Fishing in View: Satellite Technology based Monitoring, Control and Surveillance System for Pakistan Marine Sector

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Sequence of Presentation

- Overview
- Issues
  - Maritime Trespassing
  - Illegal Unreported Unregulated (IUU) Fishing
- Fishing in View Concept
  - Objective
  - Proposed Solution
  - Deliverable
- Conclusion

Overview

- Pakistan, officially the Islamic Republic of Pakistan, is a sovereign country in South Asia
- 6th most populous country with 180 million people
- 36th largest country in the world with covered area of 796,095 km2 (307,374 sq mi)
- 1,046-kilometre (650 mi) coastline along the Arabian Sea and the Gulf of Oman in the south

Overview

- Fishing plays an important role in the national economy of Pakistan
- Fisheries sub-sector has following contributions
  - 0.44 % in GDP
  - 2.03 % in agriculture
  - 57 percent in terms of production
- During 2012-13,
  - 729 thousand tons fish catch
    - 467 thousand ton from marine
    - 262 thousand ton from inland
- Pakistan's seafood exports stand at $300 million with huge potential to increase in future

Overview

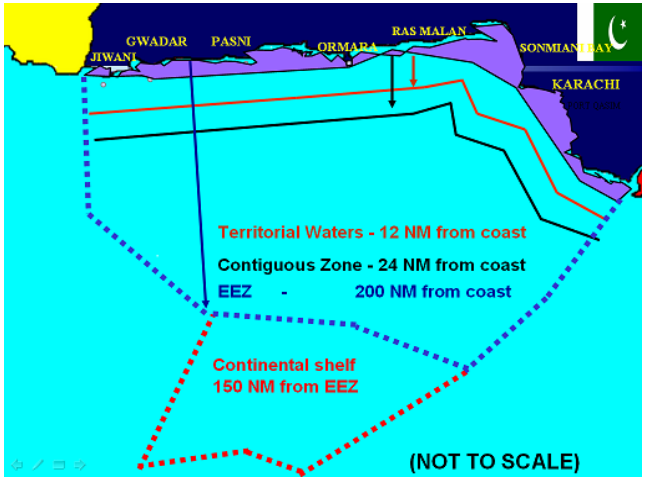
- Karachi Fish Harbor is the biggest and oldest of its kind in Pakistan, being used by all types of fishing boats
- Currently more than 4,000 fishing craft are based in it
- The major fish harbor of Pakistan are:
  - Karachi Fish Harbor handles about 90% of fish and seafood catch in Pakistan and 95% of fish and seafood exports from Pakistan
  - Korangi Fish Harbor
  - Pasni Fish Harbor
  - Gwadar Fish Harbor

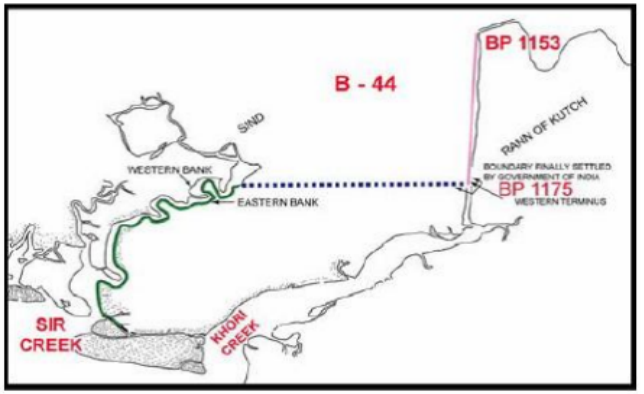
ISSUES FACED

- Two of the biggest issues faced are:
  - Maritime Trespassing
  - IUU Fishing

Maritime Trespassing

- Pakistan has a total coastline of 1,090 km and a total fishing area of approximately 300,000 sq. kms
- The coastline is divided into two major areas on the basis of two provinces i.e. Sindh and Balochistan
- Pakistan and Indian maritime border forces arrest hundreds of fishermen on the charges of border violation every year





IUU Fishing

- **Illegal fishing** takes place when vessels operate in violation of the laws of a fishery
  - This can apply to fisheries that are under the jurisdiction of a coastal state or to high seas fisheries regulated by Regional Fisheries Management Organizations (RFMO)
- **Unreported fishing** is fishing that has been unreported or misreported to the relevant national authority or RFMO, in contravention of applicable laws and regulations
- **Unregulated fishing** generally refers to fishing by vessels without nationality, or vessels flying the flag of a country not party to the RFMO governing that fishing area or species on the high seas

