HELICUS Aero Initiative

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Medical Drone Transports

ENABLING AUTOMATED & INTEGRATED DRONE SERVICES

Tim Cleys

11/05/2022

HELICUS TEAM

Mikael Shamim
CEO

Geert Vanhandenhove
Flight Operations

Tim Cleys
Healthcare Integration

Chesney De Bondt
Product Development

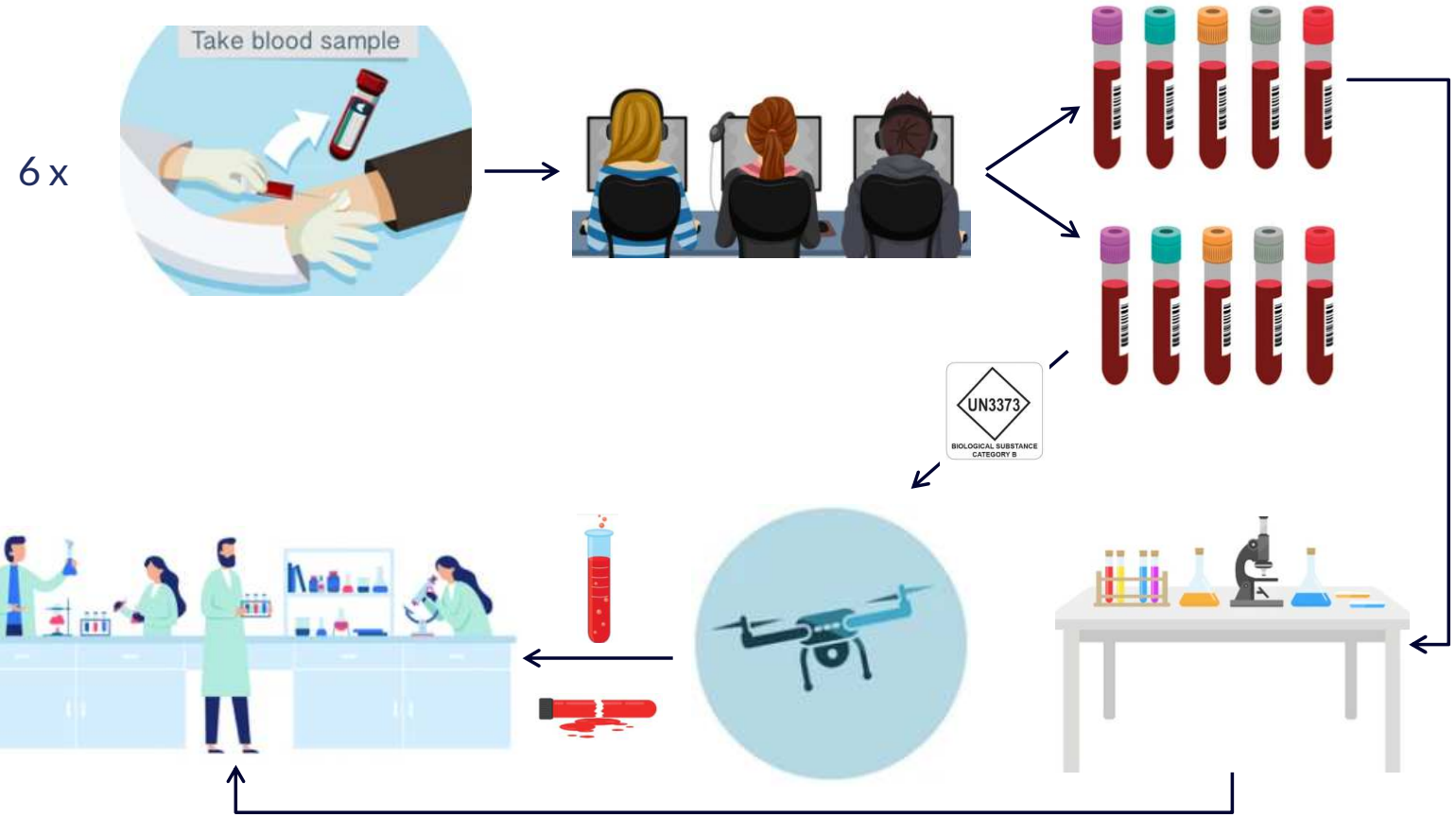
Garo Tombazian
Engineering

Rik Van Boxem
Quality & Processes

Hardware development

Medical validation – Study protocol

Focus group
Clinical Biology



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Hardware development

Medical validation 2021-2022

GZA Ziekenhuizen

Focus group
Clinical Biology

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HELICUS TEAM

Mikael Shamim (CEO)
HAI Eco-system & Project coordination, Finance

Sven Meyers — Senior Accountant and Tax Manager

Geert Vanhandenhove (Flight Operations)

Contracted pilots — Mission dependent
C2C Management — C2C Functional requirements

Helicus North Netherlands Operations
Egbert Swierts, Lars De Kloet, Jan Wiersma, Frans Hamstra

Chesney De Bondt (Product Development)
Drone Cargo Port, Under Carriage/Payloads

Lars Vanbaelen — Compact DCP design
Alexander Roets — Rugged DCP design
Sara Huysmans — AED payload design
Wouter Dirx — SAR/Inspection payload design

Garo Tombazian (Engineering)
Drone Cargo Port electromechanics, Embedded Logic and C2C interface

Mateo Swolfs | Leen Moons — Compact DCP payload management
Lies Rabaey | Nicolas Demilie — Compact DCP programming and validation
Vitya Kozachenko|Wout Prouvé — Payload and Undercarriage design and validation
Jolan Monu | Tuur Gybels — Hydrogen Charging

