



# Meeting the geospatial needs of users in the ASEAN region – CLS services

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**Dr. Tarek Habib, CLS**

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# CLS Group

## Collecte Localisation Satellites

- Subsidiary of CNES, the French Space Agency (1986)
- Key figures:
  - 120 M€ turnover
  - 700 staff
  - Network of 27 sites in 21 countries
- Development of operational applications & services using space data for 5 strategic sectors



# CLS Worldline Network



**CLS GROUP HEADQUARTERS**  
CLS TOULOUSE  
CLS Brest (establishment)

**OFFICES**  
CUNLOGAN Santiago  
ES-PAS Moscow  
CLS La Réunion  
KL-TRADING Seoul  
CUBIC-I Tokyo  
CLS VIETNAM Hanoi  
SIT Melbourne  
MANILA Manila  
BANGKOK Bangkok

## SUBSIDIARIES

CLS AMERICA Washington  
CLS PERU Lima  
PT CLS ARGOS INDONESIA Jakarta  
NOVACOM SERVICES Toulouse  
NOVACOM SERVICES Bidart  
NOVACOM EUROPE Amsterdam  
PROCANO Rio de Janeiro  
HORIZON MARINE INC. Marion  
HORIZON MARINE INC. Richmond  
CLS CHINA Beijing  
TRE ALTAMIRA  
TRE ALTAMIRA Vancouver  
TRE ALTAMIRA Milano  
TRE ALTAMIRA Barcelona  
CLS MAROC Rabat  
FULCRUM London  
WOODS HOLE GROUP Falmouth



