Trackwell´s proposal for a Technical Dialogue for upgrading fishing vessel monitoring system for Greece

Date: 13. May 2019

Submitted by

Trackwell hf
Laugavegi 178
105 Reykjavik
Iceland

Contents

Statement of Interest

Trackwell was established in 1996. Since the beginning Trackwell has been developing and operating a highly specialised service within the scope of monitoring, tracking and managing of vessels and vehicles. Our core mission is development of mission-critical systems for enterprises, governmental institutions and other organizations. Among the countries and institution s using Trackwell´s cloud hosted, Vessel Monitoring System Solutions are cloud hosted, Vessel Monitoring System Solutions are The North East Atlantic Fisheries Commission (NEAFC), the Forum Fisheries Agency (FFA) and the Western and Central Pacific Fisheries Commission (WCPFC) and Australian Fisheries Management Authority (AFMA).

Trackwell prides itself on its close-knit and innovative team of professionals with vast experience in the field of vessel monitoring and reporting. Over the years, Trackwell has established strong partnerships with leading technology and communication providers such as Amazon, Oracle, Microsoft, Red Hat and most of the major service providers of vessel units and airtime.

Combining our in-house knowledge and experience with strong partnerships we are able to offer our continuous services (24/7/365) with very high operating security.

Given Trackwell's mission to deliver highest quality software and service and to operate with excellence, we find ourselves particularly well placed to provide the requested services with the quality and completeness requested.

Contact person on behalf of Trackwell will be;

Mr. Kolbeinn Gunnarsson
Director of Trackwell Maritime
Email: kolli@trackwell.com
Phone: +354 5100600

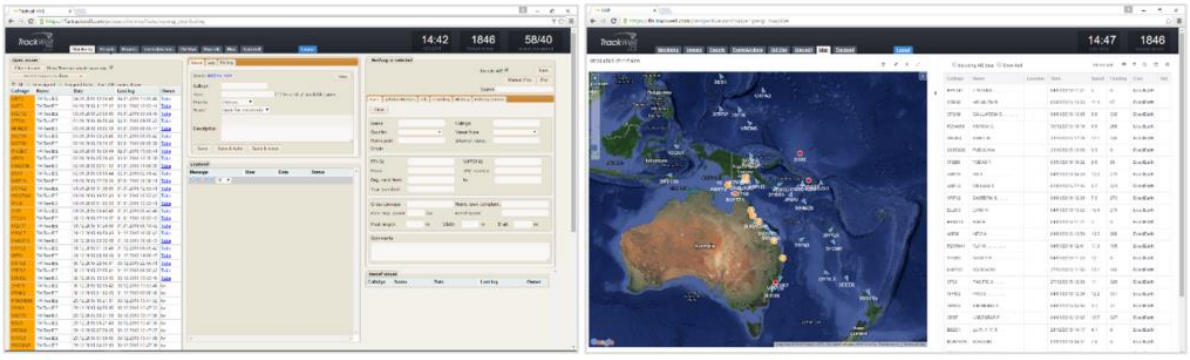
Trackwell hf hereby expresses its interest in participating in a Technical Dialogue for upgrading fishing vessel monitoring system for Greece

1. Software

Trackwell has gone through the technical specifications of the documents provided and claims that the requirements can be met by the proposed system, as stated in our answers in Section (*Trackwell´s response to Technical specifications*)

The Trackwell VMS is however in many ways much richer in functionality than directly required. The few items that are required in this tender and are not available yet will be developed and added to the system as a part of this project. The following section is a brief overview of the systems out of the box functionality.

The Trackwell VMS offers extensive monitoring and alerting options, closed zone monitoring where vessel speed can be checked for fishing versus cruising speed, reception of vessel location according to schedule and fishing license and official certificate of seaworthiness. The system's also fully compliant with international fisheries regulations and facilitates exchange of information between authorities, neighbouring countries and regional fisheries offices. The system offers data exchange formats and messages that are fully compatible with protocols and message formats normally required in bilateral agreements commonly made between countries as well as with the regional fisheries offices (NEAFC, NAFO, SEAFO and ICCAT). Trackwell has years of experience in developing and operating fully functional VMS, with a very similar functionality as is required by Greece



The proposed solution has entirely web-based user interface, requiring only a standard web browser running on a PC. VMS user interface consists of a suite of applications sitting within the same common frame application, the MCS, which provides all the other with common resources, like database connection pool and user and access management. The user can open multiple instances of the applications simultaneously and place the windows on multiple

screens if preferred. All workstations are connected to the same database, so all closed transactions performed by one user will be visible to all other users currently logged on to the system (subject to access rights).

