# Computerized Cargo System

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## 1. BACKGROUND OF ORGANIZATION

The Israel Ports Authority (IPA) controls and operates all the seaports in the State of Israel. Haifa Port (opened in 1933) and Ashdod Port (opened in 1965) are located on the Mediterranean Sea, and Eilat Port (opened in 1965) is located on the Red Sea.

The Ports Authority was established on 1 July 1961 by order of the Ports Authority Law.

The Authority is defined by law as a government corporation whose task is to plan, build, develop, manage, maintain and activate the ports. The three ports are independently managed but are responsible to the general manager; they receive staff services from the main office, which is located in Tel Aviv. They all charge the same rates, which are approved by the IPA Board of Directors (a body consisting of 15 public representatives who represent the users of maritime transport, and by government officials) and by the Finance Committee of the Knesset. They compete between themselves only concerning the standard of services which they give.

The Authority moves about 15 million tons of cargo a year.

The computerized systems of the Ports Authority are based on seven HP-3000 computers located as follows: (1) 3 in Haifa Port; (2) 2 in Ashdod Port; (3) 1 in Eilat Port, and (4) 1 in the main office.

The computers are connected to each other by a DS/3000 via the national communications network "Isranet".

## 2. FRAMEWORK OF THE SYSTEM

A storage system, or more correctly, a "cargo system" follows up after all cargo moved in the ports, from its unloading from the ship to its being handed over to the customer (import cargo) or from its entrance into the port until its oading onto the ship (export cargo).

The system follows all movement of import and export cargo at the various locations. It covers the following subjects:

1. Input and maintenance of all import manifests.
2. Receipt of cargo to warehouses (loose and containerized).
3. Movement of cargo from location to location within the warehouse.
4. Report on damage.
5. Information center (including customer display terminal).

6. Handling of separated cargo (secondary manifest on international forwarders).
7. Dangerous cargo.
8. Unstuffing of containers.
9. Direct delivery.
10. Input of release documents.
11. Release of cargo (accompanied by gate pass or accompanying documents).
12. Weighing in (all weighing on scales is handled by the system - import, expor, containers).
13. Unclaimed goods.
14. Input of export cargo into the warehouses (storage documents).
15. Input of export documents.
16. Containerizing of cargo.
17. Loading of cargo on the ship.
18. Cancellation of export.
19. Communication with associated systems.

The system is divided up to give the following sub-systems:
1. Manifests (import).
2. Receipt and dispatch (import).
3. Weighing scales (import + export + containers).
4. Unstuffing (import containers).
5. Unclaimed goods.
6. Export.
7. Association with related systems.

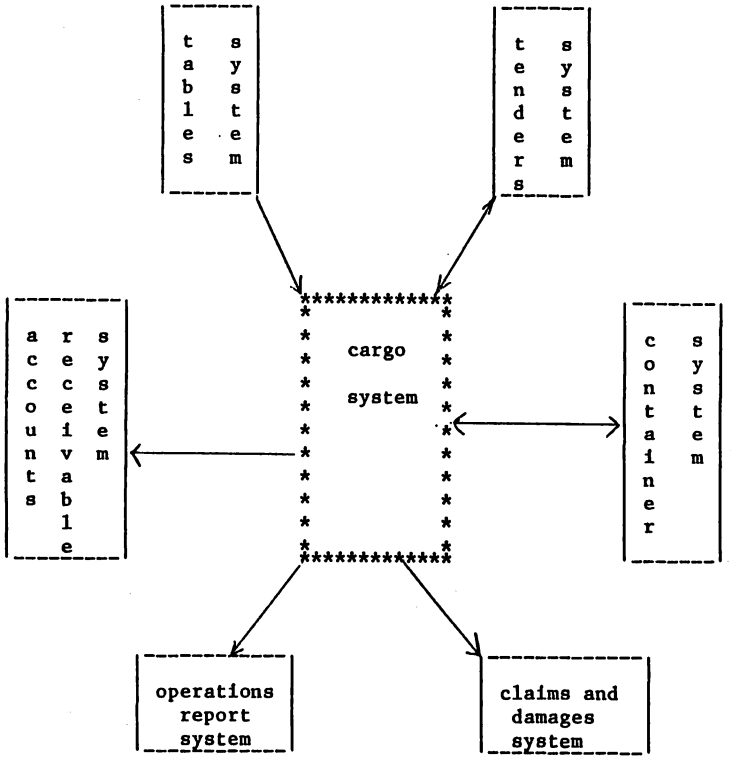
## 3. CHARACTERISTICS OF THE MANUAL SYSTEM (see table next page)

