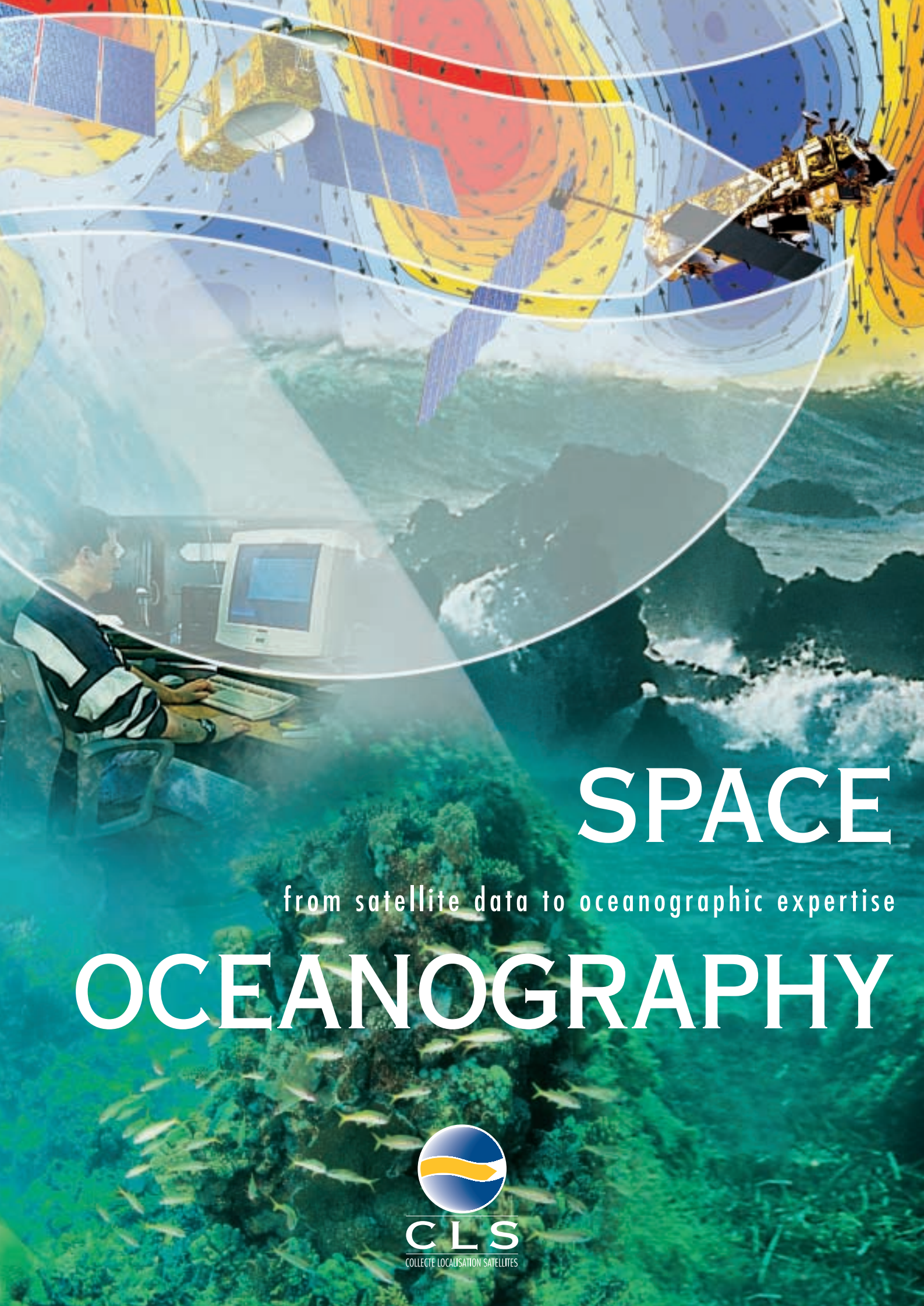


SPACE OCEANOGRAPHY

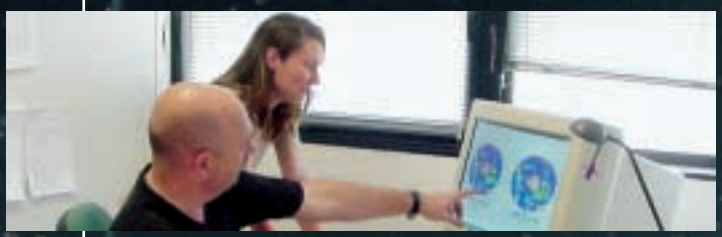
from satellite data to oceanographic expertise