The main modules of the user interface are:

- Monitoring view, which is the operators‟ main view. In it, the operator has a live feed of all-important messages/alerts and from it, the operator takes action.
- Vessel Registry view implements vessel registry functions, such as searching, listing and editing vessel information (name, position, last position, report history, course and speed, registrations, permits and so on). The vessel registry will be automatically synchronized with an external official vessel registry.
- Events and Actions view, allow the user to define which events are to be monitored and the actions to be taken when an event occurs. It also lists currently defined monitoring requests.
- Messaging view (ERS module), related to fisheries related reports. This includes listing and searching incoming and outgoing messages and editing new messages (the ERS module is optional and not included in standard VMS configuration**)**.
- Reporting tool with various reports.
- The standard web map application uses simple maps services like Google maps (all variants), Open Sea Map, Open Street Map, Bing, etc. At extra cost, navigational maps can optionally be presented, such as S57, S63 and other standard formats, should they be needed.
- The Map interface displays the positions of the vessels on a geographical map in near real-time. It has related actions, such as home, pan, zoom-in, zoom-out, stepwise zoom, cursor position display (lat/lon), vessel identification (for cluttered display), measurement tools and more. It contains a list with details on each vessel present to the system. Vessels can be selected on the map and further details viewed in a special pop-up window.
- In the “Map-edit” page users have access to drawing and marking options to create or draw areas on the map. Should the user need to mark jurisdictions, shipping routes, fishing areas etc. The map can be re-edited at any time. When the map is ready it can be displayed in the “Map page” by selecting layers and its functions and rules can be adjusted.
- The „Map history” page contains tools to bring up historical trails of one or more vessels. This means that the user can select one or more vessels or a group of vessels, defined by nationality, communication system, vessel type and measurements. The user can then define a date and time range to see the trail history of the selected vessels. This feature is useful when the user wants to better understand the comings and goings of vessels across different jurisdictions, shipping routes, fishing areas etc.

- Trackwell VMS supports integration and compatibility with the FLUX (Fisheries Language for Universal Exchange) system to assist and support the distribution of fisheries-related data to e.g. regional fisheries management organisations (RFMO). Trackwell has implemented FLUX data exchange for its customers NEAFC and Malta.

2. Equipment

The system shall be web-based, deployed, configured and maintained by the supplier with remote secured access, e.g. through SSL/TLS protocols, and consulted by multiple users through an Internet connection and various logins (user/password) combinations. No on-site hardware, except computers connected to the Internet, or network configuration, e.g. VPN connections, shall be required to access it. Similarly, no specific software shall be required to access and consult the system except for modern web browsers.

Trackwell has experience in delivering the proposed system on previous projects, e.g at NEAFC, FFA and Australia to name some, using different cloud services (Azure and Amazon). Using GC cloud GCP SA would not pose any problems. All aspects of the deployment, configuration and maintenance of both the virtualized hardware, software (application and database) layers of the system will be provided by Trackwell.

3. Architecture

As described throughout this document (Software, Proposed Technical Solution and Advantages of Technical Solution) Trackwell VMS can fulfil the requirements listed below.

- Provides centralized management
- Ensures multi-user support
- Allows interconnection with other carriers
- Provides mechanisms to ensure the integrity and completeness of the data
- Provides opportunities for designing and managing geographic information
- Enables the management of large volumes of data

- Complies and follows with all open interoperability standards both in the GIS field and in the wider field of IT.

4. Office equipment

Because the Trackwell VMS system is hosted via the cloud and has a web-based user interface it requires only a standard web browser running on a PC. Any PC with a decent memory will suffice.

Because the of these simple requirements Trackwell any computer with normal specifications will handle running Trackwell VMS. Therefore, we would suggest that all office equipment is bought locally in order to get a better price than any supplier who has to ship the equipment to Greece.

5. Employees training

Track well recommends that the first round of training happens early in the implementation usually after the first installation of a preliminary system, a beta-phase of the operation is declared. Following that it is suggested to hold a preliminary training over a web-based session, where the key operational staff will be given a rudimentary overview and hands-on experience of the system, allowing for early comments on the functionality from the buyer.

