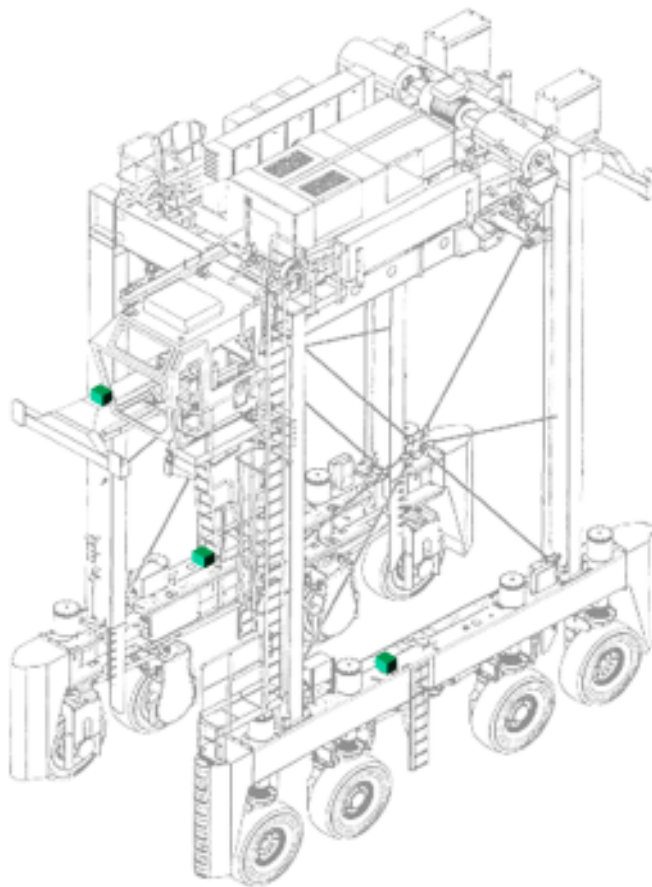




# EQUIPMENT SHOCK SENSING



## CONTAINER HANDLING EQUIPMENT SHOCK SENSING AND MONITORING SYSTEMS FOR CONTAINER PORT OPERATIONS





## Equipment shock sensing for container terminals

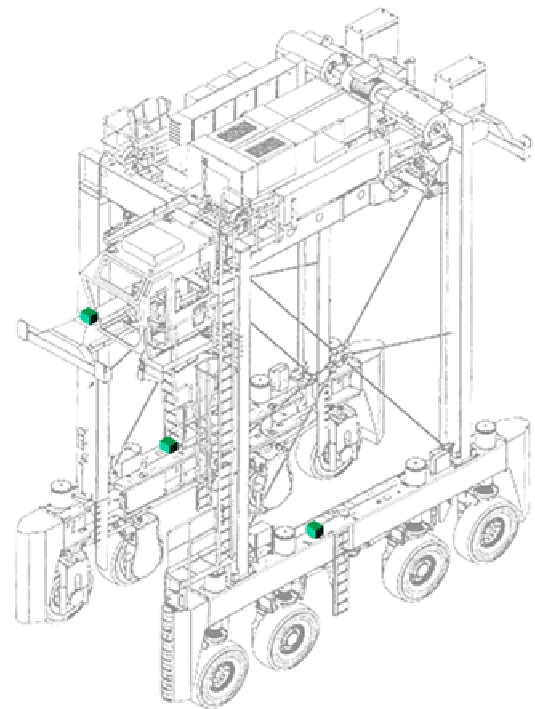
### Introduction

The ITS shock detection system is designed primarily as a safety system for installation on container handling equipment.

The system is designed to detect abnormal shocks to the container handling equipment to detect events such as collisions with other equipment, or collisions with static items such as structures or stacked containers.

The system can be provided with functions to shut down the equipment in the event of a heavy impact, a centralised information dashboard for various events, and data of circumstances prior to the event for investigation purposes.