1. The manual system is characterized by a large quantity of manual work.
2. A large amount of movement of documents and forms between the various locations (transport problems, completion of material, standard of up-dating).
3. The standard of service given to the customer depends on the existing information system - complex procedures, illegible documents, low standard of up-dating.
4. Manual control - difficult to apply.
5. Weak communication with associated system - transfer of forms, loss of control.
6. "Strong" communication with outside factors - a large quantity of paper transferred between outside factors (international forwarders, customs agents, customs, tally companies and shipping agents) and between the Ports Authority (two-way traffic).
7. Disappearance of regulations - increase in deviations.
8. Difficulties in receiving management information.

## 4. GOALS OF THE SYSTEM

1. Improvement of procedures in cargo system
   a. Elimination of unnecessary activities
   b. Automatic cut-off of accompanying events

Representation of Location of the System and its Communication with Other Systems in the Ports Authority



c. Flexibility
d. Improvement in inspection

2. Improvement of customer services
   a. High up-dating standards
   b. High reliability
   c. High frequency
   d. Reduced waiting time

3. Warehouse management tools

4. Computerized communication to related systems
   a. Containers
   b. Accounts receivable (collections)
   c. Claims and damages
   d. Operations report
   e. Tenders

5. Concentration of all information concerning cargo cancellation procedures in one information center.

## 5. ADVANTAGES OF THE COMPUTERIZED SYSTEM

a. Savings in Storage Labor

This section is almost totally based on work done by the Management Services and Organization Division of the Main Office, with the people of the Production Engineering Department of the Haifa Port.

- Receipt of magnetic media with manifest details from the Dizengoff Company and its input at the computer unit saves the preparation of documents based on the details of the manifest (packing list).
- There is no need to file packing lists at termination of dispatch (location information on already-dispatched cargo is saved magnetically for a number of years in case clarification is needed).
- Automatic input of data on DOOR containers which have been unpacked saves a range of details needed for the unloading report.
- Automatic production of unloading report.
- Cancellation of location function in the warehouses.
- Decrease of load on location unit due to the customer display terminal at the customs house.
- Receipt of a location terminal based on central information (replaces the procedure of searching through notebooks which need constant up-dating).
- Distribution of list of cargos which have been in the port for more than three months.
- Distribution of turnover reports from the computer eliminates the need to manually fill in various reports in order to calculate premiums.
- Elimination of the need to key-in unstuffing details at the container control center.

- The creation of billable transactions for unstuffing from the system decreases the intervention of the warehouse center in the billing procedure.
- A significant savings in the physical transfer of material from the information center to the warehouses and vice versa.
- There is no need to spend time manually preparing a report of weight deviation and a weight card which are distributed from the computerized system.

These savings were evaluated by means of a survey of some 400 monthly hours and do not include savings which will take place in the future as a result of improvements in the system. For example:

- Connecting the cargo system to the documentation center and to other systems.
- Receipt of manifest details from other agents on magnetic media.
- Connection between the "Zim" computer and the Ports Authority computer and the transfer of data on delivery orders.

b. Improvement of Procedures

- Shortening of procedures because of improvement in up-dating (for example: unstuffing of containerized cargo).
- Decrease of dependence on messengers who transfer material between the various work stations in the Port.
- Possibility of distributing legible and frequent information from the system to the various locations (the accounting department can receive manifest information).
- Exact collection of tariffs (ununitized cargo at unstuffing, dangerous cargo).
- Control of quantities (controlled management of quantities).
- Full follow-up of damages (various damage reports; checking that cargo is not dispatched if only a temporary report has been filled in; saving of historical data).
- Flexibility in dividing cargos between warehosues.
- Flexibility in weighing on the various scales.
- Every change of location will be up-dated and the location system will be immediately informed of the change.
- Faster and more exact charging of unstuffing.
- Full follow-up of cargo on ships operated by more than one agent (manifest number, level of agent and level of ship).
- Follow-up of changes and alterations in the manifest.
- Weight information is transferred automatically at weighing and is therefore more reliable.

