

A SYSTEM AND METHOD FOR MANAGING TRANSPORTATION RESOURCES AND TRANSPORTING FREIGHT CONTAINERS

TECHNICAL FIELD

[0001] The present invention relates to the field of freight transportation. More specifically, the
5 present invention relates to a system and method for managing transportation resources and
transporting freight containers via an integrated hub to ensure an optimal use of transportation
resources.

BACKGROUND

10 **[0002]** Containerisation is a system of freight transportation based on the use of freight
containers. The containers are built to standardised dimensions in order to provide cross-
compatibility across the various transportation networks such as road, rail and sea, for example. An
example of international standards that are applicable to containers can be found in the
International Standards Organisation (ISO) Handbook – Freight Containers, which is hereby
15 incorporated by reference.

[0003] The widespread use of ISO standards for freight containers has allowed freight containers
to become the backbone of global supply chains. It is estimated that over 13 million freight
containers are currently in service around the world and conform to ISO standards. These
containers commonly take one of three forms, though there may be others. A container is
20 commonly twenty feet, forty feet or forty-five feet in length. The capacity of vessels that transport
such containers is given in TEU (twenty-foot equivalent units). A ship capable of carrying 100
twenty-foot containers, for example, would be described as having a capacity of 100 TEU.

[0004] Matching the phenomenal growth of the use of freight containers in global trade, systems
and methods of optimising the storage and transportation of such freight containers have also
25 rapidly developed. Such measures relate to ship design, in order to transport greater numbers of
TEU per voyage, and to loading and stacking methodology, in order to optimise the loading
capacities of ships. However with the recent increase in environmental awareness, it has become

equally important not just to optimise the use of freight containers, but also to optimise the direct and indirect resources involved in the transportation of such freight containers.

[0005] In this respect, once a freight container reaches a port, for example, it is unloaded and requires transportation. If the freight container only contains freight going to one destination, then
5 that freight container may be transported directly. A single freight container may also contain freight that is required to be distributed to several locations. In such cases, the freight container may need to be transported to a repacking and re-distribution warehouse first.

[0006] Whichever the case may be, in order to transport a freight container, a prime mover (or hauling truck) having a trailer (alternatively also referred to as a chassis) is required. These are
10 collectively referred to as "transport resources". The trailer is such that it is adapted to have the freight container mounted thereon. Thereafter, the prime mover will haul the trailer (with the mounted freight container) to the intended destination. The trailers are also subject to ISO standards and come in different lengths. There are different trailers suited for transporting a single twenty-foot container, a forty-foot container or a forty-five foot container. It should be noted that a
15 trailer suited for transporting one forty-foot container or one forty-five foot container may also transport up to two twenty-foot containers simultaneously.

[0007] Transport resources may also include the additional resources required for the transportation of freight containers such as warehousing and storage yards, prime movers, trailers and trailer parks (venues where trailers may be parked). As such, systems and methods of
20 optimising these resources involved in the transportation of freight containers have also been devised in an attempt to reduce the financial and non-financial costs such as the environmental impact. The following are examples of such systems and methods:

1. United States patent application published as US 2004/0193466 A1 (the "Kull Patent"),
and
- 25 2. United States patent application published as US 2006/0111929 A1 (the "Poole Patent").

[0008] The Kull Patent discloses a method of managing a yard, via the use of a computer programme. Essentially, the method disclosed by the Kull Patent includes three main steps:

1. Collecting information associated with either a hauling truck and/or a freight container, which may be located in the yard;
2. Scheduling an activity, which includes tracking the location and status, of the hauling truck and/or container; and
- 5 3. Providing a user with information on the status of the hauling truck and/or freight container.

[0009] The method disclosed in the Kull Patent appears to manage only pre-scheduled inbound or outbound transportation of freight containers. It does not appear to provide any dynamic capability to receive inbound or outbound freight container transportation jobs, and match those jobs to the
10 resources available at the yard or to a transport resource such as a prime mover, for example. Also, there is no ability for the various resources that are managed under the Kull Patent to be shared or redistributed according to changing workloads (see paragraph [0003], Kull Patent).

[0010] Another method and system for transferring control, liability and usage of a shipping/cargo container, or trailer between different participating parties that operates from a remote location is
15 disclosed in the Poole Patent. The system requires a terminal that is defined as a freight station. The terminal may include offloading equipment, piers, container berths and storage areas, amongst others. The participants in this system include draymen, trucking firms, warehouse facilities, container depot operators and others (see paragraph [0033], Poole Patent).

[0011] In addition to the above, the system includes a central controller comprising a processor
20 and a data storage system (see paragraphs [0034], [0041] and [0043], Poole Patent). The central controller records information relating to container types, such as a dry freight container, a refrigerated container, an insulated container, for example. Each container has a unique identifier (see paragraph [0037], Poole Patent). Further, the Poole Patent also discloses that the chassis type necessary for hauling the container type may also be included in the controller. This
25 information permits persons involved in the transportation of containers to know the type of chassis required to do so (paragraph [0037], Poole Patent).

[0012] The database of the control centre also includes both static and dynamic information. Static information refers to particulars such as a container number, chassis number and terminal location, which typically do not vary over time, for example. Dynamic information includes the

location details of the container, trailer or chassis, as well as the projected time of availability thereof (see paragraph [0040], Poole Patent), which is subject to change over time.

[0013] It should also be noted that the object of the invention disclosed in the Poole Patent is stated at paragraph [0004] thereof. The Poole Patent describes the object of the invention as one
5 that "*facilitates transferring usage of a container, trailer and/or chassis without returning it to a storage area.*" According to the Poole Patent, the removal of the requirement to return transportation resources to a storage area is supposedly beneficial in that it reduces inefficiencies, reduces noise and air pollution, wastes valuable time and therefore, incurs unnecessary costs.