CLS
COLLECTE LOCALISATION SATELLITES

SPACE OCEANOGRAPHY AT CLS

processing, validating, distributing and exploiting altimetry data

Since the start of the 1990s, CLS has acquired unrivaled expertise in helping to conceive and operate satellite altimetry missions for ESA, CNES and NASA. In particular, it has worked to:

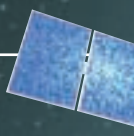


> develop simulators for the POSEIDON-1 and POSEIDON-2 radar altimeters,

> define, specify, develop and validate ground processing software for the radar altimeters and microwave radiometers on the ERS-1, TOPEX/POSEIDON, ERS-2, Jason-1 and ENVISAT satellites,

> develop the DORIS/POSEIDON Processing Center (CTDP),

> develop the Instruments Control Center (CCI) and the Multi-mission Altimetry Center (CMA), major components of SSALTO, the new multi-mission ground segment for the TOPEX/POSEIDON, Jason-1 and ENVISAT missions.



GFO (1998...)
US NAVY

ERS-2 (1995...)
ESA

TOPEX/POSEIDON (1992...)
NASA/CNES

ERS-1 (1991/1996)
ESA

Geosat (1985/1989)
US NAVY/NOAA

Instrumental expertise

Data processing

ENVISAT (2001...)
ESA

Jason-1 (2001...)
NASA/CNES

At its round-the-clock information processing center, CLS operated the DORIS/POSEIDON Processing Center and is now operating SSALTO. This new multi-mission ground segment performs:

> command and control of the POSEIDON-1 and POSEIDON-2 radar altimeters and DORIS orbit determination instruments,

> checking of input data from the radar altimeters and the microwave radiometers on TOPEX/POSEIDON, Jason-1 and ENVISAT,

> operational production of altimetry, radiometry and orbit determination data for TOPEX/POSEIDON, Jason-1, and ENVISAT,

> validation of these products,

> long-term archiving.

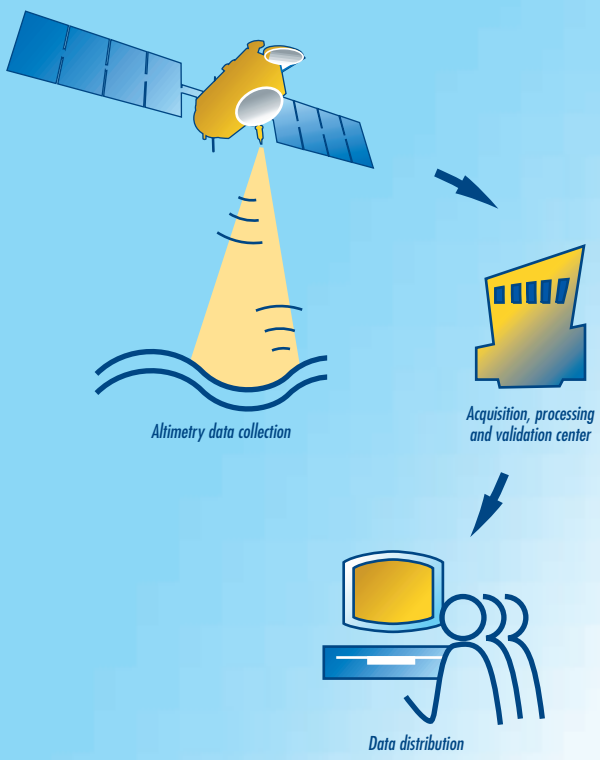
CLS also operates the AVISO service for CNES. AVISO provides:

> user support,

> documentation,

> product distribution from the TOPEX, DORIS/POSEIDON, and SSALTO processing centers.

AVISO user service
http://www-aviso.cnes.fr



In addition, CLS carries out expertise activities on the products developed for CNES and ESA:

> monitoring of instrument calibration,

> long-term monitoring of data quality,

> intercalibration of data from different missions,

> development and testing of new processing algorithms,

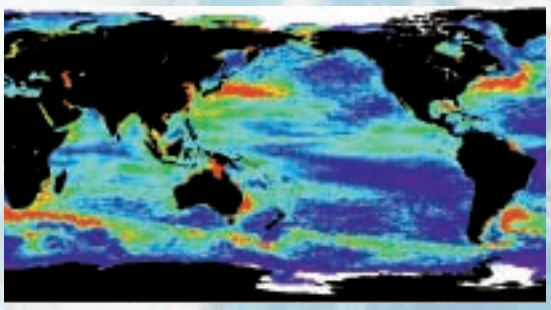
> development of real-time and off-line oceanography products from multiple satellites.

