

# Aircraft Proximity Detection





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Ramp accidents cost the airline industry about \$5B per year. A significant portion of this is due to collisions between Ground Support Equipment (GSE) and aircraft. Many collisions can be avoided if GSE operators consistently follow the correct procedures. JBT AeroTech has developed a system that helps enforce correct operating procedures for its Commander loaders, which in turn reduces the risk of collisions. The system is based on proven industrial components and JBT's 50 years of experience as a leading manufacturer of GSE.

## Basic Aircraft Proximity Detection System

The heart of the system is a controller installed in the main electrical panel. This controller interprets input from sensors and alerts the operator through a warning light and buzzer on the control panel in the cab. Also on the cab control panel is a 5 cm (2.8 in) color LCD display, which provides the operator with information and instructions on the required operations. The display is rated for outdoor use in harsh environments and like the other components designed for use on mobile equipment.

The base system includes a forward looking radar sensor with a maximum range of 6.0 m (20 ft). The radar operates at 5.8 GHz and has been approved for use on airports. Also included in the standard package is a hand throttle lever for precise control of creep speed during the final approach to the aircraft.

The system comes programmed with a large number of selectable interlocks which are password protected and can be activated by authorized maintenance personnel to best align with the required operating procedures. Examples are:

- Enable radar with: propel forward, propel forward and bridge raised
- When radar detects obstacle at pre-set distance of 6.0/5.3/4.5/3.8/3.0 meters (20/17.5/15/12.5/10 ft) distance: full stop, switch to snail speed, switch to hand control creep speed
- Warning light/buzzer/drive interlock when obstacle in pre-set range of 6.0/5.3/4.5/3.8/3.0 meters (20/17.5/15/12.5/10 ft) and forward drive selected and: cab is not retracted, bridge is not lowered, wing down has not been actuated, chassis not lowered

## Pressure Sensitive Front Bumpers

Automatically stops forward drive motion when actuated. If the loader is in creep mode at the time of impact the stopping distance is short enough to greatly reduce damage to the aircraft. The bumper can be interlocked with the warning light, buzzer, and the higher speed propel modes to attract attention to collisions and ensure proper follow up of incidents.



## Wheel Position Sensor

Accidents don't only happen during approach to the aircraft, but also during backing away. For instance if the wheels are not centered, the loader will unexpectedly move sideways. JBT's wheel position sensor can be interlocked to provide a visual and audible warning if the wheels are not centered when selecting reverse drive, or reverse drive can be disabled completely if an aircraft is in short range of the radar and the wheels are not centered.

## Powered Left Handrail

The extend/retract function of this handrail is hydraulically powered. Interlocks can be set to disable drive until the rail is folded or retracted. After interfacing with the aircraft the handrail can be extended. An ultrasonic sensor will automatically adjust to keep the handrail 5 cm (2 in) away from the aircraft fuselage.

## Engine Cowling Sensors

When a loader is used on the front lower lobe or cargo door it can get close to the aircraft engine cowling, increasing the risk of a collision during approach or when backing away. JBT offers ultrasonic sensors on the side of the loader to warn when an object enters the relatively small zone at the side of the loader. The sensors can activate a visual/audible alarm, or be interlocked with the drive system. To prevent false alarms during normal maneuvering the sensors can be set up to only activate when the aircraft is in range of the radar or when the loader is in snail or creep mode.

## Wing and Fairing Sensors

When a loader is used on the rear lower lobe or cargo doors it can get close to the aircraft wing and especially the fairings that project below and to the rear. JBT offers additional sensors to protect the relatively large potential impact zone to the rear and right of the loader bridge. The sensor can be set up to activate when the aircraft is in range of the radar or when the loader is reversing and can activate a visual/audible alarm, or be interlocked with the drive system.



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