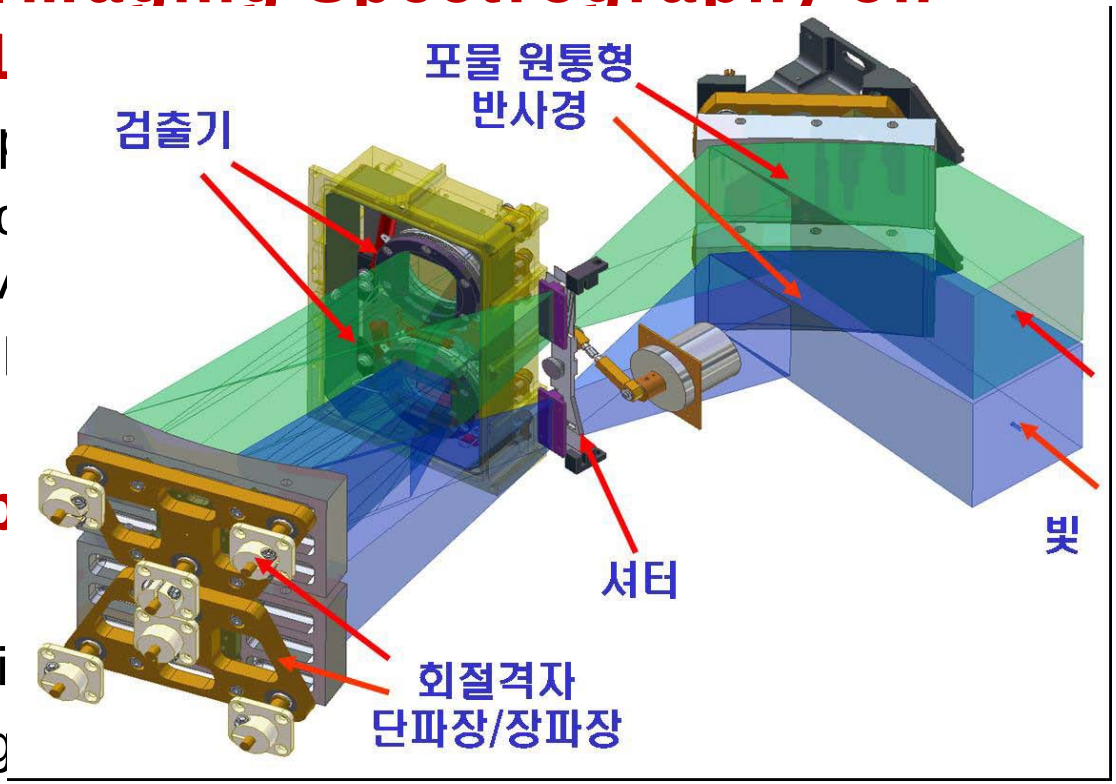
- Korean Aerospace Research Institute [KARI]
  - Responsible for all satellite programs in Korea (13 satellites by 2010)
  - Many test facilities

- Korean Basic Science Institute [KBSI]
  - Delivered optical parts to CIBER and MIRIS

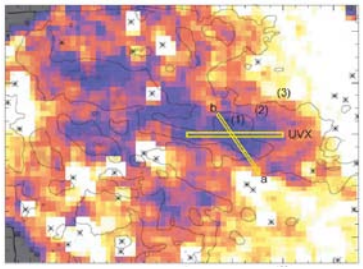
- Satellite Technology Research Center [SaTRec]
  - Successfully carried out small satellite programs such as KITSAT-1 (1992), KITSAT-2 (1993), KITSAT-3 (1999), STSAT-1 (2003)
  - Currently working on STSAT-3, to be launched in 2011-2012

