

NAFITH AQABA TRUCK CONTROL SYSTEM (“TCS”)

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Aqaba TCS Project Overview

During 2005 the Aqaba Special Economic Zone Authority (“ASEZA”) began a project to manage the movement of commercial trucks entering the Aqaba Special Economic Zone, a 375 km² area that includes Aqaba and its adjoining hinterland within Jordan, (the “Zone”) that pick up or discharge freight at the cargo and ferry terminals in the Zone. As part of a national economic modernization strategy, ASEZA was created by the Jordanian government in 2001 to govern Aqaba, oversee a multi-billion dollar program to expand the ports and related road infrastructure at Aqaba, and simultaneously create an attractive environment for tourist, commercial, and residential development.

The Preexisting System

ASEZA inherited a queuing system for moving trucks to and from the Ports – but this system undermined efforts to improve port operations, promote tourism, increase competitiveness and efficiency in the trucking sector, and advance economic competitiveness.

This process had a number of deficiencies. As part of the Nafith USTDA project¹, a third-party team of logistics experts led by Dr. Hani S. Mahmassani² was engaged to evaluate the costs and benefits of the Aqaba TCS, which they did by comparing it to the system it was replacing. They found significant deficiencies with the queuing system, including the following:

1. “Long waiting times by trucks, limiting the number of revenue trips that could be completed in a given week by a given truck;
2. Frequent mismatch between truck equipment and requirements of the load to be picked up, because “first come, first served” did not necessarily ensure the quality and equipment suitability of the truck for the requirements of the load;
3. Opportunity for manipulation of the queue ranking;
4. Quasi-chaotic conditions resulting from inadequate management of the queuing process;
5. Often severe congestion and environmental degradation of ASEZ area due to large volumes of idle trucks waiting for their turn in proximity of the port area;
6. Artificially inflated transport prices supported by long queuing times as the primary allocative mechanism.”

The Aqaba TCS Approach

¹ NTELX received a grant from the U.S. Trade and Development Agency (“USTDA”) in 2005 to conduct pilot projects to demonstrate the applicability of NTELX solutions to improve freight transport in Jordan. The name of this project was the “National Freight Information and Transportation Hub,” or Nafith

² Professor and Chair of the Transportation Center at Northwestern University in Evanston, Illinois (USA) and a past editor of “Transportation Science.”

To solve these problems, ASEZA completely replaced the truck queuing system with an advanced truck control system (the “Aqaba TCS”) that allowed the freight clearing agents to negotiate with the truck company of their choosing to pick up and deliver a specific cargo from a port terminal to a delivery point outside of the Zone.

The key to the Aqaba TCS is the issuing of a permit that allows a truck to enter the Zone to pickup or discharge cargo and governs its movement inside the Zone. Using a permit as the control object, trucks are allowed into the controlled areas only after they receive a unique permit based on validated information about the driver, vehicle, authorized operation and other pertinent information. Entry to the controlled areas, access to the port terminals and other destination points, and departure are all controlled and adjusted as needed based on capacity utilization on the roads and locations in the system. Based on this approach, only trucks already contracted for a delivery may enter the Zone, proceed to pick up or discharge cargo, and then exit the Zone.

The Aqaba TCS manages the movement of contracted trucks while in the Zone. Its goal is to maximize the Ports efficiency and security, restructure the trucking industry to decrease trucking costs and improve service, reduce congestion, and route trucks away from congested areas.

The system includes three primary elements:

1. **Technology Platform.** An information technology application that allows authorized users to apply for permits, and then organizes and controls the movements of all trucks controlled by the system.
2. **Operations.** A series of re-engineered processes (i.e., work flows), capacity control measures, and checkpoints (both staffed and automated) at key locations (the marshalling yards; port, terminal and other gates) where permits are issued and validated and truck movements are monitored and controlled.
3. **Physical Infrastructure.** Truck marshalling yards, checkpoints at critical locations, an RFID system, and a communications network to monitor and control the movement of permitted trucks.

The Aqaba TCS Information Technology Platform

In the fall of 2005, NTELX³ was engaged to customize, deploy, and operate the Aqaba TCS IT Platform as a pilot process under as part of a USTDA-supported project⁴.

³ At that time the company was named FreightDesk Technologies, Inc. The name was subsequently changed to NTELX, Inc., but the company management and ownership remained the same.

⁴ In 2005 NTELX received support from the U.S. Trade and Development Agency (“USTDA”) to demonstrate how systems using the company's technology could be deployed in Jordan to i) enhance efficiency, automate trade practices, and improve the security of Jordan's freight transport system; ii) position Jordan as a regional transport IT gateway; and iii) serve as a springboard for expansion to other Middle East and North Africa (“MENA”) nations.

