Integrated Hydro spatial Infrastructure

STVENANT

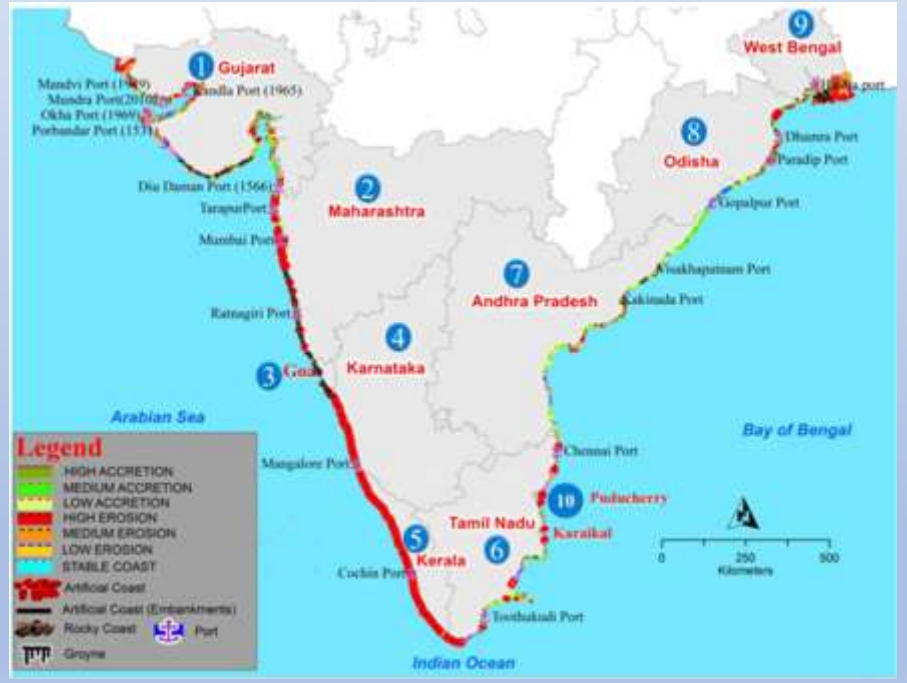
CLARITY THROUGH COMPLEXITY

www.stvenant.com

Experts in Mathematical Modelling for Coastal and Riverine processes.

Satellite-Driven Blue Growth: Coastal Monitoring, Wave Forecasting & Port Digitalization

Shoreline change studies using satellite mapping



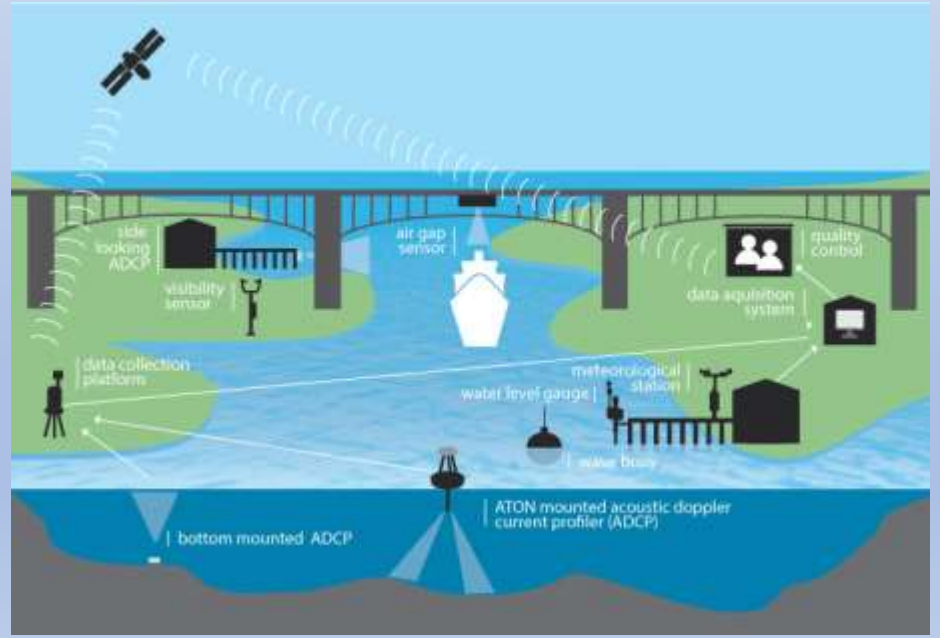
Ref: https://ncscm.res.in/shoreline-change-mapping/

- **Coastal infrastructure planning & protection** – Supports safe siting, design, and resilience of ports, energy facilities, and tourism infrastructure by tracking shoreline shifts.
- **Risk assessment for erosion & flooding** – Quantifies coastal hazards and helps industries reduce operational risk and insurance costs through proactive mitigation.
- **Regulatory compliance & environmental stewardship** – Ensures adherence to coastal zone management laws and enables responsible development near ecologically sensitive areas.

