Supply Chain Technology Enablers

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Health & Humanitarian Logistics 2022 Conference

November 17th, Brussels Expo, Belgium

HLA responseability

aidex 2022 THE GLOBAL HUMANITARIAN AID EVENT 16-17 NOVEMBER 2022, BRUSSELS EXPO

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FACTS

2,3

billion people of the Global population have

NO Access

to essential medicines

UNAFFORDABLE

UNAVAILABLE

UNREACHABLE

LOW QUALITY

UN-Acceptable

Georgraphical accessability

- UHC laws in making essential medicines accessible (Perehudoff et al. (2019): laws toward medicines frequently lack principles of **good governance** and miss details on **technical implementation**

TECHNICAL IMPLEMENTATION IS OFTEN THE ELEPHANT IN THE ROOM BECAUSE OF **RESOURCES & MINDSET**

SMART SUPPLY CHAIN MANAGEMENT 4.0

Efficient integration of different vertical supply chain methodologies from an end-to-end lineary model to a full integrated logistics ecosystem

Increase predictability, transparency and traceability

Smart, sustainable and affordable First , Middle , Last Mile distribution

Robust and resilient future value chains for Life Science & MEDtech

Pharma.Aero & HLA UAV Project

WORK PACKAGE 1:
exploring the competitive positioning of UAV in relation with other transportation modes, the regulatory framework for UAV operations and applications of UAV in the pharma and humanitarian air cargo sector. All findings of WP1 were presented in the White Paper that was shared with the industry, in August 2021.

WORK PACKAGE 2:
presenting the technical aspects of the drone systems through a 360° interactive video (drone lab, type of drones, drone operation, etc.). The video is available for Pharma.Aero members and associate partners only.

WORK PACKAGE 3:
documenting an industry case to observe the use of drones as part of a multimodal supply chain in real life.

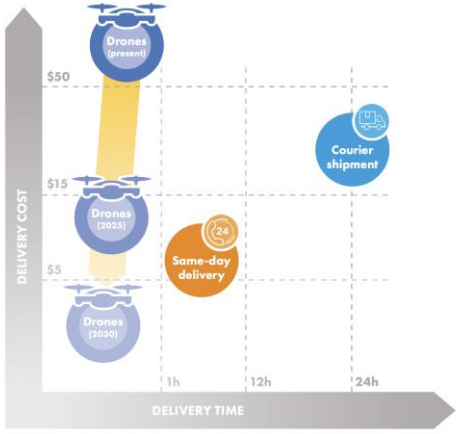


Figure 1 – Existing competitors vs drone as freight transportation

"64% claimed that their organization struggle with the lack of infrastructure."

"58,3% see a medium-term horizon (1-5 years) for drone deployment in their organization."

Pharma.Aero – HLA Use case
UAV Vaccine Deliveries in Malawi

- Why:
  - emergency health situations caused by natural disasters, war & conflict zones and topographical poor infracstructured zones
- Technology
  - enables if the human brain lets it happen... MINDSET makes the difference as we will proof
- Conflict:
  - Fast technology development versus slow human integration

Provide unprecendented insights by mapping the vaccine journey to heard-to-reach areas creating the value chain including UAV's

Increase access , speed and efficiency

The Use of Drones in transporting vaccines from factory to patient

Investigating the use of drones as part of an interconnected multi-modal dirstribution network

Use of Drones (UAV's) and its potential as part of the pharma logistics chain interconnecting different existing modes of transport

