Air Cargo Sector: Starting to prepare global transport of COVID-19 Vaccines

The Air Cargo Community of Amsterdam Schiphol Airport intends to hold discussions with multiple parties about the transport of millions of doses COVID-19 vaccines. According to Mr. Maarten van As, Director of Air Cargo Netherlands, the participants in the supply chain at Amsterdam Schiphol Airport, the sector is at the brink of an enormous challenge: "We have to think about capacity, but also security and safety, because initially, the vaccine will be scarce and in very high demand. Handling will demand a coordinated strategy; not only at the national level, but may be also at EU- or World-level".

Last week, the Bloomberg Press Agency, stated that the air-cargo logistics industry is not ready for the transportation and distribution of millions of corona virus vaccines. There is simply not enough cargo shipping capacity. During the previous decades, cargo was increasingly transported as "belly freight" in passenger aircraft, by the airlines. However, capacity has diminished dramatically, due to the corona pandemic. Maarten van As says: "We estimate that actually some 3,000 dedicated freighter aircraft fly around, packed with goods. And at the current time, belly capacity of passenger aircraft is hardly an option any longer, accounting for approximately 50% of pre-Covid total cargo capacity.

PHARMA GATEWAY AMSTERDAM

Additionally, a medical vaccine is vulnerable and costly. Very stringent requirements apply for the transportation and storage of pharmaceutical products, such as ambient outside temperature and way of packaging. Schiphol Airport as the center of the Pharma Gateway Amsterdam, has invested substantially in an adequate infrastructure. Maarten van As: "At Schiphol we have a well-organized community fully IATA CEIV Pharma certified. And at both Amsterdam and Maastricht airports we have a large capacity of temperature/climate-controlled warehouses. However, capacity is not unlimited. We have to consider storage capacity at the ports of Rotterdam and IJmuiden.

CORONA VACCINE EXPECTED DURING REGULAR CARGO PEAK PERIODS

Another important issue is the uncertainty about size and time: "Still, there is no vaccine available, but at some point that will no longer be the case, and the key question is WHEN?" The entire world, including the supply chain industry, is wondering. When it becomes available, it must be forwarded in huge quantities to many destinations at the same time. However, the expected quantities as well as the time frame are still uncertain, at least at this time. Hence, it is extremely difficult to begin serious planning for a product that still is under development and in the test phase.

Another question, more specifically focusing on the Dutch situation, is whether The Netherlands will be a link in the European or even global supply chain, and distribution. The most optimistic estimate is that from Q-4 2020 or Q-1 2021 a vaccine will become available for distribution. And unfortunately, this is one of the busiest periods for regular air cargo, due to holidays like Christmas, New Year, and the Chinese New Year.

WATER-TIGHT SECURITY NEEDED

According to the ACN director, safety and security are important issues. “The Covid-19 vaccine will be extremely valuable and in very high demand. The “light fingered gentry” will not remain seated on their hands. Also, fake products are bound to enter the market. This requires a fully “water-tight” and secured supply chain. Because of all of these considerations, we feel NOW is the right moment to develop a plan of action. This will involve participation of all parties in the supply chain, as well as governmental authorities and various departments within those authorities. It should be based on several different scenarios”. But who takes the initiative of getting all of these parties around the table?

So far the article, written by Anke Hoets for Amsterdam Logistics (translation by Henk G. Hilders).

THE SOLUTION: COOLBOXX

The Coolboxx, developed by Interbox, a Dutch SME located in Amsterdam, fulfills the complete set of requirements as mentioned in the article of Amsterdam Logistics. It is up to the task of the preparation and execution of the transportation and distribution of COVID-19 vaccines. It combines the very important properties of a temperature-controlled conveyance unit, **with real-time Visibility, as well as unparalleled Security and Safety.**
What follows in this summarized explanation is why this statement is perfectly correct and not an exaggerated advertising text.

1. The Coolboxx

The Coolboxx is based on the Cargoboxx, a lightweight collapsible air cargo container designed and developed a few years ago, by Interbox. One of the largest Logistics Services Providers asked us to consider developing a temperature-controlled version of the Cargobox, due to existing problems with pharmaceutical shipments. Their requirements were: Temperature must be kept between +2 and +8 degrees C for 120 hours and at the same time, be easy to handle at low costs. “Mission impossible” was our first reaction. But then, after some research and consideration, an idea became a project, and the project became a product. Now, 18 months later, we are proud to say the product is Coolboxx and in existence today.

