CARGO JOURNEY

Our vision: efficient operations and modern technologies support easier, smarter and faster movement of cargo.

00 – THROUGHT THE JOURNEY

DATA SHARING

Data is shared across the supply chain in digital shipment records, creating full transparency and optimizing people, systems, and assets. Any status changes and outcomes of control processes are interactively shared up and downstream via connected devices, master data and a common backbone.

An increasing array of data is used in a variety of ways (digital twins, big data analytics, artificial intelligence and machine learning) to improve decision making, risk mitigation, contingency planning and enhancing customer satisfaction.

Air cargo enables a connected, smart and highly efficient supply chain, to facilitate new business models and distribution models of the air cargo customer.

01 – OFF AIRPORT

NETWORK VISIBILITY

Cargo schedule and capacity is published in real-time improving transparency and business processes.

A digital platform using secured principles allow adhoc and regular users to obtain information.

Greater sharing of data enables advanced analytics to predict habits and required levels of service.

BOOKING

Cargo services can be booked directly via online platforms which provide the customer complete visibility of the service levels, quality and capabilities of different transport providers on specific trade lanes.

The customer is informed about trade lane specifics, mandatory customs, documentary and container requirements as well as potential restrictions for the commodity.

Scheduling for optimal pick up and drop off times will be provided and continually monitored through integrated planning and execution principles.

TRACKING

Connected devices capture, display and transmit transport and handling information of the cargo as well as required electronic documentation. The status of assets, commodities, parcels, environmental conditions, locations and people will be monitored

throughout the value chain. This real-time information will be available for use by all required systems such as Warehouse Management Systems, Load Control Systems and handling staff via AR (Augmented Reality) devices.

The availability of information and measurement of key indicators allows for optimization of how people, systems, and assets work together and coordinate their activities.

Warehouse Management Systems can suggest predictive measures to safeguard a shipment's integrity. These measures are defined based on general information about the shipment combined with real-time status information of the shipment's current condition.

Ultimately, this creates transparency that permits the entire value chain to identify wider improvement opportunities, derive best practices and optimize the end-to-end journey.

CARGO DELIVERY

Airports are highly connected to city centers with cargo drop points distributed throughout urban areas. This enable the cargo acceptance outside the airport perimeters to optimize cost and customer experience.

Pre-arrival notification messages are sent to delivery vehicles (e.g. trucks, unmanned vehicles, drones, etc.) to avoid queues and congestion at the cargo facility. The vehicle can then adjust its speed to optimize its time of arrival at the facility i.e. slow-streaming.

Mobile warehousing is facilitated through real-time communications between the mobile warehouse and cargo facility.

02 – AT DEPARTURE FACILITY

DELIVERY VEHICLE INTERFACE

The physical architecture of cargo facilities has been adjusted to accommodate automated vehicles.

Registered professionals can use a self-delivery gate to deliver goods at any time during the day or night. Clean/green vehicles contribute to the net-zero impact of the facility.

Delivery vehicles are scheduled and recognized on entry to the facility such that it's a seamless process to the loading/unloading location.

Compliance controls such as security, customs inspection and ready for carriage acceptance are automatically passed and/or flagged in advance of arrival so as to minimize wasted processing.

ACCEPTANCE AT THE CARGO FACILITY

With advanced data sharing "approved for transport" notifications can be sent along with requirements for additional compliance checks. This includes compliance checks for all standard commodities and special commodities (e.g. perishables, live animals and dangerous goods)

Goods are preceded by a data exchange and arrive in a secured supply chain, ready for carriage.

The shipments smart tag or active sensor is read upon arrival at the cargo facility and is automatically validated with the advanced booking information. This may include checks of commodity information such as species, active vaccinations, chemical composition along with basic customer and destination information.

The Acceptance Management System will automatically compare the commodity specific

information against known and highlighted risks, minimum container specifications, export or import requirements, CITES information or phytosanitary requirements if applicable, that are available in the WMS (Warehouse Management System).

Automated and integrated equipment weight, dimension and move the goods to the next location for processing.

MODAL INTERFACE (IMPORT AND EXPORT)

An automated system sorts goods according to the mode and delivery model that has been selected.

The interface between the difference modes of transport becomes a fluid network.

REGULATORY / COMPLIANCE CONTROL

Risk based controls are incorporated into the shipment record.

