



## C-Scope Supertracker

**The C-Scope Supertracker is Kongsberg Norcontrol IT's new generation Target Tracker. It is a paradigm shift in tracking, with multiple trackers at remote radar sites replaced by a single Supertracker at a central location. Instead of multiple trackers at the remote locations tracking the same targets separately, the original sensor data is fused by the Supertracker in a process integral with tracking and which results in a single track list being generated.**

**Having all the information from all the sensors available centrally allows the Supertracker to make the best decision on which sets of signals correspond to targets, which improves detection of weaker targets and at farther ranges wherever there is radar coverage overlap. Equally important is the fact that tracking performance becomes more robust, manoeuvres can be detected earlier and track noise is reduced. Sensor fusion is also not limited to radar echoes, but includes AIS feeds and target tracks from sensors that do not provide digital video. Supertrackers can be arranged hierarchically when there are many sensors, or when redundancy is required for resilience against network failures.**

### Features

The main features of the C-Scope Supertracker can be summarised as follows:

- ✦ Multiple trackers located at remote sites are replaced by a single Supertracker at a central location.
- ✦ Tracking is performed by a single Supertracker and results in a single track list, instead of being done by the trackers at all the remote sites and whose individual track lists must later be reconciled and integrated.
- ✦ Data from all the sensors is fused by the tracking engine inside the Supertracker in a manner that is integral to the tracking algorithms.
- ✦ Sensor data can consist of radar digital video, AIS information and also radar tracks. As a result Supertrackers can be arranged in a hierarchical configuration in large sensor networks.
- ✦ In areas of sensor coverage overlap it is possible to detect weaker targets and to farther ranges. Tracking becomes more robust against radar shadowing, manoeuvres can be detected earlier and track noise is reduced. Close targets can be discriminated more easily.

#### ➤ Supertracking Concept

The fundamental concept behind Supertracking is that tracks are computed at a central location where all the sensor data is available. In this manner the Supertracker is able to improve track association and tracking performance, when compared to what can be achieved at the individual sensor sites. Possible sources of input data into the Supertracker are:

- ✦ Radar digital video: echoes, fragments or polygons depending on the individual sensors and setup.
- ✦ Radar tracks: for radar sensors that do not provide video, or from other trackers or Supertrackers.
- ✦ AIS: provides positional and dynamical information in addition to helping toward target classification.

#### ➤ Architecture

When some of the sensors present overlap in coverage it is advantageous to compute tracks at a central location. Nevertheless single-sensor trackers are not eliminated from the individual radar sites for serviceability and independence, although their output track lists are not propagated unless a reduction in

network capabilities requires that tracks be sent instead of video.

Supertrackers can be installed as a hierarchy in complex networks with many sensors. This hierarchical architecture is flexible in terms of configuration and can be made resilient against network failures.

#### ➤ Improvements in Detection and Tracking

Tracks computed of the same target using different sensor data are not identical and can be hard to reconcile and integrate without error. When tracks are computed centrally from all the sensor data all the covariance information is available, which reduces the error in track association and track computation. Furthermore, detection of weak targets and track generation are both improved because the tracker fuses sensor data in a manner equivalent to sensor correlation.

The fusion of dissimilar data such as radar video and AIS is also synergetic towards tracking performance because the better qualities of each channel are propagated.

In areas of sensor coverage overlap the tracker receives new data for each target more often, and is thus able to perform more frequent updates which result in earlier detection of manoeuvres and in reduced track noise.

Shadowing and reflections are frequent challenges to track maintenance. Having independent sensor data feeds for the same target minimizes the effects of these problems, which makes tracking more robust and seamless.

#### ➤ Classification

The Supertracker takes advantage of the multiplicity of data sources to classify targets. On the one hand, the fused radar video is used to estimate target size and shape, which in itself is useful and can be compared against AIS data if available.

On the more advanced front, the detailed amplitude profile of the radar video is used against a database to identify classes of matching targets and eliminate some identifications.

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