c. Improvement of Customer Services

- Fast, exact and reliable receipt of location (immediately following input of receipt information: actual warehouse receiving goods, quantity received and not quantity declared, condition of cargo).
- Customer display terminal permits the customer to receive information about the availability of the cargo.
- Elimination of the location window in the warehouse permits the customer to send his driver directly to the dispatcher at the

warehouse without the need to wait at the warehouse location window.
- The shipping agent receives the reports (unloading report and list of cargo waiting for more than three months) faster. They are more readable and more reliable.
- Shipping agents who supply the Ports Authority with manifest information by magnetic media will receive invoicing information from Accounts Receivable by magnetic media.
- Exact calculation of storage days in the event of two charges.

d. Improved Control
- Excess cargo which was not taken care of will appear on reports which are automatically dispatched.
- The system will check, during dispatch, if the cargo is damaged, and will complete a temporary damage report.
- The quantity on the gate pass will not exceed the available quantity (amount received minus the amount dispatched).
- If the net weight on the dispatch document is greater than that approved on the gate pass, a weight deviation report will automatically be distributed.

## 6. COMPONENTS OF THE SYSTEM

### 6.1 Manifest Data Bank

The import procedure begins with the presentation of a manifest which includes details of all the cargo to be unloaded from the ship at the port. Each manifest relates to a ship and each line of the manifest relates to a particular cargo. The cargo can be a loose one (uncontainerized cargo, for example: crate or bulk), it can be part of a container, a Door to Door container. The system also handles transshipment cargo which is unloaded at the port but is designated for another port. The cargo will be reloaded on another ship at a later time.

The manifest is prepared by the shipping agent who collates it from the bills of lading. The data is received by the agent through various means: computer communication, telephone, telegram, telex and facsimile. The agent prepares the material in his office and numbers of the various cargos (a bill of lading cannot identify a cargo as it is issued at the port of loading and is not unique).

The manifest is an official document submitted for customs' approval (this body gives the manifest number). Copies of the signed manifest are transferred to the Ports Authority in order to plan the unloading and storage of the cargo. The manifest should be submitted several hours before the arrival of the ship (in rare cases, it is submitted when work begins on the ship).

Manifest data is fed through a series of screens and is collected in a data base. The data base consists of all the manifest data relevant to the port and a list of operative reports can be produced from it which

will be used during unloading (storage document, list of cargo in containers for unstuffing) and a number of management documents.

For each manifest (including ships with no cargo) general details are keyed-in, such as: identification of ship, name of ship, date of arrival of ship, agent identification. Cargo details, including type of cargo, marks and numbers, type of packing, quantity, weight, owner of cargo are listed below the general information. The data is taken from manifests submitted to the storage branch.

Most of the big agents submit the manifests from computerized systems and it is therefore possible to receive the data on magnetic media (this subject will be surveyed in detail further on).

6.2 Direct Delivery

Direct delivery is a procedure in which the cargo is directly transferred from the ship to a vehicle (in unloading) or from a vehicle to the ship (in loading), without being stored. A shipping agent who wishes a certain cargo to be delivered directly must receive approval from the suitable operations level. The warehouse does not handle cargo for which reports are not made in the warehouse. The cargo is registered in the tally report and in the warehouse responsible for delivery and the cargo leaves the port through the gate with accompanying documents prepared by the customs agent.

Some of the cargos go through the weighing scales and are reported from this work station.

6.3 Weighing Scales

The weighing scale is a work station through which some import and export cargos must pass (weighing of cargo is not obligatory and only some of the cargos are weighed at the initiative of customs, the customer or the Ports Authority). The weighing scales also weigh export containers.

The trucks are weighed empty (tare weight) and with cargo (gross weight). The difference between the two weights is the net weight of the cargo.

With each weighing the truck driver receives a document detailing the weight and type of weighing. It should be noted that with import, the truck is weighed for tare before it is weighed for gross and with export the order is opposite.