[0014] However, the Poole Patent does not appear to disclose the use of a centralised location at
10 which shared transport resources are located. Furthermore, under the Poole Patent, it would appear that the matching of possible job requirements is required to be done manually by participants. The Poole Patent also focuses on the re-use of freight containers belonging to the same shipping line. In other words, after unloading an imported container and if there is a need of the same type of container for export purposes in the vicinity, the Poole Patent will request the
15 shipping line to re-use the imported container for the purpose of export instead of returning the empty imported container to the shipping line storage depot. According to the Poole Patent, this practice is supposedly beneficial in that it reduces inefficiencies by removing the need to return and collect empty containers. However, as mentioned, the Poole Patent does not disclose any sharing of transport resources to complete jobs in the network. As such, under the Poole Patent, given that
20 the imported freight container belongs to the shipping line, it is likely that the exporter will only have use of the container provided that he uses the services of the same shipping line as well.

[0015] As such, despite the above-mentioned attempts at providing a system and method of optimising the transport of freight containers, there is still a need for a system and method for doing the same that is comprehensive in that it automatically matches job requirements to the resources
25 available in the most optimal manner. In addition, there is also a need for a system and method of transporting freight containers that is and cost – effective to implement and environmentally friendly as well. In this respect, a system and method, as described below, and as defined in the claims appended below, overcomes the above-mentioned difficulties.

DESCRIPTION OF THE INVENTION

[0016] A first aspect of the invention relates to a system for managing transportation resources and transporting freight containers. The system includes a transport resource, a central location having at least one access point, and a controller. The transport resource may be, in addition to the
5 definition provided above, a person involved in the transportation of freight containers. Thus, the transport resource may include, but are not limited to, resources such as prime movers/hauling trucks, trailers/ chassis, chassis parking, chassis pooling,(which is described in greater detail below). container storage yard, and computer systems for carrying out scheduling and job sharing (which is described in greater detail below). The transport resource may also have a unique
10 identifier. The unique identifier of the transport resource may contain information pertaining to the availability status, the particular vehicle registration number or load capacity of the transport resource.

[0017] The central location (or integrated hub known as TransHub) includes a container storage yard. The container yard is adapted to accommodate therein at least one freight container. Each
15 freight container accommodated or stored in the yard is assigned with a first unique identifier.

[0018] The central location also includes a trailer or chassis park. The trailer park is adapted to accommodate or store at least one trailer. Each trailer is assigned a second unique identifier. Typically, the freight container(s) stored in the container storage yard may be transported by a corresponding trailer from the trailer park. It should be noted that the number of freight containers
20 in the storage yard need not correspond to the number of trailers in the trailer park. Thus, the central location or integrated hub also serves as a transit or intermediate yard, where pooled transport resources such as the trailers and freight containers can be centrally controlled, scheduled and utilised more efficiently. In so doing, backhaul trucking can be achieved for both "empty" and loaded containers so that transportation efficiency can be improved.

[0019] Backhaul trucking is the return movement of a prime mover from a destination to either its
25 original point of origin or to another destination. Illustratively, when a haulier transports freight container(s) to the port, the haulier's load is then deposited at the port area for onward transportation via a shipping line. The haulier then has to make a return journey from the port to another destination and will typically make this journey without transporting any freight container

from the port. In other words, the haulier, with a trailer will have to make what is essentially an unproductive journey back. This is avoided as explained below due to the function of the controller.

[0020] The controller is adapted to be in a first communication with at least one communication network. The communication network would be one that is typically associated with logistics or transportation networks, such as PORTNET® ("Portnet"), for example. Portnet is an integrated system used by shipping lines, hauliers, freight forwarders, shippers and local government agencies to determine a vessel's transit particulars, i.e. the real time arrival/departure of vessels calling at a port. The Portnet network typically has at least one participant. In one exemplary embodiment, a participant may be a customer in reality who may wish to either export (shippers) or import (consignees) cargo in freight containers. In this exemplary embodiment, a participant will provide the controller with his logistical criteria (i.e. whether he is carrying out an export or import process) via the communication network such as Portnet.

[0021] The logistical criteria may include, but is not limited to, the scheduling of the delivery or collection of freight containers to or from the port as needed based on whether the participant is carrying out an export or import process. As Portnet is also capable of linking up with other transport networks, such as the Haulier Community System ("HCS"), and the Mobile Data Terminal (MDT System) the logistical criteria may also include details such as specifics relating to the type or identify of the transport resource to be used, for example. It should be noted that Portnet is but an example of a transportation computer network that may be used in conjunction with the system of the present invention. Thus, it follows that any other transportation computer networks that have similar capabilities as Portnet may be considered to be the first communication network that is in the first communication with the controller.

[0022] The controller is also adapted to be in a second communication with the central location. Via the second communication, each first unique identifier of any of freight container stored in the container storage yard is relayed to the controller. Furthermore, each second unique identifier of any trailer available in the trailer park is also relayed to the controller.

[0023] As such, when the controller receives logistical criteria from a participant via the first communication network, the controller performs a determination. The determination performed by the controller involves assessing if the logistical criteria can be satisfied by any of the first and/or

second unique identifiers. If the controller determines that there is/are freight containers and/or trailers that satisfy the logistical criteria, the controller will transmit that determination to the transport resource. The transmission of the determination may include detailed instructions for the transport resource to follow in order to satisfy the logistical criteria.

