Raymarine Network Radar Interfacing and Applications

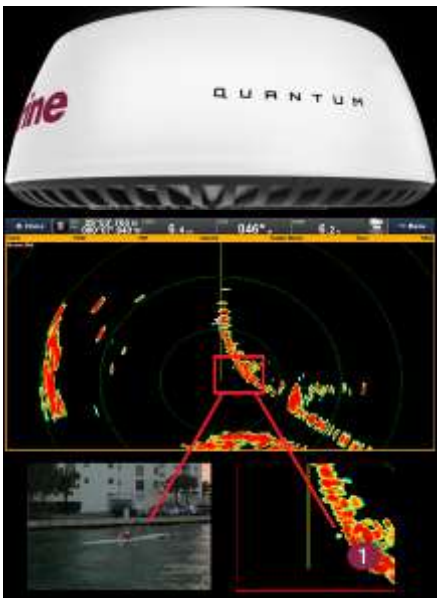
Summary

Cambridge Pixel supports interfacing to Raymarine radars using a network interface. This is supported from V1.82 onwards of SPx Server and enables receipt of radar video from Raymarine Quantum/Quantum 2, Cyclone and future network-capable radars.

SPx Server can receive the Raymarine network video and extract tracks which can then be delivered in standard ASTERIX format to a fusion or display application.

Introduction

Raymarine's Quantum and Quantum 2 radars are 54cm dome pulse-compression solid-state radars, while the Cyclone and Cyclone Pro are open-array. The radars provide high quality radar video for maritime applications. The Quantum 2 and Cyclone support Doppler processing. The radars have a single Ethernet connection for control and data, using a proprietary network protocol for communications with a host computer.



Raymarine Network Interface

Raymarine network radars use a DHCP-allocated IP address, normally in the range 10.x.x.x. This implies that the host computer running SPx Server or the user's SPx-based application should have its network interface configured so that its address is on a 10.x subnet, typically with a subnet mask of 255.224.0.0. If this requirement is incompatible with other networking requirements for the computer, a second network interface to support connection solely to the Raymarine radar may be necessary. For some radar types, the host computer also needs to provide a simple DHCP server to support allocation of an IP address to the radar. One possible option is TFTP32 (http://tftpd32.jounin.net/), which is free to use and easily configurable.

To receive radar video from a networked Raymarine radar, a USB security dongle is required from Raymarine (part number "A80631", description "Radar USB Encryption Dongle") in addition to the normal SPx Server licence.