This work station also handles more complex procedures than the usual ones. For example:

a. One truck with several cargos (must be weighed after loading of each cargo, with the gross weight becoming the tare weight for the next cargo).
b. A truck larger than the scales and weighed in two stages.

c. A truck with one tare weight for several gross weights. The system follows up on the number of weighings.
d. Completion of details when the truck wasn't weighed for tare and it is possible to avoid unloading the cargo and returning to the scales for empty weight.
e. Separating net weight calculated for two cargos which are difficult to separate.
f. Automatic follow-up of cumulative weight that the customer is entitled to release according to his gate pass, and presentation of information about deviations of weight if such exist.

6.4 Receipt of Cargo

All cargo indirectly delivered is stored, at some stage, in a warehouse. At the time of storage, the quantity received and the exact location of the cargo is noted. (It is possible to place the cargo in a large number of locations and every displacement is fed into the system.) If the cargo is found to be damaged, this is noted and details of the damage are given. Damage reports can be given at any stage. If at the time of receipt of the cargo only partial details are given, the system reports that at dispatch, details will be completed and a final damage report will be presented. During the unloading process, a cargo receipt report can be given which details all the cargos received and reported at that moment.

Registration of receipt details based on the data permits receipt of cargo information at the information center. The deviations between expected quantities and received quantities are checked by the warehouse managers and by the representatives of the tally companies (a third party which actually represents the shipping agent and its representatives register all the unloaded cargos, taking into account all the events accompanying the unloading procedure). With the completion of unloading of the ship and clarifications, the system is informed of the date of completion of unloading. This marks the end of unloading and permits presentation of an unloading report which compares the expected quantities with the actually received quantities. The report is made up of several sections, each of which relates to a different group of deviations, for example: missing cargo, excess cargo, uncounted cargo, cargo delivered directly, cargo which fell into the sea, cargo which should be released at a different port. The report is given to the shipping agent who makes corrections on the manifest (the correction is made on a legal document approved by Customs). The corrections are based on the unloading document, the tally report (given to the agent by the tally company), and examinations made by the agent.

6.5 Unstuffing of Containers

Containers slated for unloading (pier) are unloaded at the port or outside of it (at unstuffing terminals). This sub-system only handles containers which are emptied by the port. The unstuffed cargos found in the container are stored in a warehouse in a procedure detailed in

Section 6.4. The unstuffing sub-system transfer container-unstuffing information to the related systems:

a. Transfer of notice to the container system that the container has been unstuffed in order to change the status of the container in the container system.
b. Registration of the fact of unstuffing permits receipt of unstuffing information at the customer display terminal in the information center.
c. Initiation of billing the shipping agent for unstuffing, taking into account the weight of the unstuffed cargo and the type of packing. The billing is input by the collection system which prepares an invoice. The unstuffing sub-system is aided by a packing table which lists next to each type of packing if the cargo was unitized or if there is something which influences the price to be paid.
d. Transactions reports by the unstuffing crew are transferred to the system which calculates premiums.

Communication with related systems which are all computerized is done in real time. This type of communication shortens the procedures, saves the manual transfer of forms, increases the reliability of data, and saves typing time.

6.6 Information Center

Owners of cargo or their forwarders begin the process of cargo release by paying the customs authorities and the port. The customer or his forwarder receives a delivery order from the shipping agent permitting him to release the cargo. Upon completion of the payments to customs and the port, a gate pass number is stamped on a copy of the delivery order, and it is stamped by the customs authorities and the port authorities. These stamps turn the delivery order into a gate pass.

A customer arriving at the information center can check if his cargo is available by using the cutomer display terminal which is at his disposal. This terminal permits the customer to know if his cargo is available or not. The cargo will be identified by the manifest number + order number + secondary number or by the line number of the container in which the cargo is to be found. As the output will only note if the cargo is available or not, the data is not secret, and there is no need for an access restriction.

Upon receipt of a certificate that the cargo is available, the customer goes to the locations information unit where he receives exact information about his cargo (receiving warehouse, specific location and quantity received). At this stage, the details of the gate pass are up-dated to the system.

The system presents a location report which includes all the identifying details of the cargo and full details on the location(s) of the cargo (as noted earlier, the cargo may possibly be in a number of locations). This report permits the driver who comes to collect the

cargo to go straight to the dispatching warehouse person without stopping at additional stations on the way.

The information center immediately updates following input of receipt information and unstuffing data, as detailed in the two previous sections.