- 5 **[0024]** In addition to the above-mentioned particulars, the logistical criteria may also include, but is not limited to, the matching of export and import transportation particulars to ensure that trips to and from the port (i.e. backhaul) are fully utilised to avoid or at least minimise the occurrence of an “empty trip” by prime movers during backhaul. An “empty trip” is one where the prime mover is hitched to a trailer but is not delivering or collecting freight containers to or from the port. Hence,
- 10 with the controller being in network connection with port resources such as Portnet, logistical criteria about inbound freight containers can also be sent to the controller by a participant. This allows the controller to make a determination and assign available transport resources in the port vicinity to transport said incoming freight containers for the backhaul leg of their journey to the central location.
- 15 **[0025]** The logistical criteria may also include requirements for the “double mounting” of containers in one trip to and from the port based on the export and import freight containers full filling the criteria of the port. “Double mounting” refers to the carrying of two (2) 20 foot containers in one trip by a single 40 foot or 45 foot trailer. The purpose is reduce one trip and can only be done when both the 20ft containers are exported or imported on the same vessel.
- 20 **[0026]** In one exemplary embodiment, in an effort to increase the efficiency of freight transport, the participant may be a transport resource instead of a customer. In such an exemplary embodiment, the transport resource may, for whatever reason, be unable to carry out the instructions received from the customers. In such circumstances, the participant (transport resource) may then submit the logistical information (which would typically be included in the
- 25 instructions transmitted earlier) to the controller. The controller may then forward the logistical information to any other participant (which may also be another transport resource) deemed by the controller as being suitable to fulfil the task as set out in the logistical information. Once another transport resource has been determined to be suitable, the controller will re-transmit the instructions to the new transport resource. The feature of letting a participant reallocate instructions

received from the controller to any other participant (who may also be a transport resource) is known as job-sharing.

[0027] Alternatively, where one participant is unable to fulfil the task as set out in the logistical information, he may reject the task at which point, the controller may broadcast the availability of the task to all other participants. In such an exemplary scenario, the other participants may then opt to take up the task upon which the controller will send the necessary logistical information to that participant.

[0028] In one embodiment of the invention, each first and second unique identifier includes at least one type of identifying data. The type of identifying data of the first unique identifier may be selected from the group consisting location data, freight container specifications, length, width, gross weight, storage container type, load status such as "Empty or Laden" and container number and vessel estimated time of arrival (ETA) (i.e. a vessel's transit particulars). Similarly, the second unique identifier may also include information selected from the group consisting location data, trailer specifications, length, width, maximum laden weight, and trailer serial or registration number.

[0029] In another embodiment of the invention, the controller may be a computer device. In this embodiment, the controller may be located at the central location itself or remote thereto. The controller may carry out its determination of whether any logistical criteria are satisfied via a computer programme.

[0030] In one exemplary embodiment, the controller may further include a first database. This first database may contain various predetermined logistical criteria or parameters that are available for selection. This first database may be made available to participants of the communications network via the first communication. In this exemplary embodiment, the participants may then select certain preset logistical criteria and/or parameters immediately and submit their selections as their required logistical criteria. Alternatively, the participant may elect to key in or input customised logistical criteria for onward transmission to the controller.

[0031] In yet another exemplary embodiment, the first database may be a dynamic database that is updated with logistical criteria from the various participants in the communications network in real-time or at regular periodic intervals. This is to ensure that the latest and most current logistical

criteria required of the participants is constantly updated and reflected to the controller in order that the most accurate determination may be made.

[0032] In any of the embodiments of the invention described herein, the logistical criteria may include, but is not limited to, particulars of a transport resource (including prime movers and/or trailers), a pick-up location, a drop-off location, the identifying data of the first unique identifier and/or the at least one type identifying data of the second unique identifier.

[0033] In yet another embodiment, the controller may also include a second database. This second database may be adapted to contain each first unique identifier and each second unique identifier as transmitted from the central location via the second communication. In an exemplary embodiment, the second database may be a dynamic database that is updated in real-time or at regular periodic intervals.

[0034] The communications network, as mentioned above, may be associated with a transportation and/or logistics network. In this respect, it may either be a public or a private data network. In either case, the public or private network may be one that is associated with a transportation infrastructure. Examples of transportation infrastructure include, but are not limited to, ports, railway yards, terminals, airports or any other freight distribution network.

[0035] As a further exemplary embodiment, the communication network may be established according to any one or more of the following exemplary protocols:

- Wireless LAN (IEEE 802.11) Protocol,
- MAC bridging (IEEE 802.1D) Protocol,
- VLANs (IEEE.802.1Q) Protocol and Network,
- Access Control (IEEE 802.1X) Protocol,
- Internet Protocol, and
- TCP/IP Protocol.

[0036] In one embodiment, after the controller has made a determination, and transmitted the determination to the transport resource, the controller may also transmit, together or distinct from the determination, a set of further instructions to the transport resource. The instructions

transmitted to the transport resource may include a specific first unique identifier and/or a specific second unique identifier in order that the transport resource may proceed to the central location to retrieve or deposit, as the case may be, a freight container and/or a trailer corresponding to the unique first and/or second identifiers.

5 **[0037]** In yet another embodiment, the system may further include a security module. The security module may be located at the at least one access point of the central location, wherein said security module is in a third communication with the controller. The purpose of the security module is to perform a verification exercise of all incoming and outgoing transport resources. This is especially so where the transport resources are in possession of an unloaded trailer or a trailer
10 loaded with a freight container. In carrying out the verification exercise, the security module verifies that the transport resource is only in possession of a freight container and/or a trailer (as the case may be) having the first unique identifier and/or second unique identifier that corresponds to the transmitted determination or further transmitted instructions that also satisfy the logistical criteria.