SPx Server Support for Raymarine

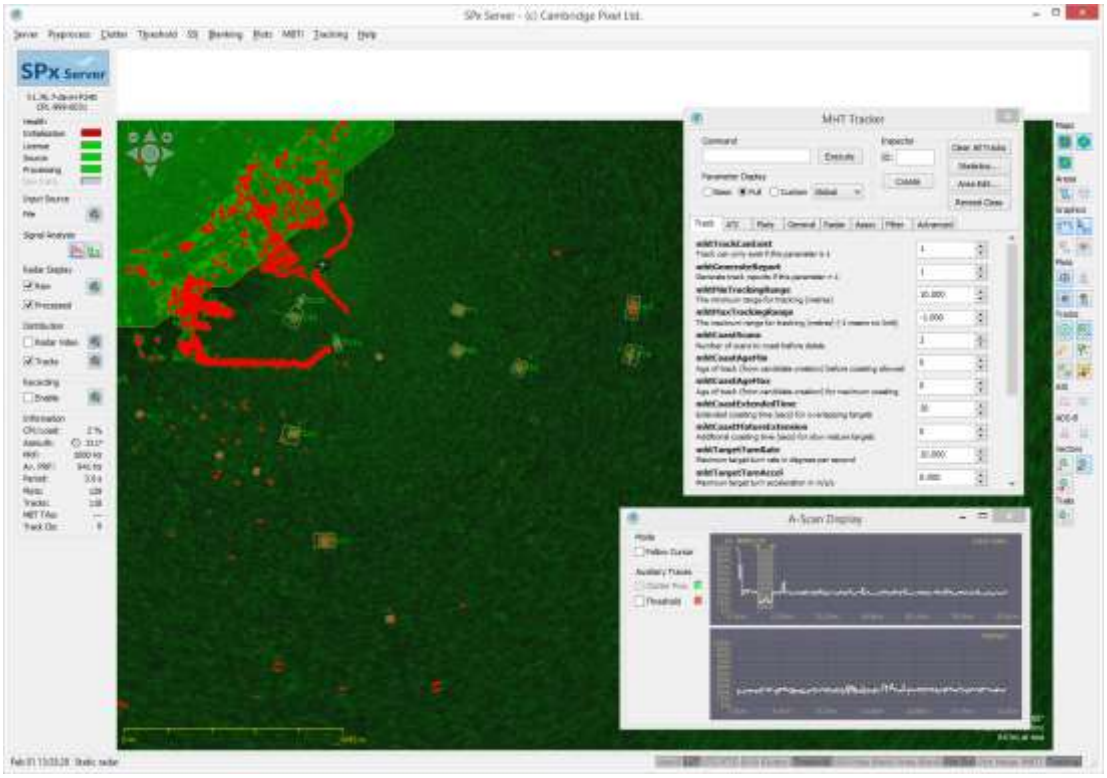
SPx Server supports control of Raymarine radars and receipt of radar video for onward distribution (for example in ASTERIX CAT-240 format) or target tracking. This allows, for example, a USV or coastal surveillance programme to use a Raymarine radar as one of its primary sensors using an application such as RadarWatch described below.

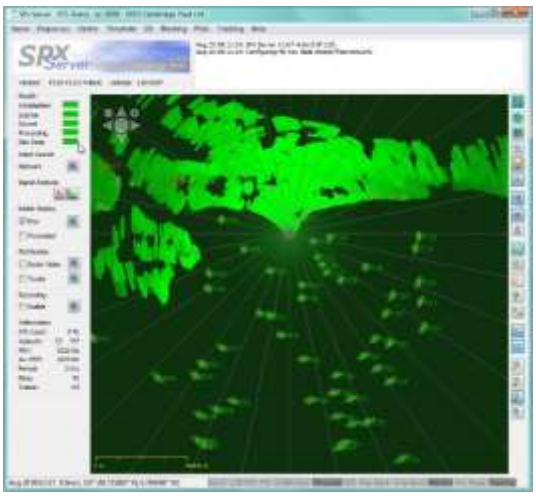
Network to ASTERIX CAT-240 Conversion

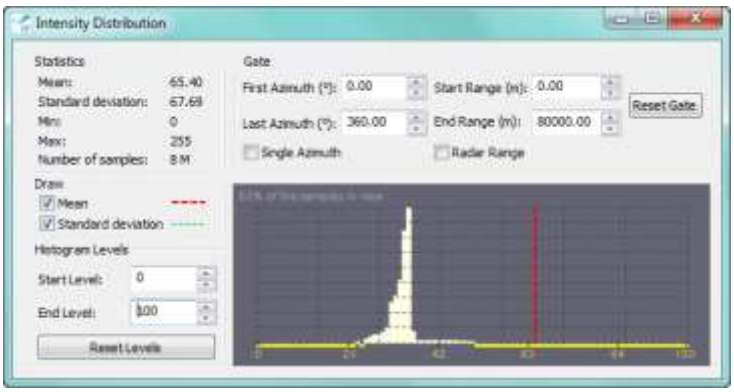
SPx Server may be configured to receive radar video from the Raymarine radar and then redistribute the video in standard ASTERIX CAT-240 format. The network parameters for the ASTERIX distribution are fully configurable, allowing the server to distribute the radar video as unicast or multicast messages.