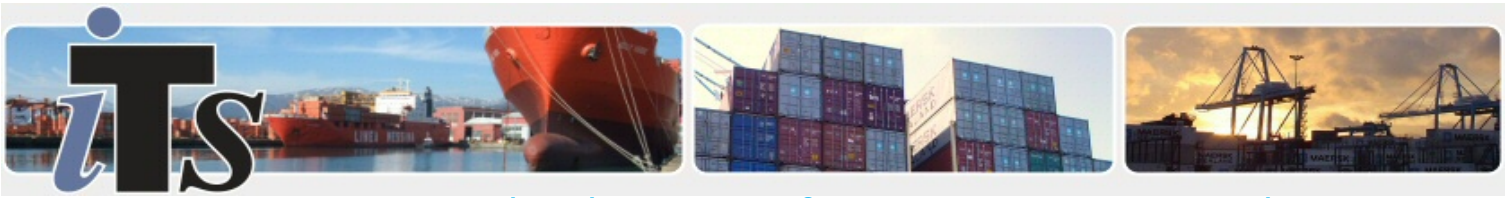
The system can be installed as a standalone system or as a module to the ITS G-POS position determination system.



### On the equipment

There are various system configurations dependent upon the type of container handling equipment used. For a typical Straddle Carrier three sensors are placed securely on the Straddle Carrier's structure, one on each sill beam and a third on the spreader or in the operator's cabin if preferred.





## Equipment shock sensing for container terminals

### The sensors

The sensors mounted on the Straddle Carrier each have an XYZ accelerometer installed inside and can be powered from either an internal battery or from an external power supply.

The sensors constantly monitor and record the acceleration placed on them in the form of positive and negative G force.

At a pre-determined level of G force beyond the normal operating criteria of the equipment the sensor takes the preceding events and sends this data to the receiver unit.



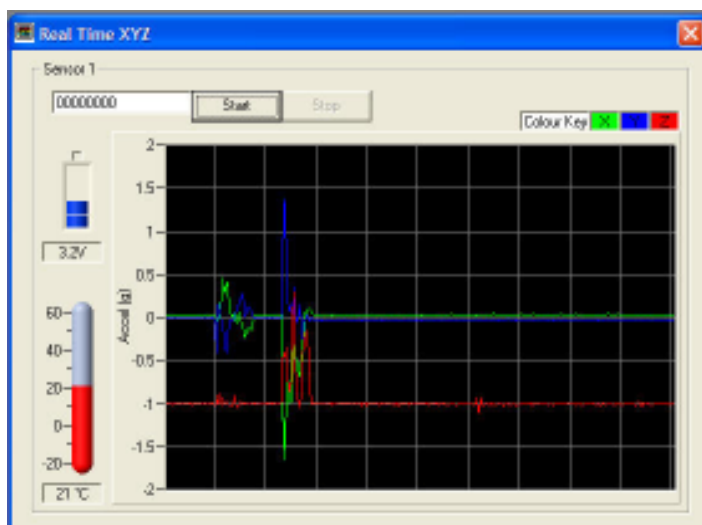
*Typical shock sensor*

### Sensor clusters

Sensors operate in a cluster, each cluster sends its data to the receiver unit assigned to that cluster. Each cluster can consist of a single sensor up to hundreds of sensors, with one cluster per item of container handling equipment.

The receiver receives the data from all the sensors in the cluster and passes this data to a processing unit. The processing unit can be the ITS G-POS system if additional functions are required on the equipment, or a dedicated processor.

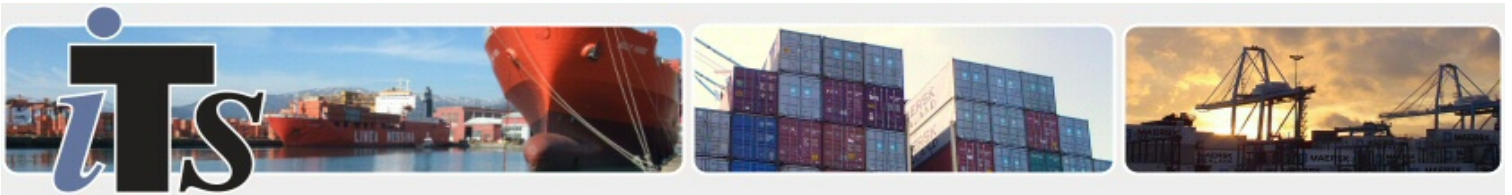
The processor can store or can send the data to a centralised dashboard for supervisory management notification and analysis. The processor can also take various other actions such as to shut down the equipment.