[0038] Another aspect of the present invention relates to a method for managing transportation
15 resources and transporting freight containers using a system as described above. The method includes the following steps:

- receiving logistical data from the at least one participant at the controller;
- receiving each first unique identifier of any of the at least one freight container and/or each second unique identifier of any of the at least one trailer
20 accommodated in the container storage yard and trailer park, respectively, at the controller; and
- performing a determination if any of the first and/or second identifiers received via the second communication positively satisfy the logistical criteria received via the first communication, and if so, to transmit that determination to the transport
25 resource, the at least one participant, or both.

[0039] One embodiment of the second aspect of the invention includes the controller receiving updated first and second communications either in real-time or at regular intervals. The transmission of updated first and second communications to the controller can be programmed

within the transmission protocol that governs the frequency at which data is transmitted via the first and second communications and the controller.

[0040] In yet another exemplary embodiment, the method may include transmitting to the transport resource instructions to follow in order to satisfy the logistical criteria. In this exemplary
5 embodiment, the instructions to follow may include information selected from the group consisting of freight container or vessel ETA, freight container arrival location and the at least one participant's location, for example.

[0041] In another embodiment, the method may further include a verification that the transport resource is only in possession of a freight container and/or trailer having the first unique identifier
10 and/or second unique identifier that corresponds to the transmitted instructions. Yet another step in the verification process may be a performance of a check to ensure that the freight container and/or trailer also satisfies the logistical criteria.

[0042] In any of the above-mentioned embodiments of the invention, the central location may be located proximate to road, rail or port infrastructure in order to reduce transit time of the transport
15 resource between the central location and the locations disclosed in the logistical criteria.

[0043] Although various aspects and embodiments of the present invention have been described above, the following illustrations of exemplary embodiments and accompanying description serve to further aid in the understanding and clarity of those various embodiments of the invention. However, it should be noted that the scope of the invention is by no means limited to the exemplary
20 embodiments described and illustrated hereafter, but rather, as set out in the claims that are appended hereto.

BRIEF DESCRIPTION OF THE DRAWINGS

[0044] FIGURE 1 is an illustrative embodiment of a system for managing resources and
25 transporting freight containers;

[0045] FIGURE 2 is an exemplary process flow diagram of an import process flow;

[0046] FIGURE 3 is an exemplary process flow diagram of an export process flow;

[0047] **FIGURE 4** is an exemplary process flow chart for depositing and withdrawing either a freight container or a trailer at the central location;

[0048] **FIGURE 5** is an exemplary process flow diagram for a trailer resource sharing scheme and trailer parking as carried out at the central location; and

5 [0049] **FIGURE 6** is an exemplary process flow diagram for the sharing of transportation jobs (job sharing) amongst participants of the communication network.

DETAILED DESCRIPTION OF THE DRAWINGS

[0050] **FIGURE 1** is an illustrative embodiment of a system for managing resources and
10 transporting freight containers. A central location **10** includes a container storage yard **11** and a trailer park **12**. The central location **10** may have a single access point for security reasons. However, if practical, more than one access point may be present. The central location **10** is intended to facilitate the carrying out of either an import process or an export process, which is described later below.

15 [0051] The central location **10** is in communication with a controller **14**. The controller **14** may be co-located at the central location **10** or remotely located at another suitable location. The communication between the controller **14** and the central location **10** may be via a public or private network, and may be wired or wireless in nature.

[0052] The container storage yard **11** is adapted to accommodate or store therein freight
20 containers. The freight containers may be 20-feet, 40-feet or 45-feet long. Each freight container is assigned a unique identifier. That unique identifier may include any one or more of the following information:

- Container specifications, such as the length, breadth, width, height, capacity;
- Container number;
- 25 • Class of cargo;
- Gross weight; and
- Empty or Laden Container.

- Carrying capacity
- Vessel transit information or particulars

[0053] The trailer park **12** is adapted to accommodate or store therein trailer. The trailer may be suitable for transporting 20-foot, 40-foot or 45-foot long freight containers. Each trailer is also
5 assigned a unique identifier. That unique identifier may include any one or more of the following information:

- Chassis specifications such as the length, breadth, width, capacity;
 - Carrying capacity;
 - Serial number; and
- 10 • Laden and unladen weight.

[0054] The controller **14** is itself in communication with networks and/or systems from other transport infrastructure such as port **18** and rail **19**. In addition, the controller **14** is also in communication with at least one participant (who may be a customer requiring freight container transportation services or a transport resource) **17**, and possibly with a prime mover **16** having its
15 own unique identifier. The prime mover **16** is also known as a haulier and in this context, refers to a truck that is hitched or unhitched to any trailer.

[0055] The status of whether a prime mover **16** is hitched or unhitched to a trailer is known to the controller as all prime movers **16** are by default unhitched and are assigned a trailer from the trailer park as and when a participant submits logistical criteria. However should a prime mover **16** be
20 hitched to a trailer whose unique identifier is not contained within the controller, that new information, i.e. the unique identifier of the trailer, may be added to the controller either by the transport resource in-charge of the trailer or when the prime mover **16** attempts to access the central location with the trailer hitched.

[0056] As with the central location **10**, the communication between the prime mover **16**,
25 participant **17**, port **18** and rail **19** may be via a public or private network and may be wired or wireless in nature depending on operational requirements. It should also be noted that all communications are indicated as being potentially bi-directional in nature.

[0057] The controller **14** receives the unique identifiers of all the freight containers and trailers that are within the central location **10**. The controller **14** may compile the unique identifiers into a database. In addition, the controller **14** is also adapted to receive logistical criteria from the participant **17**, the port **18** and the rail **19**. The nature of these logistical criteria may vary across the three parties concerned depending on whether an import or export process is being carried out. The controller **14** will provide the trucking schedule for execution accordingly to the logistical criteria.

[0058] **FIGURE 2** is an exemplary process flow diagram of an import process. An import process is where a party intends to import goods contained in a freight container into a country.