Tim Cleys (Healthcare integration)

Manage Healthcare partnerships
4 focus groups (Anapath, Clin biology, Pharmacy, ICT)
Tracking: Belgium, Netherlands, Germany, UK, France

Rik Van Boxem (Q & Process Management)

Dieter Buschop | Cedric Molkens — Medical use case study
Joren Van Steyvoort | Amin Boujedain — Non-medical use case study

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Command & Control Center (C2C) SW Development

Tim Van Waes — Chief Engineer
Christoph Van Hove — Lead architect and development (aviation)
Jorren Hendriks — Software development (aviation)
Stijn Coolbrandt — Software architect (Healthcare)

Formal partnerships with allocated manpower

Hospitals — 30+ Hospitals (BE,NL,D, UK, FR)
Authorities — EASA, Eurocontrol, ANSP, USP, Droneport, Cities (A/A/I/H)
Technology — Telecom, weather, Security, Automation, Insurance
Projects — SAFIR (‘19), Medrona (‘20), HAI-SCS (‘21), SAFIR-Med (‘22)

Helicus Aero Initiative (HAI) groups multi-sectorial leaders that collaborate on integrated & automated drone services

Helicus is a co-created initiative that includes hospital groups (40+ hospitals), and from the start !

NEW MOBILITY SOLUTIONS NEEDED

Centralisation

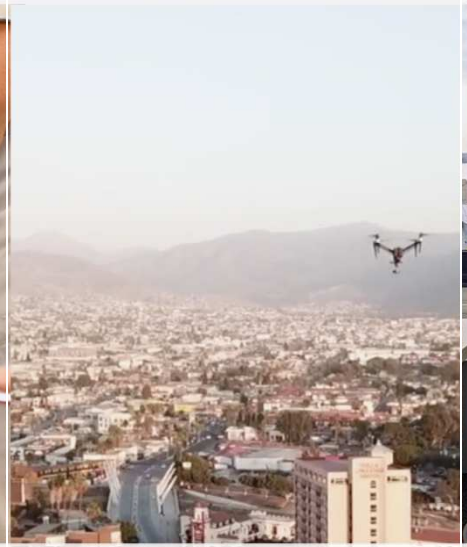
Network organisation

Saturation

Of road-based solutions

Current transport

Not on demand
Long waiting times
Limited quality control



U-Space

Strong drive from
European regulations

Drones

Strong drive from
Maturing technology

DRONE BASED SERVICES IN HEALTHCARE

Various use cases

B2B — Increased variability and public exposure
Capability/Regulation/Social acceptance build-up — B2C

Inter campus medical transport

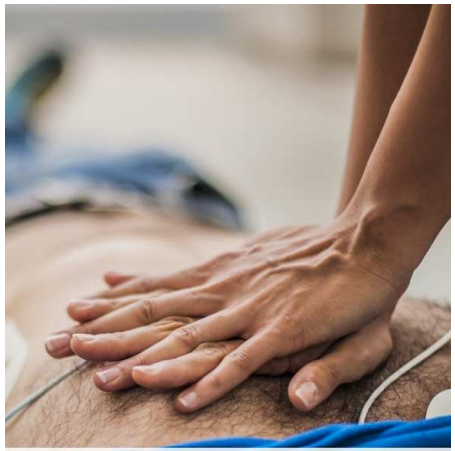
Anapath, clin. biology, pharmacy

Distance & small scale

Blood supply to hospitals (Red Cross)

Last mile

Organ transport



Open end

AED by UAV

Patient & doctor

Human transport

DRONE BASED SERVICES IN HEALTHCARE

Various use cases

B2B — Increased variability and public exposure — Capability/Regulation/Social acceptance build-up — B2C

Inter campus medical transport

Anapath, clin. biology, pharmacy

Longer distance & lower density flights

Blood supply to hospitals (Red Cross)

Long distance Conditioning/weight

Organ transport

Open end

AED by UAV

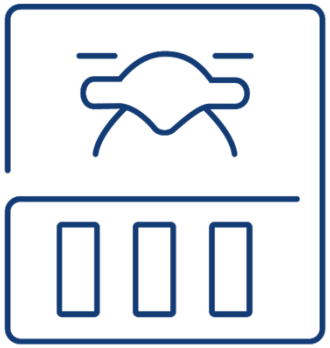
Patient & doctor

Human transport

THE 3 BUILDING BLOCKS OF HELICUS OPERATIONS

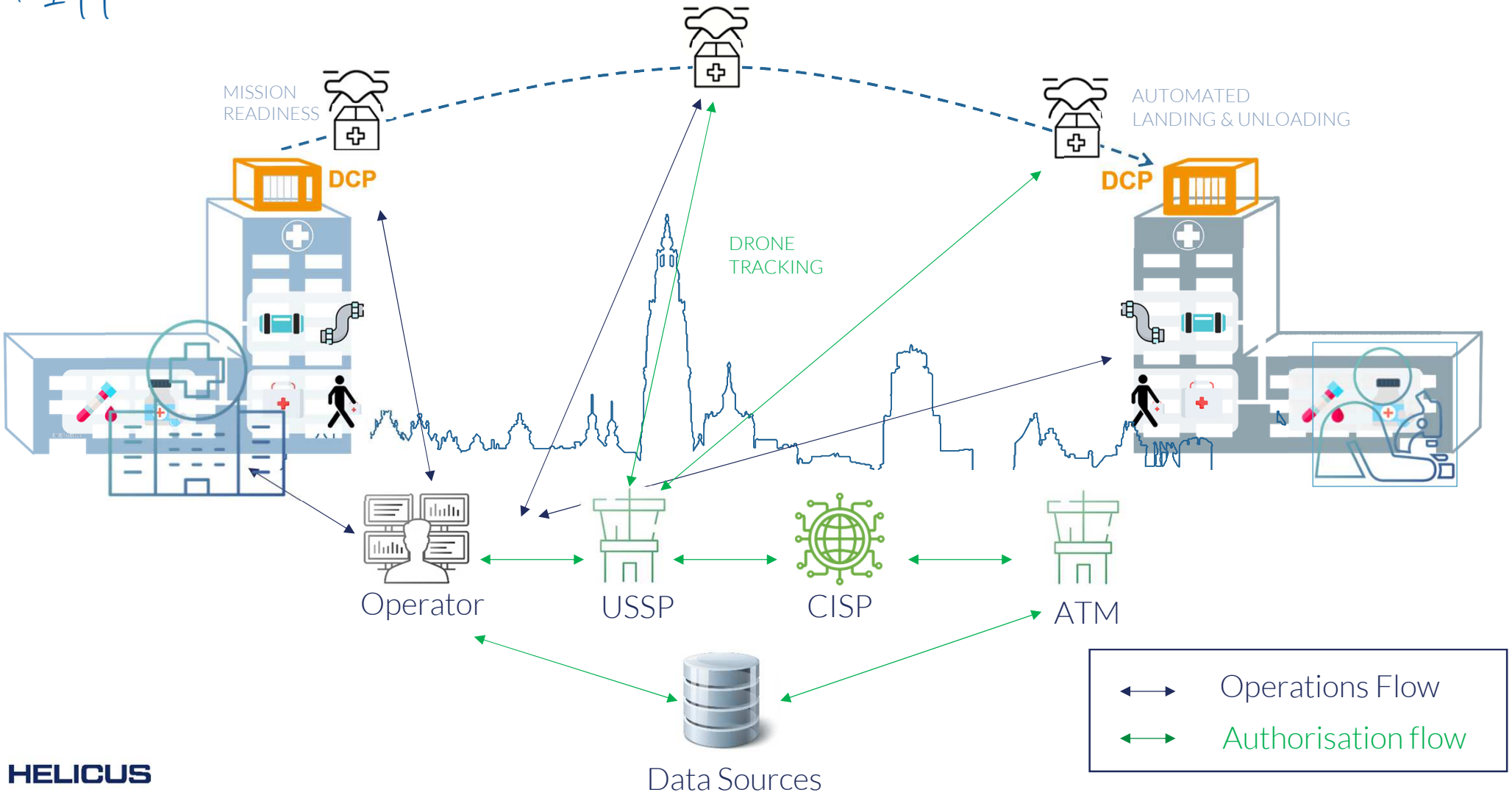
Drone Platforms

Command and Control Center



Drone Cargo Port

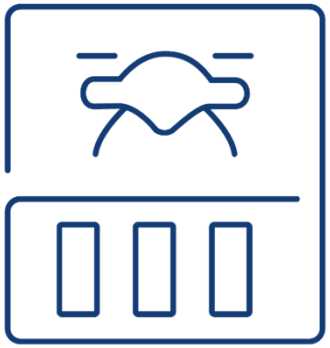