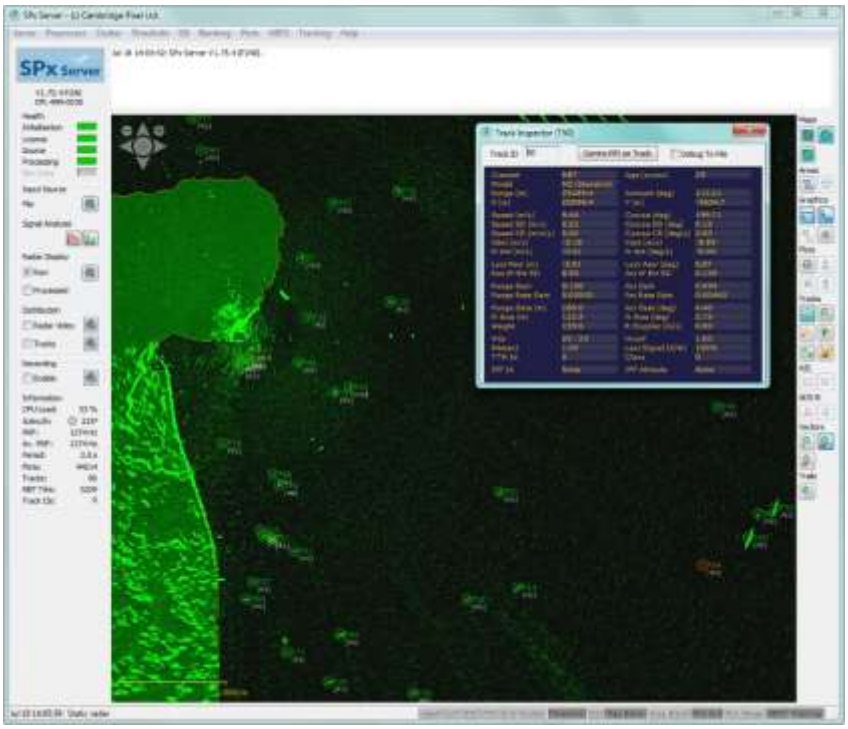
Target Tracking

The normal capabilities of SPx Server are available for processing, plot extraction and target tracking of video from the Raymarine radar. This permits tracks to be automatically extracted from the radar video and subsequently tracked. The tracking process is highly configurable to support a wide range of operational requirements from small target tracking through to large ships and aircraft. A multi-hypothesis tracking engine is used, with the addition of multiple models to permit the same radar input to be analysed for different types of targets with different parameter sets. The tracker can be used from simple ARPA requirements with manual or automatic track initiation, through to the tracking of fast, agile targets.









More information about SPx Server is available on Cambridge Pixel's web site at:

https://www.cambridgepixel.com/products/tracking-fusion-distribution/spx-tracking-server/

Record and Replay

SPx Server may be used to record and replay Raymarine radar video.

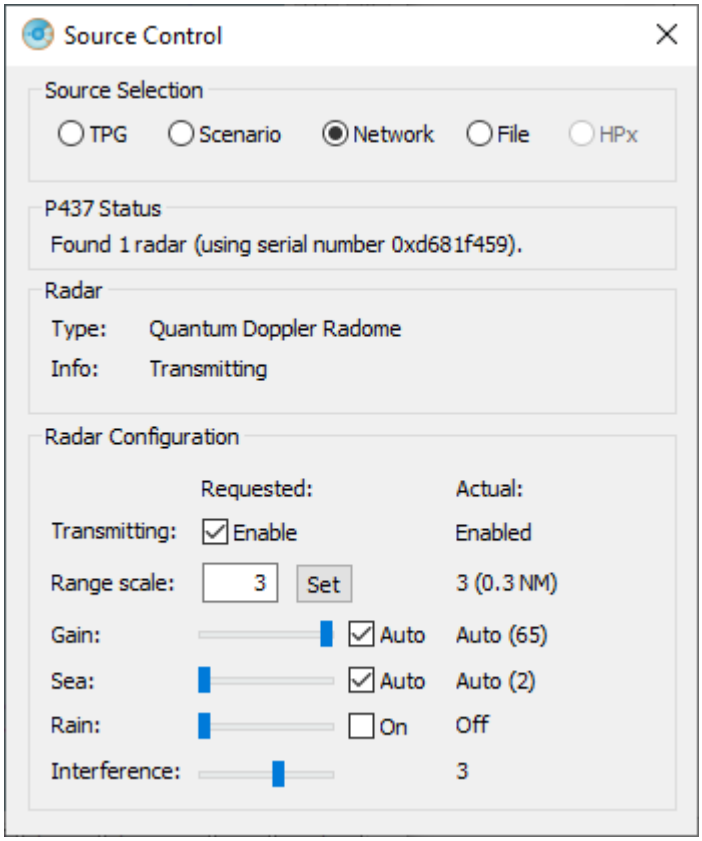
(For specialised record and replay requirements, RDR is the preferred product.)