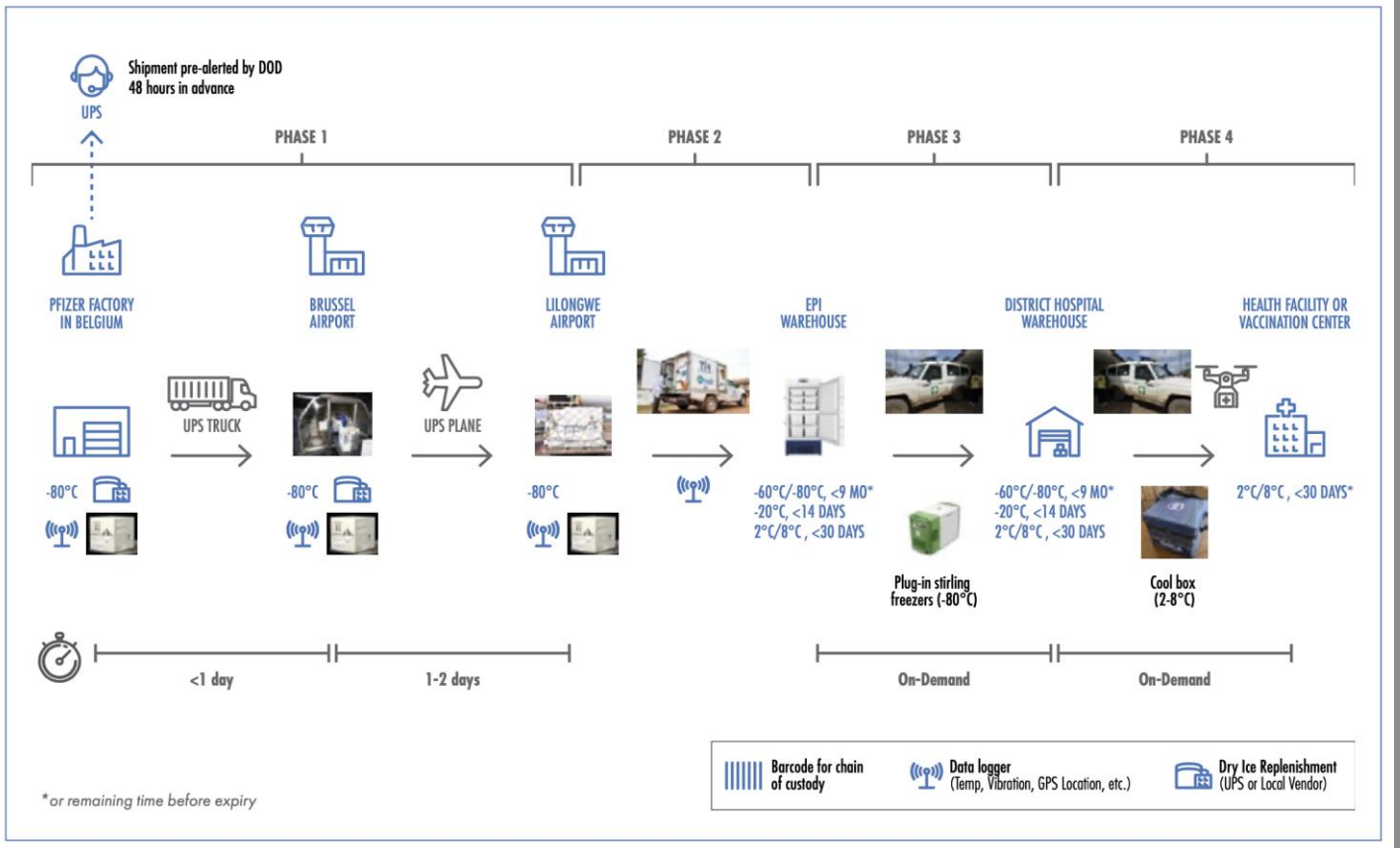
The transport comprises 4 phases:

PHASE 1: Factory in Belgium → Airport in Malawi

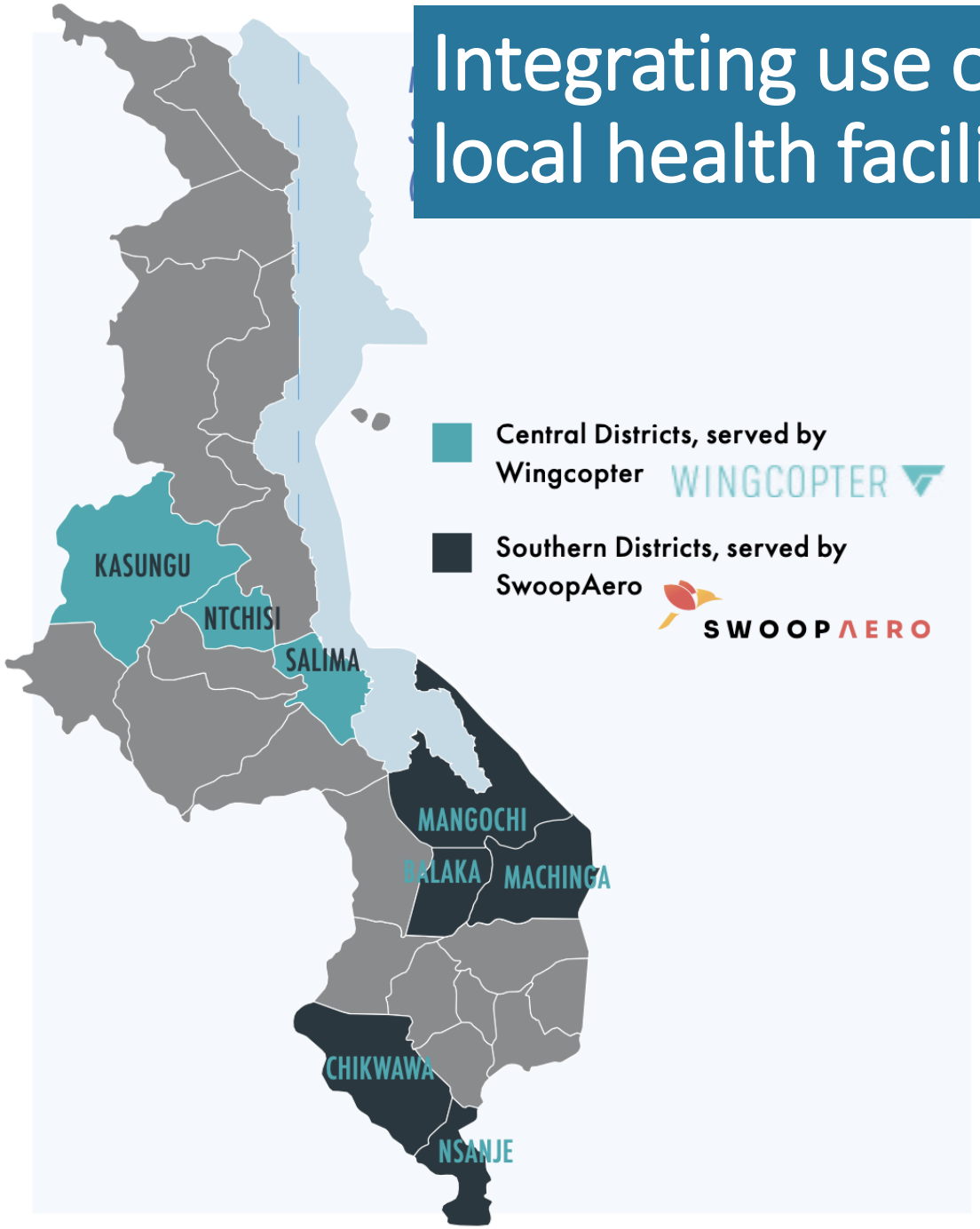
PHASE 2: Airport in Malawi (Lilongwe) → National Warehouse (Lilongwe)

