Using satellite technology to monitor illegal, unreported, and unregulated (IUU) fishing

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Blue Planet Symposium, June 2, 2017
The global threat of IUU fishing

- Illegal, unreported, and unregulated (IUU) fishing
- Accounts for up to $23.5 billion, or 1 out of every 5 fish sold
- Undermines sustainable management of fish stocks
- Threatens economic and food security for developing nations
- Associated with other crimes including corruption, tax crime, drugs, human trafficking

Photos: CCAMLR, NOAA, EJF
Why IUU fishing persists

- Vast areas of ocean to monitor
- Limited capacity for fisheries monitoring, control, and surveillance (MCS)
- Weak or nonexistent laws
- Easy to conceal identity
- Lack of consistent port controls
- Nations unwilling or unable to control fleets

IUU = High profit $$ / Low risk

Photos: USCG, AFMA
Pew’s Ending Illegal Fishing Project

A comprehensive approach including policy, technology, information sharing and enforcement:

- Port State Measures Agreement
- Unique Vessel Identifiers (UVIs)
- INTERPOL Project Scale
- Regional collaboration: FISH-i Africa
- Fisheries intelligence analysis unit
- Technology: Project Eyes on the Seas
Objectives:

• Continue to support ratification
• Work with regional organizations to support capacity assessment and implementation:
  • Forum Fisheries Agency (FFA) gap analysis
  • Central American Fisheries and Aquaculture Organization (OSPESCA) "Pescapuertos" project

Technology to Monitor IUU Fishing
Information Sources

• Global ship tracking data
• Satellite Imagery
• Environmental data
• Verified fishing vessel databases
• Automated vessel behavior recognition tools
• Expert fisheries analysts
Automatic Identification System (AIS)

- VHF-based tool for safe navigation
- Signals detected by ship-based, land-based, and now satellite-based receivers
- Required by IMO for all commercial vessels > 300 GT
- Voluntary for fishing vessels, but many (~30k) carry it
- Operates as an open system, more vulnerable to hacking

Photo: Trend Micro
Vessel Monitoring System (VMS)

- Important tool for monitoring fisheries and to deter IUU fishing
- Secure, two-way satellite communication between vessel and fishery authorities
- Nearly all RFMOs mandate VMS but requirements vary
- Data are often not publicly available
- AIS and VMS: different systems, but complementary for fisheries monitoring
Satellite Image Data

RadarSat-2 Imagery Example

DigitalGlobe Constellation Imagery Example
Satellite Image Data

2 coverage of the area per week
~ 1.5m sqkm/w

Only notified when something happens
Analytical Tools

- Color-coded icons by vessel type
- SAR detections
- EEZ boundaries
Analytical Tools

SAR detections

SAR details
Detecting Dark Targets
Who else is out there?
Heat Maps
Heat Maps
New and Emerging Data Sources

CubeSats

Infra Red

Photo Recognition
Real World Applications

Marine reserve monitoring
• 1 June 2015 – 30 May 2016
  1 January 2017 - Present
  Pitcairn Island EEZ – designated marine reserve

Regional monitoring
• 1 September 2015 – 28 February 2016
  Polynesian Leaders Group (PLG) pilot project

Seafood industry projects
• 2016 – 2017
  Seafood Task Force, Thailand
Thank You!

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Technology for Fisheries Monitoring and Surveillance:

VMS/Tracking:

Eyes on the Seas Project: