

Foreshore and river channel monitoring from Space A protective device for navigation.

Multi-temporal satellite-borne monitoring of coastal and river waters, by revealing dynamic changes and displacements of shoals and bars, serves as a firm basis for an early warning system for navigation.

Coastal waters, estuaries and big rivers - that is where a considerable part of navigation, be it for transport or fishery, is concentrated. As such, coastal waters and navigatable rivers contribute in a considerable way to the national income of many countries, worldwide. Transport over water, although being quite attractive in an economic sense, has the serious drawback of being liable to the risk of ships being grounded on shoals and bars.

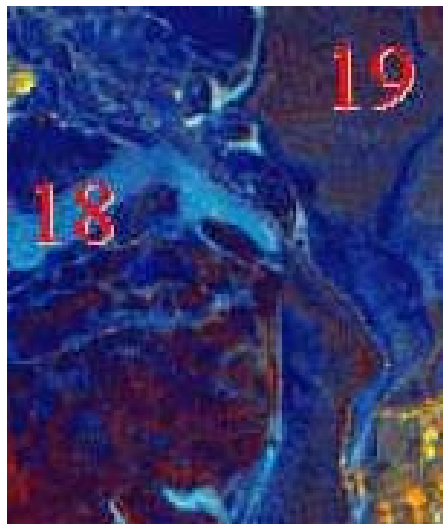
Navigational risks are especially imminent in dynamic water areas where, in a short period of time, through erosion and sedimentation, form and position of shoals and bars are being radically changed. Such are the conditions where regular monitoring is imperative.

- Monitoring from space allows for real-time processing of image maps and subsequently matchless fast updating procedures of nautical charts and river navigation charts.

- The monitoring frequency – ranging from once every three months to once every three years, or less - is to be based on the dynamics of the navigation channels.

- Satellite maps are geo-referenced and geocoded and can be made to comply with any current Geodetic Reference Spheroid, Map Projection and Grid System.

- An accuracy of 10 meters on the foreshore allows for reliable GPS navigation.



Shallow waters in The Netherlands, as observed from space: Channels (18) and shoals (19).

- Satellite maps of **an accuracy of 2 (two) meters or less** may be gained, allowing for the faithful beaconing of river channels.

References

- [1] Nezry, E., F. Zagolski, A. Lopès and F. Yakam Simen, 1996. Bayesian filtering of multi-channel SAR images for detection of thin details and data fusion. *SPIE Proceedings*, Vol. 2958, pp 130-139.
- [2] Nezry, E., F. Zagolski, F. Yakam Simen & I. Supit, 1997. Complementarity of ERS and Radarsat SAR's: Environmental survey of The Netherlands. *Commercial Report*.
- [3] Nezry, E., F. Zagolski, I. Supit & F. Yakam Simen, 1997. Control systems principles applied to speckle filtering and to the retrieval of geophysical parameters through Radarsat and ERS Bayesian data fusion. *Proceedings GER'97 Symposium*, Ottawa, Canada.