



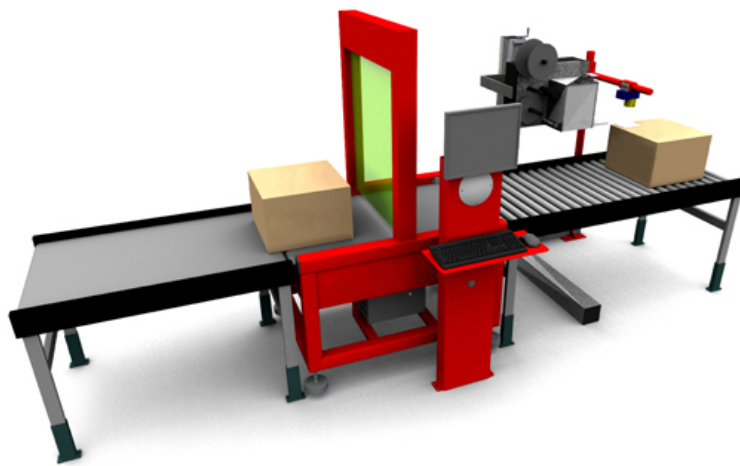
IDWS White Paper



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Overview

“Package Intelligence,” a phrase used today to describe the central importance of companies’ package distribution operations. Package intelligence includes the objective of manufacturers, shippers, transporters, and distribution centers automatically capturing package data. Package handlers require “intelligence” from barcode data (shipper, customer, address, unique package ID, etc.), weight, dimensions, condition, and package material type.



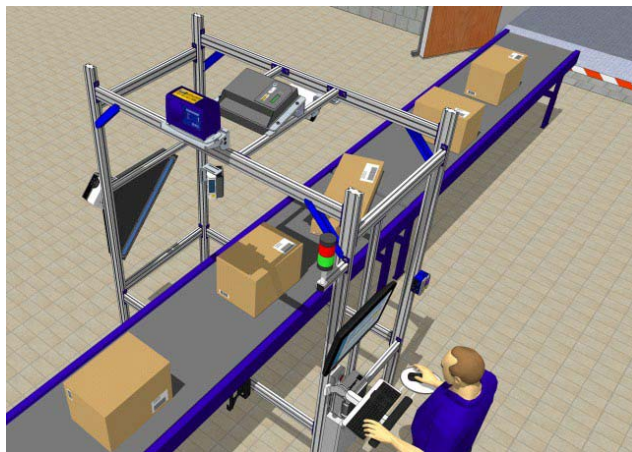
The Infoship Dimension Weigh Scan (IDWS) system combines dimensioning, scales, and barcode reader data to create parcel profile reports for the parcel dimension, weight, and barcode data for verification, trailer cubing, freight cost calculation, and sortation.

The IDWS systems’ configuration flexibility allows companies to design the best configuration based on key business requirements plus inbound barcode location(s) and type(s), package sizes and weight ranges, package characteristics, throughput, scalability, host system interface, and operator interface. The Technologies Solutions Group further describes key design considerations for the IDWS system.

Barcode Scanning

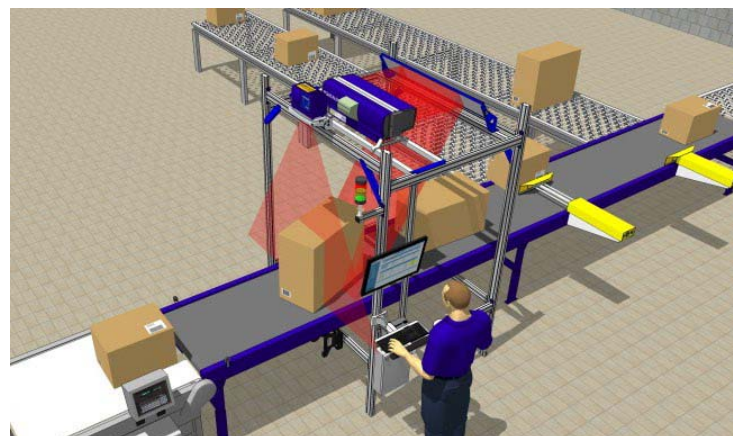
User-friendly solutions for scanning equipment allows operators to quickly locate the barcodes with ease, reducing time and lowering overall cost. Let's say the barcode location on a package always faces the top with a ladder orientation. The IDWS business specific configuration quickly delivers a single line laser scan for each package.