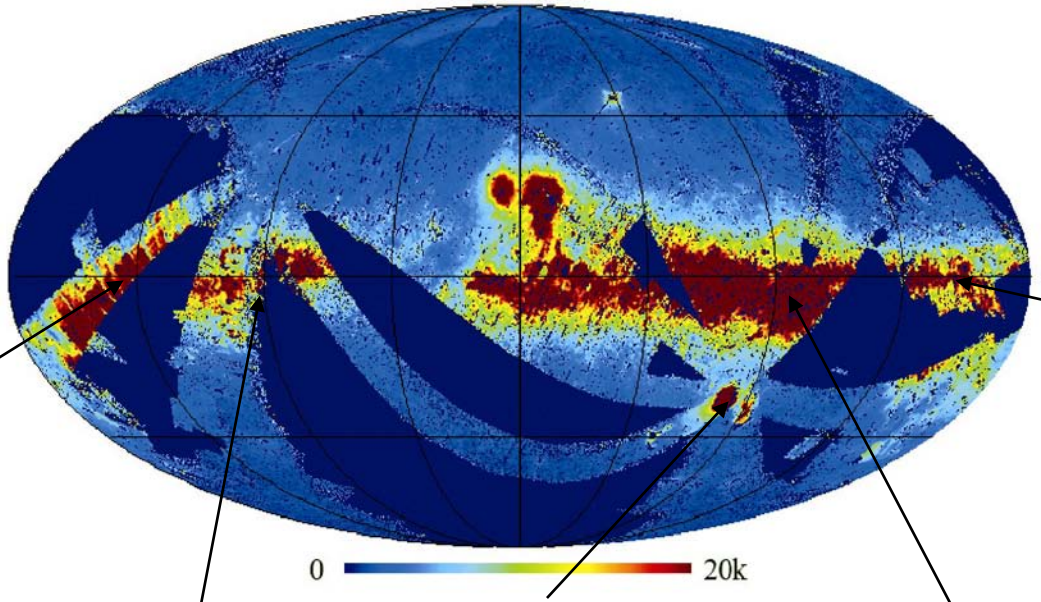
Previous and Ongoing Space Missions

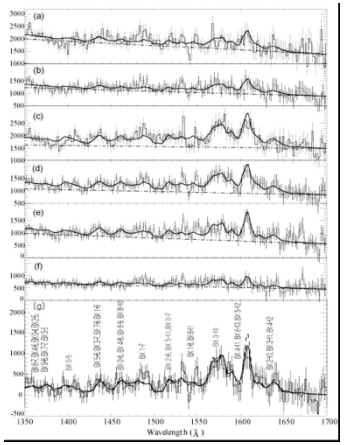
- **FIMS (Far-uv Imaging Spectrograph) on board STSAT-1**
  - Launched on Sep
  - Collaborative Pro Berkeley, and NA
  - Carried out all-s origin of the hot
- **MIRIS (Multi-p**
  - Main payload of
  - To be launched i
  - To carry out larg of warm Interstellar medium and Cosmic Background Infrared Light
  - ISAS is providing support for design, test and scientific research

