TECHNICAL NOTES

**AWMS™ Stock
Location
Management**

An easy to use inventory management system requires a flexible means for storing and retrieving stock. The VAS AWMS provides a unique and extremely flexible view on managing stock locations. The basic concept for managing stock locations views an entire facility as a giant "box" or container. Within that box are smaller boxes defined as necessary to meet operational and tracking requirements. Examples of some of the second layer of boxes may be the inbound receiving dock, the bulk storage area, active storage area(s), and to through a couple of other somewhat unique concepts into the mix, an inbound conveyance may be a second level box, as may the inbound and outbound trailer yards, other conveyance systems etc. The third level of containers in the inbound trailer yard may be receiving trailers themselves. The inbound receiving trailer themselves may contain receiving cartons and the receiving cartons contain stock. The receiving area (as possible second level layer) may contain dock doors that also may contain a trailer. In this architecture, each storage location has a "parent" location. To move a container (and thus all of it's children containers), the parent of the container is modified to indicate the new parent.

In order to visualize this architecture imagine a trailer leaving a vendors location with an ASN that indicates all of the cartons and the individual contents of each of the cartons. Initially the parent of the trailer may be not specified or specified to some other non-available location (on the way etc.). Upon arrival, the parent location of the trailer is updated to be the "Inbound Receiving Yard". The trailer (and it's contents) remains with it's parent the inbound yard until such time the trailer is moved to a receiving door at which time it parent location is updated to the "Receiving Door N". At this point all of the cartons on the trailer remain associated with the trailer, however they are now at the door. The

cartons are unloaded and place upon a receiving conveyor and conveyed past a receiving scanner at which point the individual cartons parents are updated with the "Receiving Conveyance System". This disassociates the carton from the previous parent of the trailer. Cartons that have not yet been unloaded remain associated with the trailer. Cartons may be conveyed to an inbound QA area where they are inspected. At this point the parent of the carton may be updated to indicate the carton is now located at the inspection workstation. Cartons may be palletized at which time their parent becomes the pallet. The location of (parent of) the pallet may at this time the palletization station. Once the pallet is created it may be moved and may be associated with either the moving equipment or worker or may be assigned to the storage destination. It is easily seen the great flexibility of such an information construct.

The tracking of individual items is on a "stock record" level. A stock record represents a specified quantity or count of a single SKU. If a container contains multiple SKUs, there will be multiple stock records that all have the same parent container. If all of the units from a carton were transferred, for example to a flow rack location where carton level information was not necessary, the parent of the stock record would be changed to the flow rack location. If only a portion of the units of a stock record were to be transferred, the stock record would need to be split effectively creating a new stock record. The new stock record would have its own quantity indicating the number of items removed from the old stock record. The parent of the new stock record would be the location of the newly moved portion of the units. Likewise the old stock record would have it's own units reduced by the number of units removed.

With this background, some other unique features of the location management system are presented. Locations may be created "on the

fly" by authorized workers. This feature allows an extremely flexible means to track stock in unusual circumstances. Examples of the usefulness of such a feature is when a worker needs to take some stock to some non-standard work area to do some research. This could be taking inventory to a workstation to do vendor compliance research. Normally such an action would not be tracked and the potential to loose inventory would increase. By allowing a new location (for example – "Vendor Compliance Department") to be created, the stock can be transferred to that area and continue to be tracked.

Stock locations (containers) have attributes that set the rules and dictate how inventory in the location is handled. Some of these attributes are:

NoAllocate – indicates if the stock in this location is not available for order fulfillment

NoFinance – indicates the stock in location is not to be included in financial data

NoStockRecs – indicates that no stock records may be maintained in this level of container

NoMixSKU – indicates that the location (on this level) may not contain multiple SKUs

OkMixSKUs – indicates that mixing SKUs in location will not cause a mixed SKU warning

NoContainer – indicates that the location may not be further subdivided (containerized)

FixedPar – indicates the location may not be moved to a new parent

InhParName – indicates that the prefix of name of the location is inherited from parent location

As new containers are created, their parent is first selected. The new container will inherit by default the attributes of the parent. The actual attributes of the container may be modified upon creation.

Location (container) names must be unique however a location name may have multiple synonyms each of which must uniquely identify the unique location name. This feature allows locations to be identified in multiple manners including RFID tags, unique barcode labels, and human readable labels or in other means as required.

Locations also have a location sequence number indicating the physical sequence or order the locations are accessed. This allows for shortest path operations to access stock.

Like locations stock records also have "attributes" that are similar to the location attributes. A stock record also inherits the non-conflicting attributes of its parent location. Some of the attributes of a stock record are:

NoAllocate – indicates if the stock is not available for order fulfillment

NoFinance – indicates the stock is not to be included in financial data

NonStock – indicates the item is not a stock item (not to be sold)

Allocatable stock, when moved to a parent that has the NoAllocate flag set, will not be allocatable. The stock record itself remains allocatable. Once the stock record is moved back to an allocatable location the stock would then be available for allocation.

The location management system likewise provides for location to be deleted by authorized workers provided that the location or its children do not contain stock. On the fly location management provides operational features not found in conventional WMS system.

The location features described combine to provide an extremely flexible means for operating and reconfiguring stock location management. As mentioned in other white papers, the true distinction of an AWMS is that it has an inherent inclination to accept new information to establish its current image of reality.

AWMS™ is a trademark of Vargo Adaptive Software The term AWMS™ may be freely used by any party to describe a WMS that has an inherent inclination to adapt to and accept new information to establish current conditions.