Automated & integrated medical drone logistics



THE 3 BUILDING BLOCKS OF HELICUS OPERATIONS

Drone Platforms

Command and Control Center



Drone Cargo Port

THE 3 BUILDING BLOCKS OF HELICUS OPERATIONS

Drone Platforms

Command and Control Center

Drone Cargo Port

DRONE PLATFORMS

Fixed Wing Hybrid

Single Rotor

Fixed Wing

Multi Rotor

DRONE AGNOSTIC SOLUTION

Unmanned Aerial Vehicle (UAV)

Helicus integrates platforms depending on Use Case

- Distance
- Weight / conditioning
- Frequency

All platforms conform Helicus specification

- Safety: duplicate and redundant
- Functional: interchangeable payload (via Helicus standard)
- Green: electricity or H^2

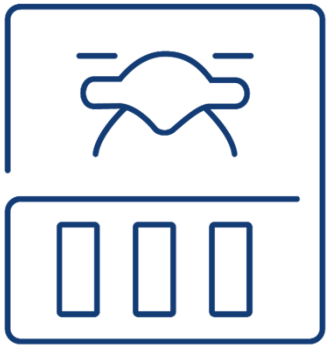
End user benefits from drone agnostic setup

DRONE PLATFORMS

THE 3 BUILDING BLOCKS OF HELICUS OPERATIONS

Drone Platforms

Command and Control Center



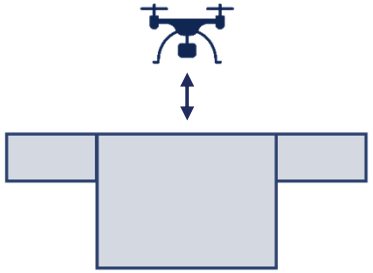
Drone Cargo Port

DRONE CARGO PORT (DCP)

