Logistics and Trucking in Jordan: The Benefits of Intelligent Transport Systems

How does one turnaround transportation chaos fifty years in the making into a model of efficiency in a few months? A committed group of Jordanian government officials, working with an U.S. company, implemented a technology-driven system that combines data management with real-time road and terminal capacity controls for trucks accessing Aqaba, Jordan's sole seaport. Immediately reducing wait times and improving information flow, confusion and congestion virtually vanished, benefitting the Jordanian trucking and trade sectors, Aqaba and the nation. In June 2009 the system was honored with the award from the Intelligent Transportation Society of America for the best new product or service.

Background

Prior to 2003, Jordan's road freight industry was heavily regulated, with fixed tariffs required for specific routes and cargoes. The industry was fragmented and lacked performance incentives; in Aqaba, the result was queues, congestion, pollution, with old trucks speeding to grab top spots in the lines. Bribery to cut in line and favoritism were seen as endemic. For years, Jordan's truck federation had run the queues and collected fees but had done little for truckers and even less to improve truck services.

The problems in Aqaba, Jordan's sole seaport on the northern tip of the Red Sea, and critical to both imports and exports, were of growing concern. Major port expansion and relocation projects were underway to complement the redevelopment of the historic city into a tourist, residential and commercial center. Trucks clogged the city, port operations were hampered by chaos and confusion outside terminal gates, and importers and exporters were frustrated by poor service and lack of control over who was going to pick up, transport, handle, and deliver their cargo. Truckers would often wait days, and in some cases a week or more, in Aqaba for a load, while cleared goods would sit idle at the port.

Jordan's joining the WTO and signing of a free trade agreement with the US in 2000, and the subsequent deregulation of the trucking industry by the Ministry of Transport demonstrated the government's commitment to improve economic performance and competitiveness. But in Aqaba the decades-old problems persisted. Adding even more infrastructure alone would have treated only symptoms – such as congestion -- and not their root cause. The solution? Install an intelligent transport system in parallel with construction of truck waiting areas and control points to manage truck movements on the existing road network serving the port terminals and other destinations in the Aqaba Special Economic Zone (ASEZ), a 375 km² jurisdiction that includes Aqaba, the ports, Jordan's Red Sea coast, and adjacent hinterland.

The NAFITH Truck Control System (NTCS) was developed and installed between August and November 2005. Working under the leadership of H.E. Shadi Majali, then Commissioner of Customs and Revenue for the Aqaba Special Economic Zone Authority (ASEZA), a team comprising NTELX, a U.S. software solutions company based in McLean, Virginia, its local partners, and ASEZA staff tackled the problem with determination and speed. After meeting with stakeholders from across the Jordanian logistics community, the team realized that the congestion, chaos and delays in Aqaba were caused not by a lack of infrastructure capacity but by poor information flows resulting in too much waiting-around time – trucks waiting on paperwork and approvals, waiting in lines, and waiting at terminals – a problem that could be eliminated by an innovative intelligent transport system. The overriding design objective was to collect, validate, and share information quickly in order to minimize waiting times and unnecessary trips, and get trucks quickly and smoothly through the port terminals.

From this starting point, the NTCS was developed with three basic goals: (1) provide for the coordination and matching of cargo and trucks, (2) manage the flow of trucks to maximize efficiency and minimize congestion, (3) increase security management of trucks, cargo, and drivers. A fourth goal pertained to "showcasing" a modernized regulatory regime in ASEZ, including the port.

Within twelve weeks, using NTELX's FD*folio*™ software the team was able to deliver a highly sophisticated, scalable information technology platform to address the NTCS design objectives. The resulting NTCS deployed a sophisticated, web-based intelligent transport system that ensures the following:

- Trucks only enter the ASEZ when all paperwork and approvals are complete and validated against the appropriate, external databases, including confirmation that intended operation is viable, e.g. cargo is ready for pick up.

- With time windows and routing information issued to the truck driver, each truck's movements are monitored as it moves through a series of operator-controlled checkpoints including waiting areas and key destinations, to ensure that trucks follow the instructions specified by the NTCS permits.

