Automation began at VPA in 1970 for payroll, invoicing and account receivables. Through 1978, cargo control systems were added for export and import cargoes. These started out as batch systems in which the operator would enter data and then prepare a report from the data at the end of the day. Beginning in 1978, the system became on-line whereby various users of the system could access data for different purposes. Through 1985, the accounting and operations computer system was further refined to include a spare parts inventory, accounts receivable, cost accounting, work order, billing, general ledger, container inquiry, vessel scheduling, and break bulk cargo.

A recent development involves the interphase with the Customs Automated Manifest System. This effort by Customs is intended to reduce the amount of paperwork and to increase the effectiveness of its inspection services for import cargoes. Another recent development involves the use of personal computers for communication with port sales offices on customers and their service needs. We are also looking at improved yard management in the port to track containers and equipment. The port personnel in the terminals will feed data using hand-held units into a central computer to provide for real-time data on the location of containers, chassis and other equipment. Worker orders can then be sent from the central control office to various yard locations.

In the future, the VPA is looking at developing decision-support data to help the port operate more efficiently, and also an Electronic Data Interchange system to link the port with Custom, shiplines, inland carriers, importers and exporters.

INTEGRATED AUTOMATED TERMINAL OPERATIONS

By
John H. Leeper
Leeper, Cambridge & Campbell, Inc.

The term Integrated Automated Terminal (IAT) is a proprietary term coined in 1986 to describe a new generation of multi-purpose intermodal transshipment facilities that combine materials handling devices and robotics with advanced computer communications and control technology.

The IAT is focused on improving transshipment productivity

The concept for the IAT was developed from a perceived need in the transportation industry to improve transshipment productivity and to reduce excessive capital investment in containers, transportation equipment, and port facilities.

In the container business, major productivity gains have been realized in the last five years through the introduction of jumbo containerships and double-stack rail platforms. However, these productivity gains were not matched by similar productivity increases in inland transshipment systems. In fact, inland transshipment inefficiencies have generally added to the cost of through intermodal transportations and have offset the remarkable unit cost decreases that have been realized in the various transportation line-haul modes. Symptons of transshipment system failures include:

- The generally stagnant state of coastal port loading and unloading productivity and the poor application of new technology to the problem.

- The high number of ship sets of containers that must be owned or leased by containership operators to maintain acceptable standards of service.

- The existence of large numbers of idled containers in some locations while containers are unavailable for export cargoes in other locations.

- The existence of high volumes of empty containers passing each other in opposite directions on inland rail and highway routes.

- The emergence of conventional transshipment services as the low cost competitor on some trade routes.

Intergrated Automated Terminals seek out selected markets and correct their transshipment inefficiences

The integrated automated terminal seeks out a market niche where the applications of automated systems can eliminate or reduce transshipment inefficiencies. In the past six months, our firm has prepared market analyses and economic feasibility evaluations on several markets that are vulnerable to IAT penetration. Among these are:

- The transfer of bagged cargoes between rail cars and ocean transshipment vessels.

- The transfer of boxed and baled cargoes between containers/trailers and transshipment vessels.

- The transfer of lumber from mills or motor carriers to trailers and containers.

- The transfer of general cargo between rail cars, trailers, and containers.

- The transfer of new automobiles between containers and trailers and intermodal distribution hubs.

- The assembly and loading of containers and trailers in a container freight station.

- The transfer of small package and courier cargoes between aircrafts and motor carriers.

The Matsystem is an example of an IAT-type application

Although there have been other experiments with computer enhanced container transfer facilities in ocean ports, the Matsystem, developed by Matson Terminals, is one of the more advanced.

The Matsystem is designed to handle up to 60 moves per hour and features a container conveyor device that continuously feeds the container crane so that the yard gantry crane can function independently.

Computers serve a number of purposes in the Matsystem including:

- determination of container center of gravity,
- lashing limits,
- deck strengths,
- stowage plan printouts,
- yard gantry direction,
- container stacking and positioning locations,
- continuous load-out positioning,
- documentation processing and container tracking, and
- transaction integration.

The Matsysem complex in Los Angeles is designed to handle 2,400 gate transactions a day.

The first green field designed IAT in the U.S. will combine U.S. and European technology

The first green field IAT design in the U.S. will involve the application of advanced conveyor technology (called Spiralveyor in the U.S.) that was first developed and used in Europe. The first Spiralveyor unit was placed in operation in Antwerp at the Belgian new Fruit Wharf in 1980 and has operated since then at high rates of productivity and reliability.

The Spiralveyor employs a spiral conveyor which is suspended from a specially designed crane. It is an all weather system which can position or retrieve cargo from a ship's hold with a retractable/extendable conveyor arm which can reach all corners and levels of a breakbulk or barge hold.

In the IAT application, the Spiralveyor is combined with an automated computer controlled transit shed and rail siding which unloads, accepts, stores, transfers, palletizes, depalletizes, and loads cargo while it processes documentation with computer controlled materials handling and communications equipment. The facility can unload 72 conventional rail box cars with automated car unloaders in a 7-hour work shift.
In essence, this facility can transfer selected transshipment cargoes with dockside efficiency similar to that of a containership at reduced terminal handling and stevedore costs and without the capital cost of containers and high technology containerships.