Accordingly, the freight container would typically arrive either via road, rail or sea. Where the freight container arrives by sea, for example, it will be unloaded at a port. Prior to this, while the freight container is still in transit, a participant may log into a network and input or select present his logistical criteria or booking information. In this example, the participant will typically input any one of the following parameters such as the expected time of arrival (ETA) of the vessel, the number of containers (if there are more than one), type, size, class of cargo and serial number of the freight container(s).

[0059] Upon receiving the booking information or logistical criteria, the booking information is verified by the controller **14** via its communication network with the port **18**. If the booking information cannot be verified the customer is notified that the logistical criteria cannot be satisfied.

[0060] After the verification step is carried out and accepted, the participant **17** will be informed that the booking information has been accepted and that the freight container will be picked-up and delivered to the container storage yard **11**. Once this is done, the controller **14** will schedule when the freight container is to be picked up as well as ensure that a space is allocated for the incoming freight container in the storage yard **11**. The controller **14** will prioritise those prime movers **16** that are transporting export containers to perform the import function since those prime movers **16** are in port area and can perform the import as backhaul trip. In the event that no prime movers **16** are available from the export pool then the controller **14** will also inform a prime mover **16** of the pick-up requirements. In so doing, the controller will also inform the prime mover **16** to come to the trailer park **12** to collect a suitable trailer if required prior to travelling to the port **18** to collect the freight container.

[0061] Once the prime mover **16** collects the freight container from the port **18**, it is transported back to the central location **10**. At the access point to the central location **10**, a security module or gate module performs a verification exercise to ensure the following:

- 5 • that the prime mover **16** is the same prime mover **16** that was dispatched to collect the freight container;
- that the trailer hitched to the prime mover **16** is the same one that was taken out earlier (or assigned) on to collect the freight container via a comparison with the unique identifier already within the controller **14**, unless the prime mover **16** already had a trailer hitched to it previously; and
- 10 • that the unique identifier of the freight container is captured and entered into the controller **14**.

[0062] Thereafter, the freight container is received at the storage yard **11**. The prime mover **16** may return the trailer to the trailer park **12** or alternatively, if the prime mover **16** has been assigned a further freight container-related task, proceed with that task if the trailer that is currently hitched is
15 suitable. The controller **14** will then inform the participant **17** that the freight container has been received and is presently at the storage yard **11**. The participant **17** may then make his own arrangements to collect the freight container from the storage yard **11**.

[0063] The participant or its representative will have to inform the controller **14** via the communication network of the identity (whether it is a serial number or the third unique
20 identification) of the prime mover **16** that is retrieving the freight container. The third unique identifier of the prime mover **16** may be pre-stored in the controller **14**. As such, the prime mover **16** that is sent to collect the freight container from the storage yard **11** will also have to go through a verification exercise at the access point via the security or gate module. This verification exercise is intended to ensure that only the authorised prime mover **16** having the matching and/or allocated
25 unique identifier is allowed to enter the central location **10** and to retrieve the specific freight container and/or trailer from the storage yard **11** and trailer park **12**, respectively. The freight container being retrieved will undergo a verification exercise upon exit to confirm that the correct freight container bearing the correct unique identifier is being transported on a trailer having the

correct unique identifier by a prime mover having its own correct unique identifier for onward delivery to the customer's premises. With that, the import process is completed.

[0064] It should be noted that at each verification exercise, there is the possibility of a manual override taking place if it is determined that entry or exit of the prime mover, freight container or trailer should be allowed for other reasons.

[0065] **FIGURE 3** is an exemplary process flow diagram of an export process. An export process is the process by which a participant intends to ship goods via a freight container out of a country. Prior to the export process being initiated, the freight container is loaded, or "stuffed". The freight container used for stuffing may originate from the central location **10** or from another location. If the freight container to be used originates from the central location **10**, a prime mover of a participant proceeds to the central location **10** to collect a trailer if required and freight container and carries out a freight container retrieval process and delivers the freight container to a particular location for stuffing. Once stuffing is complete the prime mover (which may or may not be the same prime mover that first brought the container to the stuffing location) picks up the stuffed container and transports it to the central location **10**. Upon reaching the central location, the prime mover deposits the stuffed container at the container storage yard **11** via a freight container deposition process.

[0066] During both the freight container retrieval (for stuffing) process and the freight container deposition process similar verification exercises, as described above, are carried out by the controller **14** and security module (or gate module) during the entry and exit of the prime mover, trailer and freight container. Typically prior to the freight container retrieval or deposition processes, the participant **17** would have already sent in its logistical criteria or booking information to the controller **14**. Under an export process where the freight container is being shipped out for example, the information would typically include, but is not limited to, the name of the vessel, the ETA of the vessel, the number of containers to be transported to the vessel's loading area, the serial number of the freight container(s), and the date of the freight container arriving at the container storage yard **11** for export.

[0067] Upon receipt of the booking information, the controller **14** verifies the information with the port **18** via a communication network to confirm the ETA of the vessel and its location details upon docking. The controller **14** will also determine whether the participant **17** has provided sufficient

particulars with respect to the unique identifier of the freight container and/or trailer (if applicable). If the logistical criteria (or booking information) has been successfully verified, the storage yard **11** will expect the freight container to be delivered pursuant to the logistical criteria stated by the participant **17**. Upon delivery, a verification exercise, as described above, will be conducted and the
5 freight container will be placed in the storage yard **11**.

