

Automated identification of containers and equipment

Automation in Port Operations - Antwerp 26 - 27 September 2005

Introduction

In an operation with 95% plus terminal throughput being transshipment it is critical to ensure that an optimum container storage and movement plan is maintained to minimise the amount of re-handle moves. Whilst in theory this can be achieved with the assistance of one of the modern synchronised yard and vessel planning systems, in practice other factors come in to play. One of the main difficulties of putting the theory into practice is the quality of reporting and the accuracy of movement of containers. Traditionally in many existing terminals the labour force are drawn from a pool of labour and paid predominantly on containers moved. This is normally a good incentive until you reach the situation where it is easier to move the container to the closest location not necessarily where the container was planned. These actions may result in a second container move being required.

In order to overcome the above problems the system functional requirements where to:

- ◆ Automatically identify the carrying equipment (prime mover).
- ◆ Automatically identify the Container move.
- ◆ Automatically display the exact move required to the operator.
- ◆ Automatically ensure the container is placed in the planned location.
- ◆ Allow system flexibility to allow for exceptions whilst maintaining move discipline.

Operational overview

The system facilitates the automatic identification of the external truckers and internal truck heads, containers carried, the positions the containers are on the chassis, and planned positions in the container yard.

The system is based on the ITS Infrared truck ID system to provide a seamless post gate automated data transfer and container movement confirmation system. The system is also provided with an optional twistlock interlock to stop yard movements being carried out incorrectly, and preventing containers including high security or suspect cargo being misidentified or placed in the wrong location.

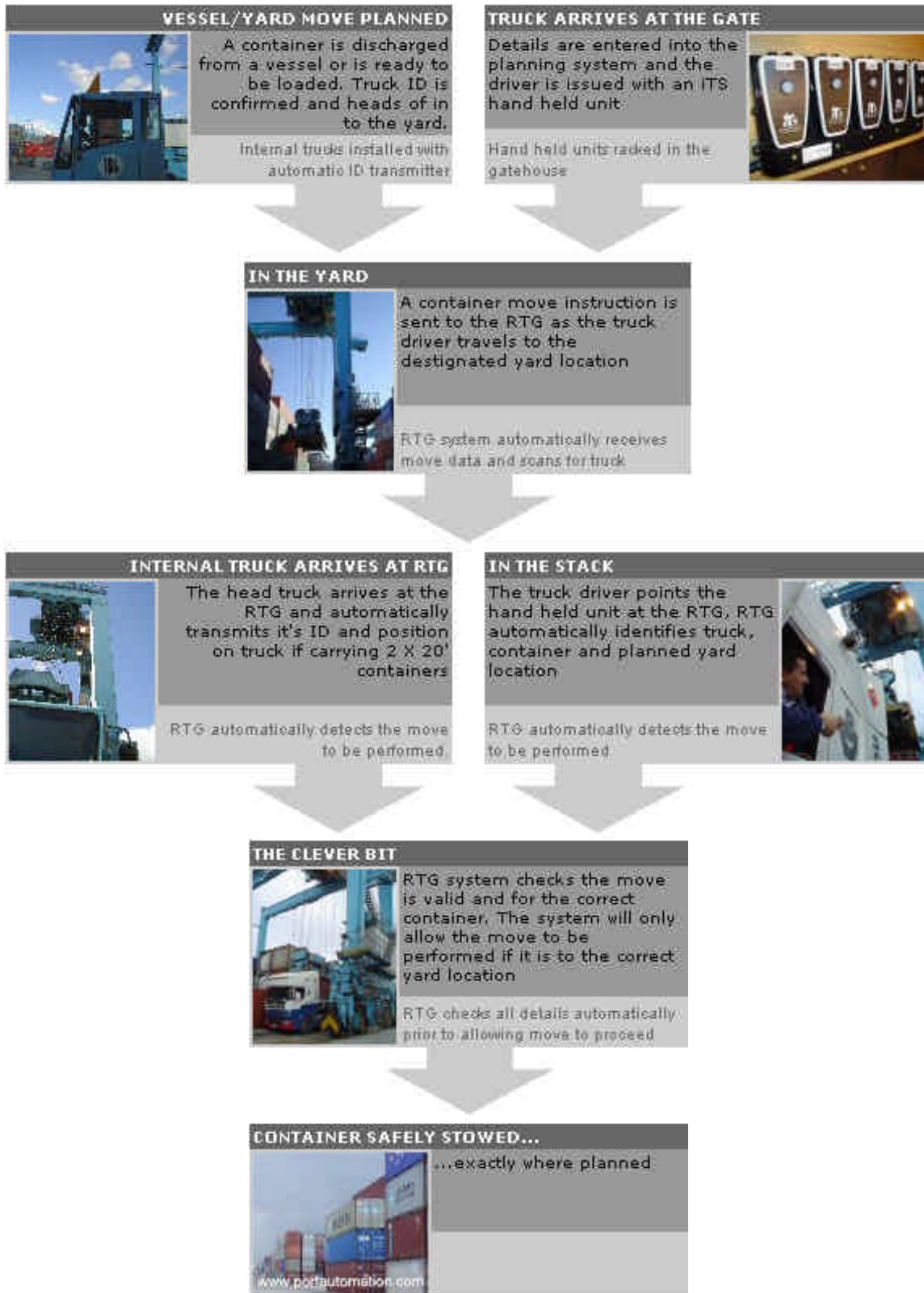
The paperless and keyboard free system leaves no scope for yard operatives to misidentify the containers or yard locations. This ensures full data integrity allowing the terminal to plan with confidence for the optimum stack locations, increased density and reduce the yard checking and number of re-handles.