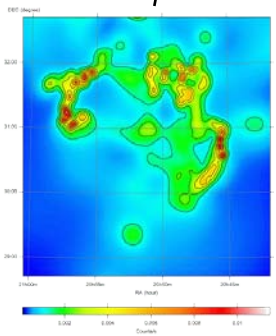


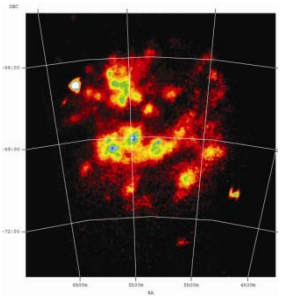
FIMS Research Highlights

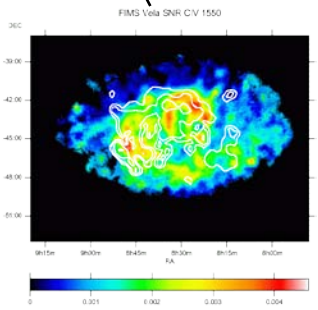




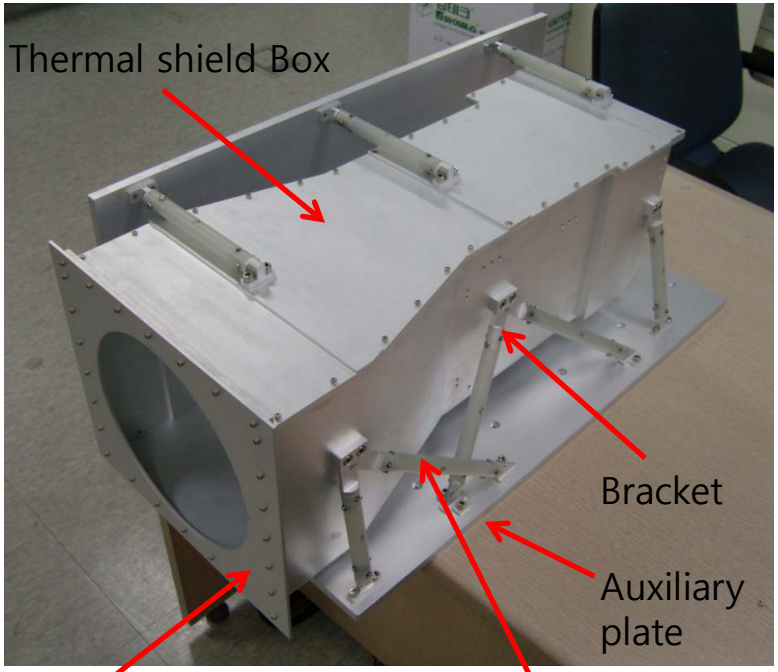


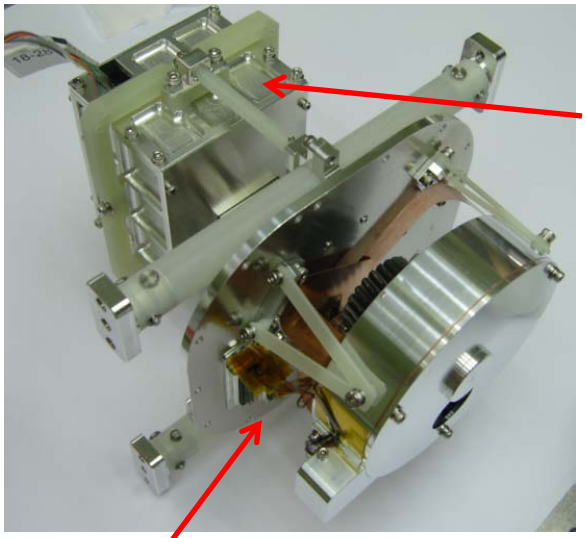


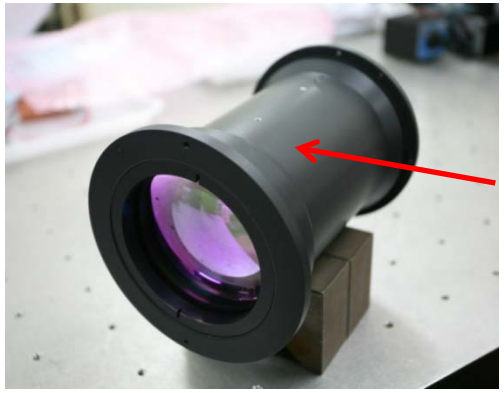


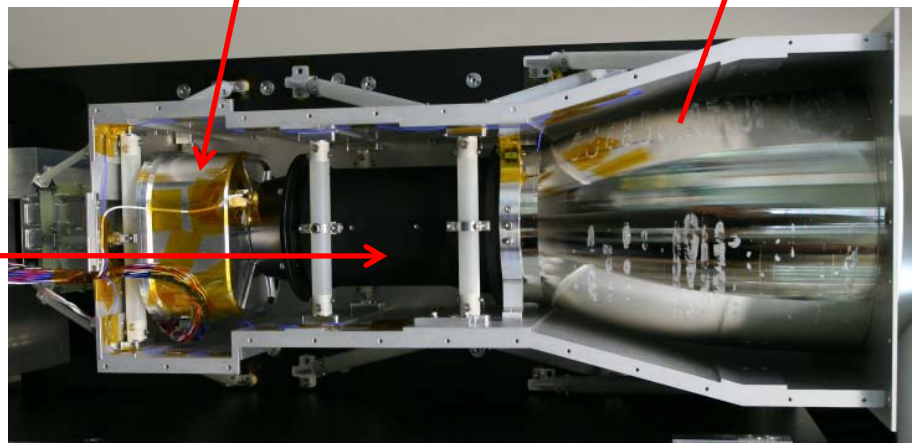


MIRIS Space Observation Camera









SPICA Related Activities 1.