Data validation

User service

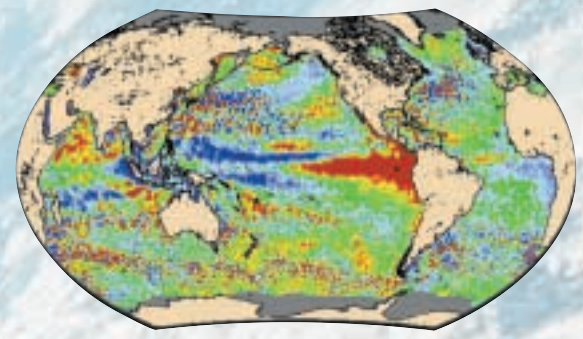
CLS has drawn on its altimetry experience to further its oceanography expertise and develop a range of services focused on analysis, interpretation, and scientific and commercial exploitation of processed data. This includes:

> **Oceanography studies** aimed at gaining a clearer understanding of the underlying mechanisms that drive variations in sea level and ocean circulation. Such studies are pursued chiefly within the scope of European research projects and for the preparation of **future operational oceanography systems.**



Mesoscale variability statistics from TOPEX/POSEIDON and ERS.

> **Merging of altimetric measurements** with other types of satellite and *in-situ* data, such as sea surface temperature and ocean color, to support a broader range of applications and offer **new products tailored to a broad range of users,** including oceanographers, fishermen, agencies monitoring fish stocks, and offshore platform managers.

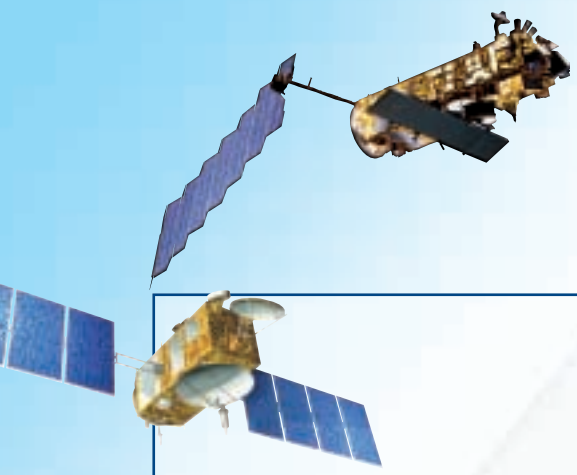


Real-time merged TOPEX/POSEIDON and ERS data during the 1997/1998 El Niño event.

> **Real-time description and prediction of ocean conditions in three dimensions,** using complex operational oceanography systems. These systems use assimilation techniques to integrate altimetric and *in-situ* data in high-resolution numerical models. CLS is actively involved in setting up and operating such systems, in particular for the **MERCATOR, GODAE, and SOAP projects,** and for the **European MFS project.**

Data interpretation

Exploitation



Ocean-observing satellites are entering a new **operational** era and naturally occupy an important place in programs designed to manage and predict **ocean and climate change**.

Radar altimetry is a leading-edge technology used in space oceanography that is now finding a growing number of **scientific and commercial applications**.

CLS has been playing a leading part in developing this technology **for over 10 years** and is now gearing itself up for the **missions of the third millennium**.

Our partners

CLS has developed its space oceanography expertise through many contracts, chiefly with CNES, ESA, IFREMER, SHOM, and the European Union.

Over the years, it has nurtured its skills working in close partnership with leading scientific research teams in France, Europe and worldwide.

Acronyms

AVISO: *Archivage, Validation, Interprétation des données des Satellites Océanographiques*
(Archiving, Validation and Interpretation of Satellites Oceanographic data)
CLS: *Collecte Localisation Satellites*
CNES: *Centre National d'Etudes Spatiales (French space agency)*
DORIS: *Doppler Orbitography and Radiopositioning Integrated by Satellite*
ENVISAT: *ENVIronmental SATellite*
ERS: *European Remote Sensing satellite*
ESA: *European Space Agency*
GODAE: *Global Ocean Data Assimilation Experiment*
IFREMER: *Institut Français de Recherche et d'Exploitation de la MER (French institute of marine research and exploration)*
MFS: *Mediteranean Forecasting System*
NASA: *National Aeronautics and Space Administration*
SHOM: *Service Hydrographique et Océanographique de la Marine (French Navy's hydrography & oceanography department)*
SOAP: *Système Opérationnel d'Analyse et de Prédiction*
SSALTO: *Segment sol multi-missions, altimétrie, orbitographie et localisation précise (SSALTO multi-mission ground segment)*

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