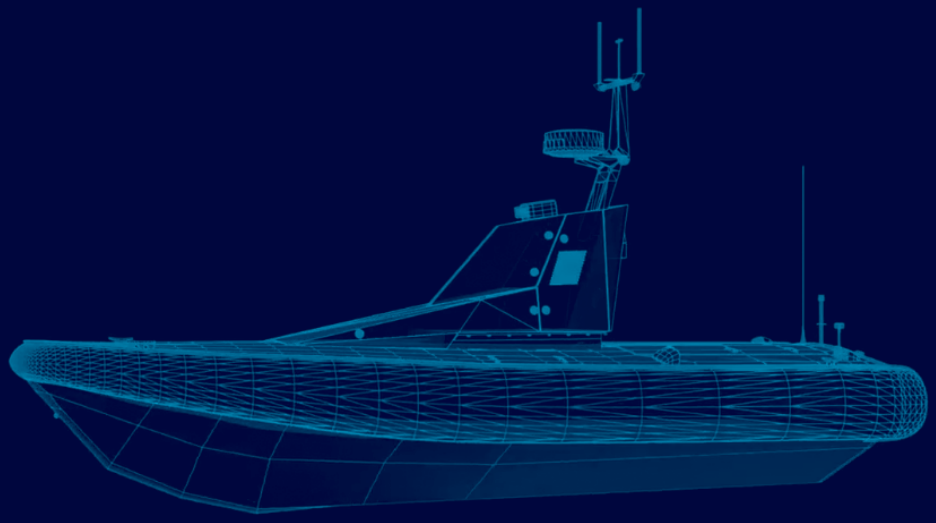


CR-006299-MD-01

INTEGRATED USV SOLUTIONS

UNMANNED PAYLOAD INTEGRATION SOLUTION FOR MARITIME SURVEILLANCE & EARLY WARNING

RF sensor integration kit for NRE co-engineering or rapid capability insertion programs, TRL-9 sensor technology.

Designed with an Uncrewed-Vehicles Platform Manufacturer for a NATO member, CRFS created a self-contained spectrum monitoring and TDoA system that fits onto a Group 1 USV. The system facilitates ISR missions for the VHF and UHF bands in hostile environments.

The equipment designed for this project had the following specifications:

- RFeye Node (sensor) 100-18 (18GHz)
- USV with 105+ hours integral run-time, tested up to Sea State 5, with shock protection to 30Gs

The system uses self-contained power and weighs less than 300kg.

APPLICATIONS

- Observe & data capture
- ISR in permissive environments
- ISR in hostile environments
- Radar & RF signal interception
- Military information support operations
- Jamming detection
- Maritime observe & data capture
- Short-range monitoring / early warning
- Long-range monitoring / early warning
- Non-kinetic defence

GROUP	CLASSIFICATION	CRAFT LENGTH	ENDURANCE	CRFS PAYLOAD
1	Mini	< 7 meters	24 hours	Yes - bespoke (self-contained power source)
2	Small	Up to 11 meters	105+ hours	Yes - bespoke (self-contained power source)
3	Medium	Up to 26 meters	130+ hours	Yes - bespoke
4	Large	Up to 41 meters	130+ hours	Yes - bespoke

www.crfs.com

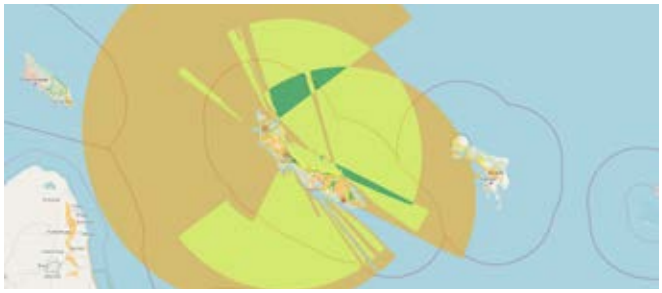
CRFS

EXTRAORDINARY
RF TECHNOLOGY

MONITORING A NARCOTICS SMUGGLING ROUTE FROM VENEZUELA TO CURAÇAO

This simulation demonstrates how deploying RF sensors on USVs can increase the detection radius and significantly improve the TDoA geolocation of signals of interest.