### Data Analysis

*The system can provide data of the events leading up to an incident for operational and safety investigations*

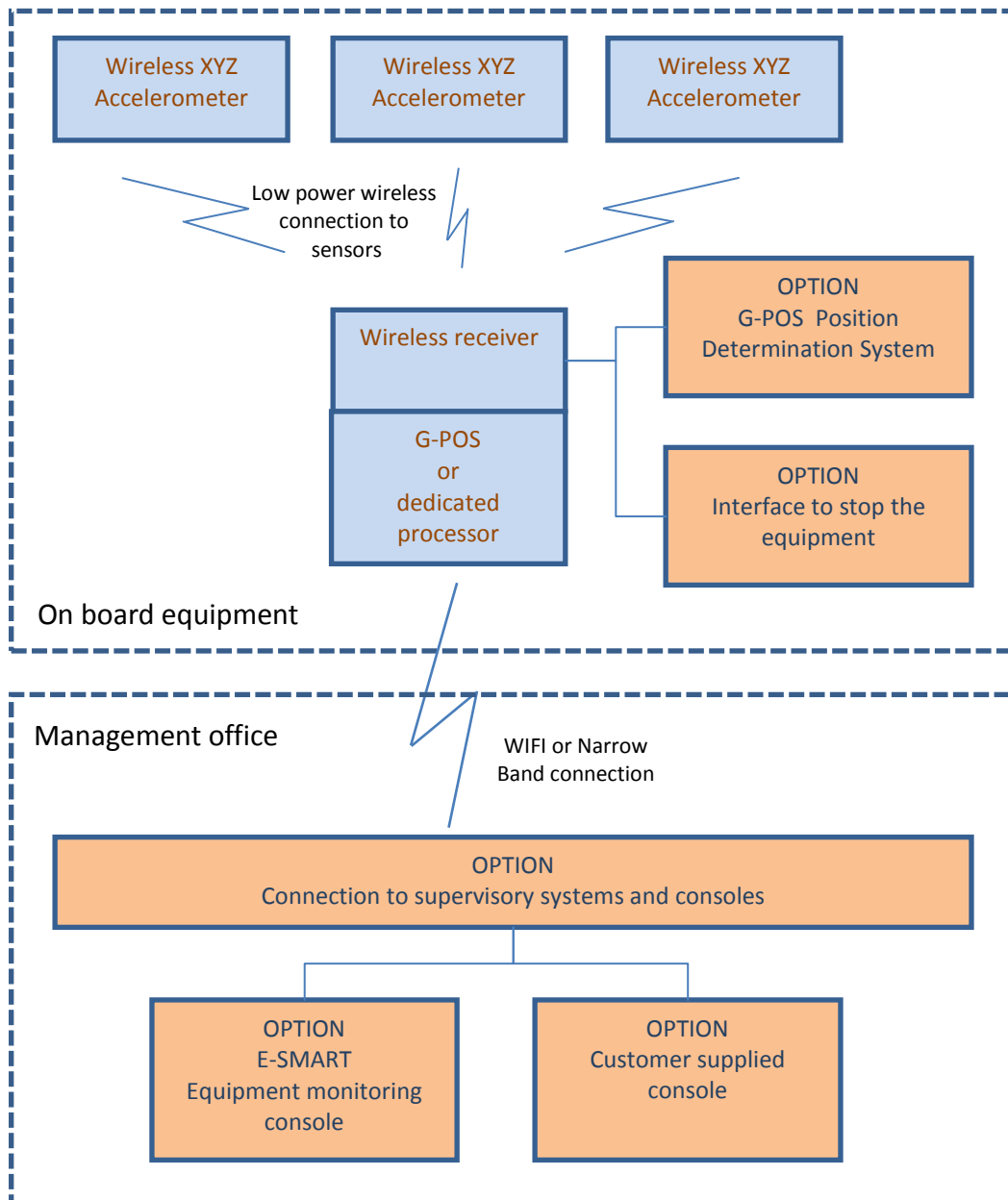


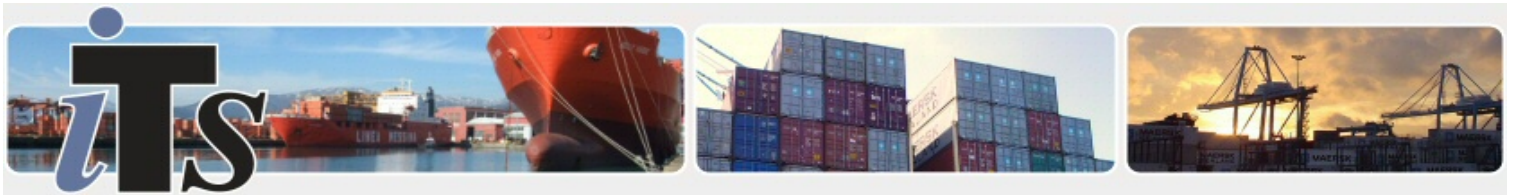


# Equipment shock sensing for container terminals

## System Integration

The system can be implemented in a number of ways from a fully integrated system with many other functions to a standalone system. The following are just a few of the options available.

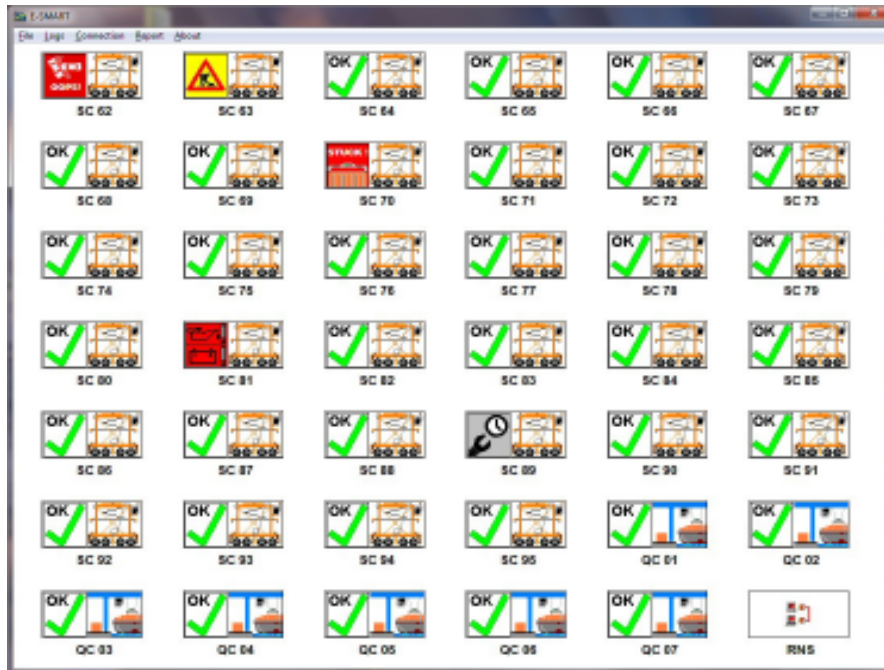




## Equipment shock sensing for container terminals

### E-SMART console option

The E-SMART console provides a rapid visualisation of the equipment status. In one glance the maintenance engineers and management can easily see the instant equipment requires attention, what the fault is and also the active status of any on-going work. The E-SMART system automatically displays when potential damage has been caused, providing an immediate alert for supervisors and management.



### Instant visualisation

*E-SMART provides a management console to immediately see the status of the equipment with large and clear icons.*



### About ITS

ITS have considerable experience in the field of RFID, GPS, automation and remote data systems for ports, terminals and logistics operations. With its headquarters in the prestigious Loughborough Technology Centre in the UK and access to the research and development facilities of Loughborough University, ITS offers a range of services – from consultancy and product development, through to system support and maintenance.

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