[0068] Thereafter, the controller will carry out a determination of the available trailer and assign or schedule a suitable trailer to transport the freight container to the port **18** at the designated time. Concurrently, the controller **14** will also notify a prime mover **16** of the need to pick up the freight container at a designated time for transportation to the port **18**. In this regard, should the prime
10 mover **16** already have a trailer hitched thereto, upon entry into the central location **10** the details of the trailer hitched to the prime mover **16** will be captured and the originally assigned trailer will be freed to satisfy other logistical criteria from other participants. Regardless, the prime mover **16** with a trailer hitched thereto will collect the freight container from the storage yard **11** and transport it to the designated location in the port **18**. Upon delivery to the port **18** and discharge, the participant
15 will then be notified thereof.

[0069] After delivery to the port **18**, the prime mover **16** will be designated with another trucking job by the controller. As the prime mover **16** is likely to have a trailer hitched thereto already, the controller will prioritise such prime movers **16** to collect freight containers from the port **18** for transport to the storage yard **11**.

20 **[0070]** **FIGURE 4** is an exemplary process flow chart of for depositing and withdrawing either a freight container or a trailer at and from, respectively, the central location **10**. This process flow chart is part of the process flow chart of either the import or export processes described above. Alternatively, it may simply function as a stand-alone process to allow owners of freight containers and/or trailer to make available their respective transportation resources for other parties to use.
25 For example, a participant **17** may have a plurality of trailer, freight containers, or both and may not be using all or any of it. In such instances, the participant may deposit some or all of its trailer and/or freight containers at the trailer park **12** and freight container storage yard **11** at the central location **10**.

[0071] The participant **17** begins by sending the unique identifiers of its freight containers and/or trailer to the controller **14**. The controller **14** determines from the information received whether there are any space constraints at the container storage yard **11** and/or trailer park **12**. If there are, then the deposit request is declined. Otherwise, the controller **14** accepts and notifies the
5 participant **17** of the acceptance. The respective storage yard **11** and/or trailer park **12** are notified of the incoming resources.

[0072] As in all the prior processes, a verification exercise or procedure may be instituted at each stage. The verification exercise is, as always, subject to a manual override should there be a need to do so. When the resources to be deposited arrive at the access point of the central location **10**,
10 the verification exercise is performed to ensure that the resources being received match those stated in the unique identifiers provided by the participant **17**. Once verified, the resources are accepted and stored in the appropriate locations for use by the participant **17**, or any other authorised party.

[0073] Subsequently, should the participant **17** wish to withdraw its resources, the participant **17**
15 will simply have to send its withdrawal request stating the unique identifiers of the resources to be withdrawn. The controller **14** will then prepare the resources for withdrawal by not assigning them to any future transportation tasks and/or jobs. If the resources are already being employed, then the controller **14** may inform the prime mover **16** to return the resources as soon as the task is completed. Once the resources to be withdrawn have been prepared and are ready for withdrawal,
20 the participant **17** is then notified and may collect the resources. Upon exiting the central location **10**, a security verification exercise is once again carried out.

[0074] Through this, a sharing of logistical resources (such as prime movers **16** and trailers) participants, such as transport resources, are able to undertake a greater variety of transport jobs and tasks as they will have at their disposal a variety and number of freight containers and trailers
25 at the central location **10**. Furthermore, they will not be short of trailers to transport the various freight containers as there ought to be a sufficient number available via the trailer park **12**.

[0075] If any participant requires additional trailers, the controller **14** will verify and check for availability of such resources from other participants before accepting the request of a participant in need of additional resources.

[0076] FIGURE 5 is an exemplary process flow diagram for a trailer resource sharing scheme as carried out at the central location. A participant in the resource sharing scheme registers the particulars of its resources such as a prime mover and/or a trailer, for example. The registration is confirmed. If the participant has already stored the maximum number of trailers under an allocated
5 quota at the trailer park, then the registration is rejected. Otherwise, the participant is informed that the trailer may be sent to the trailer park to be deposited thereat for use by other participants.

[0077] Practically speaking, the participant has to send a prime mover hitched to the trailer over to the central location. Upon reaching the central location, the prime mover, which has the third unique identifier, which was also registered with the controller earlier on, is allowed into the central
10 location. Entry to the prime mover and trailer is granted once the respective unique identifiers are confirmed by the controller and/or security module at the access point to the central location. Once entry is gained the trailer is stored and accordance with the protocols by which trailer parks are governed by.

[0078] Alternatively, where a participant is seeking to retrieve or pick up a trailer, a verification of
15 the identity of the prime mover is still carried out. Then instead of depositing a trailer, the prime mover retrieves and is hitched to the allocated trailer. Subsequently, in both instances, whether a trailer is being deposited or retrieved, the prime mover then exits the central location.

[0079] FIGURE 6 is an exemplary process flow diagram for the sharing of transportation jobs (job-sharing) amongst participants (as transport resources) of the communication network. A participant
20 enters information about a job, which is typically the logistical information pertaining to the transportation (either an import or export process) of a freight container. If the pre-requisite amount of logistical criteria is entered, the controller will accept the job entry. Otherwise the job entry will be rejected.

[0080] If a job entry is accepted by the controller, the job entry is then placed into a pool together
25 with other job entries. Participants are granted access to this pool of job entries and are allowed to select jobs which they would like to undertake. Upon selection, the controller may either approve the selection or reject the selection.

[0081] If the selection is accepted, the controller would have carried out a determination of the logistical criteria (which is part of the job entry) against the available resources. Then it would

transmit that determination to the participant (a transport resource) for execution. However if the selection is rejected, then the participant is notified and may select another job entry from the pool.