Following is an operational flow diagram.

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Operational Flow



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Technical overview of the truck ID system

In order for a terminal to take advantage of the above system certain system modules must be present, these are.

A radio data system capable of receiving move information from the main planning system and reporting back for move confirmation and a method of displaying the move instruction to the driver of the handling equipment.

A Position Determination System (PDS – sometimes using GPS technology) capable of tracking the location of the handling equipment and reporting every twistlock and unlock position.

Whilst the above items are not new in concept, the further step ITS have taken on this system is to fully integrate these systems along with the recently developed Infrared truck ID system to provide a seamless working system. The result of this is that an onboard computer called an ACU (automation control unit). Can automatically determine the exact container being handled and move required. It can also determine if the move being undertaken is valid and if not the system can take the necessary warning actions, including to inhibit the twistlock action.

In order for the truck ID system to function each internal truck is fitted with an infrared transmitter set to transmit the unique identity of the truck.

For the external trucks that arrive at the terminal portable rechargeable handheld infrared transmitters have been developed.



TRUCK ID
TRANSMITTER

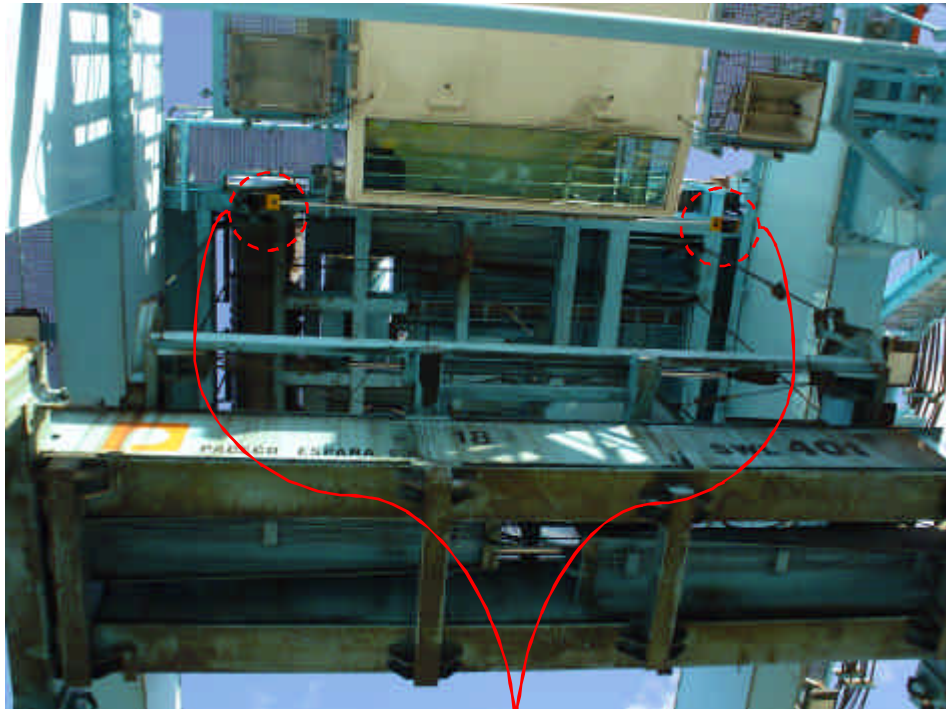


PORTABLE HAND HELD TRANSMITTERS
FOR OFF-SITE EQUIPMENT

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The infrared transmitters communicate with Infrared receivers mounted on the handling equipment (RTG cranes in the case shown). In most cases 2 receivers are mounted on the handling equipment (as is shown in the next picture) to allow the system to differentiate between 20 ' containers being carried on the same chassis.



TRUCK ID RECEIVERS

The basic technical specification for the IR equipment is as follows:

- ◆ Infra red transmission
- ◆ Safe (no license required)
- ◆ IP 65/66
- ◆ 255 or 4K+ discrete secure codes (ID's,)
- ◆ Configured by dip switches
- ◆ Range up to 40m
- ◆ Transmitter operational angle up to +/- 15 deg
- ◆ Receiver operational angle up to +/- 45 deg

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Overall results

The system has been phased in to the operation during 2005 and is now in full operational use reliably providing the following functions.

- ◆ Guarantee of good reliable data without operator input
- ◆ Automatically identifies the truck and therefore container
- ◆ Provides keyless operation into and out of the stack
- ◆ Provides driver warnings without manual move selection
- ◆ Prevents the wrong move being carried out

In May 2005 the system handled 274,000 TEU across the terminal.