2. Insulation Components

We designed a sophisticated package of Vacuum Insulation Panels to obtain the highest possible insulation characteristics and added special Phase Change Materials based rechargeable “gelpacks”. This combination enables us to keep the contents between +2 and +8 °C during an amazing 96 - 120 hours, depending on nature of the goods and ambient temperature. This insulation package we developed is low in weight, very cost-effective and the Phase Change “gelpacks” are very efficient because their melting point is exactly at +5 °C.

3. The “Intelligent” Lockbar

The Lockbar contains the brains of the Coolboxx. The Lockbar is the closing strip with a mechanical lock, controlled by the electronics installed on a solid-state printed circuit board inside.

It contains numerous sensors as well as other state-of-the-art features, such as GPS, GPRS, WiFi, Bluetooth, NFC and RFID for communication with the outside world.

A Coolboxx travels closed and locked, preventing pilferage, theft, and possible terrorist actions. If a "deviation" occurs, alert and alarm messages are sent to the relevant party, including a time and position stamp of the event. Unlocking the Lockbar requires a 6-digit Security Code which can only be obtained by means of a request sent by an authorized person.

4. Cargosyst

Cargosyst is the software package which controls the Coolboxx. It functions as an access portal to the data handling and control system, and is part of the "Intelligence umbrella", which manages the Coolboxx during its entire journey around the globe. Once a party has been authorized, it opens the door to IBM's Air Cargo Platform Service, which is the heart of the data processing center. All data are stored at a 24/7 redundant chain of data centers, and only the relevant parties of a shipment have access to the respective file. Please see the schedule here below.