[0082] In one exemplary embodiment of the method of the invention, at least one participant inputs, uploads or forwards its own logistical criteria to the controller. This logistical criteria may
5 take the form of a freight transport job that the participant has available but is unable to undertake for whatever reason, including a lack of transport resources. Once the logistical criteria is received by the controller, the said logistical criteria is made available to at least one other participant for viewing and possible selection. Upon selection of the logistical criteria by the at least one other participant, the controller receives the first unique identifier of any of the at least one freight
10 container and/or the second unique identifier of any of the at least one trailer. The controller performs a determination if any of the first and/or second identifiers received via the second communication positively satisfy the logistical criteria. The controller may also perform a determination if the other participant is suitable to undertake the freight transport job (which the controller received in the form of logistical criteria). If either one or both determinations are
15 affirmatively made, the controller will transmit that determination to the at least one other participant in order that the other participant may proceed to execute the freight transport job. The other participant may be also be another transport resource.

[0083] For illustrative purposes, the transport job may include any of the following (but not limited to) jobs:-

- 20 (i) Returning or collection of containers to or from shipping lines;
- (ii) Trucking containers and/or resources from the central location, port and/or shippers/consignees' premises; and
- (iii) Trucking between the central location and the port.

[0084] As mentioned earlier, the above description of the exemplary embodiments of the present
25 invention merely serve to aid in the understanding of the underlying principle behind the invention. The present invention is not to be construed as being limited to the illustrated embodiments but rather, to the extent as defined in the claims that follow.

CLAIMS

What is claimed is:

1. A system for managing transportation resources and transporting freight containers comprising:

a transport resource,

a central location having at least one access point, and

a controller,

wherein the central location comprises:

a container storage yard adapted to accommodate therein at least one freight container, each said at least one freight container having a first unique identifier, and

a trailer park adapted to accommodate therein at least one trailer, each said at least one trailer having a second unique identifier;

wherein the at least one freight container is transportable by the transport resource using the at least one trailer, and

wherein the controller is adapted to be in a first communication with at least one communication network having at least one participant, wherein said at least one participant provides logistical criteria for onward transmission to the controller via the first communication;

wherein the controller is adapted to be in a second communication with the central location such that each first unique identifier of any of the at least one freight container and/or each second unique identifier of any of the at least one trailer accommodated in the container storage yard and trailer park, respectively, are communicated to the controller via the second communication,

such that upon the controller's receipt of the logistical criteria from the at least one participant via the first communication network, the controller is adapted to perform a determination if any of the first and/or second identifiers positively satisfy the logistical

criteria, and if so, to transmit that determination to the transport resource along with instructions for the transport resource to follow in order to satisfy the logistical criteria.

2. A system according to claim 1, wherein each of the first and second unique identifiers of each of the at least one freight container and each of the at least one trailer each comprise at least one type of identifying data.
3. A system according to claim 1 or claim 2, wherein the transport resource is a haulier operating a prime mover or a hauling truck having a third unique identifier.
4. A system according to any of the preceding claims, wherein the controller is a computer device.
5. A system according to any of the preceding claims 2 – 4, wherein the at least one type of identifying data of the first unique identifier of the at least one freight container is selected from the group consisting freight container specifications, length, width, height, weight, fitting type, storage container type, load status, vessel transit details and serial number.
6. A system according to any of the preceding claims 2 – 5, wherein the at least one type of identifying data of the second unique identifier of the at least one trailer is selected from the group consisting trailer specifications, length, width, weight, fitting type, load status, carrying capacity and serial number.
7. A system according to any of the preceding claims, wherein the controller carries out the determination via a computer programme.
8. A system according to any of the preceding claims, wherein the controller further comprises a first database, said first database being made available to the at least one participant and adapted such that the at least one participant may select predetermined logistical criteria contained in said first database or input customised logistical criteria for onward transmission of the at least one participant's logistical criteria to the controller.
9. A system according to claim 8, wherein the first database is a dynamic database that is updated with logistical criteria from the at least one participant in real-time or at regular periodic intervals.

10. A system according to any of the preceding claims, wherein the logistical criteria is selected from the group consisting vessel transit details, a pick-up location, a drop-off location, the at least one type of identifying data of the first unique identifier of the at least one freight container and/or the at least one type identifying data of the second unique identifier of the at least one trailer.
11. A system according to any of the preceding claims, wherein the controller further comprises a second database, wherein the second database is adapted to contain each first unique identifier of the at least one freight container and each second unique identifier of the at least one trailer.
12. A system according to claim 11, wherein the second database is a dynamic database that is updated with logistic al criteria from the at least one participant in real-time or at regular periodic intervals.
13. A system according to any of the preceding claims, wherein the at least one communications network is a private or public data network.
14. A system according to claim 13, wherein the private communication network is a computer network that is associated with a transportation infrastructure.
15. A system according to claim 14, wherein the transportation infrastructure is a port, a railway yard or a distribution network.
16. A system according to claims 14 or 15, wherein the transportation infrastructure is a port and the computer network is a Haulier Community System linked to Portnet for transmitting and receiving information on the transportation of freight containers with the port.
17. A system according to any of the preceding claims, wherein the at least one communication network is established according to at least one protocol selected from a group consisting of Wireless LAN (IEEE 802.11) Protocol, MAC bridging (IEEE 802.1D) Protocol, VLANS (IEEE.802.1Q) Protocol and Network Access Control (IEEE 802.1X) Protocol, Internet Protocol and TCP/IP Protocol.