6.7 Dispatch of Cargo

The driver arrives at the warehouse and takes his gate pass and location report to the dispatcher. The dispatcher checks the cargo against the documents.

If there are no deviations, the cargo is loaded on the vehicle. The dispatcher updates the system with details of the dispatch (the dispatched quantity is erased from the location from which it was taken, the dispatched quantity is updated, and details of the vehicle and the driver are registered). The driver goes to the port gate and leaves the gate pass there.

When cargo is only partially removed (when the entire cargo cannot be loaded onto one vehicle) the driver leaves the gate pass at the gate on his first trip and all the other trips are accompanied by an accompanying pass prepared by the computerized system which follows all quantities which are dispatched. The accompanying pass is attached to the gate pass at the gate. The documents accumulated at the gate are periodically transferred to the collection department to check if additional invoicing is necessary (especially because of additional storage time).

6.8 Unclaimed Cargo

Cargo which has not been released three months after its receipt can be sold. The system will periodically release a list of cargo which has been in the port for more than three months. The list will include all details identifying the cargo and its exact location. Every warehouse manager will receive a list of the cargos found in his warehouse. He will check his warehouse and confirm that these cargos are physically in their place.

In the event that the cargo is not located, documents in the port and in the offices of the shipping agent will be examined. If these checks show that the cargo has been dispatched, this will be sent to the system. If no confirmation of dispatch is found, a theft report will be filed (one type of damage report). These two procedures will prevent this cargo from appearing on the existing inventory report of the warehouses. The cargos will be checked to see if they can be given the status of unclaimed cargo. Cargos that can be labelled as unclaimed, will be transferred to the unclaimed cargo warehouse. With the transfer of the handling to the unclaimed cargo warehouse, the owner of the cargo and the shipping agent will be notified by letter that the cargo stands to be sold.

If no reply is received from the customer within 14 days, the various authorities (customs, Ministry of Health, Ministry of Agriculture, Ministry of Transport) are asked if the cargo can be sold as unclaimed cargo. Upon receipt of approval to sell by tender, the cargo is opened and listed down to its smallest detail. The description is transferred to the tenders system, which presents a list of cargos which can be sold. The tenders system handles the advertising of the tender, the collecting of bids and the winner of the tender, and transfers the results of the tender to the cargo system, so that it will release the goods to the winner of the tender.

6.9 Direct and Indirect Export

In this procedure the cargo arrives by vehicle to the port's export warehouses. The cargo is accompanied by cargo documents prepared by the customs agent. The warehouse people check the cargo and input its identifying details and its location through the terminal in the warehouse. Upon completion of input, the system will print a storage document which will be considered a certificate of receipt to the warehouse.

When the time comes for loading to begin, the customer or his forwarder presents an export document, which gives him permission to remove the cargo from the warehouse for loading. A good part of the cargo is transferred to the area where containerization is done (loading of cargo into export container). Upon completion of stuffing of the cargo into the container, the container is transferred to the container terminal (the system accepts the identification of the container into which the cargo is stuffed).

If the cargo is exported by means other than container, it is transferred to the loading dock. This transfer will be reported to the system.

The system communicates between storage documents and export documents. The cargos loaded onto the ship are registered by a tally company employee. The registrations are checked against the documents at the port and if they are suitable, a cargo listing can be prepared.

Direct export is analogous to direct import, when the cargo arrives by truck directly to the loading dock without being warehoused. The only accompanying document in this case is the export document.

## 7. CHARACTERISTICS WHICH UNIFY THE SYSTEM

7.1 Communication with Outside Factors

This system, which is the largest operations system existing in the Ports Authority today, is characterized by its strong communication with outside factors. This communication is expressed by intensive daily contact between representatives of these factors and cargo workers at the port, and by massive transfers of documents in both

directions.

a. Shipping agent
   Submission of manifest
   Submission of notification of dangerous materials
   Request for direct delivery
   Receipt of unloading report
   Submission of alterations to the manifest
   Obtaining of delivery order
   Receipt of list of cargos not released within three months.

b. Customs agent
   This factor represents the customer in the procedure of releasing the cargo, from the moment the customer pays the shipping agent (it should be remembered that some customers do not use the services of a customs agent and handle release of goods by themselves).
   His activities involving the system are:
   Receipt of delivery order from the shipping agent and its transfer at the port.
   Receipt of information about the cargo and receipt of a location report at the information center.
   Handing of the location report to the driver, who drives to the warehouse.
   Issuing accompanying documents for bulk cargo for direct delivery.
   Handling weight deviations beyond those listed in the gate pass.