- Roadway congestion and capacities at destinations are monitored in real time to ensure that critical thresholds are not exceeded, and when necessary the waiting yards are used to hold trucks until problems are resolved.

Though five truck waiting areas were constructed as part of this effort, no new roads were built, saving millions of dollars and speeding implementation of this new system. Critically, this incremental infrastructure provides the real-time operational control needed to make the bypass roads, terminal gates and other infrastructure work as efficiently as possible.

How NTCS Works

At the NTCS website, the trucking company dispatcher applies for a permit for a truck to enter the Aqaba Special Economic Zone (ASEZ), providing a cargo release number, a truck number, and a driver's license number, details on the operation to be performed, and selects a route for the trip.
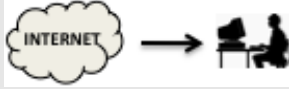
After validating the information against customs, port, terminal, and ministry databases, the system issues a permit with a time window for entering the ASEZ.

The dispatcher gives the permit number to the driver who drives from point of origin (usually Amman) to an ASEZ entry point.

The gate operator enters the permit number in the system, which generates a permit with the all the pertinent instructions for the driver.

As the truck goes to one of four waiting areas and, as capacity becomes available, is directed to the next point on a designated route—another waiting area or one of 39 possible destinations—including terminals, warehouses, and logistics centers—to pick up or deliver cargo or return equipment and containers.
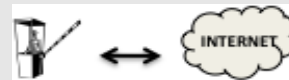
As the truck moves through its route, the system recognizes that capacity has become available and releases those trucks that have been waiting for this capacity. The truck then exits.

Immediate Benefits

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. The NTCS 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. Trucking dispatchers entered truck and driver information along with the associated operation into the system, obtaining a permit that would allow that truck to enter the ASEZ and port only when their documents were verified, the cargo, including its customs and other clearances, were ready, and capacity available. Capacity-control algorithms ensured that congestion was minimized as trucks moved between the 39 destinations

in the system. Truck presence in Aqaba dropped as truck waiting times dropped; while 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.

Long-term Benefits

Deregulation and the NTCS have changed the road freight industry in Jordan, giving rise to professional fleets over the past three years. The system handles approximately 10,000 trucks -- 80% of which are Jordanian, representing more than 50 percent of Jordan's trucks over five tons. Trucking companies have lowered operational costs. Improved truck turn times at Aqaba, which are now measured in hours and minutes, have multiplied vehicle usage rates. Higher usage has encouraged owners to invest in better and newer trucks.

The NTCS 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 can 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 quality of service.

The NTCS offers a rich data source for trucking companies, the government, and other logistics stakeholders. NTCS 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 NTCS was introduced.

Perhaps most visibly, the NTCS has had positive developmental benefits. Operating the system has created over 200 new jobs—ranging from 25-30 management positions to less-skilled gate operators staffing control points around the clock. The NTCS 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, as have vehicle accidents. And back to its initial objective, the system has removed trucks from areas in Aqaba slated for development.

According to the IMF, Jordan's GDP in 2008 was US$19.2 billion; logistics costs are over 15 percent of the GDP, and trucking is a major component of these costs. The NTCS not only is making logistics and road freight transport in Jordan more efficient but also is reducing infrastructure construction and maintenance. 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 NTCS.

In early 2008, Nafith Logistics, a subsidiary of NTELX, began operating the NTCS under a public-private partnership agreement with ASEZA. The joint success of this collaboration has received international recognition. In June 2009 the Intelligent Transportation Society of America, the leading organization for those involved in fostering the use of information technology in surface transportation systems, recognized the NTCS with its Award for Best New Innovative Product or Service. The system was also a finalist for the Middle Eastern Business Achievement Award for E-Government.

Sources: Interviews with Amrinder Arora, Bruce Finland, Lawrence Kahn, and Dhiren Patel, all of NTELX, Inc. (US), formally FreightDesk Technologies, in McLean, Virginia, June 10, 2009. NTELX developed the IT system for the NTCS. Messrs Kahn and Patel also are on the board of Nafith Logistics, PSC (Jordan), which operates the NTCS under an agreement with the Aqaba Special Economic Zone Authority.