18. A system according to any of the preceding claims, wherein the instructions transmitted to the transport resource comprise a specific first unique identifier and/or a specific second unique identifier.
19. A system according to any of the preceding claims, further comprising a security module located at the at least one access point of the central location, wherein said security module is in a third communication with the controller.
20. A system according to claim 19, wherein the security module is adapted to perform a verification procedure to verify that the transport resource is only in possession of any at least one freight container and/or trailer having the first unique identifier and/or second unique identifier, respectively, that corresponds to the transmitted instruction and that also satisfies the logistical criteria.
21. A system according to any of the preceding claims, wherein the central location is located proximate to road, rail or port infrastructure.
22. A method for managing transportation resources and transporting freight containers using a system as defined in any of the preceding claims, said method comprising:
 - receiving logistical criteria from the at least one participant at the controller;
 - receiving each first unique identifier of any of the at least one freight container and/or each second unique identifier of any of the at least one trailer accommodated in the freight container yard and trailer park, respectively, at the controller;
 - performing a determination if any of the first and/or second identifiers received via the second communication positively satisfy the logistical criteria received via the first communication, and if so, to transmit that determination to the transport resource, the at least one participant or both.
23. A method according to preceding claim 22, further comprising:
 - receiving updated first and second communications either in real-time or at regular intervals.
24. A method according to preceding claim 22 or claim 23, further comprising:

transmitting to the transport resource instructions to follow in order to satisfy the logistical criteria.

25. A method according to preceding claim 24, wherein the instructions to follow comprises information selected from the group consisting freight container expected time of arrival, freight container arrival location and the at least one participant's location.
26. A method according to any of the preceding claims 22 – 25, wherein each of the first and second unique identifiers of each of the at least one freight container and each of the at least one trailer each comprise at least one type of identifying data.
27. A method according to any of the preceding claim 26, wherein the at least one type of identifying data of the first unique identifier of the at least one freight container is selected from the group consisting vessel transit details, freight container specifications, length, width, weight, fitting type, storage container type, load status and serial number.
28. A method according to any of the preceding claims 22 – 27, wherein the transport resource is a haulier operating a prime mover or a hauling truck having a third unique identifier.
29. A method according to any of the preceding claims 22 – 28, wherein the controller is a computer device.
30. A method according to any of the preceding claims 26 – 29, wherein the at least one type of identifying data of the second unique identifier of the at least one trailer chassis is selected from the group consisting carrying capacity of the trailer, trailer specifications, length, width, weight, fitting type, load status and serial number.
31. A method according to any of the preceding claims 22 – 30, wherein the controller carries out the determination via a computer programme.
32. A method according to any of the preceding claims 22 – 31, wherein the controller further comprises a first database, said first database being made available to the at least one participant and adapted such that the at least one participant may select predetermined logistical criteria contained in said first database or input customised logistical criteria for onward transmission of the at least one participant's logistical criteria to the controller.

33. A method according to any of the preceding claims 22 – 32, wherein the first database is a dynamic database that is updated with logistical criteria from the at least one participant in real-time or at regular periodic intervals.
34. A method according to any of the preceding claims 22 – 33, wherein the logistical criteria is selected from the group consisting vessel transit details, a pick-up location, a drop-off location, the at least one type of identifying data of the first unique identifier of the at least one freight container and/or the at least one type identifying data of the second unique identifier of the at least one trailer chassis.
35. A method according to any of the preceding claims 22 – 34, wherein the controller further comprises a second database, wherein the second database is adapted to contain each first unique identifier of the at least one freight container and each second unique identifier of the at least one trailer chassis.
36. A method according to any of the preceding claims 22 – 35, wherein the second database is a dynamic database that is updated with logistic al criteria from the at least one participant in real-time or at regular periodic intervals.
37. A method according to any of the preceding claims 22 – 36, wherein the at least one communications network is a private or public data network.
38. A method according to preceding claim 37, wherein the private communication network is a computer network that is associated with a transportation infrastructure.
39. A method according to preceding claim 38, wherein the transportation infrastructure is a port, a railway yard or a distribution network.
40. A method according to claims 38 or 39, wherein the transportation infrastructure is a port and the network is a Haulier Community System linked to Portnet for transmitting and receiving information on the transportation of freight containers with the port.
41. A method according to any of the preceding claims 22 – 40, wherein the at least one communication network is established according to at least one protocol selected from a group consisting of Wireless LAN (IEEE 802.11) Protocol, MAC bridging (IEEE 802.1D)

Protocol, VLANs (IEEE.802.1Q) Protocol and Network Access Control (IEEE 802.1X) Protocol, Internet Protocol and TCP/IP Protocol.

42. A method according to any of the preceding claims 22 – 41, wherein the instructions transmitted to the transport resource comprise a specific first unique identifier and/or a specific second unique identifier.
43. A method according to any of the preceding claims 22 – 42, wherein the system further comprises a security module located at the at least one access point of the central location, wherein said security module is in a third communication with the controller.
44. A method according to claim 43, wherein the security module verifies that the transport resource is a prime mover having a third unique identifier that is permitted access to the central location to carry out instructions received by said transport resource.
45. A method according to any of the preceding claims 22 – 44, further comprising
verifying that the transport resource is only in possession of any at least one freight container and/or trailer having the first unique identifier and/or second unique identifier, respectively, that corresponds to the transmitted instruction and that also satisfies the logistical criteria.
46. A method according to any of the preceding claims 22 – 45 wherein the central location is located proximate to road, rail or port infrastructure.
47. A method according to any of the preceding claims 22 – 46, wherein the at least one trailer and transport resource is shared by the at least one participant with at least one other participant.
48. A method according to any of the preceding claims 22 – 47, wherein the at least one participant inputs logistical criteria to the controller and the said logistical criteria is made available to at least one other participant for selection, wherein upon selection of the logistical criteria by the at least one other participant, the controller receives the first unique identifier of any of the at least one freight container and/or the second unique identifier of any of the at least one trailer, respectively, and performs a determination if any of the first

and/or second identifiers received via the second communication positively satisfy the logistical criteria received via the first communication, and if so, to transmit that determination to the at least one other participant.

49. A method according to claim 48, wherein the at least one other participant is a transport resource.
50. A method according to claim 49, wherein the logistical criteria relates to a transportation job requiring the transport resource.