A formal training would be held on site at the end of the implementation of the system, where the functionality of the system for all roles will be covered in theoretical and hands on training sessions. In situations where there are to many operational offices for onsite training to be performed, web-based sessions are added.

All training material such as a User Manual and a Training Manual with exercises are provided.

6. Guaranteed commissioning

As stated earlier all aspects of the deployment, configuration and maintenance of both the virtualized hardware, software (application and database) layers of the system will be provided

by Trackwell. Both Azure and Amazon offer high guarantees of the lasting functionality of the software and services they offer.

7. Timetable - Implementation Phases

Confidential data

8. Technical - Professional competence / Experience of Candidate Contractors

Trackwell has established itself among the leading companies in the field of Vessel Monitoring and Safety at Sea. Trackwell has worked closely with its customers including Fisheries Authorities, Coast Guards and vessels owners to develop a unique solution which combines a Vessel Monitoring System and an Electronic Reporting System (ERS) for fishing authorities and fisheries, either as a cloud-based service or locally hosted. The system complies with international fisheries regulations and allows fisheries authorities, coastguards, navies and fishing companies to handle and monitor thousands of vessels every day, all around the world. During the last 20 years, Trackwell has worked with many of the leading countries and organizations, for example; Iceland the home market, Greece, Albania, Faroe Islands, NEAFC, NAFO, SEAFO and now FFA and WCPFC monitoring the Western and Central Pacific Ocean.

Below is a brief overview of some of our projects:

Table removed - Confidential data

The Team

Overall management of the project will be handled by Mr. Kolbeinn Gunnarsson who is one of our most experienced employees. Being one of the founders of Trackwell in 1996, he is now Director of Trackwell Maritime.

Trackwell has a dedicated team of professional software design, development, testing and documentation. All in all, a team of 12 experts, most of who have a B.Sc. degree in Software Engineering are employed by the company. The team has an average work experience over 10 years and over 7 years with the company. Expertise ranges from development in C/C++, Java, HTML, JavaScript, CSS, C#.NET, Python and VB.NET.

The Tackwell maritime division. The team covers software design, development, testing and documentation for Trackwell Maritime.

The projects this team has undertaken includes mission-critical real-time communication servers, flexible interactive and web-based user-interfaces, PC and mobile device client software, secure and business-critical transaction gateways and long-term life-cycle maintenance and incremental requirements for all of our existing services.

All employees of Trackwell have fluent reading-, writing- and speaking capability in the English language.

References

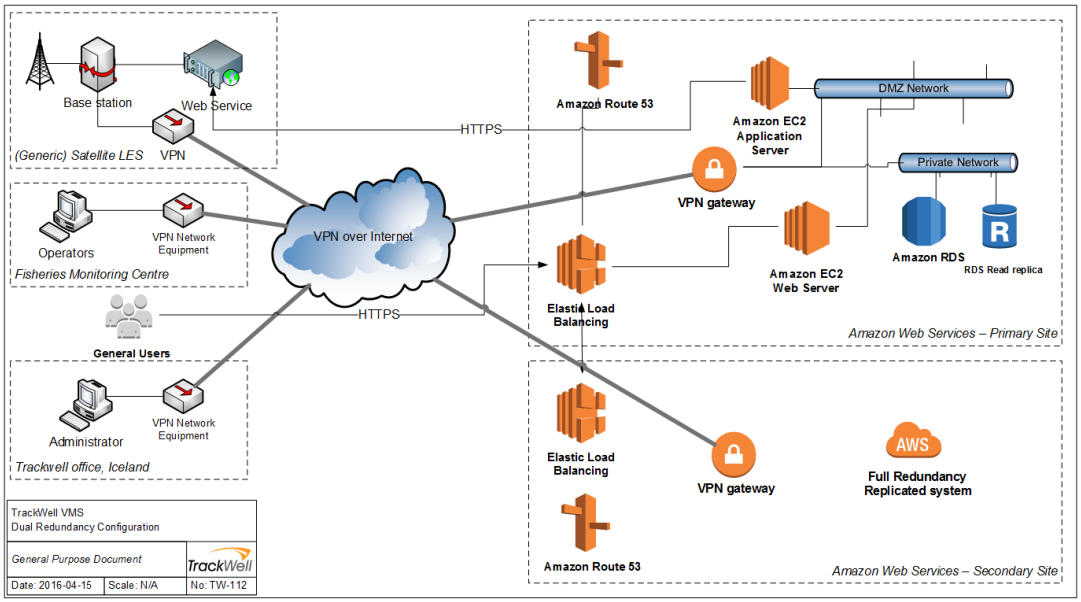
Confidential data

9. Proposed Technical Solution

Application Hosting

Amazon Web Service (AWS) infrastructure supports reliable and distribution operation. Each server cloud has a VPC private network, is composed of 3 EC2 servers and RDS Oracle hosting, with a read

replica for deeper data analysis. For data synchronization, AWS features are used. The whole environment can be scripted for rebuild and maintenance.