# CLS key assets and technologies

## GEOLOCATION AND DATA COLLECTION SYSTEMS



## EARTH OBSERVATION SATELLITES



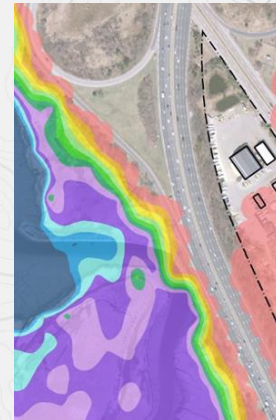
## DRONES



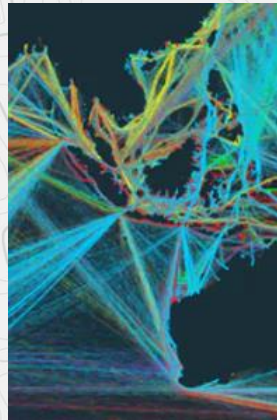
## IN-SITU MEASUREMENT



## NUMERICAL MODELING



## BIG DATA



# CLS involvement in Copernicus



**Atmosphere**  
(CAMS)



**Marine**  
(CMEMS)



**Land**  
(CLMS)



**Climate**  
(C3S)



**Emergency**  
(EMS)



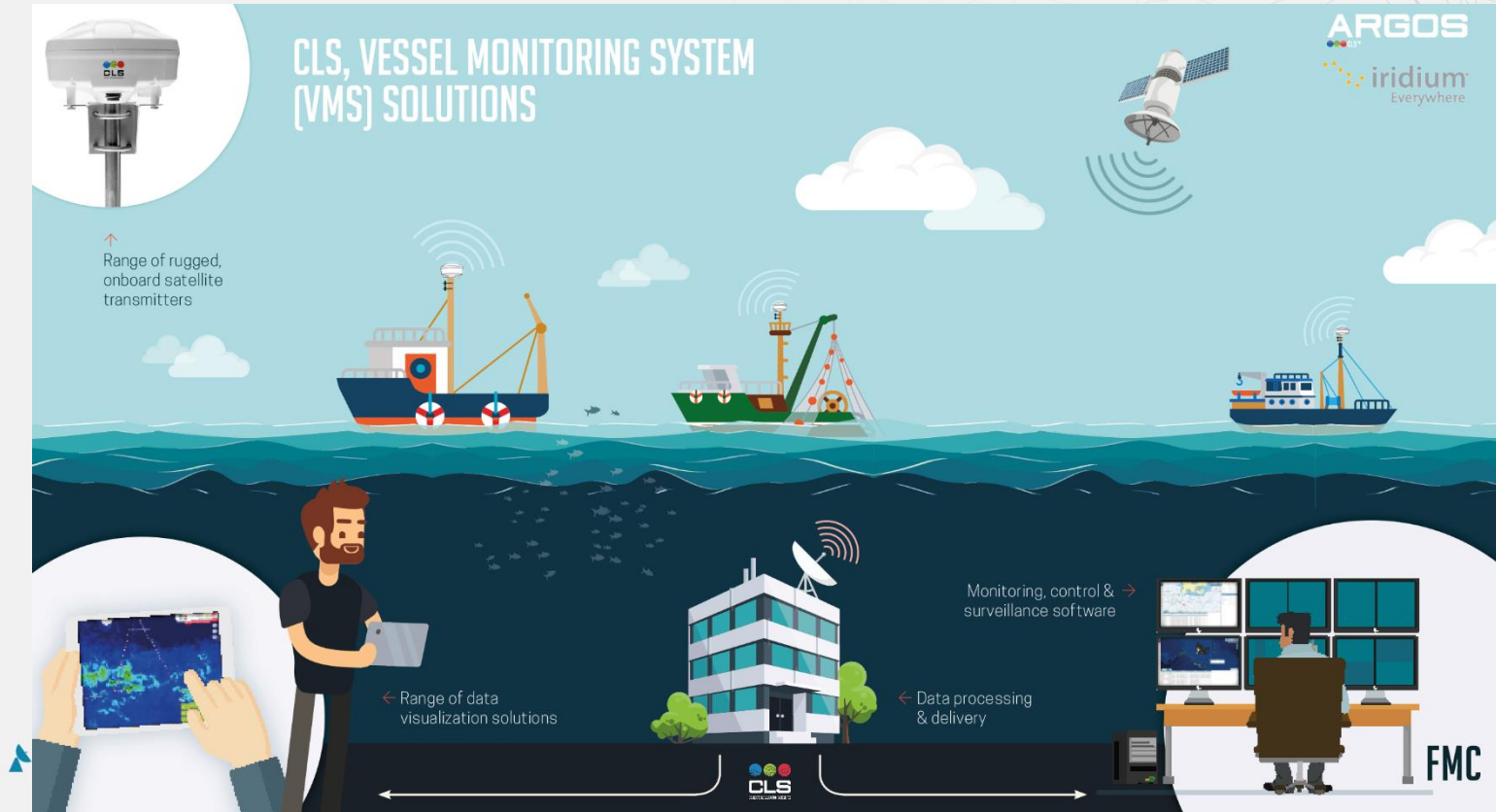
**Security**

CLS Group is involved in 5 out of 6 Copernicus core services



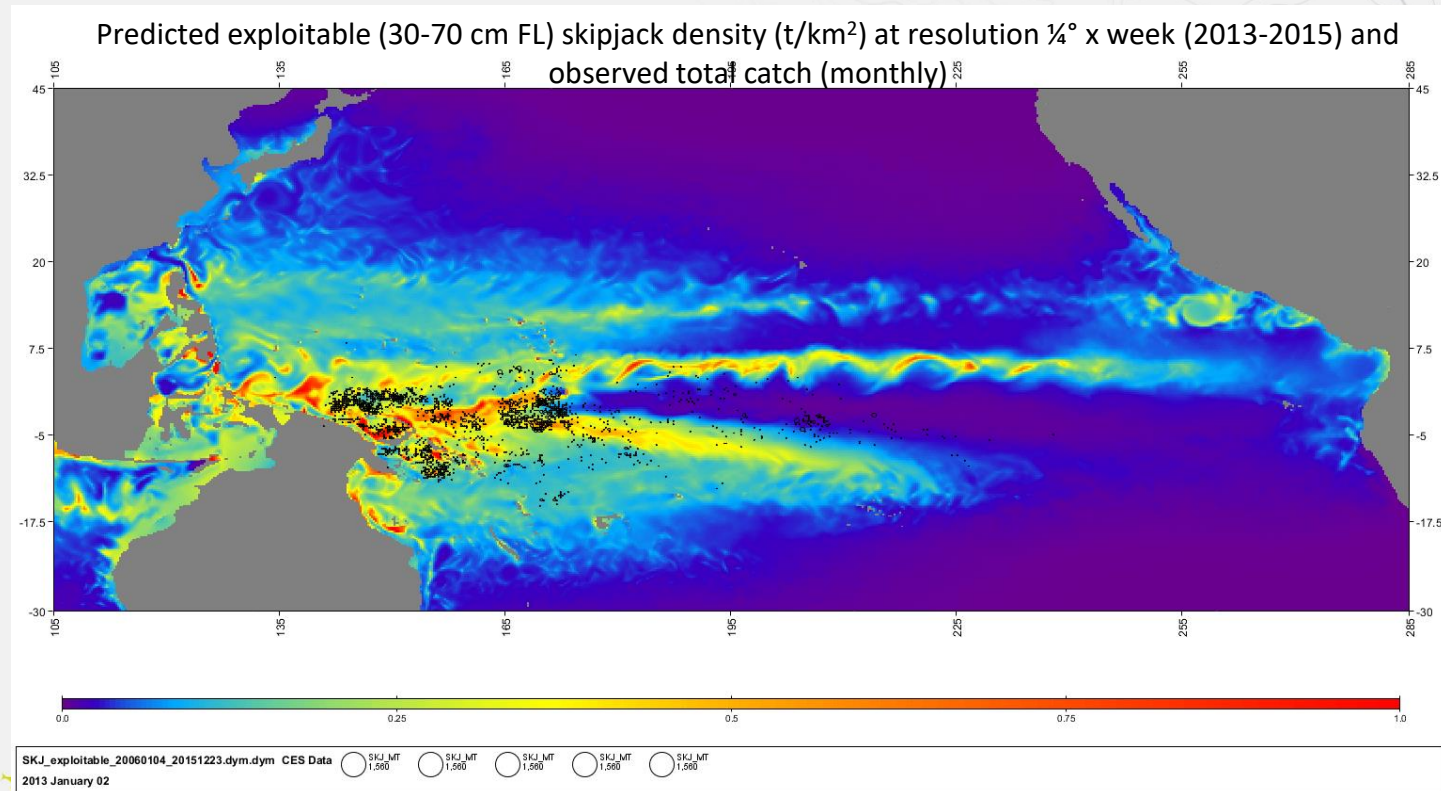
# Sustainable management of fisheries

## Vessel Monitoring System



# Sustainable management of fisheries

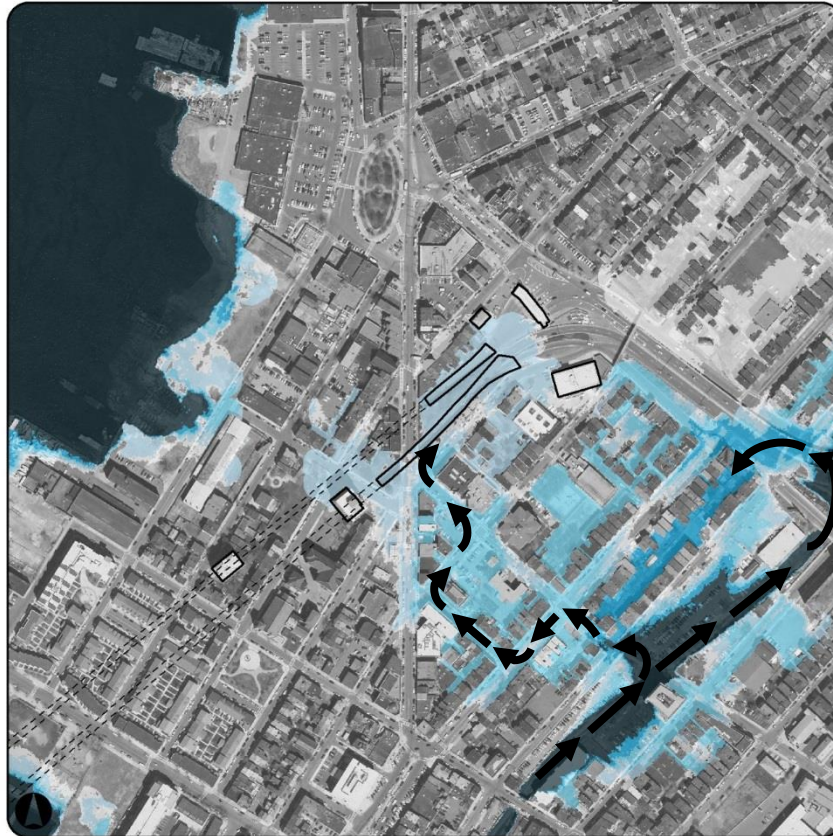