IUU Fishing

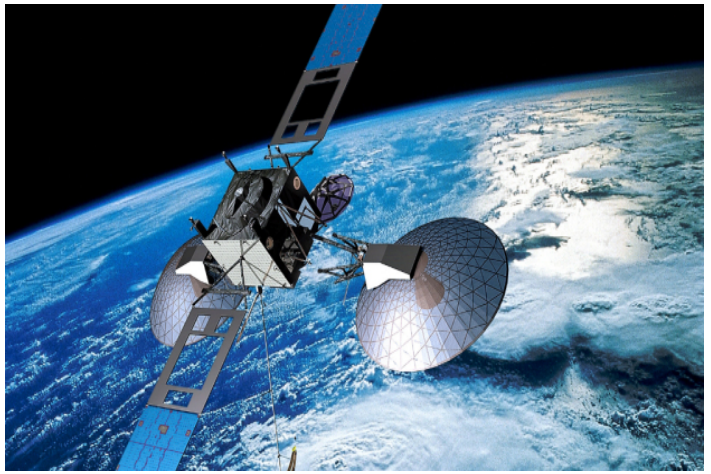
- The current trend in the production of global marine fisheries resources presents an alarming concern for food security and sustainable development
- The seafood and fishing industry in Pakistan loses at least $50 Million a year to tuna fish smuggling, according to the WWF-Pakistan
- IUU fishing is the major contributor with negative impact on
  - Economic
  - Environmental
  - Ecological
  - Social Arenas

IUU Fishing

- Stopping IUU Fishing is a top international priority area
- IUU Fishing account for 13 to 31% of global fish catch and valued at $10 to $23bn annually
- Nearly, 50% of global IUU is carried out in the western and eastern Indian Ocean

Fishing in View Concept

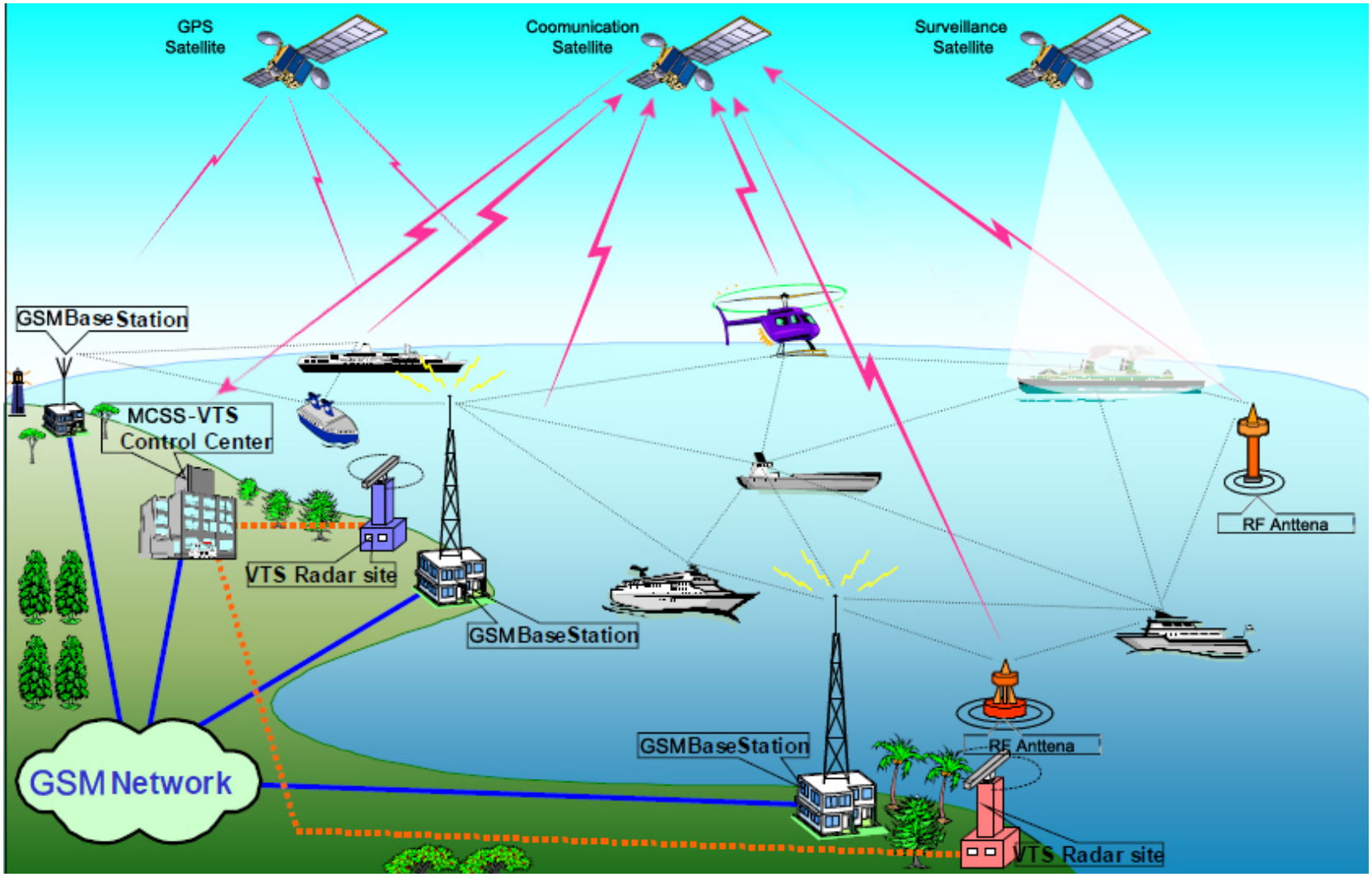
- Fishing in View is a concept of applying Satellite Technology for Monitoring, Control and Surveillance of fish vessels in Pakistan's Exclusive Economic Zone (EEZ)



