

# THORONDIR

## SOFTWARE FOR REAL –TIME RADAR CLASSIFICATION IN ESM SYSTEMS



THORONDIR  
intelligent  
identification  
software

### Overview

THORONDIR is artificial intelligence software for radar identification in ESM and RWR systems.

It uses an “Open Systems Architecture” approach based on the use of industry standards such as TCP/IP to interface with the rest of an Electronic Warfare suite.

It is derived from software that is used in the Royal Navy’s front-line ESM systems but is also applicable to airborne RWR systems.



Figure 1 - THORONDIR is derived from software used in Royal Navy ESM

### Application

THORONDIR is targeted as a replacement for conventional identification software in ESM and RWR systems for a range of platforms from patrol craft to aircraft carriers and from attack helicopters to fast jets.

### Operation

THORONDIR matches deinterleaved and characterised intercepts from a radar ESM receiver against a database of radar emitter parameters.

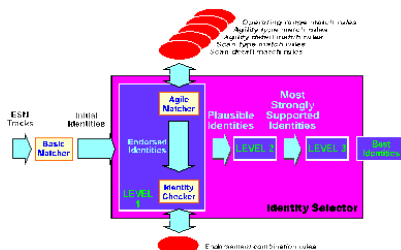


Figure 2 - THORONDIR represents ESM knowledge in the form of rules

THORONDIR reports radar identifications in real-time – usually matching a unique identity for each intercept.

THORONDIR uses knowledge about radar characteristics and ESM failure modes encoded as ‘rules’ in a flexible knowledge base.

### Features

COTS standalone software that can be embedded in an ESM or RWR system.

Industry leading identification accuracy with very low ambiguity.

Fast, real-time identification.

Can model the latest, complex, modern radar emitters.

Can be run on a standard PC platform or be integrated into an embedded system on standard processor cards.

Designed for ease of integration.

Supports separate, extendable library of radar signatures.



Figure 3 – THORONDIR is suitable for airborne defensive aids systems

# THORONDIR

## SOFTWARE FOR REAL-TIME RADAR CLASSIFICATION IN ESM SYSTEMS



### Performance

Greater than 75% correct and unambiguous identification with less than 6% incorrect identification in scenarios with high parameter ambiguity.

Average identification rate of greater than 10 intercepts/sec for a single instance of THORONDIR on an Intel i3 2.4 GHz with 5000 mode mission library.

Maximum latency for individual intercept identification is 3 seconds whilst maintaining average identification rate with 5000 mode mission library.

### Package

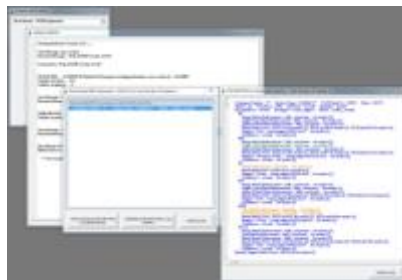
Versions currently available for Windows and Linux on a range of processor platforms.

Provided with comprehensive documentation of the API and library format.

Can be provided with a commercial radar emitter library although performance is not guaranteed with this library.

Comprehensive integration support can be provided.

Offline performance analysis software is available to support the building of emitter libraries.



**Figure 4 - PalTester performance analysis software aids library building for THORONDIR**

### Upgrades

THORONDIR is constantly evolving in response to customer requirements and licencing can include a maintenance package that provides regular upgrades.

ESROE is currently developing a 'generic' identification capability that can indicate the function performed by an intercepted radar without requiring a library to be loaded.

### ESROE LIMITED

ESROE LIMITED is a UK-based, Electronic Warfare company specialising in Electronic Surveillance software and solutions. ESROE's origins are in the Defence Science and Technology Laboratory (Dstl), where the software was originally created.

ESROE's software products have been created to protect and defend naval, airborne and land based systems, vehicles and formations against radar and radio threats. ESROE continues to develop state of the art software to meet ever changing requirements.

For more information please contact Jon Roe on +44 1329 237285, [jon@esroe.com](mailto:jon@esroe.com)

Copyright © 2015 ESROE LIMITED, First Floor Offices, 6a High Street, Fareham, PO16 7AN, UK

The information contained herein is subject to change without notice. ESROE shall not be liable for technical or editorial errors or omissions contained herein. THORONDIR is the registered trademark of Dstl, licenced to ESROE LIMITED. All other marks are the property of their respective owners.

Photos Copyright © 2010 Jonathan Roe.