Compliance inspections are triggered based on risks of the supply chain as a whole and those controls triggered by data within in the specific shipment record.
Goods will be diverted to compliance inspection areas if required. Otherwise the goods move smoothly through the facility and supply chain.

SECURITY

Security screening uses supply chain risk analysis to determine the most appropriate measures to deploy.

Screening technology performs multiple actions in a single fluid, touchless process. Weight, dimensions, integrity, composition and other elements shall be determined simultaneously to identify the next processing step.

Screening is not limited to only assess unlawful interference but also performs additional checks

such as commodity specific identification and safety checks. This enables the detailed identification of the product's composition or characteristics e.g. animal species, drug properties, perishable alterations. Detection of prohibited illegal trade of wildlife and wildlife products (e.g. ivory) is therefore possible too.

The screening process includes automatic validation of the booking information and data from the shipment's smart tag or sensor to ensure conformity of the cargo.

Screening may have been performed at an earlier stage in the transportation chain in dedicated off-airport locations using qualified equipment and secured transport routes.

Any facility is a secured area with appropriate access controls and vetting of facility staff and others interacting with the facility.

Departure facilities may be located off-airport with secure vehicles and tamper proofing devices combined with monitoring of goods ensures security is not compromised during transfer to the airport.

STAGING

Goods move into an outbound staging area using automated equipment which also validates the weight, dimensions, security checks, acceptance condition checks and ULD service-ability checks.

The optimal location for processing and outbound staging is determined using piece level sensor technology and real-time logistics management. This minimizes the number of touch points.

All non-safety critical cargo can move at speed using automated ground service equipment.

BUILD-UP

Robotic systems perform an automated build-up and break-down of cargo. The robots can fully optimize

the stability and integrity of shipments.

Handling staff are aided by use of augmented reality (AR) which provides enhanced information on the goods and their required handling. This helps staff to perform their tasks efficiently. Ta sks are assigned automatically and tracked to ensure full compliance e.g. which pieces to move next with the task and location data updated in the shipment record. Staff competency is maintained at a high level as additional prompts and information is provided to those who need.

Use of robots in combination with AR aided staff minimizes the potential for product damage and processing times.

Modular ULDs are assembled based on the contours of the aircraft and allocated space to maximize the aircraft load factor.

Robots also take care of the handling of potentially dangerous situations occurring during operations such as handling over-sized or extremely fragile cargo or for dealing with toxic spillage.

Build-up facilities can be multi-level, minimizing the overall footprint of the cargo facility, while granting flexibility in the operational process.

03 – AT DEPARTURE AIRPORT

LOADING

The availability of real-time information regarding the aircraft's status allows for timely movement of shipments from the cargo facility to the aircraft.

Upon loading of the shipment into the aircraft, the shipment record is updated and a status notification automatically shared with the relevant parties. The pilot is informed of the loading location and recommended settings (e.g. temperature).

04 – IN-FLIGHT

SHIPMENT HEALTH MONITORING

Shipment health is monitored throughout the flight. In the event of an occurrence with the cargo, an alarm will be triggered and mitigating actions can be taken upon this early warning.

CUSTOMS / REGULATORY INSPECTION

Data sharing of the shipment record with customs enables customs clearance via a virtual process.

Goods are therefore pre-cleared before arrival, with exceptions flagged in the shipment record.

Shipment health data is provided to the relevant authority minimizing the inspections required.

Those items that require inspection will be diverted upon arrival to the authority.

05 – AT ARRIVAL AIRPORT

ARRIVAL CARGO

As with cargo build-up, robots are used to efficiently perform the cargo break-down on arrival.

Enhanced shipment data records combined with automated scanning and sorting of cargo facilitates the efficiencies, speeds and processes required for a range of distribution models.

The cargo is prepared for the final mile. Automated streaming of goods allows for transfer onto multiple transport modes such as on-airport drones, road, rail and other newer modes of transport.

06 – AT DESTINATION

DELIVERY

Drop/collection points located within city centers minimize the need for people to come to the airport.

Small cargo delivery drones are used for last-mile delivery of small parcels. Medium size drones replace trucks / road feeder services for cargo delivery at distribution centers.

Real-time data sharing and communications with the customer allows for optimum delivery operations which match customer requirements and expectations.