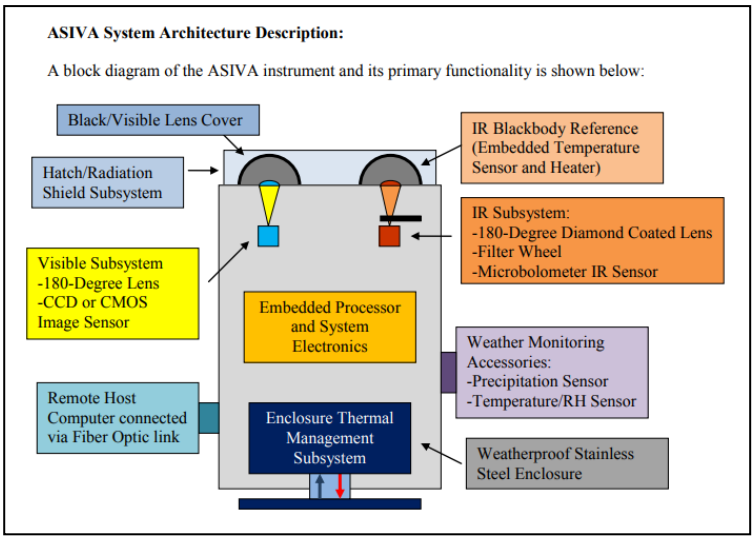
All Sky Infrared Visible Analyzer (ASIVA)

visible and infrared sky imaging and analysis instrument

INTRODUCTION:

The All Sky Infrared Visible Analyzer (ASIVA) is an advanced ground-based imaging system designed to monitor the entire sky in both visible and infrared wavelengths. It provides continuous, hemispherical sky observations, capturing cloud cover, cloud type, and radiative properties. ASIVA operates day and night, offering valuable data regardless of lighting conditions. It integrates multiple sensors and cameras to collect data in visible, shortwave, and longwave infrared bands. The instrument helps in studying cloud dynamics, radiative forcing, and atmospheric processes.



OBJECTIVES:

- Full-Sky Monitoring
- Diurnal and seasonal tracking of cloud cover
- Radiation Balance Studies
- Monitor Temporal Variations in Sky Temperature
- Support Radiative Flux Calculations

DATA OUTPUT:

- Full-Sky Monitoring
- Cloud/No Cloud Reporting
- Cloud Cover Determination
- Photometric Quality Assessment
- Sky Opacity/Transmission Determination
- Visible/IR Correlation and Integration
- Water Vapor and Ozone determination
- Sky/Cloud Temperature (brightness and colour) Measurements

KEY SPECIFICATIONS:

- **Field of View (FOV):** 180° hemispherical (full-sky dome)
- **IR Camera Sensor:** 640×512 uncooled microbolometer array
- **Visible Camera Sensor:** 1-megapixel monochrome CCD or CMOS detector
- **IR Range:** 8-14 microns
- **Number of IR filters:** Six
- **Image format:** 3-dimensional FITS images (640x512 pixels)

MEASUREMENT AND WORKING PRINCIPLE:

ASIVA uses a combination of visible and infrared fisheye cameras to capture the full sky hemisphere.

The visible camera records daytime sky conditions for cloud detection and classification. The infrared camera helps to detect thermal radiation from clouds and the sky.

To enable multi-spectral infrared measurements, ASIVA is equipped with a motorized filter wheel that houses several IR bandpass filters, allowing it to capture radiance in different infrared bands. This helps determine cloud temperature profiles, emissivity, and infer cloud height using standard atmospheric lapse rates. Advanced image processing algorithms classify cloud types and compute fractional cloud cover.

KEY FEATURES:

- Day and Night Operation using Visible as well as IR camera.
- Whole Sky Imaging with full 180° hemispherical views.
- Motorized IR filter wheel for multi-spectral thermal measurements.
- In built Black Body Reference to calibrate the infrared camera in real-time.
- Housed in a weatherproof and thermally controlled enclosure.

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