   Preparing of export documents.

c. Customs
   Receipt of copy of manifest with printed number and signature.
   Certification of alterations on manifest.
   Demand for customs examination.
   Cancellation of stoppage of cargo.
   Signature on gate pass.
   Certification of sale of unclaimed cargo.
   Determination of value for customs purposes, which will influence the port tariff.

d. Forwarders
   The international forwarder brings cargo from a number of customers, on one bill of lading. With the arrival of the container at the port, he takes care of paying the shipping agent and receives from the agent a delivery order which he turns in at the port. The forwarder attaches a divided list detailing the entire cargo including the general delivery order, and he supplies his individual customers with secondary delivery orders which relate to the cargos listed in the divided list.

e. Tally companies
   Representatives of these companies station themselves near the pier and register all cargo unloaded from the ship or loaded onto the ship. At the stuffing and unstuffing terminal, they register the cargo removed from the containers or stuffed into them.
   The tally company performs a number of activities connected with the system, such as registration on-the-spot of quantities on forms

provided by the system, such as: storage report or packing list; clarification in the event of unsuitability of data, submission of centralized tally report.

7.2 Transfer of Data To and From Outside Factors on Magnetic Media

a. "Zim", the national shipping company, handles 50% of the cargo moved in the ports of Israel. In light of this fact, the IPA made a trial attempt to receive data from the shipping agent on magnetic tape. Starting in January 1984, a magnetic tape is transferred daily with the manifest data obtained by the data processing unit of the Dizengoff Company (which represents Zim) from Zim by the data processing unit of the port of Haifa. The tape is called by software which transfers the data to the data base in which other manifest data is stored by means of Data Entry.

With the beginning of the operation of a cargo system at Ashdod Port in February 1988, magnetic tapes were transferred with manifest data on ships coming to Ashdod Port. The tapes are transferred to the computer unit at Haifa Port, called to the Haifa computer, and then transferred to the Ashdod Port computer by means of the National X-25 network via DS-X25 communications software.

b. The Dizengoff Company presents a magnetic tape every day with data concerning expected containers at the Ashdod Port container terminal. This tape is transferred to the computer unit at Haifa Port and is handled in a similar way to the manifest tape, as described above.

c. Recently a new trial has been started to input a diskette created on a personal computer by an additional shipping agent. The diskette should include manifest data relating to cargos which should arrive at Haifa and Ashdod ports. The diskette is read by software which operates on a PC located in the computer unit in Tel Aviv and the information is then uploaded to the HP-3000.

d. The Dizengoff Company receives a tape once a week with all the data of billing done by the Ports Authority to the Dizengoff Company. The various systems handling collection from shipping agents obtain these tapes, which include data relating to invoices of this specific agent. The tapes are presented at each port to the local representative of the agent, who transfers them to the correct unit at Zim in Haifa, for handling. The transfer of data by magnetic media reduced an enormous amount of keying-in data and decreased the backlog in preparing financial reports of the Dizengoff Company.

7.3 Connection between Computers

In parallel to the transfer of tapes between the Zim Company and the Ports Authority, it was decided to check the possibility of connecting the Zim Company computer to the Ports Authority computer in Haifa

Port. The purposes of this connection are as follows:

a. Independence from messengers who physically had to transfer the tapes.
b. Transfer of data at high frequency (once every 20 minutes). This will permit input of data on delivery orders in a reasonably short time from the moment of their creation. The creation of a temporary pool of delivery order data arriving through communication will improve service to the agent's customers (it will save keying-in time of data at the port and will prevent errors because of incorrect input). Connection between the computers should fulfill these two purposes.

The problems with the connections are in two areas:

a. Different hardware in the two companies (HP-3000 at the Ports Authority and VAX-8250 at Zim) to be solved through the use of a PC as an intermediary.
b. Approach to information and data should be protected on the Ports Authority computer, as the Ports Authority is a public company subject to the Privacy Protection Law.