IDWS supports variation additions (random orientation, multiple package faces, multiple barcodes or barcode types, increased range of package dimension, conveyor size, conveyor speed) as the complexity and cost of the scanning requirements change. Utilizing multiple scanners and/or omnidirectional scanners can form a scanning "tunnel" as shown in the top-front-side laser IDWS system figure:



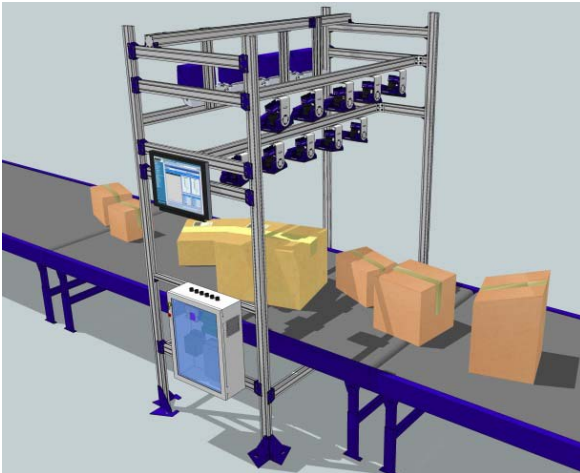
Standard laser scanner technology requires the lowest up-front investment to read barcodes in any orientation and any face of the package. Laser technology limitations include the ability to only read 1D barcodes, one package face at a time, and provide single data string output.

Industry standards for vision or camera technologies require larger per-unit investment but boast greater performance for barcode reading rates, types, sizes, and quality. Another advantage to using vision and cameras includes multiple-face scanning with a single camera reading top and front mounted at 45 degrees, 2D barcode decoding (Data Matrix, QR code, PDF417, etc.), image capturing for diagnostics and/or verification, and lowering operational maintenance as shown in the single camera, reading front and top of packages, IDWS system.



Dimensioning

There are two package dimensioning categories: certified Legal-For-Trade (LFT) and non-LFT. Certified LFT systems generate shipping charges based on package weight and/or dimensions. Certified LFT IDWS systems, or “revenue recovery” systems, are popular with parcel distribution, transportation operation, and logistics operation industries generating lucrative ROIs. Regional LFT certifications are administered via regional or local certifying entities, including NTEP and Canada Weights and Measures in North America and MID and OIML in Europe. LFT IDWS systems supply dimensioning accuracy to within 0.2 inches for length, width, and height.



Non-LFT systems, or “rough dimensioning” are not legal for commercial transactions and only supporting “package intelligence” for inventory systems, trailer loading, and fulfillment verification applications.

The simplest IDWS package provides characteristics and flow components (singulated, cuboidal package results) and variations for non-singulated, near-cuboidal, irregular, and mass-flow systems. Packages must be singulated for proper package weighing in all instances as shown in the mass-flow scan-and dimension system figure to the left.

Weighing

The IDWS weighing solution categories are LFT and non-LFT. In-motion scale conveyors are used in automated DWS systems. The type and size of the in-motion scale varies based on requirements of the package size, conveyor speed, and weight accuracy throughput.

Package size is a primary determinant of the physical aspects of the scale. The scale belt length must be as long as the longest package, the needed transport time for the package to settle, and accurately captured weight of the package.

Packages must be singulated on the scale belt to accurately capture the weight and assigned to the package. The normal singulation process runs an infeed control/ brake-metering conveyor positioned immediately prior to the scale belt provided with the IDWS or in-motion weighing solution.