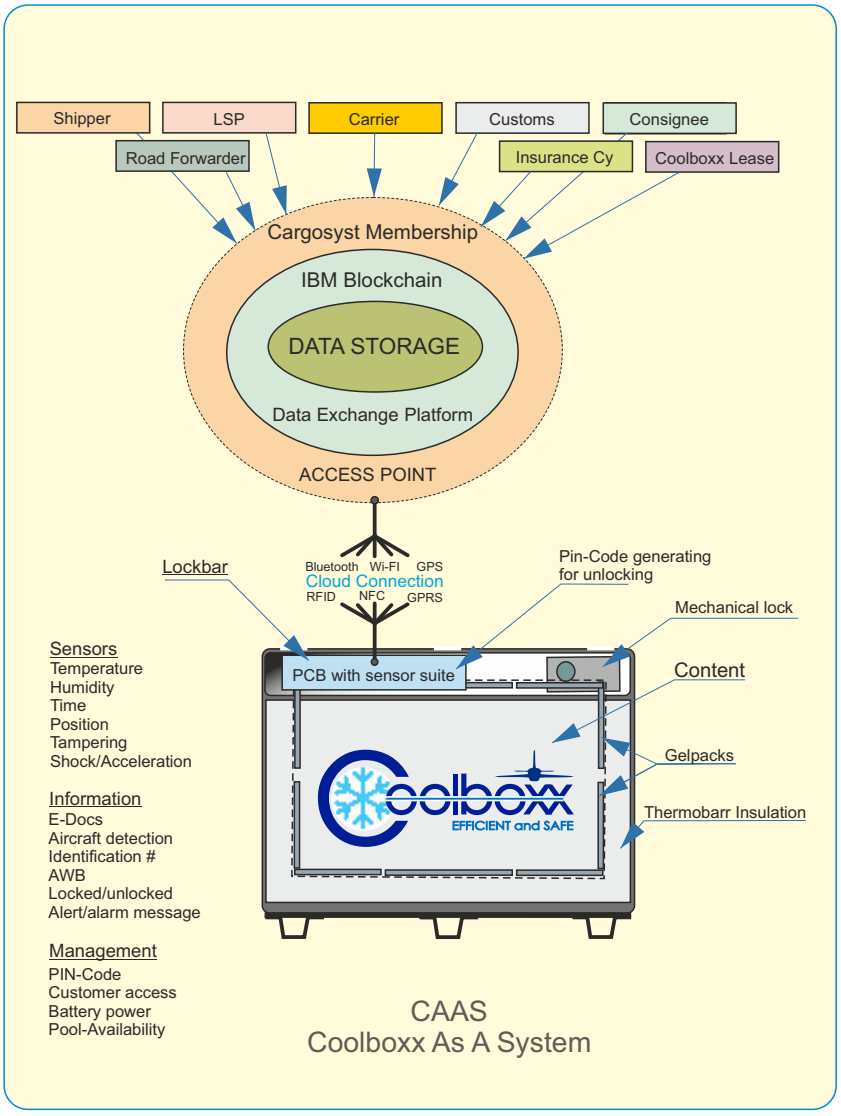


Figure 1: The Coolboxx IoT Schedule

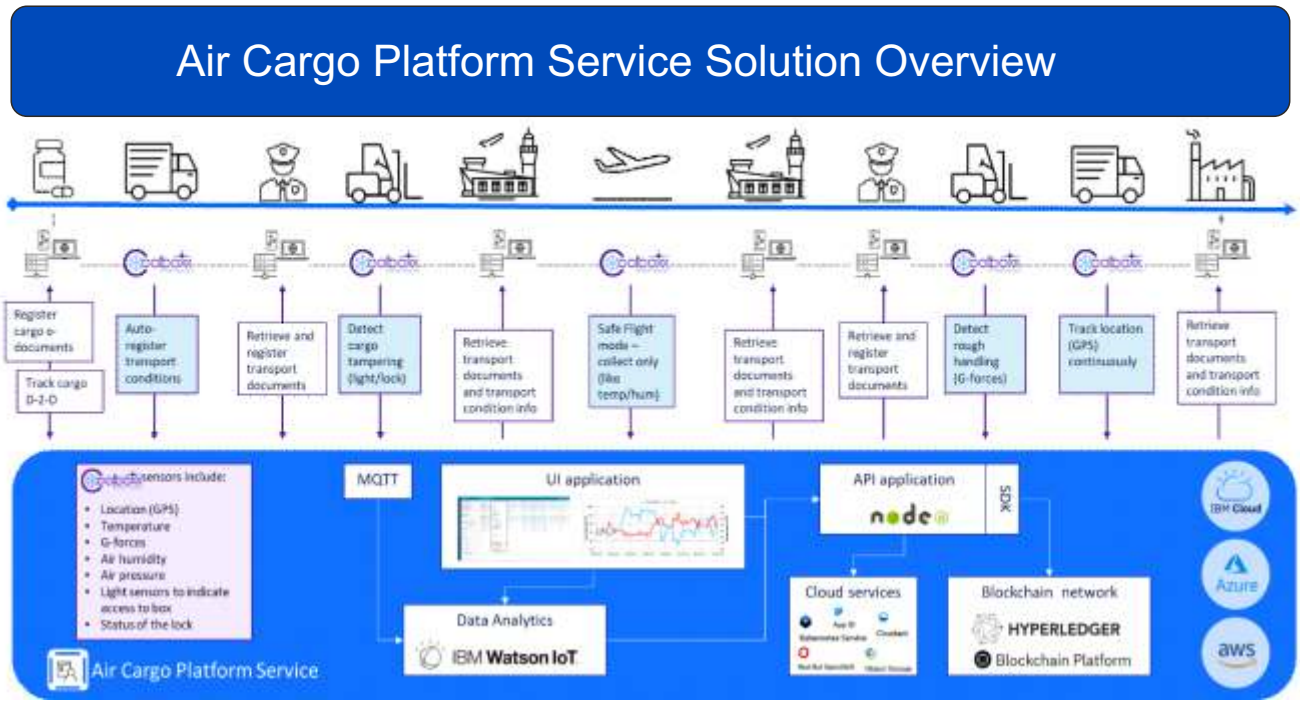


Figure 2: The IBM Air Cargo Service Platform Solution overview

5. IBM Data Exchange Platform Service

Interbox has teamed up with IBM to develop the Air Cargo Platform Service. IBM has relevant experience with developing business and technical industry platforms, including the appropriate ecosystem governance. In December 2018, IBM and Maersk successfully deployed TradeLens, an interconnected ecosystem of supply chain partners for container shipping. TradeLens further optimized the ocean freight supply chain, using a blockchain platform to capture and exchange data. Today far over 100 organizations use it on a daily basis, to handle the enormous flow of documents.

6. COOLPOOL Minimal Viable Product

Market introduction must have a solid starting point, based on extensive experience. That's why a Minimal Viable Testing Program, CoolPool, is currently being prepared. However, Coolboxxes should be at hand as soon as COVID-19 vaccines become available. The Fraunhofer Institute in Stuttgart, Germany will assist Interbox to accelerate the practice test procedures and successive analysis of the test results. This way, series production can start earlier, so sufficient Coolboxxes will be ready to carry the thousands of vaccines to all destinations, in a safe and secured way, within the contents temperature kept within the +2 and +8 °C range.