PHASE 3: National Warehouse → District Warehouses

PHASE 4: District Warehouses → 800+ Health Facilities / Vaccination Centers



Integrating use of drones in the last mile: the local health facility



use of drones in 8 of the 28 districts

significantly shortening the delivery times

- 90 minutes truck to 9 min UAV
- 3hr boat to 12 min UAV

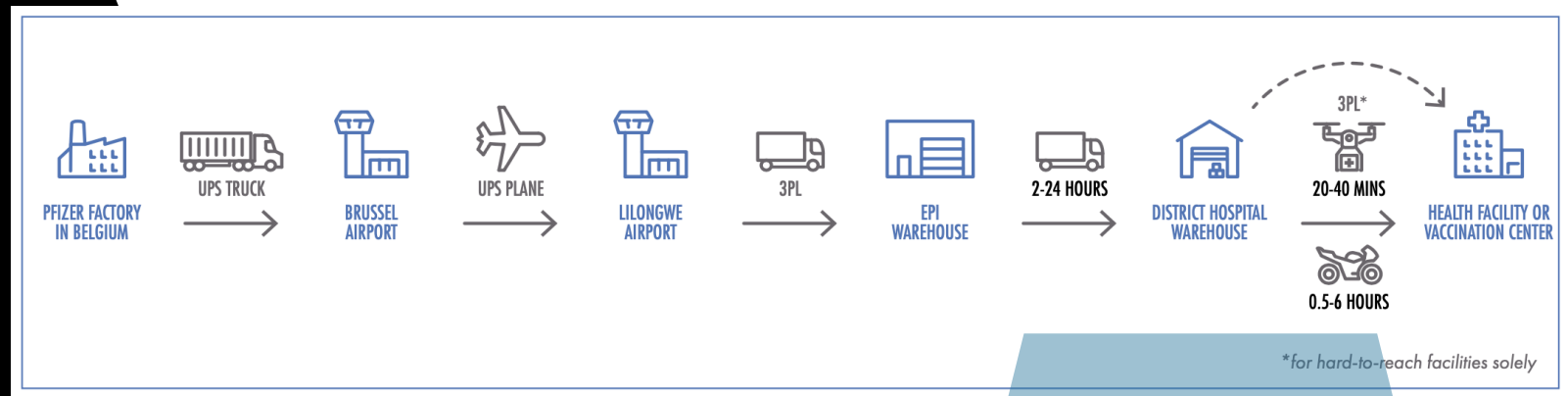
bi-directional use of drones with vertical take-off and landing

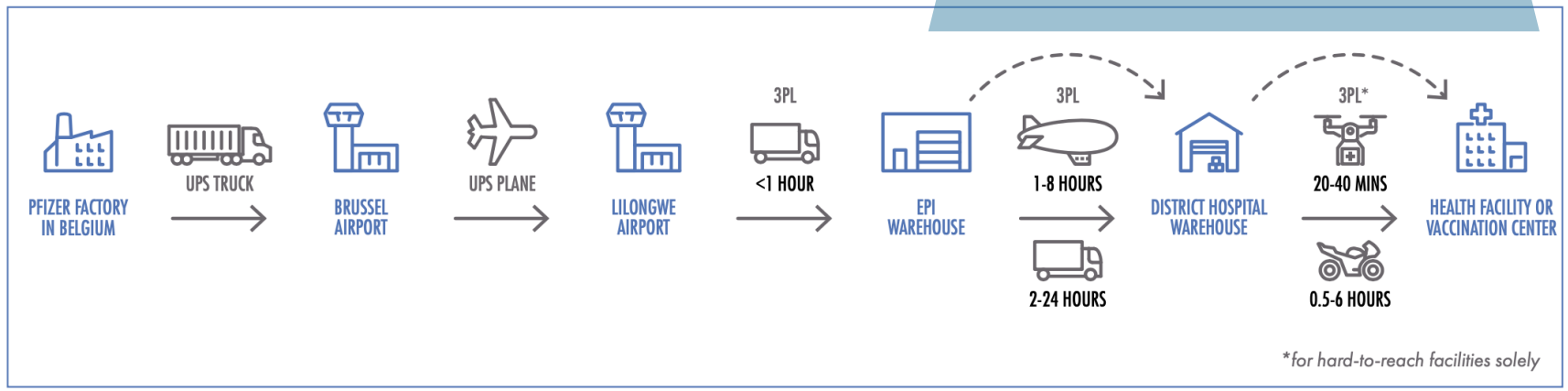
resulted in

- easy infrastructure to operate
- low human resources needed
- bi-directional use can ensure delivery medication and health supplies and pick-up lab samples for urgent analysis
- regulatory support enables the test case