Ground integration

HELICUS

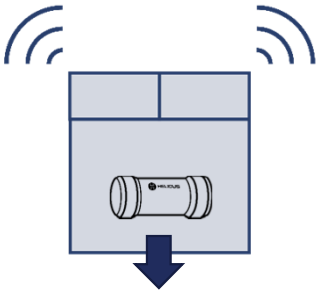
DCP functionalities



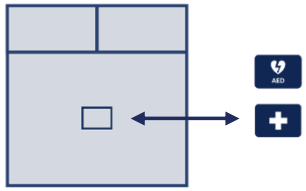
Automatic landing
& take-off

Drone Storage and
protection

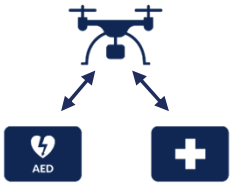
Drone Charging
(Elec & H^2)



Cargo handling
(box and pneumatic tube)



Human-machine
interface



Automatic payload
swapping

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THE 3 BUILDING BLOCKS OF HELICUS OPERATIONS

Drone Platforms

Command and Control Center

Drone Cargo Port

COMMAND & CONTROL CENTER

C2C

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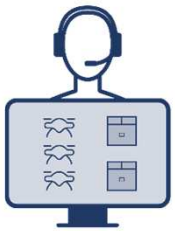
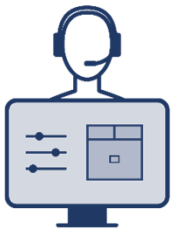
COMMAND & CONTROL CENTER

C2C functionalities

Route planning and creation



Asset management (incl. UAV, DCP, payloads)



Automated pre-and post flight checks

Digital twin of the real world

Air traffic authority communication

Automated flight approval

Remote pilot monitoring

Logistical tracking

HAI-SCS

Flights Port of Antwerp

C2C to UAV interface
- telemetry &
- flight path upload

Connectivity demonstration
- 4G flights (2021)
- 5G flights (12/2021)

Flights under new EU legislation

Test new insurance model & setup
- Helicus operator (safety mgt, operating handbook, mission leader)
- Manufacturer (drones, pilots)

HELICUS

SAFIR-Med Status

First Cross Border Controlled BVLOS Flight

02/2022

Cross border remotely controlled flights (105km)

- Antwerp (BE): Helicus Command and Control Centre (C2C)
- Valkenburg (NL): TU Delft AED drone

Press release:

"This long distance controlled flight forms the next step of an extensive in-field test program, coupling drones with automated fleet ground control (C2C) enabling economically viable (medical) services by drone.

