Inside every BlueTraker VMS terminal there is feature that we call 'Hardware Embedded Geozones'. Hardware Embedded Geozones offer a big advantage over Software Geozones that 'live' in the computers of the FMC. But what are Geozones and why should FMC use them? Why should they care about the difference between Hardware Embedded Geozones or Software Geozones?

Firstly let's establish what exactly a geozone is.

In the context of fisheries, a Geozone is a geographical area on the sea that has been established for the purposes of vessel activity monitoring. Fisheries Monitoring Centres (FMCs) will often want to keep a careful watch on particular sea areas: for example those that are recognized as fish spawning grounds or fragile marine areas that are particularly sensitive to disruption. Geozones are often set-up to have different time reporting intervals applied to them, so that FMCs can more closely regulate the activity that occurs within the Geozone by seeing which of the vessels in their fleet are passing through.

There are 2 features of Geozones that enable FMCs to understand potential vessel activity.

An entry message of when a vessel traverses a Geofence entering a Geozone and an exit message when a vessel traverses the Geofence exiting the Geozone. This permits the FMC to understand the cumulative number of vessels travelling through the Geozone over a given period and can also provide the number of vessels in the Geozone at any particular time. Geozones can have attributes assigned to them so that a vessel's reporting frequency increases (i.e. More positional reports are sent), this allows the FMC to view with a greater level of accuracy what a

vessel is doing within a Geozone. If we look at the difference between Figure 1, vessel A is reporting on a 15 minute interval and we can quickly see from the tell-tale zigzag pattern that the vessel is likely fishing. With vessel B they are also in the same prohibited Geozone yet because they are reporting on a 1 hour reporting interval we don't see the same zigzag pattern as there is not the same number of position reporting.
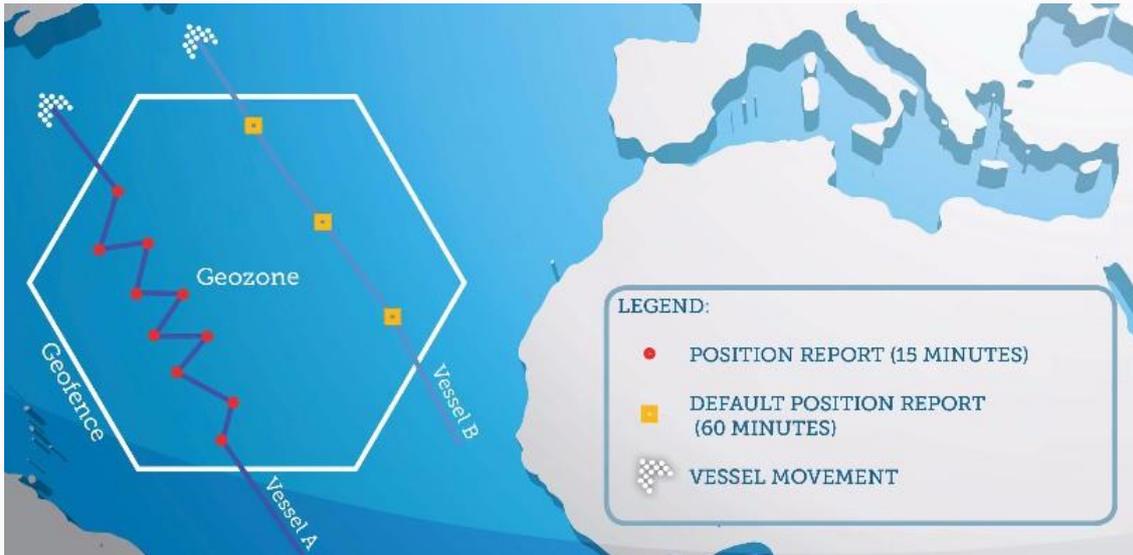

Figure 1: The importance of choosing the correct reporting interval (five minute vs fifteen minute reporting).

What is the difference between Hardware Embedded and Software Geozones?

The key difference is linked to where the geozones reside, hardware embedded geozones are 'physically' on the VMS device (embedded within the firmware of the device) whereas software geozones reside on the software at the FMC.

How do Hardware embedded and Software Geozones affect reporting behaviour of a VMS device?

Hardware Embedded Geozones

The BlueTraker terminal will automatically monitor and log its GPS location every few seconds. The key advantage of having the Geozones embedded is that device continually monitors the GPS coordinates of the vessel in comparison to the GPS coordinates of the Geozones within the device.