Performance

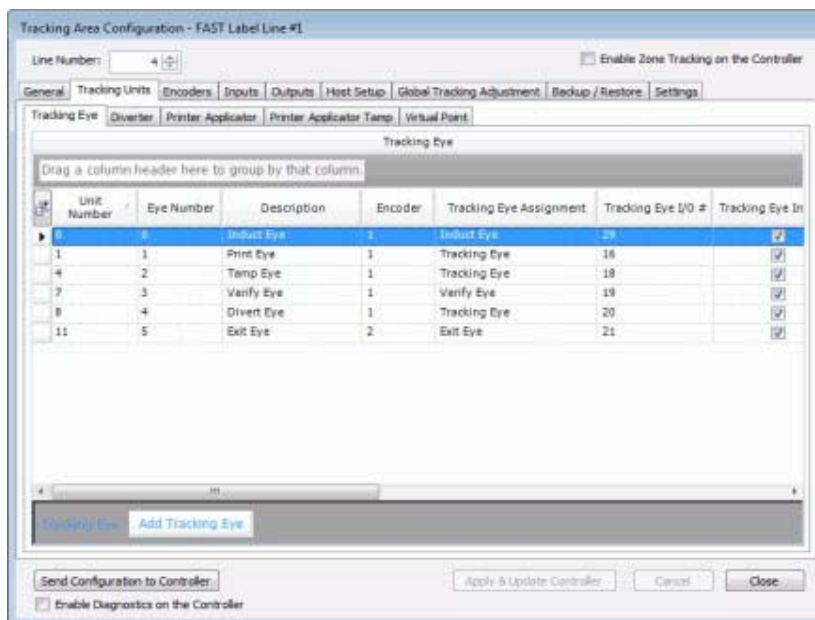
IDWS systems operate at conveyor speeds up to 250 feet per minute and process package characteristics by:

- Weight range between 1 lb. and 100 lb.
- Weight accuracy to 0.1 lb. accuracy
- Package lengths between 6 in. and 36 in.
- Package heights between 1 in. and 36 in.
- Package widths up to 36 in.
- Package throughputs up to 2500 packages per hour (41 packages per minute)

When package specifications exceed the common parameters, alternative design enhancements (increasing the initial cost) to handle wider ranges of variables are made. For weighing, alternatives for longer or wider scale belts, and faster speeds such as a two-belt scale system are options for consideration.



Integration



The centralized station controller is the heart of the IDWS system providing all communication interfaces, conveyor I/O controls, user interface, and usually mounted on the IDWS frame located in a rugged industrial enclosure. The user-friendly and configurable embedded I/O control system adapts to user environments and cost-effective. The figure to the left shows a typical user-configuration screen.

The IDWS system includes additional system options :

- Enhanced I/O for sortation or other package routing management
- In-motion label print-and-apply for package re-labeling or destination labeling
- Rate-shopping and manifesting
- Infoship image capture and storage for diagnostics, validation
- Package dimension verification
- Trailer cube planning

The IDWS controller supports configurable conveyor functionality. Approved operators can select the run/stop logic for the conveyors based on:

- IDWS run status
- Run status of downstream conveyor(s) interlock
- Alternative operational modes including bypass and maintenance
- Other external inputs

Interface

Interface

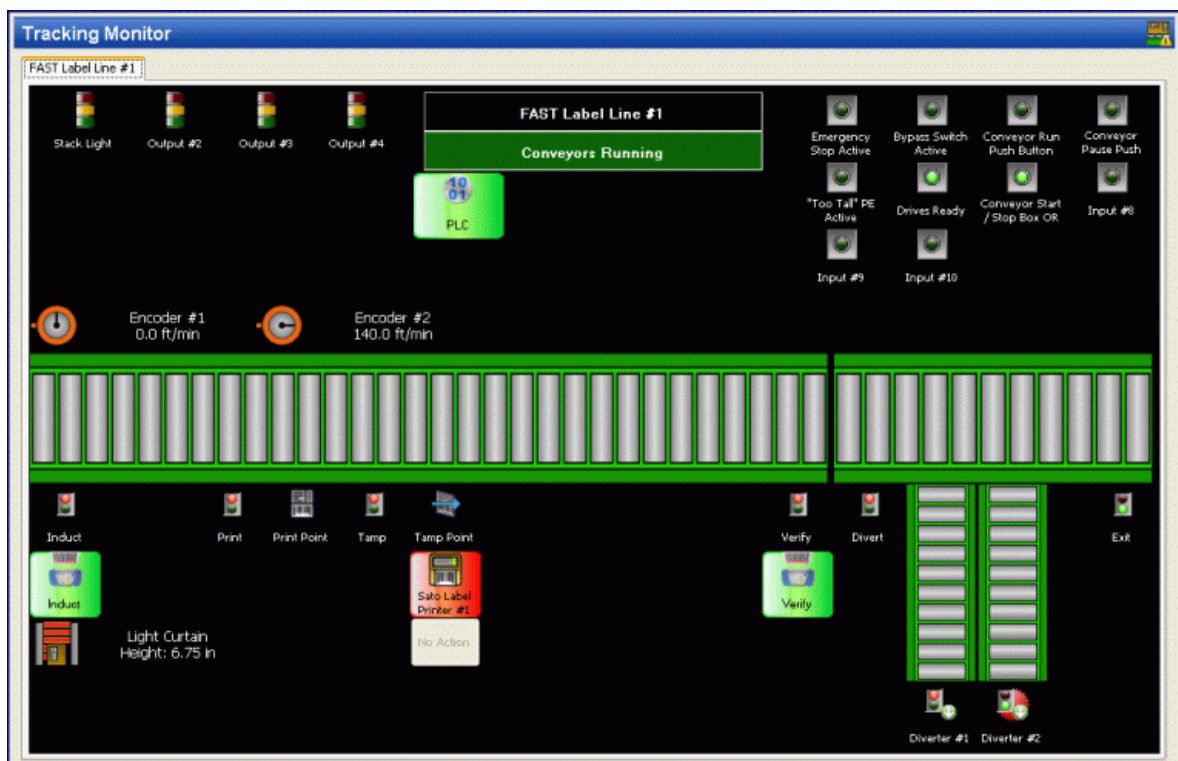
The system controller stores captured data for 30 days. Serial and Ethernet connections required for the host interface and configured for the protocol (simple serial strings, TCP/IP Sockets, FTP, and Ethernet/IP) necessary to support host requirements. Host message format and content field configurations available for size, message position, format (right justified, fixed length, zero filled, etc.), and text if needed.

