

❖ Enhance Operational Performance Testing as part of TOS Implementation and On-going TOS Improvements

As terminals grow in size, scale and complexity, there is increasing risk adverseness to the introduction of major changes to the terminal operations, such as new equipment, automation and automated processes, changed yard layout, new set of services, etc. Typical risks include:

- Decline in operational performance and throughput after the change, due to unintended consequence of the change,
- Configuration bugs lurking in new system,
- Inadequate training in a realistic setting, leading to confusion or slowdowns

Consequently, many terminals choose to adopt extended types of testing, including automated and operational performance testing. A popular option is to perform a large set of operational performance tests in an automated, reproducible fashion with emulation. Emulation connects the TOS to a platform that mimics the behavior of actual terminal equipment without actually using the equipment. Once the emulation platform is configured and connected to the TOS, very complex business scenarios can be executed and approximations of operational KPIs can be calculated.

Besides testing and tuning the TOS, emulation can also be used to train the operations staff on how to use the TOS in a realistic setting in order to prepare for the upcoming changes.

Benefits of Navis Emulation Services

- 1 Navis can serve as a prime contractor and manage emulation as one work stream and can make independent recommendations on:
 - Emulation vs. other approaches to operational performance testing
 - Emulation vendor
- 2 Navis is the developer and provider of the global technology standard terminal operating system and has unparalleled knowledge of these systems. Emulation involves many TOS functions, including:
 - Integration work with the TOS (especially with new versions)
 - TOS data set preparation
 - Tuning of TOS optimization module
- 3 Navis has the experience with the performance characteristics and best practices at more than 250 terminals globally. Navis PS helped implement 10+ projects in 2013 alone in partnership with emulation vendors. Plus, Navis QA uses Emulation as a part of the product testing process before a new version of our TOS is released.
- 4 Navis has built a dedicated global Optimization Services Practice, which is building and applying the Navis Solution Implementation Standard for optimization and emulation projects.

Navis Emulation Services offerings include:

There are several emulation platforms available that have been integrated with the Navis N4 terminal operating system (TOS). Based on these, Navis Professional Services can augment our TOS implementations with the following offerings:

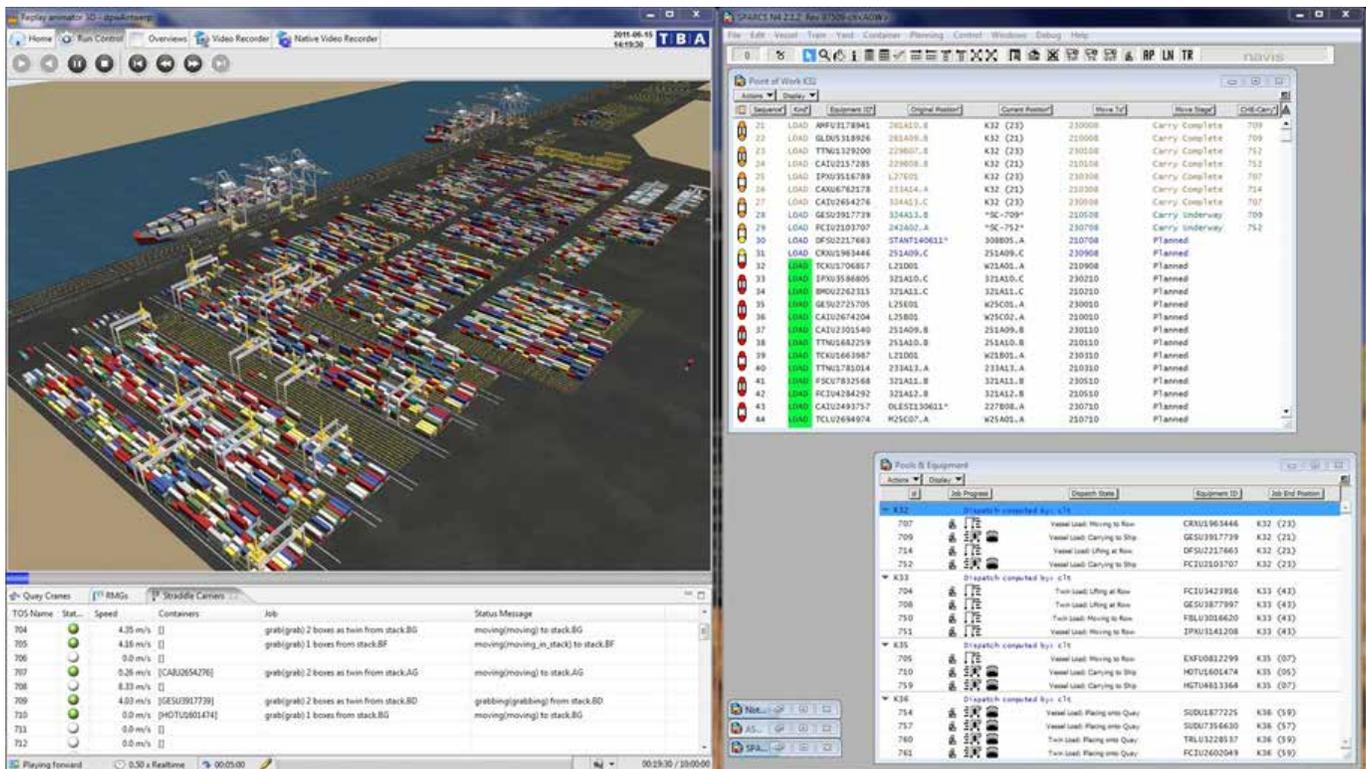
- End-to-End Emulation.
- Emulation Project Assistance.

End-to-End Emulation

In an end-to-end emulation project, Navis will embed an emulation work stream into the overall TOS implementation. Navis will serve as the prime contractor for both the TOS and the emulation work. Navis will collaborate with the client's preferred emulation vendor to bring the right combination of talent from Navis and the emulation vendor to complete the project.

Emulation Project Assistance

In emulation project assistance, the terminal operator is planning an emulation initiative led by the terminal or the emulation platform vendor. In this case, Navis experts will work side-by-side with the terminal operator and/or the emulation vendor to analyze emulation test results, update the parameter settings of our advanced optimization modules, and help define additional scenarios to test.



About Navis Professional Services

For more than 25 years, Navis has provided operational technologies that unlock greater performance and efficiency for our customers, the world's leading terminal operators. Backed by the experience of working with more than 250 customer sites, the Navis Professional Services Team is uniquely qualified to help address terminal operational challenges with comprehensive implementation and optimization services. The Navis Professional Services team is comprised of former terminal operators, MBAs, operations research PhD's, and Navis N4 experts with decades of experience helping terminals to implement their TOS and optimize operations. As a result, Navis Professional Services helps terminals to maximize investments in advanced technology solutions, new business processes and operational optimization initiatives by aligning them with our customers' highest-level strategic goals.

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