As soon as the vessel traverses a Geofence (Figure 2) and enters a Geozone, the device will submit an entry message within a few seconds of the event occurring. When the device exits a Geozone (traversing a Geofence) it will also send an exit message. In fact, as the device monitors the speed of the vessel, it is able to calculate retrospectively the precise time the vessel crosses the Geofence to within a few meters. The device then updates the preset reporting interval according to the Geozones attributes.
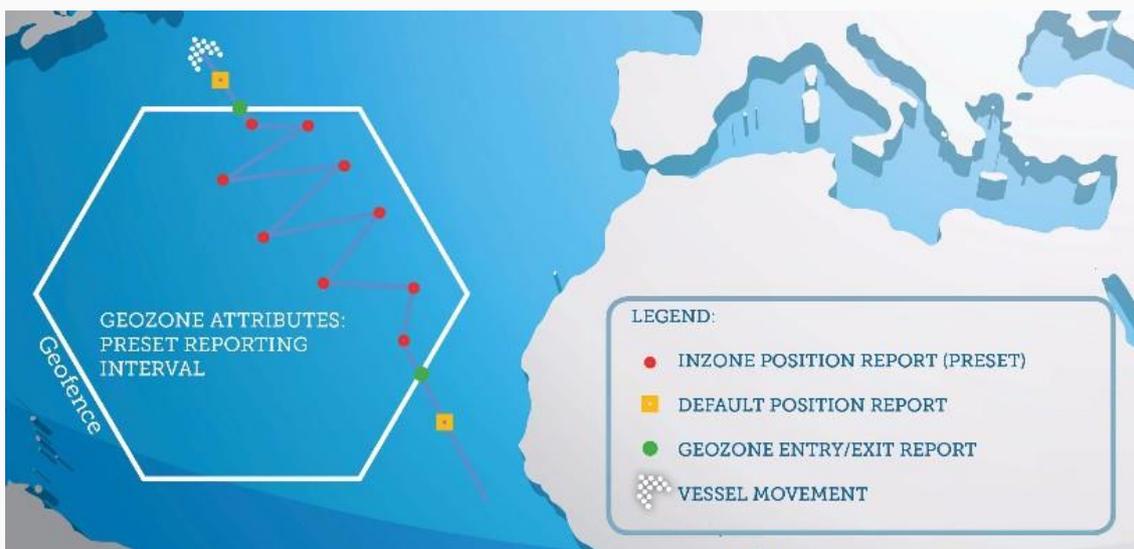

Figure 2: Vessel shows suspicious pattern within a Hardware Embedded Geozone.

Software geozones

The VMS terminal monitors the GPS coordinates of a vessel and transmits the data at the default reporting interval. A vessel may cross the Geofence of a Geozone but the first time an FMC or other monitoring body will know about this breach is if the default reporting schedule happens to coincide with the vessel being inside the Geozone (Figure 3). A message will then appear upon the screen of the FMC to

alert them to the presence of a vessel being within a Geozone.

Figure 3: Only a single position report while inside the Software Geozone.

If we compare Figures 2 & 3 the difference between the quantity and the preciseness of the position reports transmitted back to the Fisheries Monitoring Centre becomes apparent.

For the Hardware Embedded Geozones (Fig 2.) as soon as the vessel traverses a Geofence and enters into a Geozone, an entry message is sent and the VMS device changes the reporting interval from 60 minutes to 15 minutes reporting. As the vessel exits the Hardware Embedded Geozone, the device changes back to the default reporting interval. For Software Geozones (Fig 3) only a single report within the Geozone is transmitted so we can see no evidence of vessel activity.

As seen in Figure 4, we can see that a vessel could have potentially travelled through the Geozone but as the default report interval did not coincide with the vessel being in the Geozone, no alert message was transmitted. This means there is no evidence of the vessel being in the Geozone and the FMC could not take any action.

Figure 4: Default position reports occur outside the Software Geozone, so any Geozone activity goes undetected.

Conclusion

Hardware Embedded Geozones enable FMCs to more accurately and precisely monitor vessel activity within geozones. They are superior to software Geozones as they autonomously update the reporting interval and can report a vessel's entry/exit of a geozone to within a few metres of a vessel traversing a Geofence. All this additional information permits an FMC to more quickly identify what a vessel is doing within a Geozone and so act accordingly.

If you are interested in Hardware Embedded Geozones and want to find out more, then contact: sales@bluetraker.com.