TrackWell VMS

Presentation in Barbados
March 27th 2008
Agenda today

- Introduction to TrackWell
- TrackWell VMS
  - Overview
  - User interface applications
  - Platforms
  - System architecture
  - Vessel units
  - Implementation
- Q/A at end of session
**Founded in 1996**
- Offshoot from The University of Iceland
- History goes back to 1987
- 26 employees in Iceland

**Software development and systems integration**
- Complete solutions for the customers
- State of the art consultancy services, leveraging expertise and technical know-how

**Solid international customer base**
- Services operational in 14 countries, spanning five continents
- Strong partnership forged with key customers and leading industry players

**Subsidiary in Houston Texas – Trackwell ADS**
- Partnership with e.g. Thrane & Thrane, Telenor, Tele Atlas and Inmarsat
Company Background

Proven track record of providing solutions for mission-critical Mobile Resource Management projects

Air traffic control
- Radar Data Processing and Presentation System
- Monitoring all aircraft in the world's second largest oceanic air sector

Search & Rescue
- Monitoring all Icelandic vessels
  - Coastguard
  - Directorate of Fisheries
  - Vessel Owners
  - Life Saving Association
- 112 / 911 automatic callout systems

Fisheries Control
- Enforcing international fisheries regulations
- Operational VMS
  - Iceland (1997)
  - UK (NEAFC, 1999)
  - SEAFO (2006)
TrackWell VMS - Overview

- Developed in close cooperation with Coastguard and Fisheries Authorities
- In use since 1997 – continuous development
- Highly flexible and independent of communications systems
  - Supports all the major types of vessel units concurrently
  - Already existing standard vessel units can be used
- Main fields of usage
  - Surveillance (Coastguard)
  - Fisheries Control (Coastguard/Fisheries Authorities)
  - Safety (Search And Rescue teams)
  - Resource Management (Coastguard, Vessel owners)
ICG VMS highlights

- **Processes**
  - 1.5 million position reports per day
  - Hundreds of catch and activity messages per day

- **All data stored in a database**
  - 7 days of full data
  - Data reduced to 10 minutes intervals and special events before archiving

- **Synchronized with outside data sources**
  - Official vessel registry
  - Fishing license database (DoF)

- **Thousands of vessels registered**
  - Automatic registration of foreign newcomers (e.g. AIS vessels)

- **Data accessible by patrol vessels and aircraft**

- **A number of lists and reports on generated automatically**
Vessels are equipped with tracking devices (e.g. Inmarsat-C, Inmarsat D+, VHF/UHF, ARGOS, GPRS)
- Positions, speed, heading, timestamp and i.d. are received, processed, stored and displayed
- Vessel owners pay for the tracking device and the communication cost
- All vessels are tracked at all times while at sea

- Geofencing – EEZ, harbours, closed areas
- Monitoring of message reception according to schedule
- Alerts generated in case of lacking reports, entry/exit events and possible infringement
- Data transferred to Inspection vessels and aircraft during operations
Surveillance – Vessel registering

- **Vessel registry module**
  - Standalone or synchronized with official registry

- **Vessels have their own profiles containing**
  - Vessel Details (and registration)
  - Communication parameters
  - Update rate and positioning parameters
  - Fisheries license details

- **Polling and programing of reporting rate from vessels**
**Many Configurable Map Tools**
- Main Window and Overview
- Vessel Status and Detail Windows
- Map Actions and Measurements
- History Query
- Filter Function
- C-Map, S57, other map formats

**Specialized Maps**
- EEZs
- Regulatory Areas
- ICES Areas
- Customer specific maps
Surveillance – History tracks

- User selects vessels of interest and other parameters
- User selects date range
- Search returns a trail
- Trail detail window shows information related to individual points

Icelandic Redfish Vessels in June 2002.
Surveillance – Monitoring and Alerting

- Monitoring is a key feature
  - Reception of position according to schedule
  - Geo fence - Entry into and Exit out of defined areas (EEZ, closed areas, harbors)
  - Speed and vessel characteristics
  - Validation of vessels’ licenses and registration

- Actions include
  - Alert message generated (Message Handler, email, SMS, buzzer)
  - Vessel polled automatically
  - Positions, Entry and Exit messages forwarded
Surveillance – Monitoring and alerting

- Alerts are:
  - Stored in DB
  - Viewed in the Message Handler

- User can:
  - Filter alerts
  - Sort alerts
  - Copy alerts
  - Delete alerts

- Event Engine
  - Triggered by positions
  - Triggered by timing events
  - Tampering warnings received from mobile units
Fisheries Control - Overview

- Fishing license management
  - Licensed species, timeframe, days at sea

- Full support for message exchange as required by Regional Fisheries Offices (NEAFC, NAFO, SEAFO, etc.)