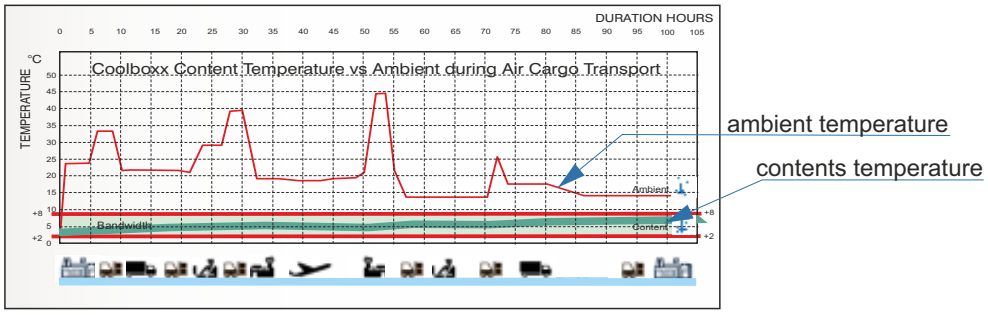
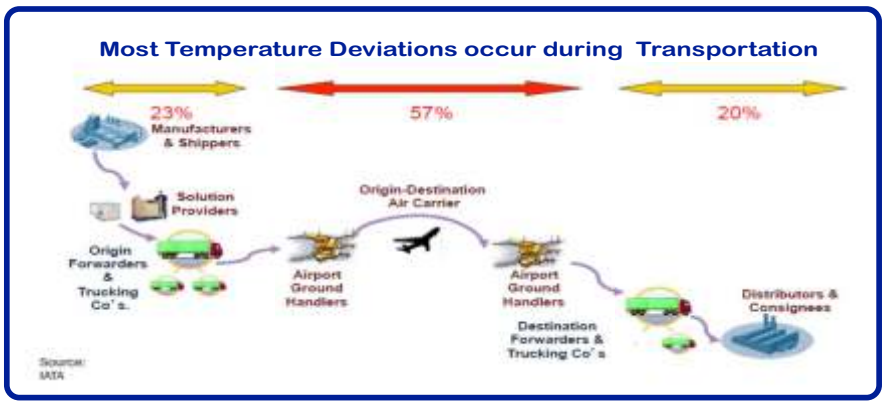


Figure 3: A typical Temperature Curve of a Coolboxx journey



„According to IATA, currently 57% of all temperature deviations occur during airport handling and flight, 20% during transport to a distribution center and 23% while forwarded from shipper to airport of departure. Standardized packaging and digitized E-documents accelerate handling processes and eliminate human errors".

FROZEN SHIPMENTS AT MINUS 70 °C

Since we know that COVID-19 vaccines will also be forwarded at a deep-frozen Temperature (minus 70 °C), Interbox has considered to serve this specific market segment, too. With an extreme efficient insulation package, based on our Thermobarr vacuum panel concept, we have calculated the amount of dry-ice needed for three time intervals: 48, 60, and 72 hours, for both the half-expanded Freezeboxx as well as the full-size Freezeboxx.

Temperature Kept at -70 °C	During	48 hrs	60 hrs	72 hrs

1. Half expanded Freezeboxx
   Internal net volume: 104 x 86 x 132 cm = 0,47 m3
   Amount of dry-ice = 15 kg = 19 kg = 23 kg
   Estimated empty weight (excl. dry-ice) = 39 kg
   Minimum chargeable weight = 170 kg

2. Fully expanded Freezeboxx
   Internal net volume: 104 x 86 x 52 cm = 1,18 m3
   Amount of dry-ice = 27 kg = 34 kg = 41 kg
   Estimated empty weight (excl. dry-ice) = 55 kg
   Minimum chargeable weight = 338 kg

LEASE COSTS PER TRIP

With all of its amazing features, the most remarkable one is the lease price per trip. Our very best estimate is as follows:

1. Half expanded Coolboxx (including gelpacks), trip duration = 120 hrs: € 350,00/trip
2. Half expanded Freezeboxx (excl. dry-ice), trip duration = 120 hrs: € 315,00/trip

3. Full size Coolboxx (including gelpacks), trip duration = 120 hrs: € 475,00/trip
4. Full size Freezeboxx (excl. dry-ice), trip duration = 120 hrs: € 440,00/trip

OPPORTUNITY

The “cradle-to-grave” solution is the Coolboxx and its IoT umbrella offer. It will give participants a competitive edge and a privileged position for the global air cargo transport of hundreds of thousands doses of COVID-19 vaccines. Interbox and IBM intend to demonstrate the benefits of an Air Cargo Platform Service, based on Blockchain technology and „intelligent“ containers in a Minimal Viable Product (MPV). For this unique opportunity we invite all parties in the Pharma Logistics Supply Chain to join us reaching our goal. It is a worthwhile endeavor, because next to fair revenue, it also will give the feeling to have contributed to improving the daily lives of millions of people around the world.