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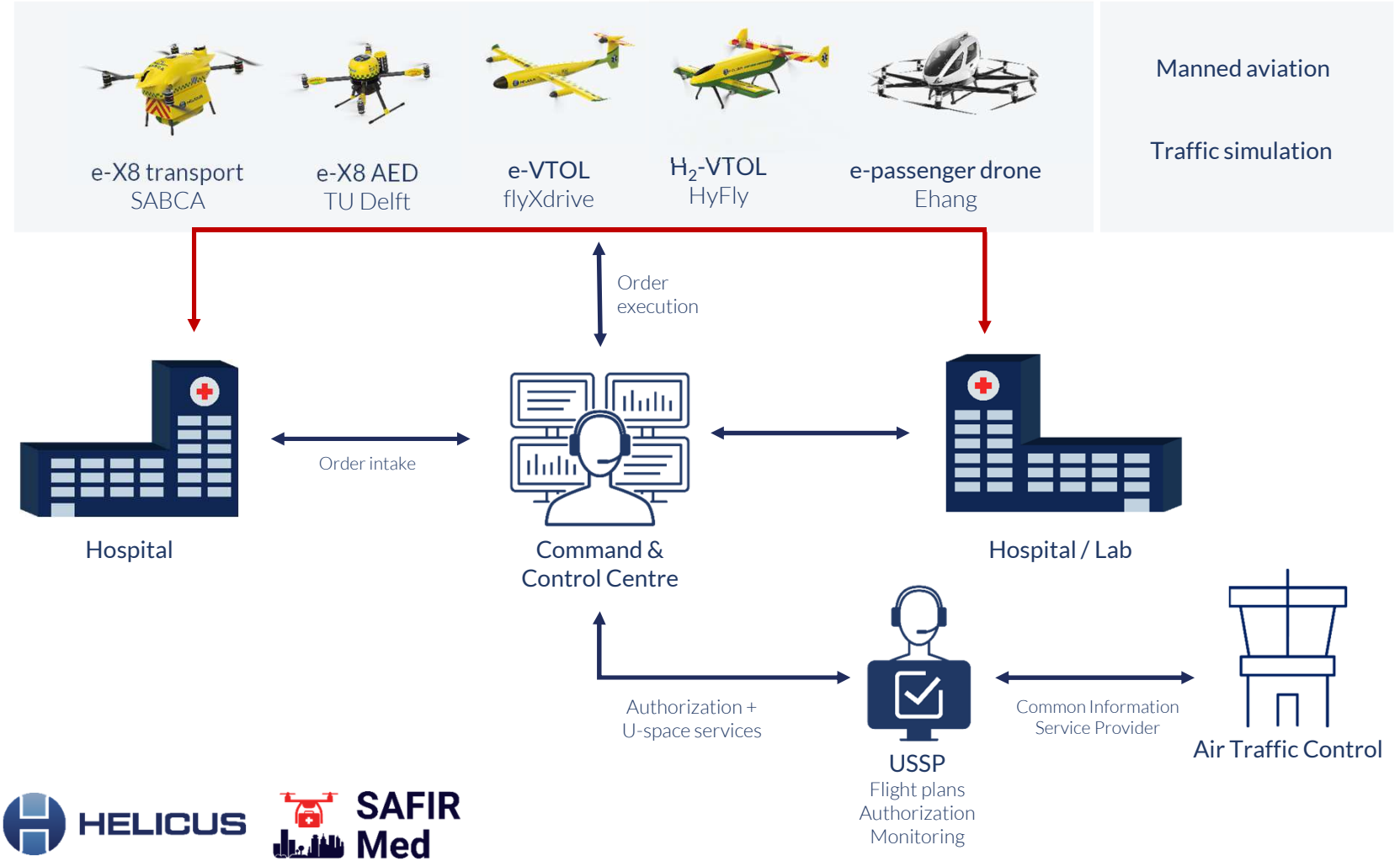
Integrated medical drone logistics



2023

U3

U-space advanced services
More complex operations
Increased automation and more BVLOS flights