The Aqaba TCS IT Platform is a production-level, server-side information technology platform, including the servers, system software, hosting environment, and applications needed for the issuing of valid Aqaba TCS permits required for all commercial vehicles licensed as trucks for entering, exiting, and moving within the Zone.

The team worked primarily with ASEZA, and secondarily with the port, trucking communities, and other government agencies to design a web-based system that would meet the needs of all of the stakeholders. The design team created a management system and new set of processes to control truck movements from entry into the Zone until exit. A truck may enter the Zone at one of five entry points, including two international border crossings. Following entry, the truck proceeds to one of three truck waiting areas (which were created as part of the Aqaba TCS Project) and then are dispatched to one of 39 destinations at a specific time and via a specific route. The truck would then follow a specified route to exit the Zone.

The system design considerations included the following:

- Ability to control the number of trucks allowed into the Zone, waiting areas, the ports, and other destinations.
- Verification of data for trucks, drivers, and cargo through integration with third-party databases (e.g., ASEZA, National Customs, Ministry of Transport).
- A large number of users from diverse communities (truck company dispatchers, clearing and custom agents, government agencies, etc.), some who had never used a computer system.
- Efficient TCS permit verification at checkpoints, which historically had been bottlenecks.
- Easily accessible data for standardized reports and management.
- Highly reliable, stable, and flexible.

The resulting system design centers on the issuing of a TCS permit at the request of a registered truck company dispatcher, through the Internet. Permitting follows a four-step process:

1. Dispatcher chooses the entry point, exit point, destination, and type of operation for the truck-trailer combination.
2. Dispatcher enters the custom release number for the cargo that is to be loaded and/or unloaded.
3. Dispatcher enters the driver and other required information.
4. Dispatcher is required to select a route.

By setting both routes and time limits, the Aqaba TCS ensures that trucks can only enter the Zone, proceed to waiting areas, and go onto the ports and other destinations when space is available, eliminating congestion and bottlenecks.

The Ministry of Transport served as in-country project sponsor, and the focus of the USTDA project was the building of three pilot systems to demonstrate, test, and evaluate the hypothesis that NTELX could create data-driven information technology applications of value to Jordan's freight transport sector. From the outset, NTELX worked closely with Telaterra Software, a Jordanian IT company focused on work flow systems, as its local partner. Telaterra was led by Mr. Sameer Mubarak with Ms. Nourah Mehyar as the project leader.

At each step, the data entered is verified against third-party data or against system validity checks. For example, registration of the truck and trailer are verified through automatic integration with Ministry of Transport databases, while custom release numbers are verified against National Customs or ASEZA Customs databases.

In most cases, a permit is issued and capacity in the Zone reserved once the dispatcher has correctly entered all required data, the system has verified the data, and confirmed the availability of space for the chosen route. If the data is verified but capacity controls do not allow the truck to follow the chosen route, the request is accepted but the permit is placed on hold until capacity allows for entry. A permit request will be rejected if the data indicates a problem.

The Aqaba TCS IT Platform was deployed during November 2005 as a fully functioning, full-scale production system. It is a sophisticated application accessed via the Internet that has brought the entire logistics community that uses Aqaba onto a common data platform.

Design elements include:

- Enterprise-grade architecture, using Java Enterprise™ architecture and the Oracle™ DBMS, that meets current and future requirements.
- Easily adapts to changes in routes, capacities, and terminal processing times
- Presents user interfaces in Arabic and English
- Collects detailed data for planning and management.
- Supports integration with multiple systems, including Ministry of Transport, National and Aqaba Customs, and the port.

The Aqaba TCS won the 2009 award from the Intelligent Transportation Society of America for the best new product or service using advanced technology in surface transportation.

Current Operations

Currently, Aqaba TCS operations oversee five zone entry points including two international borders, 13 terminals handling bulk and containerized cargo, 39 specific destinations, and hundreds of routes. There are approximately 4,000 truck moves daily.

By qualitative measures, as displayed in the table below, the Aqaba TCS is Jordan's largest web-based, public-sector application, and its reliability has been outstanding.

AQABA TCS IT Performance

<u>Category</u>	<u>Measurement</u>
Daily Permits	4,000
Daily data inputs	32,000
Concurrent Users	150 +
System Uptime	Over 99.9%

The Aqaba TCS is operated by Nafith International (“Nafith”) under a Public-Private-Partnership (“PPP”) agreement with ASEZA. The system users pay Nafith a fee for each permit issued by the Aqaba TCS, and Nafith has a revenue sharing agreement with ASEZA.