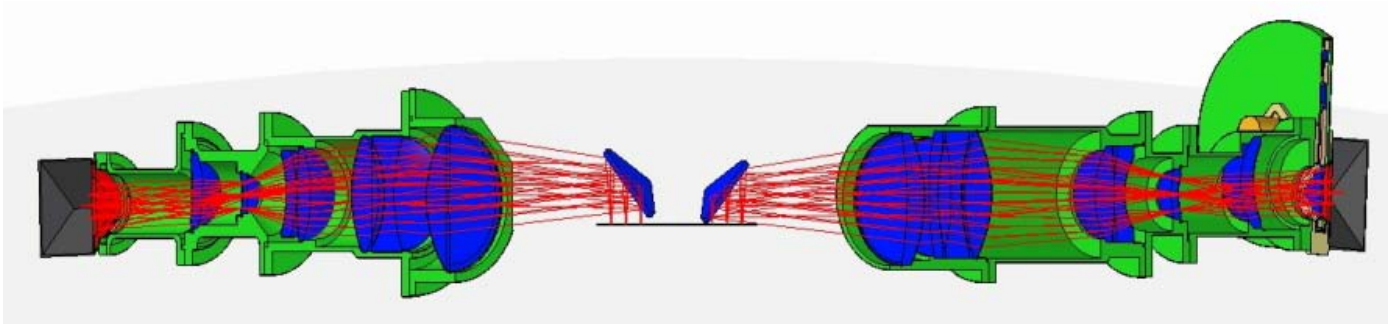
- Participation in AKARI Project (2000 - present)
  - Mainly from Seoul National University
  - Limited to numerical simulation, data analysis and scientific research, and no hardware commitment was made
- Infrared Astronomy Working Group (IRWG, 2001-present)
  - Took a leading role in providing the concept of MIRIS and promotion of SPICA collaboration
- Feasibility study for international collaboration in space astronomy (2005)
  - Funded by Korea Ministry of Science and Technology (MOST)
  - Recommended to actively participate in SPICA project

SPICA Related Activities 2. Joint Meetings

- SPICA MIR Instrument Workshop, Sep. 14, 2007@ISAS/JAXA
- Japan-Korea SPICA Working Group Kickoff Meeting, July 14, 2008 @SNU
- The 2nd J-K SPICA Meeting @ISAS, Nov. 10, 2008
  - Exploration of areas of collaboration
- The 3rd J-K SPICA Meeting, Jan. 20, 2009 @SNU
  - Requirement of FPC was discussed in detail
- FPC Science meeting on Feb. 27, 2009 @SNU
  - Several legacy programs were identified

