

Ports automation: making order out of data chaos

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Marine and intermodal terminals around the world are seeking automated container handling solutions at an increased rate. There is no shortage of automated equipment solutions – from quayside gantry cranes to container yard rail-mounted gantry cranes, shuttle carriers, automated guided vehicles and more. The individual system solutions for terminal operations are embedded with complex logic ensuring optimization of equipment usage, yard space, vessel productivity, gate productivity and rail productivity all in the safest manner.

Many terminals are now in the process of introducing advanced and innovative technology to optimize their physical operations. Greenfield terminals especially are tendering this to reduce operational costs and provide an increased level of service to its customers. Typically, the focus is on proven technology for OCR, RFID, and positioning and introduction of touch screen-equipped pedestals at truck lanes. However, there is a big challenge for all IT departments: how to design a solid manageable solution, integrated with the Terminal Operating System (TOS).

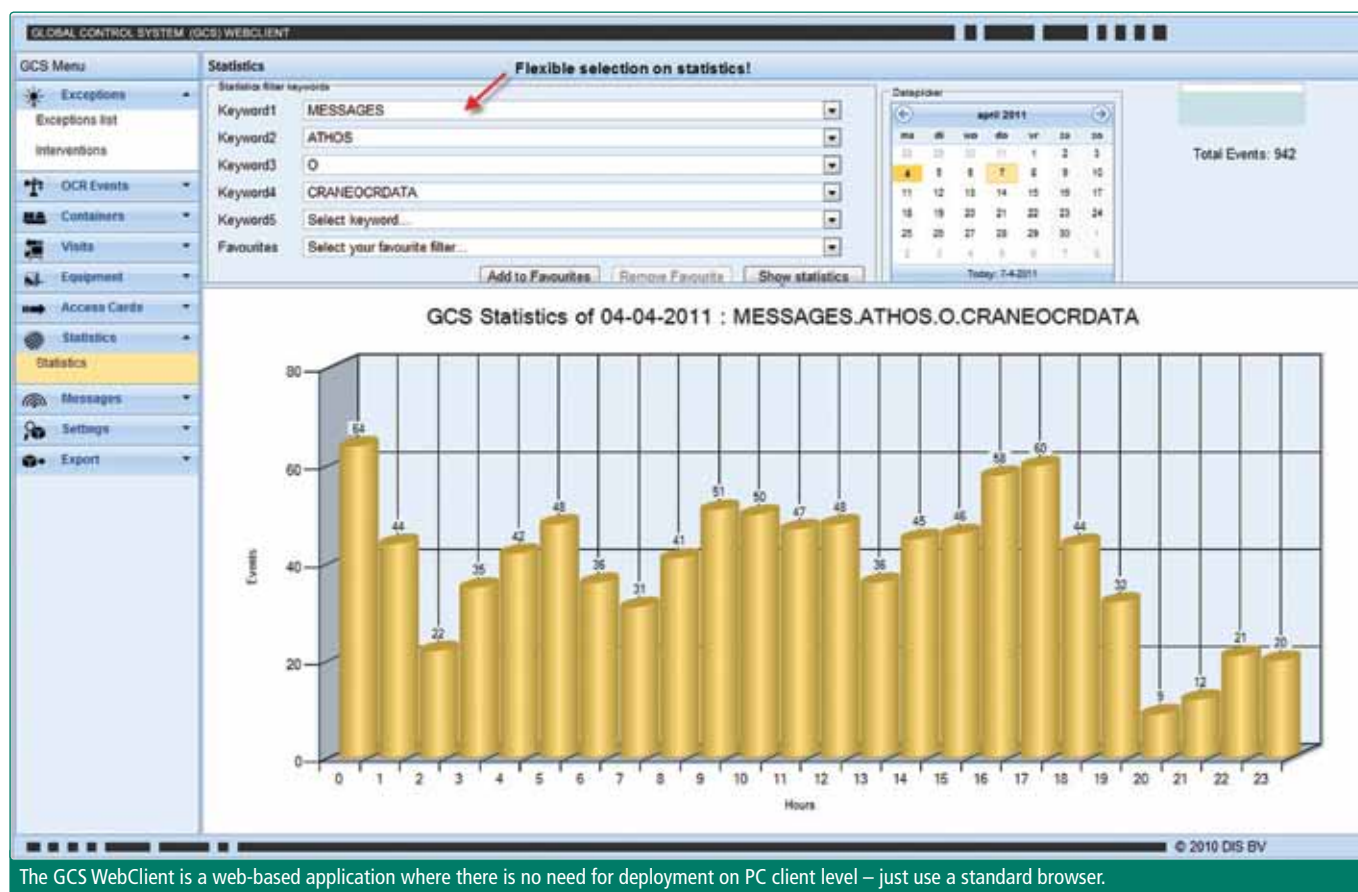
Rising to the challenge

HTS originally provided OCR systems for gate, rail and crane operations, including a standard interface for data and images. However, as terminals are not only integrating OCR (which can be linked to a TOS directly), HTS noticed the introduction of

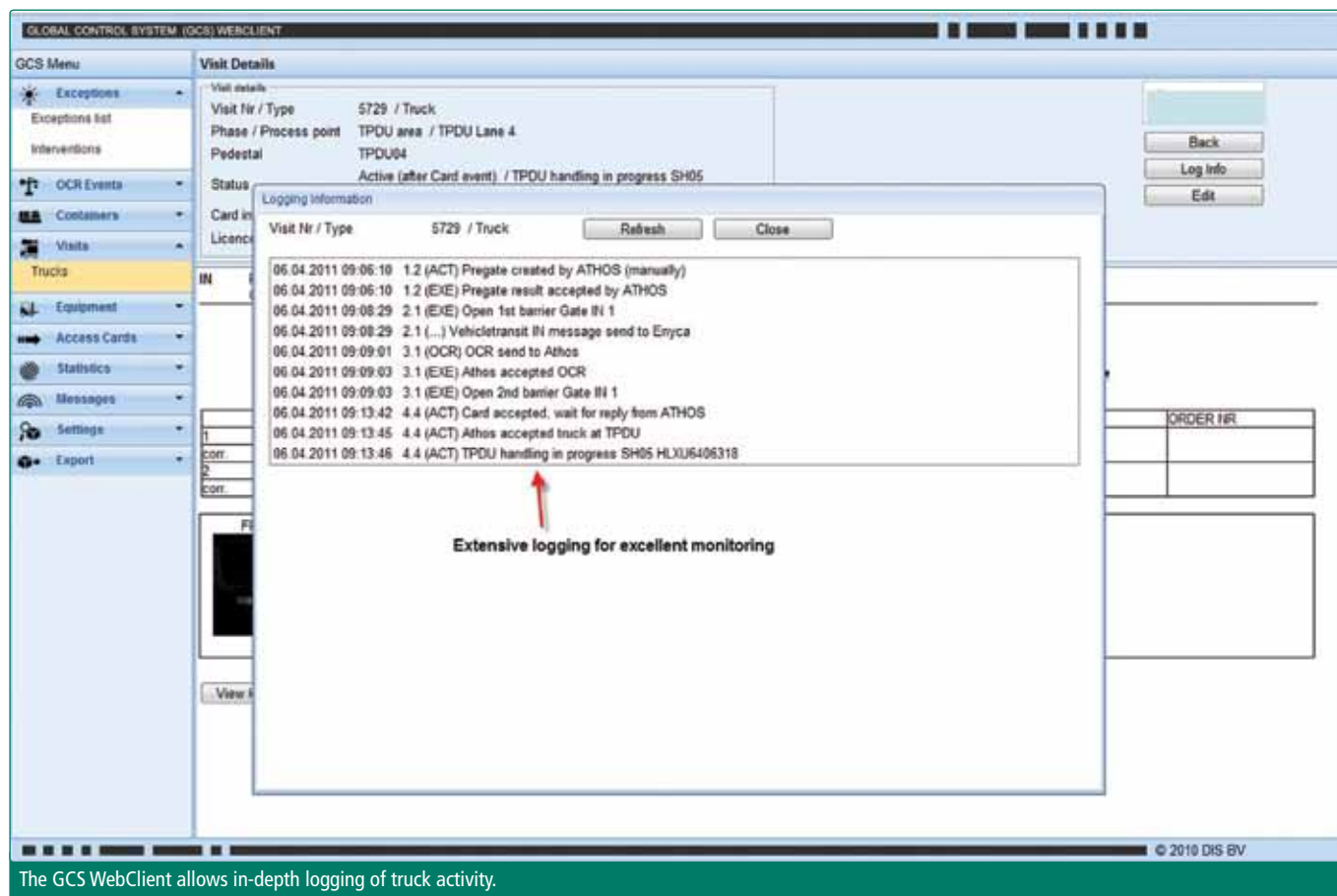
other subsystems parallel to OCR and decided that there was a need for a middleware software system that could deal with all these subsystems at once. Therefore HTS, along with collaborator company IT Partner, created the Global Control System (GCS) to fulfill the data fusion requirements in container terminal automation. GCS is a software layer that is designed to operate as middleware between the various subsystems and a (terminal) host system.