## Fish stock assessment





# Flood risk assessment

## Flood pathways



MassDOT/FHWA Climate Adaptation Pilot  
BH-FRM Flood Pathway Analysis

2013 Regional and Local Flood Pathways

Callahan Tunnel  
East Boston, MA

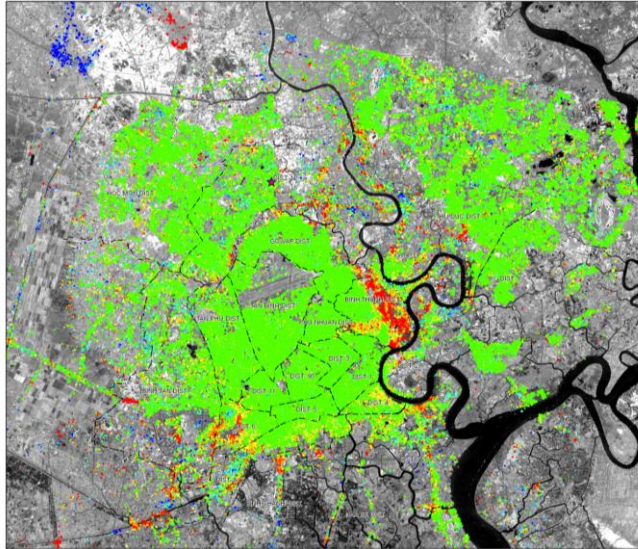


### CA/T System



# Subsidence monitoring

Historical mapping of terrain deformations in Ho Chi Minh City  
based on the PSI analysis of ERS and ENVISAT ASAR data (1996 - 2010)



- Legend**  
**Annual deformation rate (mm/yr)**
- more than -20.0 mm/yr
  - from -20.0 to -15.0 mm/yr
  - from -15.0 to -10.0 mm/yr
  - from -10.0 to -5.0 mm/yr
  - from -5.0 to 0.0 mm/yr
  - from 0.0 to 5.0 mm/yr
  - from 5.0 to 10.0 mm/yr
  - from 10.0 to 15.0 mm/yr
  - from 15.0 to 20.0 mm/yr
  - more than 20.0 mm/yr

**Interpretation**  
The ERS and ENVISAT ASAR data were used to monitor the ground deformation in Ho Chi Minh City. The data were processed using the PSI technique, which allows for the detection of millimeter-scale ground movements. The results show that the majority of the city is experiencing subsidence, with the highest rates of deformation occurring in the central and eastern parts of the city. The subsidence is primarily due to the extraction of groundwater for urban development and industrial activities.