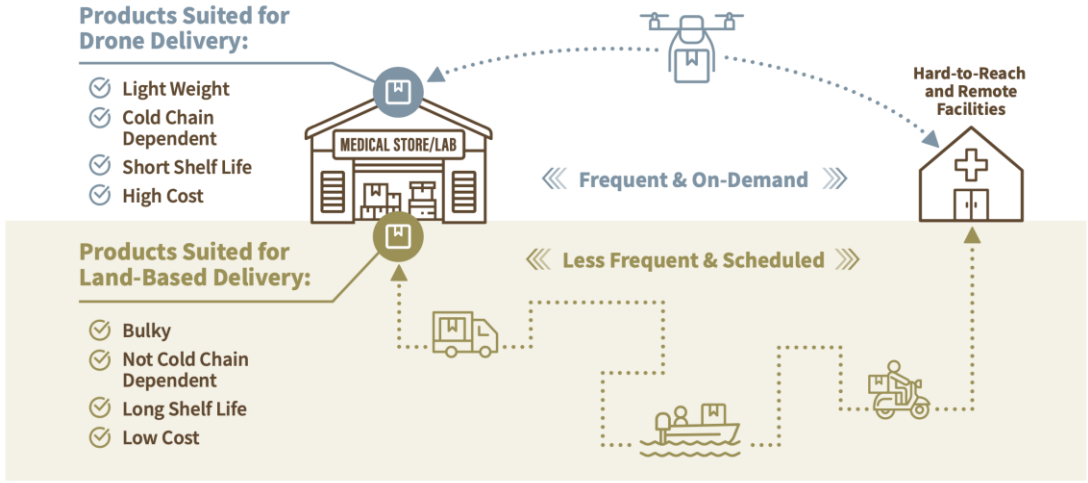
Integrating use of drones middle mile segment

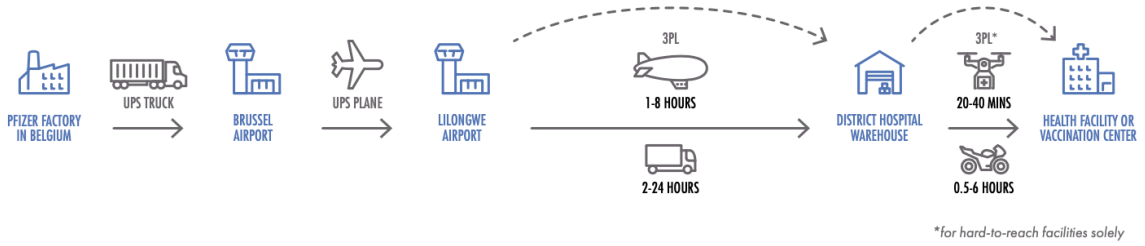
- Technology: a series of challenges especially to the type of drone (fixed wing etc..)
- Regulations: more authorization processes and flight regulations
- Sustainability : affordable operations and use can only be reached by creating an integrated multiple health program with additional network design and combined use of drones





Integrated Drone Transport





*for hard-to-reach facilities solely

Conculsions

From stand-alone to fully integrated use needs more research

Focus on efficiency failure of land-based transportation modalities both in hard-to-reach remote areas as metropolitan dense cities

From vertical segments (emergency, on-demand or deliveries) focused in public health, to full applicability to enable affordable drone operations

A different market penetration is necessary combining different modes and commodities, similar to all other existing logistics methods in place

DRONE (UAV) is one of the technical enablers in an entire ecosystem of Innovative supply chain management

- Continous improvement of road networks and connected air hubs
- Regional and local pharma production and diagnostic centers
- Intergrated supply chain modes and methods
- Integrated next generation of digital technologies

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