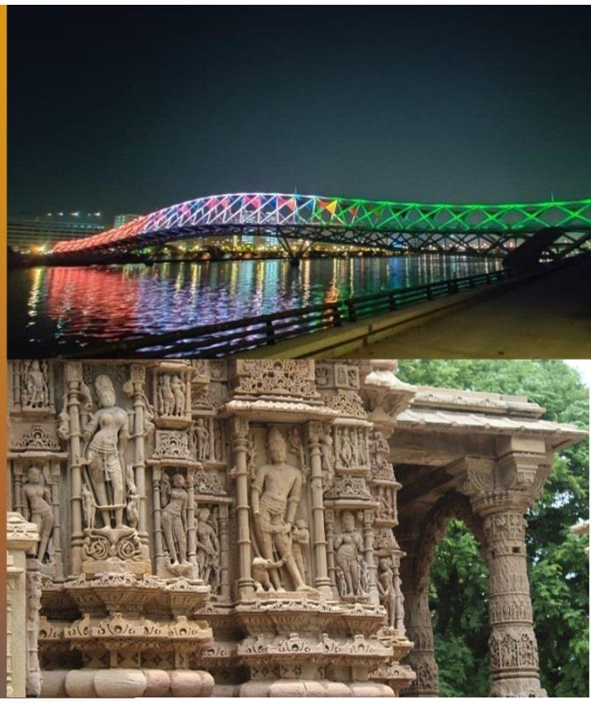
International Science Workshop

on

High-Resolution Thermal Earth Observation



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Ahmedabad

Gujarat, India

19-21 November, 2024

Hosted by
Space Applications Centre

Organized by
Indian Space Research Organisation

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About Workshop

The Indian and French Space Agencies, ISRO and CNES, are jointly developing a state-of-the-art Thermal InfraRed (TIR) - Visible Shortwave InfraRed (VSWIR) Imaging Satellite mission, TRISHNA for high-resolution natural resources assessment. The satellite is planned to be launched on-board Polar Satellite Launch Vehicle (PSLV) during 2026 for a duration of 5 years with possible extension of 2 years. Data acquisition will cover the entire globe for four (4) TIR bands around noon and midnight times as well as in seven (7) VSWIR bands. TRISHNA will offer a spatial resolution of 60 meters with a revisit period of 3 days at equator and more at higher latitudes. A primary objective of TRISHNA mission is to provide consistent and systematic records of surface temperature, in addition to several biophysical variables, to model the surface energy balance allowing to derive heat fluxes and estimate evapotranspiration. The need for high-resolution thermal observation has been recognized also internationally leading to complementary missions in preparation like Surface Biology and Geology (SBG) (NASA/ASI) and Land Surface Temperature Monitoring (LSTM) (ESA/EC). To reach out to the Indian and global science community and various user agencies/departments for awareness creation and larger involvement in the utilization of TRISHNA data and science products, a 3-day workshop is planned to be organized by ISRO during November 19 - 21, 2024. In preamble of the workshop, tutorials will be conducted on modelling tools for thermal radiative transfer, surface energy balance and evapotranspiration during November 17 - 18, 2024 at Ahmedabad.

Objectives

- Scientific updates on applications of thermal and optical data within Earth system research
- Current and planned international high resolution thermal missions for terrestrial and coastal applications
- Science products generation, product validation and data dissemination
- Creating awareness and capacity building for simultaneous use of high-resolution thermal and optical data
- Operational applications development for societal benefit areas using high resolution thermal and simultaneously with optical data.
- Developing international cooperation on product calibration-validation, harmonization and applications

Workshop Themes

A. Earth system research and scientific appraisal

- *Ecosystem stress and water use (i.e. Monitoring of water & energy exchange of the continental biosphere)*
- *Coastal and inland waters (i.e. monitoring of meso-scale, sub meso-scale dynamics).*
- *Urban (i.e. Monitoring of fluxes of urban surfaces)*
- *Solid Earth (i.e. Monitoring of volcanology, sub-surface fire etc.)*
- *Cryosphere (i.e. Monitoring of snow-melt run-off, glacier debris, high-altitude lake dynamics)*
- *Atmosphere (i.e. Monitoring aerosols, water vapor, cloud type)*

B. Mission calibration and data validation plans, data quality assurance and uncertainty quantification

C. Applications development for societal benefit areas:

- *Drought assessment for early mitigation of crop failures*
- *Irrigation management through optimal irrigation scheduling based on crop water requirements and improving water use efficiency*
- *Crop monitoring and yield forecasting*
- *Snowmelt-runoff rate forecast modelling for reservoir operations in summer months.*
- *Agromet advisory services for the benefit of farmers*
- *Urban heat island dynamic mapping & issuance of heat alerts/ warnings*
- *Sub-surface coal fire & thermal anomaly for managing coal fires*
- *Coastal and inland water quality and thermal pollution monitoring*

D. Exploring synergies with other current and future space-based systems (e.g. Landsat, Copernicus Sentinels, LSTM and SBG missions).

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