INFORMATION

IBM Nederland BV
Johan Huizingalaan 765
1066 VH AMSTERDAM
The Netherlands
Phone: +31 6 46 257 267
E: wouter.helming@nl.ibm.com
E: hans.deijkers@nl.ibm.com

INTERBOX International BV
Arent Janszoon Ernststraat 215
1083 JN AMSTERDAM
The Netherlands
Phone: +31 20 679 2635
E: henk.hilders@cargo-box.com
E: erick.vink@cargo-box.com

INTERBOX Ltd.
537 Enterprise Place
Hong Kong Science Park
SHATIN
Hong Kong
Phone: +852 2881 6842
E: vk@vizilog.com

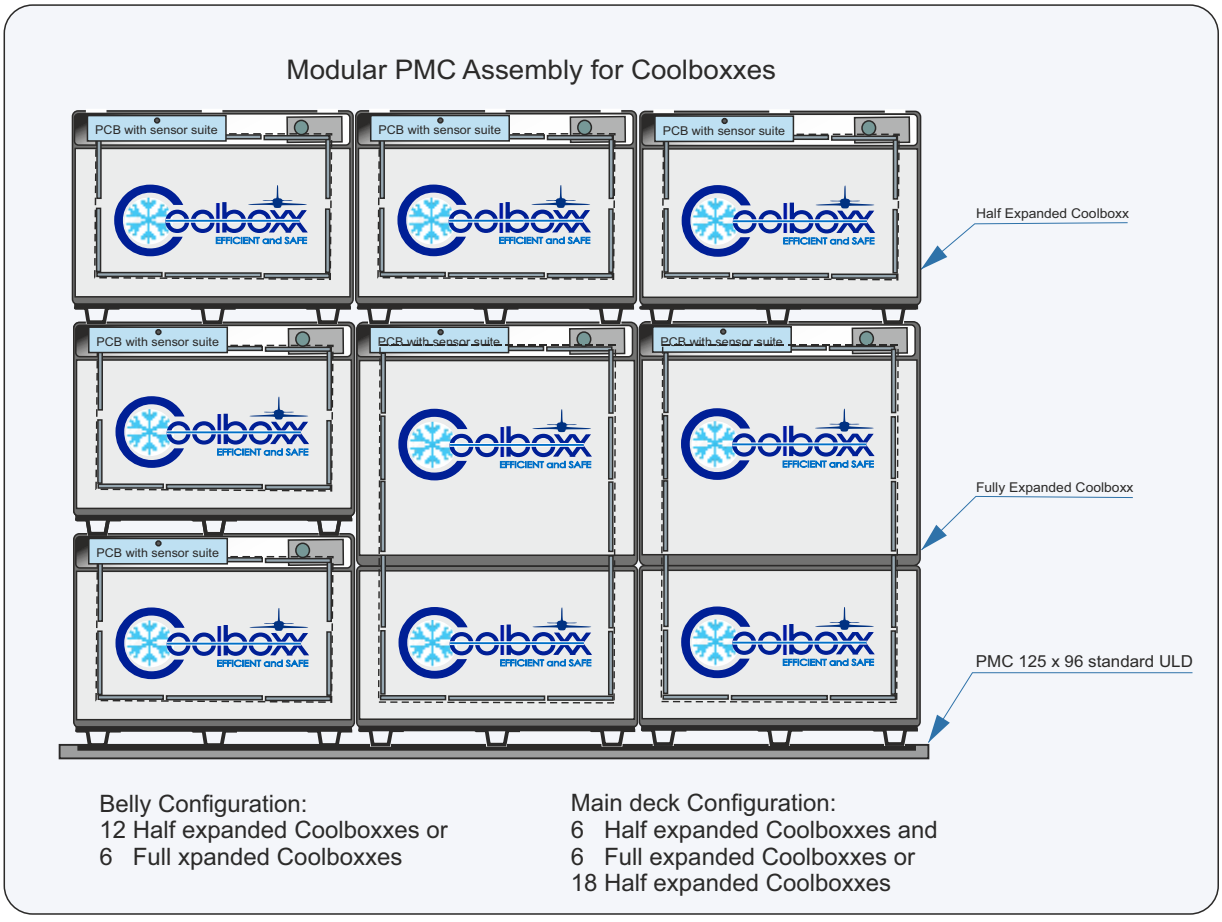


Figure 4: PMC Assembly Configurations