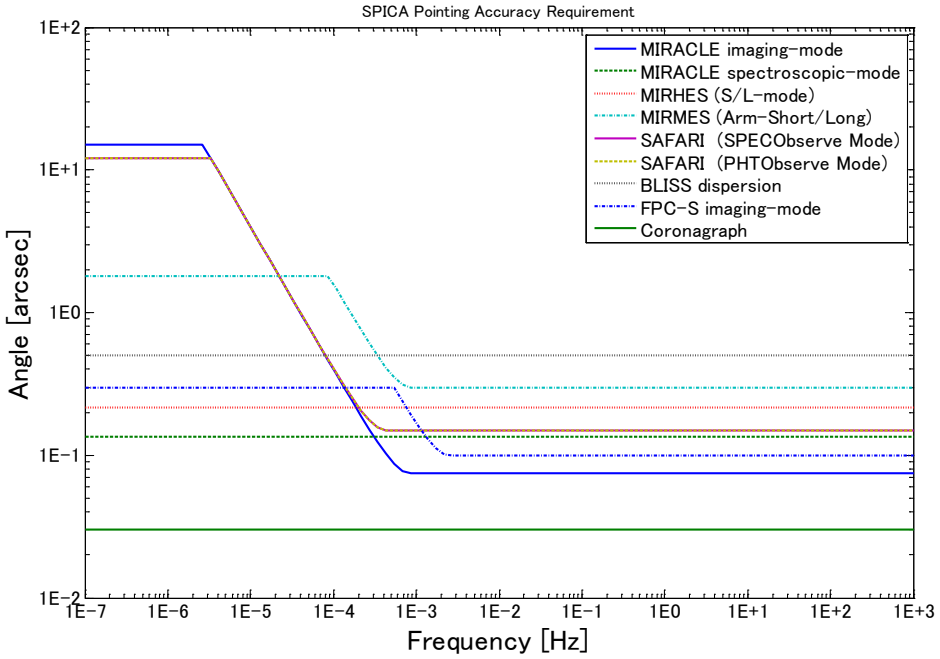
Proposed Instrument

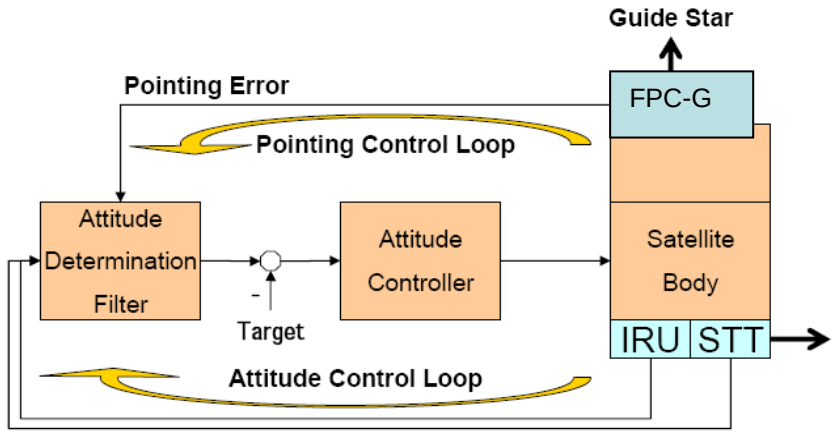
- **FPC (Focal Plane Camera, see P7-221)**
  - ✓ FPC-G (FPC Guidance)
    - To provide positional information of identified stars
    - To maintain the guiding stability
    - 5’ x 5’ FoV, I-band
  - ✓ FPC-S (FPC Science)
    - Near-IR Imaging & Spectroscopy
    - Back-up Instrument of FPC-G
    - 5’ x 5’, 0.8 – 5 μm, 10 filter positions



Role of FPC-G

- AOCS: pointing stability ~ 1 arcsec
- Requirements of FPC-G
  - Fine guiding ~ 0.036 arcsec (3σ, 0.5 Hz readout)
  - Will use Guide Star Catalogue II
  - Pointing error budget (alignment, attitude, internal disturbance error …)