Fusion

Optionally, the output of SPx Server may be input to SPx Fusion Server, which combines the track reports with a second source of tracks (overlapping radars) and/or with AIS data.

Radar Control

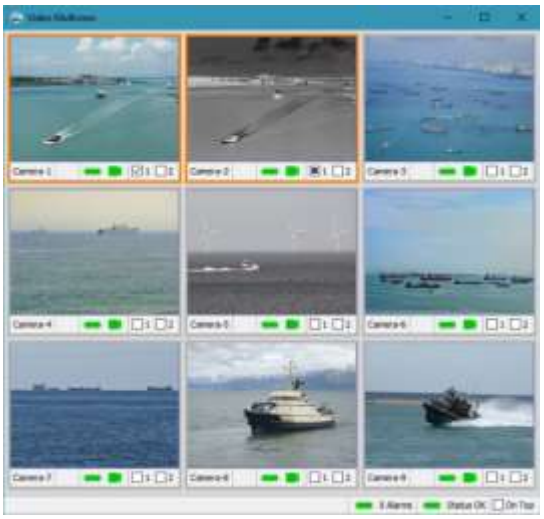
SPx Server exposes a number of radar control parameters for basic configuration of the Raymarine radar. This includes range scale, gain control, sea/rain clutter filtering, interference rejection and transmit enable. Other control features provided by the radar may be exposed in due course. For specific needs, consult Cambridge Pixel.



RadarWatch

RadarWatch is Cambridge Pixel's integrated maritime security application providing a display of radar video, tracks, AIS, charts, camera video, alarms and related data.





Key features of RadarWatch include:

- Display of primary radar video
- Display of radar tracks and AIS
- Display of tiled and ENC charts
- Camera video display and camera control (manual, slew-to-cue)
- Comprehensive alarm facility for events of interest
- Multi-window, multi-screen display
- Augmented vision (tracks overlaid on camera video)

RadarWatch supports the interfacing and display of multiple radar feeds (from Raymarine or other radars) to create a composite picture. Tracks are generated by SPx Server and may be fused with AIS reports prior to input to RadarWatch for display as an overlay to ENCs of other mapping sources. Complex alarm rules may be specified to identify behaviours of interest, for example with targets in specified locations, moving in a specific way or otherwise behaving in an unexpected manner. Alarm outputs may be reported to a user, delivered to an external sub-system, used to control a camera, or used to initiate recording. RadarWatch may be configured with a user-interface with multi-window, multi-screen support, or it may be used as a server application generating alarms when specified events are identified.

More information on RadarWatch may be found on Cambridge Pixel's web site at:

https://www.cambridgepixel.com/products/display-applications/radarwatch/

Support for Raymarine Radars in other Cambridge Pixel Applications

Consult Cambridge Pixel to discuss the options for interfacing Raymarine radars to other Cambridge Pixel software applications. In many cases, using SPx Server as the bridge allows any existing Cambridge Pixel product that accepts radar video to be used with a Raymarine network radar.

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