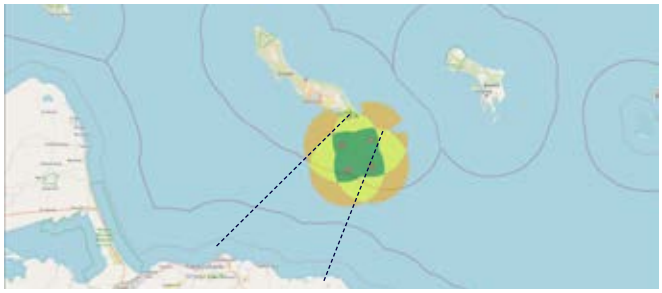
Result: an early warning system monitoring the island's territorial waters and in its EEZ



1. Ground-based RF sensors

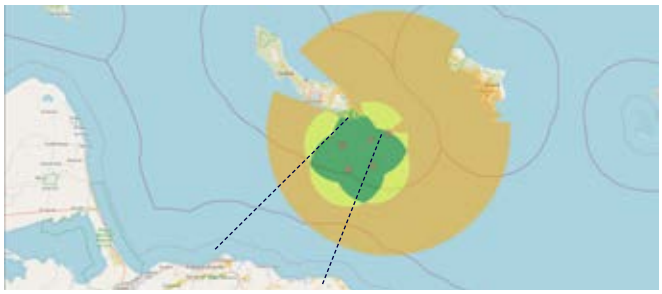
Curaçao is 57km long and 10 km wide

- Three sensors are deployed at the highest possible locations on the island on 10m towers
- RF sensors detect signals at 156MHz, transmitting at 10W
- Red area shows coverage of one sensor
- Yellow shows coverage of two sensors
- Green shows areas where TDoA is possible



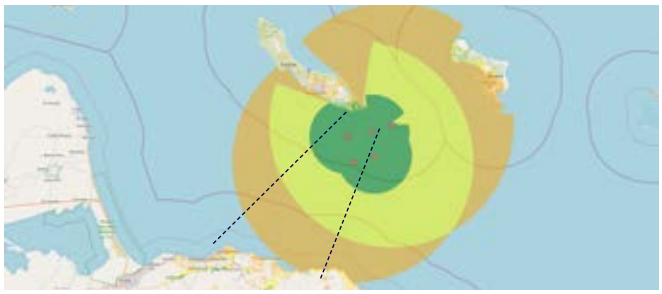
2. RF sensors on four USVs

- The lines indicate a popular smuggling route (The distance from the island to Venezuela is 72 km)
- Four RF sensors are deployed on USVs at 2.5m
- Highly accurate TDoA in the green area
- Possibility of DF in the yellow area
- All the smuggling area in the territorial sea is covered (and some of the EEZ)



3. Adding a land-based tethered drone

- Adding an additional land-based RF sensor (top right) on a tethered drone at 100m extends line-of-sight and the detection and geolocation area



4. Adding a USV-based tethered drone

- Adding a 100m tethered drone to a USV further extends the line-of-sight, detection, and TDoA geolocation accuracy

BENEFITS

- Significantly increase discreet ISR effectiveness
- Address a capability gap
- Data capture, store, and stream via backhaul
- Tactical response
- Sensor network range extension enabler
- Reduces the exposure of personnel and their proximity to hostile forces

CRFS Inc
Chantilly
VA, USA
+1 571 321 5470

CRFS Ltd
Cambridge
United Kingdom
+44 (0) 1223 859 500

CRFS and RFeye are trademarks or registered trademarks of CRFS Limited. Copyright© 2025 CRFS Limited. All rights reserved. No part of this document may be reproduced or distributed in any manner without the prior written consent of CRFS. The information and statements provided in this document are for informational purposes only and are subject to change without notice.

bsi. ISO 9001:2015 Quality Management
UK Certificate number: FS576625