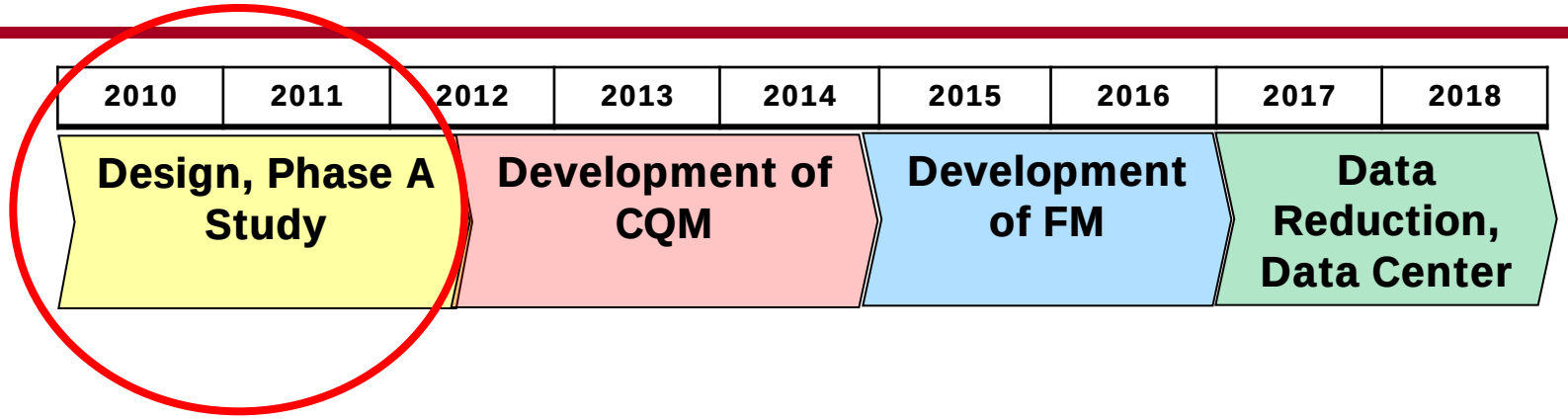




FPC-S Scientific Programs

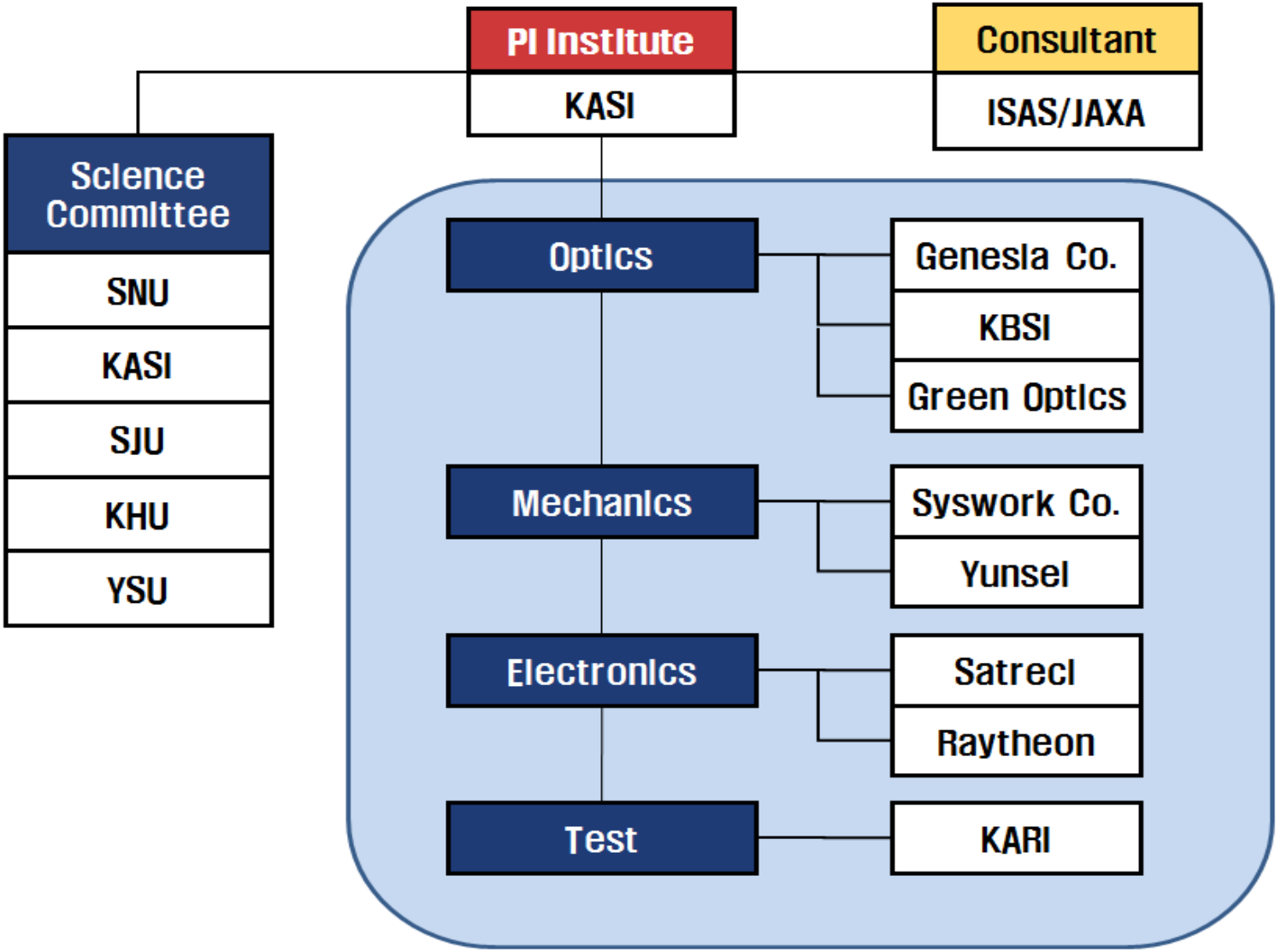
- Legacy Programs
  - NIRSS: Near-Infrared Spectroscopic Survey with FPC for Cosmic IR Background and Extragalactic Sciences
  - Parallel Imaging Survey for Extragalactic Sciences with MIR instrument
- Target of Opportunities
  - Comet Observations
  - Gamma-ray bursts