Architecture of the hosted solution.

The system will be available 24/7/365. In the specifications, a requirement of 99.9% availability of the system is required. According to the model provided by the hosting center. In current installation, there have hardly been any downtimes and maintenance is performed on line in nearly all cases. A monitoring application (Xymon) will be used to monitor the health of all major components of the system and statistic collected on up-time.

The backend of Trackwell´s VMS

The system is comprised of the following parts:

- VMS Server for automatic message processing, formatting, storage and retransmission of messages.
    - VMS MCS (Monitoring Control and Surveillance) interface application, is a web based system for viewing, editing and transmitting messages; monitoring alerts, creating reports and system administration tasks.
    - Fleet Management Platform
    - RabbitMQ message queue
    - HTTPS Messaging Services is an intermediate messaging gateway.
    - Email reception/forwarding of messages from/to other VMSs.
    - Oracle Database

The application server that runs the web bases services is the open source software Apache-Tomcat. The VMS Server, HTTPS Messaging Services and the VMS MCS application server run on the Linux operating system, also open source. The Fleet Management Platform is written in C/C++.

Network capacity, transaction volume and data transmission;

One of the current installations of Trackwell VMS has over 7000 vessels registered in the vessel registry and over 1.500 vessels reporting concurrently with reporting interval from 30 seconds to 6 minutes, reporting through the AIS system. The amount of data processed is over 3 million messages per day. 4.000 vessels reporting every hour will result in less than 36 million reports per year, which is about 12 days data in this installation, which by the way does not have any load balancing. This customer of Trackwell is using the same interface applications as being proposed here. Concurrent users are similarly easily coped with. The hosting center has high bandwidth internet connection that handles hundreds concurrent users.

This solution can be scaled up as needed with respect to CPU power and disk storage space. All access points are secured with HTTPS or VPN connections, having firewalls to protect all inputs.

10. Advantages of Technical Solution

Trackwell offers a state-of-the-art Vessel Monitoring System (VMS) that provides customized solutions and technical support for different needs. The system provides countries and organisations with the tools to monitors vessel movements and use the positional data received from the system to analyse the vessels' behaviour, for both law enforcement and resource management purposes. In almost all cases, Trackwell provides the entire VMS software, technical maintenance and user-level support.

Trackwell VMS is a vital component for authorities combating IUU fishing (illegal, unreported and unregulated fishing) and the system is fully compliant with international fisheries regulations and facilitates exchange of information between authorities, neighbouring countries and regional fisheries offices.

Our VMS is used by Fisheries Authorities, Coastguards and Navies for Surveillance, Search and Rescue, Resource Management and Fisheries Control and currently manages the data of thousands of vessels every day all around the world.

Trackwell vessel monitoring system supports integration and compatibility with the FLUX (Fisheries Language for Universal Exchange) system to assist and support the distribution of fisheries-related data

to e.g. regional fisheries management organisations (RFMO). Trackwell has for example implemented FLUX data exchange for its customers NEAFC and Malta.

Finally, it is worth mentioning that Trackwell is working on a new project called TrackIUU. This is a system based on an intelligent machine receives data from available sources and calculates a risk factor for IIU activity. This risk factor is feed back to the VMS map where vessels with risk are indicated on the map with icons in colours and/or shapes that clearly stand out. The system then issues Alerts generated for high risk vessels based on their behaviour. This project has already been granted phase 1 funding from the European Union.

11. Technical leaflets of a proposed solution

Our Trackwell VMS Brochure is attached to the same email as this proposal.

12. Other Proposals

Trackwell has no other proposals except for the proposed system described in the sections above.

13. Trackwell´s response to Technical specifications

Confidential data

14. Estimated cost of offered solution for each of the above

Confidential data