Digital Twins for Port Operations

Smart & Integrated Port Operations

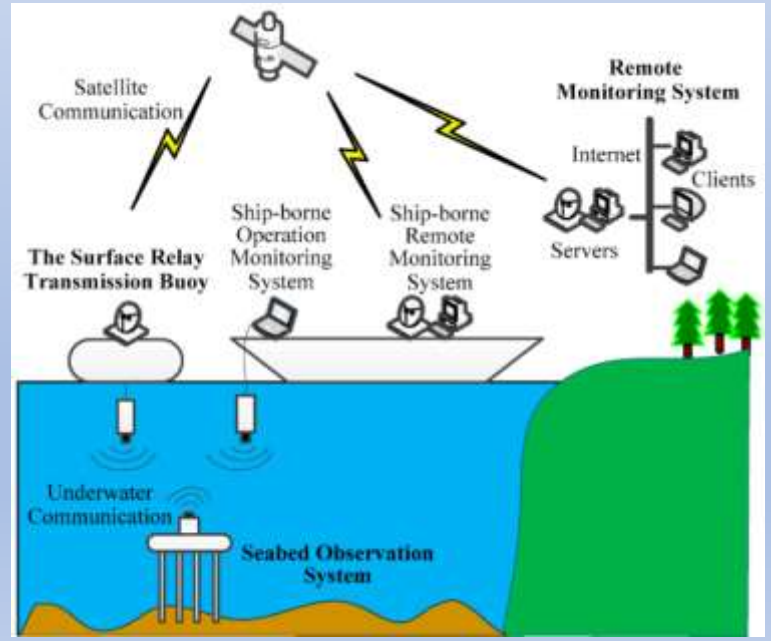
Promoting navigational safety and efficiency of port operations through real time and forecasted data on cross currents, wind drift and ROT



https://tidesandcurrents.noaa.gov/ports.html

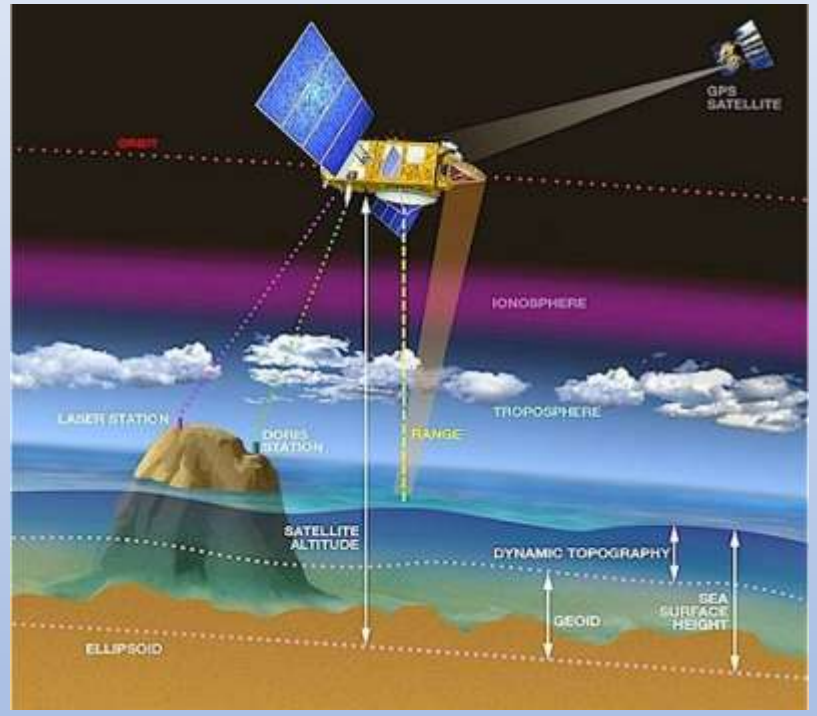
Real time Mapping of depth and siltation measurements

The bathymetry modifications due to siltation will be monitored automatically using IOT based underwater drones providing real time maps of bathymetry as well as siltation



https://www.mdpi.com/1424-8220/19/5/1255

Satellite altimetry for measuring sea waves



https://eumetrain.org/resources/waves-radar-altimetry-satellites

- Retrieval of wave parameters using alimetric satellites
- Satellites such as SWOT, Jason, Saral-Altika, Envisat

•**Improved ocean circulation and wave monitoring** – Satellite altimetry provides accurate sea surface height and wave data, enabling safer navigation, efficient shipping routes, and reduced fuel costs.

•**Enhanced coastal hazard prediction** – Continuous monitoring of sea-level changes, storm surges, and swell propagation supports early warning systems and protects coastal infrastructure and livelihoods.

•**Support for marine resource management** – Mapping ocean features such as eddies and upwelling zones aids fisheries planning, offshore renewable energy siting, and sustainable exploitation of marine resources.