The IAT will not replace the container, but in selected locations and for

specific flows, it will establish a profitable market niche based on fast transit time and reduced through costs. The facility will also allow rail operators to use box car equipment and will increase the number of revenue voyages that can be made by transshipment vessel operators.

Other IAT applications will also address special market niches

There are other applications for IAT technology under study which will focus on specific markets.

Similar to the Spiralveyor-based IAT is a facility that transfers and loads pallets of mixed cargoes. This facility is also equipped with materials handling devices and computer technology. It can achieve loading speeds similar to some containership operations and can be applied to a broader market than the Spiralveyor-based system. This system features an elevator crane called a Palletveyor.

In addition, multi-use computer based terminals have been designed. For instance, one specific design can handle both steel, as a neobulk cargo, and containers. Such a facility can be profitable for terminal operations that are focused on a specific neobulk cargo but also want the flexibility of handling containers.

Still other versions of IAT technology address the need for inland rail/motor carrier transfer hubs and barge-rail transfer facilities.

One IAT application that is under preliminary study serves an entire industrial park with a cargo transporter system that unloads, loads, and moves cargoes between shipper/consignee loading platforms and ocean, rail and motor carrier transshipment stations. This self-contained computer controlled system virtually eliminates both redundant longshore/terminal handling and expensive drayage operations between ports and origin/destination platforms.

This type of industrial port appeals to larger manufacturers with high volumes of import component parts and export products. There are numerous greenfield locations for this type of industrial park on the Gulf Coast.

IAT and other market-oriented systems will focus on changing future port requirements

Shippers and carriers will increase their demands for improved transshipment systems both inland and in ocean ports. Priorities will be placed on:

- Improving vessel turn-around time
- Reducing transshipment costs and time
- Reducing land utilization
- Improving inland transport efficiency
- Improving system reliability

IAT systems will appeal to private investors

Our experience to date with IAT system planning is that private investors see the need for automated terminal development and are prepared to assume the lead

in both equity and debt financing. In some cases, where strong market responses can be predicted, non-recourse debt financing may be available from financial institutions.

Other sources of capital for IAT construction include traditional entities and instruments

Public port authorities can and will be a source of capital either as total or participating investors in IAT facilities. They may invest in supporting inland terminals as well as those within their immediate port jurisdiction.

The IAT will impose new variables on port planners

New IAT development and emerging market niches that attract purpose-designed facilities will increase the difficulty of long-range port planning.

In the coming era, the principles of port planning will include what we have identified as the six obstacles to confident investing.

- Technology is dynamic - to get the longest life cycle you must be the first to invest.
- Regulation is unpredictable - will the next Congress begin to reregulate and if so, how will cargo flow patterns react?
- World trade is fickle - today's backhaul may be tomorrow's headhaul.
- Hinterlands are vulnerable - nobody owns a hinterland, not even within a port city.
- Users will change perspective - will railroad-owned ocean carriers continue to focus on load centers that maximize ocean revenue?
- Sources of money are unstable - public money for port expenditures may not readily available in the future.

There are two important rules of thumb in port planning

Port planners, faced with increased planning uncertainty and more pressure to produce a winning plan, would do well to remember two rules of thumb:

- Port planning is a journey, not a destination. The ultimate, final plan does not exist.
- If you are correcting today's problems, you are in operations, not planning.

Don't invest based on today's needs. Anticipate and discount those who say, "Its's never been done that way," or "it can never be done that way." Ultimately, they are always wrong.

Port strategists have alternatives for the future

Increasingly one of the more popular and profitable strategies for port planners will be to convert land and facilities to non-transportation uses. In many cases, such strategy will increase the economic impact of the port and remove inefficient facilities and underutilized workers form the nation's transportation network. More efficient transportation reduces the unit cost of commerce, increases demand and stimulates economic growth.

For those ports that do stay in transportation, there must be a focus on increased efficiency. Ports must increase facility volume so that fixed costs can be spread over a greater throughput of cargo, thereby reducing the unit cost of transshipment.

Future port strategies will include facilities that specialize in:

- load center container ports
- specialized container ports
- market niche breakbulk/neobulk ports
- multi-use industrial ports.

THE COMPETITIVE BATTLE AMONG GULF PORTS

By
Donald R. Gibson
and
E. Cameron Williams
University of South Alabama

Changing Shipping Patterns in the Gulf

Recent trends in ocean transportation are changing traditional ways of doing business at seaports. These trends, which are inter-related, are: deregulation of transportation; intermodalism; the increasing cost of operating modern vessels; and the development of "land bridge" and "load center" concepts. These trends have implications for Gulf seaports which are largely negative.

Intermodalism, generally speaking, is any transfer of goods between two modes of transportation, however accomplished, which achieves an intermodal transfer (Mahoney 1985). However, in common usage the term usually means the development of systems for rationalizing and facilitating intermodal transfers. Of these systems, the one which has had the most profound effects on global logistics is containerization.

Briefly, containerization involves the use of standard-sized steel containers, holding up to 20 tons of cargo, which can be quickly transferred between rail, highway, and ocean carriers, using special container-handling equipment and vehicles. As an illustration of the productivity increases brought about by containerization, a single crane operator, assisted by a handful of spotters and yard drivers, can load or discharge as much cargo in containers in 15