7.4 Information Center

The system is charcterized by the strong daily communication with a large number of customers. In the past, customers would receive operational reports based on handwritten reports which were partial and inexact (based on data of expectation and not on actual data). Obtaining the data was done manually.

The establishment of a computerized system based on work stations at every operational location made it possible to turn the locations unit into an information center based on data existing in computerized systems. A customer receives the location of a Door to Door container from the container system and the location of a containerized cargo or a loose cargo from the cargo system. The menu on the screen includes several lines which suit the types of dispatch and any activity chosen will connect that terminal to the suitable system (the connection between two different systems on the same computer is made transparent for the user).

The information center was recently expanded by the addition of a customer display terminal, which will help customers make clarifications concerning their cargos. This terminal, which is located in a room specifically for customers, will be operated by the customers themselves and will permit them to know if their cargos are available or not. The limitations of information given about the cargo do not necessitate checking if the customer is eligible to receive the information and it is suitable to the management of the Privacy Law of availability of information. The customer can request information according to container in which his cargo will be found or according to identification of the cargo (manifest + number + secondary).

This service can be extended to othr areas and terminals can be

located at the offices of large customers so that they can thus serve their customers in their offices without making it necessary for their customers to come to the port.

7.5 Intensive Communication with Other Computerized Systems at the Ports Authority

The cargo system is characterized by its strong communication with other computerized systems in operation today.

a. Container system

Receipt of data on Door and Pier containers which were unloaded (a program which surveys the container file and outputs, according to manifest, all the Door and Pier containers unloaded from a particular ship. Door type containers will have their receipt noted so that an unloading report can be prepared, and Pier type containers will be registered in the file of containers for expected unstuffing).

Locations screens connected to the container system.

Transfer of information about unstuffing of containers from the cargo system to the container system.

Preparation of an expected container file within the manifest.

b. Collection system

Transfer of unstuffing data.

Transfer of labelling data to the cargo servicing accounting system.

Transfer of moving and storage data to the cargo servicing accounting system.

Transfer of notice of dangerous materials.

Exact collection based on actually received quantities.

c. Tenders system

Transfer of description of cargo to be sold by tender.

Input of results of tender into the cargo system.

d. Operations report system

Transfer of turnover data of workers.

e. Claims and damages system

Transfer of data on damaged cargo.

f. Tables system

The cargo system uses about 20 tables which are found in the central tables system.

7.6 Communication between the Computers

a. Communication between different computers located at the same location.

This connection, based on HP LAN solution (IEEE 802-3), permits the existence of communication between the cargo system and the other computerized systems which are in operation on other computers.

b. Communication between computers in various ports.

This type of communication is performed via the national X-25 communictions network, "Isranet", based on DS-X-25 and will be replaced by the end of the year by NS-X-25. This permits the

following activities:

1. Transfer of manifest and expected container data from the Haifa port computer to the Ashdod port computer.
2. Transfer of manifest data which were slated for one port to another port following a last minute change in the port of arrival.
3. Comparison of missing cargo at one port with excess cargo at the other port.
4. Transfer of data on cargo accepted at one port, but released at the other port (the cargo will be transferred before the release procedure from port to port, overland).

7.7 Computerized Work Station at the Weighing Scales

Every port operates a number of weighing stations (used to weigh bulk or other cargo whose weighing is demanded by the customs authorities or by the owner of the cargo).

The weighing scales are equipped with a computerized weighing head with an RS-232-C communications interface. The weighing head transfers the weight data to the HP-3000 computer at a rate of 2400 BAUD, upon request of the HP-3000. Weight data is input by means of two screens (one for weighing before the cargo is handled by the cargo system and the second after handling and filling in the suitable documents). Each one of them has a field into which the weight is transferred in real time by Authority written communications software (in the event of a communciations breakdown, the data will be fed manually). The work station at the weighing scales performs the following operations:

1. Tare weight of the truck.
2. Gross weight of the truck.
3. Distribution of weighing documents.
4. Distribution of notice on weight deviation.
5. Distribution of weight chart to gate pass.
6. Query on tare weight.
7. Distribution of report on turnover of the weighers.