Operating System

The IDWS System controller, a Windows operating system, configurations may include standard virus scanning software, software updates, version control procedures (defined and provided with system) and system firmware version.

User Interface

The controller provides a configurable a host interface, conveyor control, and interlocks with adjacent conveyors and user interface for operational status, configuration, and visual system diagnostics. The controller supports a keyboard and swing-arm-mounted monitor for all operator interfaces. A graphic conveyor system diagnostic screen is shown in the figure below.



Applications

Inventory Verification & Put-Away

IDWS systems capture or validate package data as input for WMS and Technologies Solutions Group's Infoship API with the ability to expand data files with proper interface protocols. By capturing dimension, weight and barcode data, IDWS systems provide real-time verification of package characteristics against expected values.

Trailer Loading

Shippers operating scan-and-dimension systems capture specific package dimension data and feed that data to a Warehouse Management Systems (WMS) or business analytics systems optimizing trailer planning and loading.

Revenue Recovery

Package distribution carriers charge shippers based on the dimension and weight of packages transported. Shippers using in-house shipping systems provided by the carriers include a scale and label printer. IDWS systems for revenue recovery pinpoint weight and dimension data to adjust the transport package charges, if necessary, and apply transport charges to the shipper's account. The IDWS systems' automated revenue recovery systems delivers an amazing ROI for package distribution companies!

Please note that all IDWS systems must have LFT certifications, save package data (dimension, weigh and scan) in electronic "alibi" storage, and ability to quickly access data by a defined timeframe (30 days as a rule of thumb).

Fulfillment Verification

After pick and pack operations, employed IDWS systems verify the pick accuracy through real-time package characteristic comparisons versus expected carton size, weight, and label information for a give shipping package. The captured data gives check points through the fulfillment process. Add-on functionality options include reject divert, out-of-tolerance warnings, and image capture/storage are available.



Diverter add-on function

Services

Concept

Technologies Solutions Group collects data to best understand system requirements and priorities through collaboration with clients for an effective and efficient IDWS system design.

Site Survey

Technologies Solutions Group performs a site survey to ensure that all design elements are met before developing the IDWS system.

Integration and Testing

Technologies Solutions Group performs all system integration and testing.

Installation

Technologies Solutions Group installs the IDWS mounting frame, infeed conveyor, scale, dimensioner, scanner (s), and other hardware. The IDWS owner provides conveyor leading to and away from the IDWS system, power, communications, compressed air, and other support requirements for the IDWS install point.

Start-Up

Technologies Solutions Group installs functional software and acceptance testing after completing a successful IDWS system component installation. LFT applications require a certified representative to perform testing and assure LFT compliance and affix a stamp or sticker identifying the LFT approval.

Post Installation Support

The IDWS Controller includes remote support via dial-in or web access. The IDWS owner must allow for access to the system(s) via the network(s) in the facility and access to the network from outside the facility.

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