- Full support for EU message exchange format

- Sophisticated Catch and Effort reporting system
  - Electronic Log Books (certified by Directorate of Fisheries)
    - Now being installed in all Icelandic fishing vessels
  - Product Log
  - Fleet Manager (for the vessel owners)
Fisheries Control – NAF message support

- Powerful NAF message validation
  - Message syntax verification
  - Mandatory and optional fields
  - Record number/sequence number checked
  - Constrained values, e.g., ISO-3166 codes, Vessel types and Species

- Catch data compared against licenses

- Catch by fishing trip calculations

- Fisheries related alerts presented in Message Handler
Fisheries Control – Catch and Effort Reporting System

- **Fishing Log**
  - Transmits to office and Directorate of Fisheries
  - Vessels location, quantity of fish caught, species, weather and more
  - Supports most fishing tackle
  - Connectable to a variety of sensor devices
  - Receives data from vessels using the SeaData Fishing Log

- **Fleet Manager**
  - Used by fleet managers and other in management
  - Total catch structure along with other useful information
  - Data analysed to the smallest details such as average catch per hour
  - Wide range of report options
  - Catch History, data from fisheries authorities

- **Product Log**
  - Extension to Fishing Log.
  - Information about price, utilisation, unit size and more
Fisheries Control – Catch and Effort Reporting System

Analysis of trails and catch

Comparison of fishing areas
Safety At Sea

- **Mandatory reporting system for all Icelandic vessels**
  - Manual system established in the fifties
  - Automated in 1998
  - Combined with Coastguard’s VMS in 2006

- **Shore based communications for smaller boats (VHF)**
  - Report in/out of harbour
  - Report position every 30 second
  - Alert generated after 15 minutes without report
  - Alert button on board vessels

- **Satellite system for the larger vessels**
Resource Management

- **Surveillance craft**
  - All Coastguard vessels and aircraft are tracked at high report rate

- **Fishing fleet**
  - Vessel owners can have their position reports routed to their offices, into their Fleet Manager software
  - Collect history data from their own vessels
  - Detailed information on location, catch, weather, temperature, conditions of the catch, etc.
  - Helps selecting good fishing grounds and avoiding bad ones
System Platforms

- **Server – Client model**
  - Server runs on most platforms (Unix, Linux, Windows)
  - Clients run on Windows PCs

- **Relational SQL database (Oracle)**
  - Customer has access to schema

- **Variety of User Interface Applications**
  - Desktop
  - Web based

- **Variety of reporting tools**
  - Crystal report
  - Compatible with MS Office tools

- **Supports most communications systems, concurrently**
Application Server Architecture

Communication Layer
- Gateways to Communication Systems
  - GSM
  - TETRA
  - Inmarsat C
  - M-Sat
  - GPRS + GPS
  - OTHER
- Communications System Manager
- API

Services Layer
- Fisheries Message Processing
- Tracking Services
- API

Access Layer
- Access Control
- User Registration
- Administration
- Request Registration
- Message Gateway
  - SMS, e-mail
- API (XML, Proprietary)
- TracScape Server
- Map Server

User Interfaces
- Devices
- Controller Work Station
  - Messaging
  - Admin
  - Situation display
- TracScape - WWW Applications
  - Messaging
  - Admin
  - Situation display
ICG VMS network

Internet access via VPN or HTTPS
- Coastguard vessels/aircraft
- Other countries and organizations
- Data sources (LES, etc.)
- Support access

Directorate of Fisheries

DMZ

HTTPS GW

Application servers
Database servers (Dual redundancy)

AIS data source

VHF data source

ICG net

Search and Rescue operational room

PC workstations

FW

FW

FW

FW
**Vessel Units**

- TrackWell VMS supports most standard types of vessel units
- TrackWell ADS - Tamper proof solution available
  - Optional Display Terminal
    - Input of catch data
    - General messaging
- Domestic Partner for installation and maintenance

### Diagram
- Inmarsat-C Satellite Transceiver
- Control Panel
  - Light and sound indication of operation status
- Control Box with battery backup
- Connection to Echosounder or Sonar for depth information
- Power Input 10-36V DC
- Optional Messaging Display Terminal
- Domestic Partner for installation and maintenance
- TrackWell ADS - Tamper proof solution available
  - Optional Display Terminal
  - Input of catch data
  - General messaging
Implementation procedure

Gab fit analyse

Consulting team
- Customer
- TW
- Domestic Partner
- Specialists

Functionality modules
- General Surveillance
- Fisheries Control
- Safety
- Fleet Management
- Modifications/additions

Steps with customer
- Installation
- Configuration
- Testing
- Training
- Support and maintenance
- Long term marriage!
The VMS is just one piece of a large puzzle!!!

The customer needs to provide:

- Legislation
- Infrastructure to operate and monitor the VMS
- Patrol vessels/aircraft
- Means to detect non-cooperative vessels
- Procedures to use the data to control the EEZ
- Etc.
Support and service

- TrackWell operates 24/7 service desk
  - Mobile phone
  - support@trackwell.com

- First line support by local partners or by customer specialists

- Second line support by TW or local partners

- Third line support by TW 24/7

- Support and maintenance contract
  - Extensive monitoring of the system
  - Bug fixes and mainstream upgrade
  - Tailor made development on time and material basis or by fixed price offers