Current Status



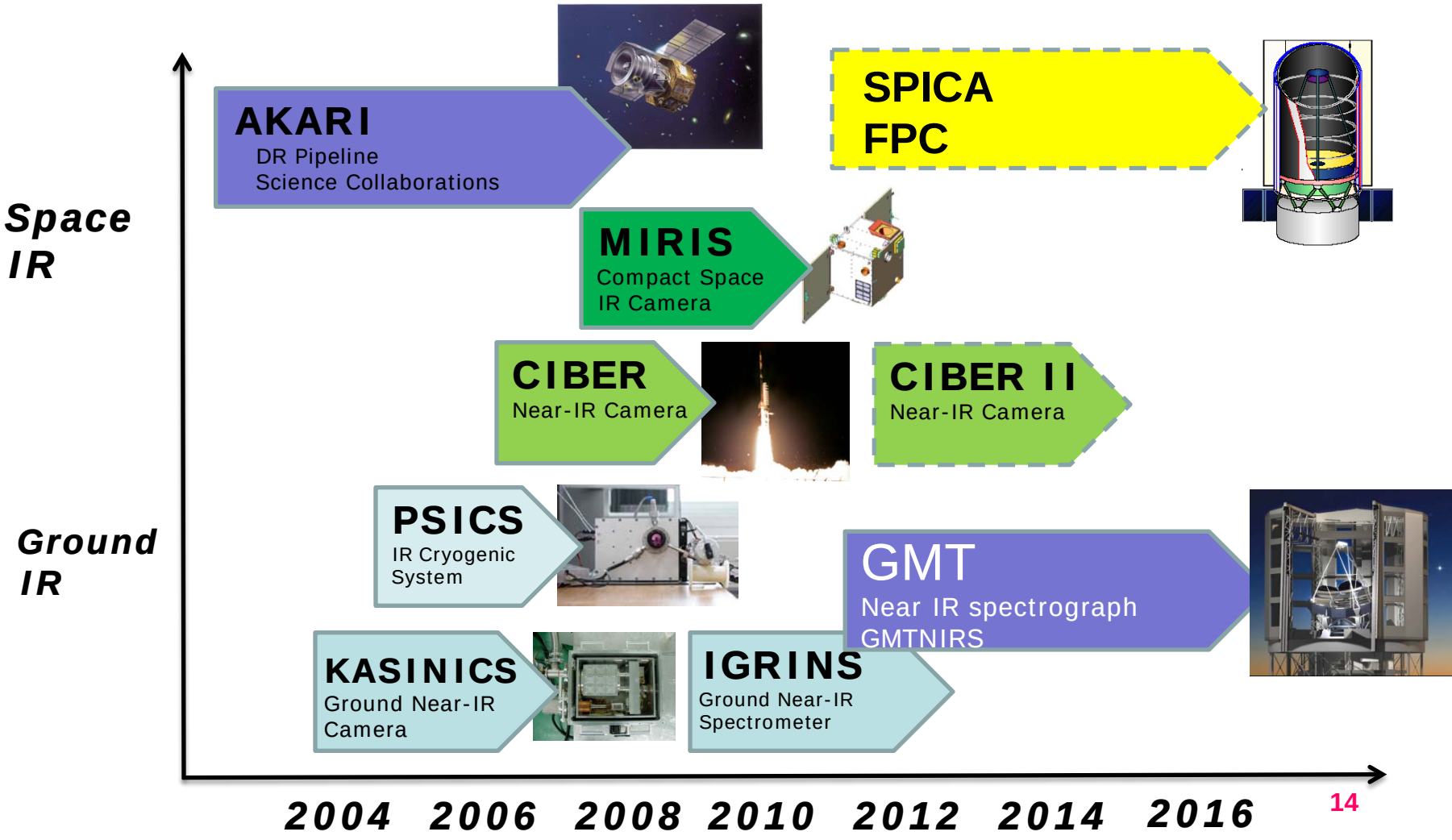
- Phase A study was approved inside KASI.
  - Project review was successfully passed at KASI (11/22)
    ➔ Selected as one of KASI's new R&D project
- Selected as a top priority in astronomy for the National Large Research Facility Roadmap, released in December 2010
- 3rd FPC proposal is submitted and is under review process

Framework of Development



KASI's Roadmap of IR Projects

- Experience in the near-IR instruments
- Data analysis & scientific research in IR



Summary

- Korea has been seeking collaboration on SPICA from the very early phase (~2000)
- We now have strong community support and consensus for SPICA collaboration
- Korea proposes to supply Focal Plane Camera (FPC) in near infrared for fine guiding and scientific observations
- The benefit of FPC-S includes
  - Distinct scientific research for Cosmic Infrared Background, and thereby the first generation of stars
  - Parallel surveys with mid-Infrared will add the knowledge on high redshift galaxies, quasars, and low mass stars
  - Target of opportunities such as GRBs, comets, etc.
  - GMT will add more scientific outputs together with FPC