Fishing in View
Proposed Solution

- Satellite Technology based Monitoring, Control and Surveillance System (MCSS) will comprise of following Subsystems
  - Master Control Center (MCC)
  - Global Navigation Satellite System (GNSS) based Vessel Monitoring System (VMS)
  - Remote Sensing/SAR Satellite based Vessel Detection System (Optional)
  - Data Communication Link (DCL)

Fishing in View

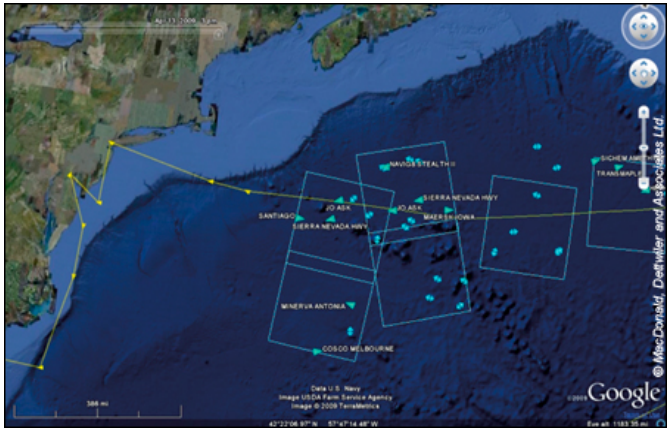


Fishing in View
MCSS Master Control Center

- MCC will receive real-time fish vessel positioning, heading and fish catch information from VMS
- MCC will also receive Remote Sensing/SAR satellite based imaging data which will be correlated with VMS positional data to detect vessel
- MCC will generate alerts for concerned authorities for following functionalities
  - IUU Fishing activity Alerts with positional info
  - Limit Entry
  - Count on total fish catch
  - Trip Limits
  - Search & Rescue Alarm
  - EEZ Boundary Crossing Alarm

