

## Quay Crane Anti-Collision with Navtech N100-AC Radar



### Designed for the exacting demands of Crane obstacle detection systems

The Navtech crane anti-collision system uses high-resolution radar to identify hazardous obstructions in the path of the moving crane boom. Should the crane approach the ship too closely or the ship drifts towards the crane the system will generate alarms to the control systems. Unaffected by heavy rain, fog or dust, it operates effectively in all weather conditions, twenty-four hours a day.

Costly antenna stacks are the first ship items to be found in the path of the approaching crane boom. The N100-AC will eliminate costly insurance claims from crane and ship collision. The system ensures safe operation of the crane during loading/unloading or working of the back-reach without affecting the operational efficiency. The radar provides complete coverage over 360 degrees, these are no missed segments between measurements as with competing sensors. Specifically designed for industrial applications Navtech radar systems are field proven and are operational in Ports, Airports and Mines.

The Navtech N100-AC is designed to measure, with high sensitivity, the range and bearing of objects in its line of sight. The radar is mounted on the underside of the crane boom to detect approaching obstructions. With a powerful ability to discriminate, the system can detect objects from the smallest whip antenna to a part of the vessels superstructure.

### The Navtech crane anti collision systems has the following features:

- The system has a high probability of detection.
- Detection zones are configurable on both sides of the boom.
- The system tracks the movement of the crane trolley through the detection zones to avoid generating false alarms.
- The system measures the speed of the crane during long travel and automatically measures the time to impact in both directions of travel. Time to impact and distance are used to generate warning and stop signals.
- The system measures the range to the obstacle and the closing speed.
- Separate alarms are generated in both directions for slow down and stop of the crane.
- Field proven, Installed and operational.
- Simple dry contact relay interface.

## Technical Description

The radar sensor acquires measurements through a 360-degree arc from 2m to 100m. Multiple measurements are taken within the radar beamwidth, There are no missed segments as with competing sensor technologies where thin whip antenna could go undetected. Several radar measurements are compared to reduce nuisance alarms and improve detection probability, this gives a probability of detection for a whip antenna at 50m 0.9995 with higher detection probabilities for larger objects. As the crane approaches an obstruction, ranging from a small whip antenna to a part of the ship structure, a relay contact is thrown to alert the crane control system to slow down at a pre-determined time to collision. If the crane continues towards the obstacle the crane is alerted to stop, short of the obstructing structure. The radar cancels the stop alarm when it detects that the crane long travels in the reverse direction.

Because of the high range resolution of the N100-AC the crane is able to approach closely to parts of the ship superstructure without triggering the stop alarm and so operational efficiency is not effected. The system also tracks the trolley position as it moves through the detection zones to avoid generating any false alarm signals

All Navtech radar sensors have been rigorously environmentally tested, they are designed for industrial operation and include in-system error checking and diagnostics. A radar healthy signal is generated and feeds directly into the crane control system, should a sensor error be generated.

## Specification

Scanner Speed	3 rps
Maximum Range	100m
Range Resolution	0.25m
Coverage	360 degrees, detection zones either side of the boom are setup in software.
Beamwidth	1.8 degrees
<b>Outputs:</b> Dry Relay Contact	Alarm Status: Slow down / Stop on either side. System health.
RS232 (for data logging)	Distance to an obstruction and distance from boom to obstruction. Closing speed on the obstruction.
<b>Inputs:</b> Detection Zones	Changes to default protected zone positions if required. The system is supplied with default settings.
<b>System:</b> Environmental	IP66
Operating Temperature	-20 to +70 degC
Vibration	6.8g to 200Hz
Power Supply	24Vdc