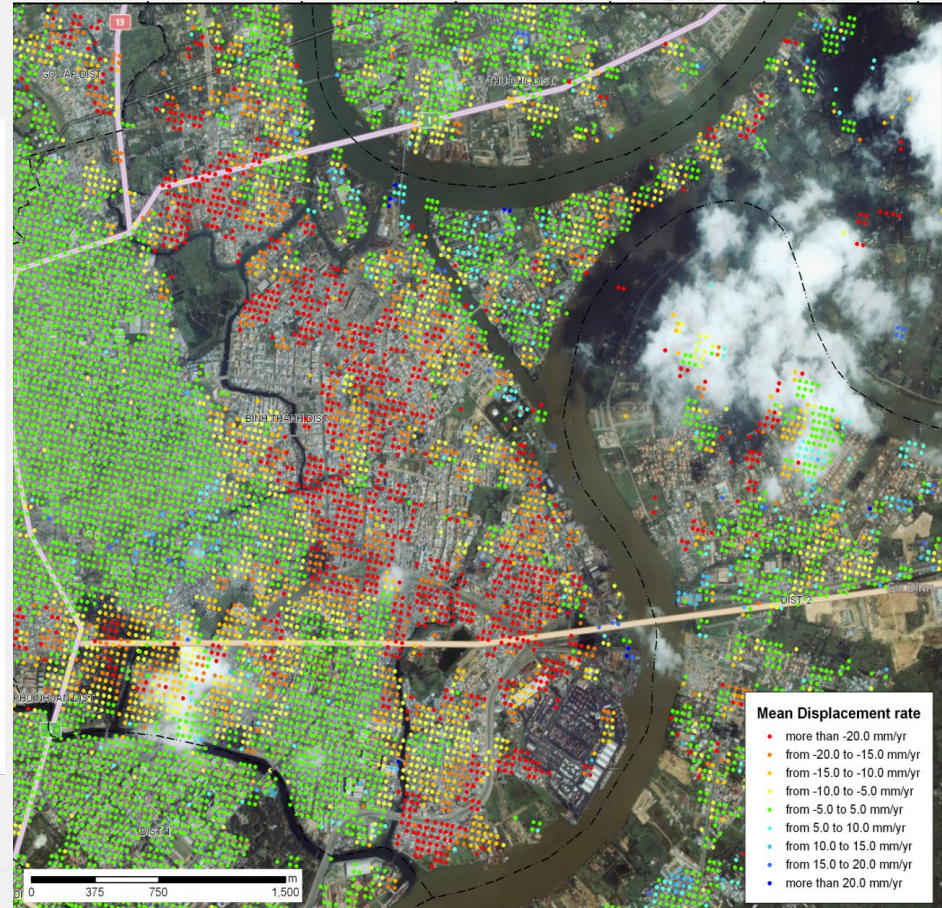
Local Projection: UTM Zone 48 North  
Datum: WGS 1984

1:130,000

**Data sources**

ERS and ENVISAT ASAR data were acquired between the 1996 and 2010 period. The data were processed using the PSI technique, which allows for the detection of millimeter-scale ground movements. The results show that the majority of the city is experiencing subsidence, with the highest rates of deformation occurring in the central and eastern parts of the city. The subsidence is primarily due to the extraction of groundwater for urban development and industrial activities.

The use of ERS and ENVISAT ASAR data for monitoring ground deformation in Ho Chi Minh City is a significant achievement. It provides valuable information for urban planning and infrastructure development. The results of this study can be used to identify areas of high risk and to develop strategies to mitigate the effects of subsidence.



- Mean Displacement rate**
- more than -20.0 mm/yr
  - from -20.0 to -15.0 mm/yr
  - from -15.0 to -10.0 mm/yr
  - from -10.0 to -5.0 mm/yr
  - from -5.0 to 0.0 mm/yr
  - from 0.0 to 5.0 mm/yr
  - from 5.0 to 10.0 mm/yr
  - from 10.0 to 15.0 mm/yr
  - from 15.0 to 20.0 mm/yr
  - more than 20.0 mm/yr



# Marine pollution monitoring



Name : MAERSK KIERA  
MMSI : 566234000  
Flag : Singapore  
Type : oil / chemical Tanker  
Length : 183 m