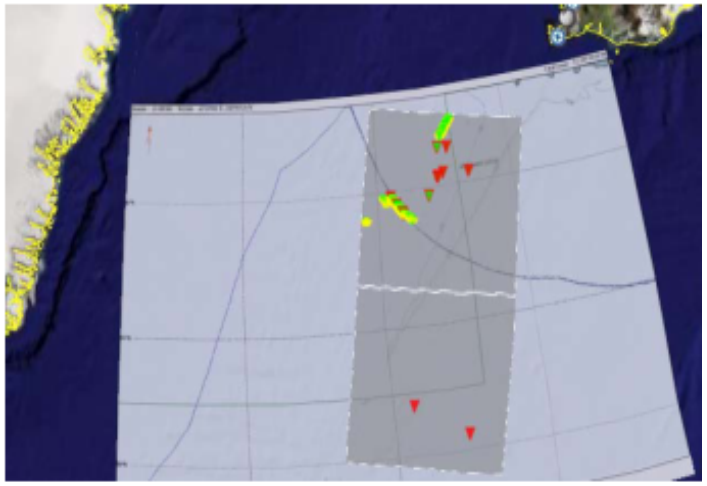
Fishing in View
Vessel Monitoring System

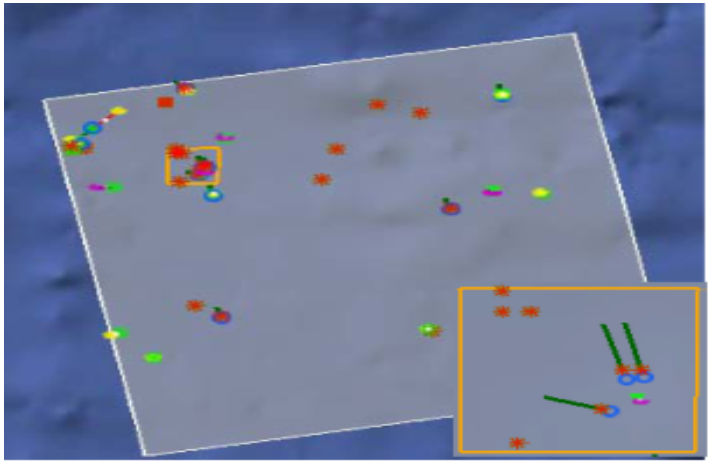
- VMS will consist of GNSS receiver integrated with fish catch data acquisition system
- VMS will transmit real-time position, heading and velocity information to MCC via data communication link
- VMS hardware/software will be installed with tamper-proof standards to identify any manual tampering
- VMS will transmit
  - Position, velocity, heading of vessel
  - Fish catch info
  - Trip info
  - Search & Rescue Alarm
  - EEZ Boundary cross Alarm



Remote Sensing/SAR Satellite based Vessel Detection System

- Even standardized VMS may become victim of
  - Intentional tampering of VMS Hardware/ software
  - Tampering of power-module
  - Spoofing/Jamming of GNSS receiver
- Vessel Detection System (VDS) may augment VMS/AIS to
  - Determine the number of fishing vessels and their position in a given area
  - Cross-check the positions of the fishing vessels detected by VDS with position reports from VMS
  - Signal the possible presence of fishing vessels from which no position reports





Remote Sensing/SAR Satellite based Vessel Detection System

- VDS process includes:
  - Satellite image acquisition
  - Remote Sensing/SAR processing
  - Vessel detection
  - Reception of other positioning data (VMS and AIS)
  - Data fusion - matching VDS positions with VMS and AIS and reporting results to inspectors
- The time needed for the whole process varies between 15 and 90 minutes

Fishing in View
Data Communication Link

- DCL will consist of following options
  - GSM/GPRS/3G/4G near coast
  - UHF/VHF/HF in mid sea
  - Satellite Communication link in deep sea
- GNSS data from VMS will be transmitted from above mentioned communication link as per the requirements/availability

Deliverable

- Satellite Technology based Monitoring, Control and Surveillance System (MCSS) will provide
  - Real-time Fish Vessel Monitoring System using GNSS/Remote sensing/SAR/Sat-com technology
  - Only registered fish vessel will be allowed to catch fish in EEZ
  - Search & Rescue Alarm System
  - EEZ Border Crossing Alarm

Conclusion

- IUU Fishing is causing seafood and fishing industry in Pakistan to lose at least $50 Million a year

- Fishing in View using Satellite Technology based Monitoring, Control and Surveillance System (MCSS) will enable Pakistan
  - Registered fish vessels including catch reports
  - Minimize/stop IUU Fishing
  - Search & Rescue for fish vessels
  - Stop marine border crossing issues

International Cooperation

- GNSS Technology & Application Development
- GNSS Monitoring and Analysis Centre
- Training & Talent Cultivation

UNOOSA

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THANKS

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