Korea Pathfinder Lunar Orbiter (KPLO)

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### Korea Pathfinder Lunar Orbiter (KPLO)

- The first mission of *Korea Lunar Exploration Program* (KLEP)
  - A lunar orbiter (100 km, 90° inclination)
  - Mission duration: 1 year
  - Total mass: 678 kg
- Will be launched in **August** (or later), **2022**
- 4-month transit (ballistic lunar transfer method)
- Five science instruments
  - **LUTI**, a high-resolution imager
  - **PolCam**, a wide-angle polarimetric camera
  - **KGRS**, a gamma-ray spectrometer
  - **KMAG**, a fluxgate magnetometer
  - **ShadowCam**, a highly-sensitive camera (NASA-provided)
- One technical demonstration payload
  - **DTNPL**, a DTN experiment instrument
- **LUTI** (LUnar Terrain Imager)
  - Two high-resolution optical cameras ($R \sim 5\, \text{m}$)
  - To investigate candidate landing sites for Korea’s future landing mission (‘30s)

- **PolCam** (wide-angle Polarimetric Camera)
  - The first polarimetry from the lunar orbit
  - Twin cameras mounted at $45^\circ$ tilt angles from the nadir across the orbital track in opposite directions
  - Polarimetric measurements at various phase angles up to $\sim 140^\circ$
  - 430 and 750 nm filters with polarization filters
  - Additional 320 nm filter without polarization
**KGRS** (KPLO Gamma Ray Spectrometer)
- Will map the spatial distribution of gamma-ray energy of 10 keV ~ 10 MeV
- To investigate the chemical composition of the lunar surface materials

**KMAG** (KPLO MAGnetometer)
- Three tri-axial magnetometers
- Mounted on a 1.2 m-long boom
### ShadowCam
- Highly sensitive camera developed by NASA (ASU)
- 200 times more sensitive than the LROC NAC
- Look into Permanently Shadowed Regions (PSRs) in lunar poles
- To see cold-trapped volatiles

### DTNPL (Disruptive Tolerance Network experiment PayLoad)
- To conduct an interplanetary internet communication experiment on disruption tolerant networking
More Korean Lunar Missions To Come

- A lunar lander as the second-stage KLEP is in preparation
  - Will use a Korean launch vehicle
  - Will land in 2030s

- Four scientific instruments to be onboard NASA’s CLPS landers
  - LUSEM (a pair of solid-state telescope) will join IM-3 mission to land at Reiner Gamma swirl
  - Developing three more payloads
    - GrainCams (light-field cameras to observe regolith grains)
    - LSMAG (magnetometers on a 1-m long boom)
    - LVRAD (a suit of instrument to measure radiation environments)