Nafith was founded in Amman, Jordan by NTELX, a U.S.-based technology company, the company’s Jordanian partners, and with support from the U.S. Trade and Development Agency. Nafith designs, builds, and operates trade and transport facilitation services for public and private sector customers to improve the operating efficiency, productivity, and security of land-transport freight operations and to automate trade practices.

Nafith currently has operations in Jordan and is expanding to Iraq (Umm Qasr and the smaller ports in Iraq, and the principal border crossings). Nafith has received an equity investment from the International Finance Corporation, a member of the World Bank Group and the largest global development institution focused exclusively on the private sector, and Foursan Capital Partners, a private equity fund targeting investments in accelerated growth companies in the Levant and North Africa to support the company’s expansion plans.

Within Jordan, Nafith operates the Aqaba Truck Control System. Nafith provides dispatching services for Jordan Petroleum, the national oil importer, refiner, and distributor, and a dispatch system for the Ministry of Industry and Trade (MoIT) for the transport of grains from Aqaba to 12 regional silos and warehouses. Nafith also provides an eWaybill service for containers, along with other services.

Since inception Nafith has focused on adding additional services and capabilities, and on regional expansion. Nafith believes that its offerings are unmatched in terms of quality and value.

Aqaba TCS Impact

The system was rolled out in stages, initially to move imports of refined products, fuel oil, containers, and phosphate, and after a few months handled virtually all traffic into and out of the port, including all containerized cargo. The Aqaba TCS was expected to minimize the impact of trucks on the Aqaba tourist, commercial, and residential zones and control traffic entering terminals and the city. The positive effects on city congestion and port disorder were immediate. Truck presence in Aqaba dropped as truck waiting times dropped and waiting trucks were shunted to truck waiting areas instead of clogging city roads and port gates. Pollution and traffic accidents decreased, especially in the city of Aqaba. Old, overloaded, and underpowered trucks no longer jockeyed for position in arbitrary queues.

According to an impact assessment of the Aqaba TCS performed in 2011 by Nathan Associates, the system has increased Jordan’s GNP by US\$100 million annually since its 2006 launch. The assessment found that trucking costs to and from inland points has dropped, port infrastructure has become more efficient and secure, and the impact of truck traffic on residential, tourist, and commercial neighborhoods has been minimized.

Nathan Associates found that the system cuts an estimated 14 hours from turnaround times for trucks transiting Aqaba. It saves time and money by reducing road congestion and improving turn times, terminal access, and reliability, all of which boost Jordan’s economy and create jobs. Road freight firms, logistic and international trade industry stakeholders, the government, and consumers have all benefited from changes in performance and mindset attributable to the Aqaba TCS.

Deregulation and the Aqaba TCS have changed the road freight industry in Jordan, giving rise to professional fleets. Trucking companies have lowered operational costs by an estimated 20%. Improved truck turn times at Aqaba, once measured in days are now measured in hours and minutes, have multiplied vehicle usage rates, allowing the same number of trucks to handle a greater volume of goods. In turn, higher truck usage has encouraged owners to invest in better and newer trucks.

The Aqaba TCS has significantly increased the efficiency of transporting imports and exports in Jordan. Particular transits are now reliable and consistent in schedules and pricing. Instead of joining queues, trucks may only be at the port for a specific reason; and absent queuing as the criteria for securing business, trucking companies are competing for customers based on their service quality.

The Aqaba TCS offers a rich data source for trucking companies, the government, and other logistics stakeholders. Aqaba TCS data allows the government to measure activity at the port on a real-time basis. Information on drivers, trucks, and cargoes improves security. Data allows the trucking companies to predict the time an operation will take, establish benchmarks, monitor performance, and look for operational improvements. For example, trucks performing both an export and import-related job while in Aqaba have steadily grown since the Aqaba TCS was introduced.

The Aqaba TCS also has produced collateral developmental benefits. Operating the system has created more than 200 new jobs in Aqaba, a historically depressed region of the Kingdom, ranging from 25-30 management positions to less-skilled gate operators staffing control points around the clock. The Aqaba TCS has introduced many Jordanians to a web-based, commercial system, some of whom had never before used a computer. The endemic corruption associated with the queuing process disappeared. Pollution has been cut along with fuel consumption, as have vehicle accidents. And back to its initial objective, the system has removed trucks from areas in Aqaba slated for development.