Business: Overview

ków! Founded in 1989 by Drs Amos Barkai & Mike Bergh.
Quantitative fisheries management and eLog Solutions. Predictive analytics and Big Data.
Offices in Cape Town, Johannesburg, Lisbon and London.
Operates in 17 countries.
Naive to expect ALL data associated with fisheries and fishing operations will fit together neatly.

Fisheries Data Are Dynamic and Complex. Rarely as calm as this. More often the reality is closer to this... Reality is we have...
Technology and Data Saturation Without Direction and/or Cooperation

VMS
- Vessel Monitoring Systems, or VMS, aboard vessels broadcast GPS coordinates, speed, and other data to a fisheries monitoring center via satellite. These systems allow direct communication to/from vessels and are widely used and required by many flag States, coastal States, and regional fishery bodies.

SAR
- Synthetic Aperture Radars, or SAR, satellites circle the globe day and night, independent of weather conditions, and can detect vessels in remote areas. The radar does not require cooperation from fishing vessels, providing a more complete picture of maritime activities.

AIS
- Automatic Identification Systems, or AIS, broadcast a vessel’s identity, position, and other information by VHF radio to nearby vessels and coastal stations and are mandatory under SOLAS for all commercial vessels larger than 300 gross tonnes. Satellites can also capture the radio signals to provide a global picture of vessel activity.

OPTICAL SATELLITE
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Electronic Monitoring System
- Electronic Monitoring Systems, or EMS, are compact video monitoring systems installed aboard a fishing vessel to record day-to-day activities and are required by some regional fishery bodies and coastal/flag States. The video is reviewed by authorities after a vessel returns to port.

Unmanned Aerial Vehicles, or UAV, are remote-controlled or autonomous aircraft outfitted with imaging and sensor equipment. Flight duration and range vary depending on the model. Some can be launched and recovered at sea.

Wave Gliders, an example of an unmanned surface vehicle, or UUV, are crafts that use the ocean’s wave energy for propulsion and do not need recharging. Solar panels power satellite communications and onboard sensors such as AIS receivers or acoustic monitoring equipment.

Unmanned Underwater Vehicle, or UUV, are remotely controlled autonomous submersibles.

Clearinghouse and Tracking Servers
- Centralized databases for data management and analysis.

Cellular Networks
- Mobile devices, enable small-scale fishers to report catch and a platform for crowdsourcing information.

FADs
- Fish Aggregation Devices send fish location and quantity data via satellite to vessels.

Smart Gear
- Devices aimed at reducing bycatch or the entangling of small fish. The pad hook aims at reducing bycatch.

Server
- Centralized databases for data management and analysis.

Cellular Networks
1: Need Structured and Cooperation

Citizen science
- Need to collect high quality, verifiable, and structured data.
- Citizen Science needs to take the next step and allow citizens to analyse the data they have collected.

Industrial
- eLogs that collect data beyond compliance needs.
- Universal Data Standards.
- Fishers and Owners to get use out of their data.
- Collect high resolution data for greater insight.

Artisanal
- Data collected at sea and collated on a web server.
- Allows small scale fishermen to connect.
- Multi-stakeholder engagement
- Socio-economic empowerment: Fair trade.

Knowledge Sharing
- Bring together various clusters of knowledge.
  - Science
  - Industry
  - Sustainability leaders
- Coming together to address cross-cutting issues and opportunities
• Chaotic System

• Resists conventional predictive analytics techniques

• Fishing industry is in dire need of new solutions and disruptive innovation

• The fisheries industry, exists at the nexus of many complex, dynamic, interacting systems and has both need for, and the data to satisfy the requirements of modern machine learning techniques.
THE GREATEST ENEMY OF KNOWLEDGE IS NOT IGNORANCE, IT IS THE ILLUSION OF KNOWLEDGE

10s of data review studies have shown paper logbook data to be:

• WORTHLESS

Or even worse

• MISLEADING
Illusion of Knowledge

The attempt to apply OLD THINKING to both:

• data collection and

• data analysis techniques

to meet the massive demand for information and deal with the massive accumulation of data is simply:

• not realistic

• nor practical
Reasons:

• No clear or quantifiable objectives are set
• Poor technology - poor data quality
• Culture of misreporting
• Lack of agreed standards on all levels
• Little to no understanding or interest in data science controlling the data collection process
• Management thinking is anachronistic
• Instead of looking at new ways of doing things just hammering fishers with more regulations and more data requirements
Solutions:

• Set up minimum requirement standards
• Make it simple and beneficial for fishers to collect good quality data
• Implement technology with consideration of practical realities
• Advanced data mining techniques at all levels of management, analysis and harvesting programme development
• Create data and knowledge sharing platforms that are cooperative and bring them under one roof
• Incorporate machine learning techniques and technologies

• Species recognition
• Events recognition
• Catch estimates
• Fishing effort estimates
• Fish source IDs using genetic markers...