Every subsystem has a specific task, such as capturing OCR, handling Card Access Control, reading RFID tags, handling I/O signals and so on. In the end the Host System, normally a TOS, controls the flow of the area in which the subsystems operate. The Host System does not control the subsystems directly (its core function is to control the logistic operation), but it uses GCS to get input from and/or send output to the subsystems using a single channel to GCS only. Where a TOS has normally a single type of connectivity to external systems, GCS is the multi-connector that deals with all the specific interface technologies of the subsystem vendors. GCS has a dedicated software module for every subsystem, which converts from subsystem format to its own database-driven messaging structure. Another dedicated module, the Message Handler, controls the process flow.

With GCS you can automate Gate operations, with step-by-step control of the entire truck flow, from Pre-Gate to Gate Out.



The GCS WebClient is a web-based application where there is no need for deployment on PC client level – just use a standard browser.



The GCS WebClient allows in-depth logging of truck activity.

Every phase is monitored and the traceability of truck, driver and containers is easy. It merges LPR and OCR events from incoming and outgoing gates for a single truck. It gives a viewer to all images and video files captured at the OCR portals. You can also integrate nuclear detection systems, where alarms can be interfaced to route trucks if necessary.

When Position Detection Systems (or PDS) are part of the waterside operations, GCS can merge OCR and positioning and provide job-step activation and confirmation. This eliminates the need of manual input at Quay Crane and confirmation on a screen in Container Handling Equipment (CHE). Combine this with twistlock control and it gives you our zero-error principle. Keywords: fast, reliable, controlled.

GCS WebClient

The GCS WebClient is a very powerful tool that gives operations control to GCS and the subsystems. As before, GCS is middleware, where 99% is running unattended and systems are designed to minimize exceptions. The user focus within the GCS WebClient is mainly on managing exceptions, monitoring and configuration. Apart from that it provides statistics and analysis functions.

All data is stored in a database, where the customer can use the software's own standard reporting tools to integrate GCS data into their own performance reports. Although GCS data is temporary, the customer can decide how long it is kept in the database, configured separately for messages, OCR events and other work data.

GCS is not a static environment; it has been enhanced and improved in an ongoing manner. With every new project HTS adds more features into GCS. It is designed using the Microsoft .Net environment, with a SQL Server database. All modules are developed as individual Windows Services for unattended operation, compatible with various virtualized environments. The GCS WebClient is a web-based application where there is no need for deployment on PC client level – just use a standard browser. The GCS Pedestal Client is designed using embedded Windows on industrial PCs and provides the truck driver/self-service user interface indoors and outdoors.

Another very beneficial function is the ability to create your own messages in the simulator, which is especially designed to help testing and implementation, even when some subsystems are not yet deployed. Every module also has an extensive logging file, which gives a clear view on the interface behaviour.

In our experience, issues may arise when new systems are integrated, where subsystem providers have difficulty finding issues in their own systems and assume the issue may lie in another subsystem. With full visibility into messages, timing, acknowledgement and content, the GCS reduces time for deploying and commissioning new systems. This is particularly important in the deployment of new and costly technology solutions in any container terminal project, but most important in regards to automation, since there is typically an extremely large investment made in infrastructure and equipment.

ABOUT THE COMPANY

Hi-Tech Solutions (HTS) is a recognized leader in the Optical Character Recognition (OCR) and Computer Vision technology markets. Founded in 1992, HTS is headquartered in Israel, with offices in the USA and Europe. With customers in over 40 countries around the globe, HTS provides OCR solutions for a wide range of security and transportation applications.

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