## 8. EQUIPMENT AVAILABLE

Haifa Port

| | Existing & Operating | | Additions in Progress | |
|---|---|---|---|---|
| | Terminal | Printer | Terminal | Printer |
| Information Center | 3 | 2 | | |
| Warehouse 7 | 1 | 1 | | |
| Warehouse 15 | 1 | 1 | | |
| Unstuffing Terminal | 3 | 1 | 3 | 1 |
| Scales, East | 1 | 1 | | |
| Locations | 1 | 1 | | |
| Customs House | | | 1 | |
| Documentation Center | | | 1 | 1 |
| Kishon 3 | 1 | 1 | | |
| Scales, West | 1 | 1 | | |
| Scales,Kishon | | | 1 | 1 |
| Warehouse 3 | | | 1 | 1 |
| Total | 12 | 9 | 7 | 4 |

Ashdod Port

| | | | | |
|---|---|---|---|---|
| Information Center | 3 | 1 | | |
| Locations | | | 3 | 1 |
| Documentation | | | 1 | 1 |
| Warehouse Manager | | | 1 | 1 |
| Weighing Scales | | | 3 | 3 |
| Warehouse 201 | | | 1 | 1 |
| Warehouse 104 | | | 1 | 1 |
| Warehouse 105 | | | 1 | 1 |
| Warehouse 202 | | | 1 | 1 |
| Warehouse 203 | | | 1 | 1 |
| Warehouse 207 | | | 1 | 1 |
| Warehouse 302 | | | 1 | 1 |
| Warehouse 303 | | | 1 | 1 |
| Total | 3 | 1 | 16 | 14 |

## 9. SOFTWARE

### 9.1 Overview

| Sub-system | Application at Haifa Port | Application at Ashdod Port |
|---|---|---|
| Manifests | January 1984 | January 1988 |
| Receipt and Despatch | June 1986 | June 1988 |
| Weighing Scales | January 1986 | June 1988 |
| Unstuffing | June 1988 | December 1988 |
| Unclaimed Goods | August 1988 | January 1989 |
| Export | January 1989 | June 1989 |
| Communication with Related Systems | January 1989 | June 1989 |

9.2 The System Files

The cargo system is based on the Turbo Image/V data base. The data base includes:
10 manual master files
5 automatic master files
15 detail files
Average number of keys for Detail file is 2.
Maximum number of keys for Detail file is 3.
The maximum number of pointers from a Master file is 5.
The capacity of the Data Base is 250 megabytes and it is capable of reaching 400 metabytes.

Other than the Data Base files, there are about 10 KSAM files and 10 MPE files. One of the KSAM files is the central tables file, which today includes about 80 tables, of which about 20 serve the cargo system.

9.3 System Programs

Development is mainly based on Powerhouse software (QUICK, QUIZ, QTP) version 5.01. So far, some 60 QUICK programs, 60 QUIZ programs and 10 QTP programs have been developed. The QUICK programs, which handle complex screens, are very large and consist of 1700 lines of code. Most of the programs have 300-500 lines of code.
In addition to Powerhouse software, programs written in third generation languages are used, such as: COBOL and SPL. Programs written in COBOL are BATCH programs which should perform transfers and/or massive processing of data.

One program was written in SPL, and its function is to transfer the weighing data from the weighing head to the field located on the screen where weighing data is input. The QUICK program performs dispatch reading which is located in a segmented library. The reading is done by the instruction Do External. The weighing data is input as ASCII String and transferred to QUICK as Integer.

9.4 Personal Computer Software

The system is assisted by PC software services. This software should perform the following functions:

1. Transfer of manifest data written on diskette to the HP-3000.
2. Connection of HP-3000 to the VAX by means of a PC. For this purpose, a software package (Reflection*, from Walker, Richer and Quinn, Inc.) is used which performs emulation on the PC, at a terminal recognized by the HP-3000 (HP-2622) and as a terminal recognized by the VAX (VT-100), plus file transfers to and from each computer.

9.5 Summary

1. This application is very complex and has a large number of exceptions which were not evident at the beginning. The decision to use the Powerhouse software as a development tool for the system was correct. The system developed as a prototype. Use of a third-generation language would significantly increase the reaction time to any changes required in the applications process.
2. In a number of cases it was decided to substitute COBOL for the QUIZ and QTP programs because the functions were simple to program and easy to maintain.