2025

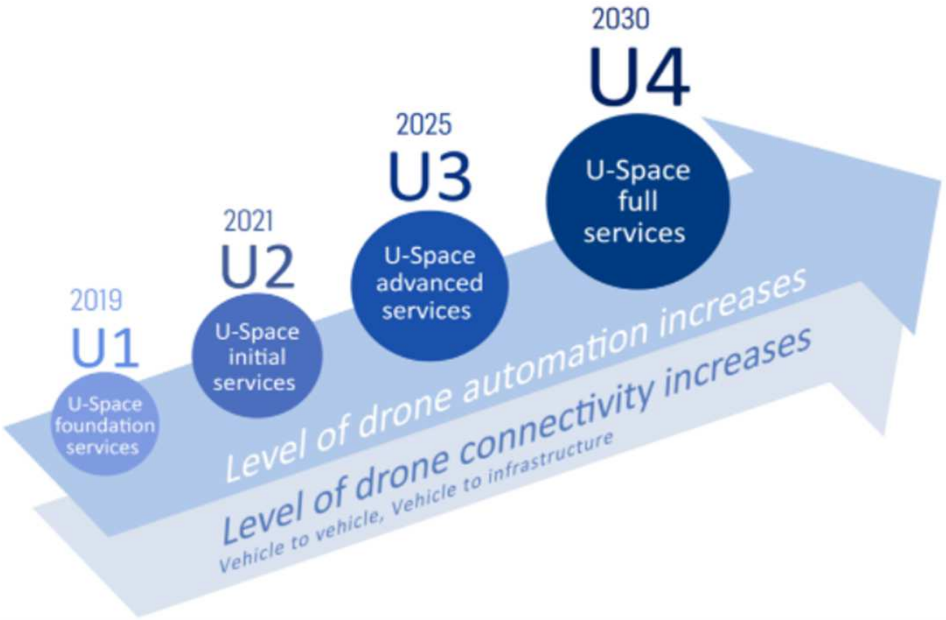
U4

U-space full services
Automated, connected and digital U-space is available throughout European airspace

HELICUS

SAFIR Med

DRONE LEGISLATION



U1 Initial and basic services of the U-space, to highlight both the registration and the electronic identification as well as the geofencing system).

U2 Initial U-space services for flight management. This includes the creation of a system for flight planning, permit approval, monitoring and conventional interaction with air traffic control (ATC).

U3 Support services for more complex situations within the U-space system, such as automation for the resolution of conflicts between aircraft that interfere with each other, as well as obstacle detection and avoidance functionalities.

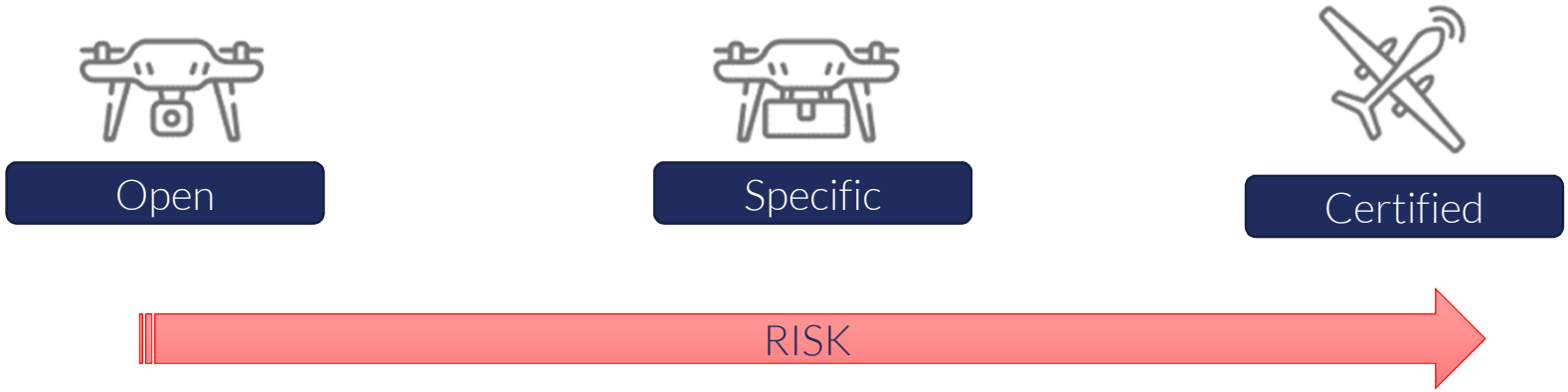
U4 Implementation of all U-space services, including high levels of process automation and interconnection between aircraft, pilots, authorities and other responsible and interested parties.

DRONE LEGISLATION

Before 2021: Different national legislations

Since 2021: One legislation for Europe

- no differentiation between hobby and professional drone pilotes
- differentiation based on the risc factor of the flight you plan to execute
  - type of drone
  - flight operation
  - risk for incidents during flight



DRONE LEGISLATION

Open

- Drones up to 25kg
- Max altitude of 120m
- No cargo (dis)charging
- Visual Line Of Sight

Specific

- Drones above 25kg
- Altitude above 120m
- Above people and populated area's
- Near airfields
- Cargo (dis)charging
- Beyond Visual Line Of Sight

Certified

- Risk as manned aviation
- Passengers on board

DRONE LEGISLATION

Open

- No authorisation or declaration required by operator before start of flight

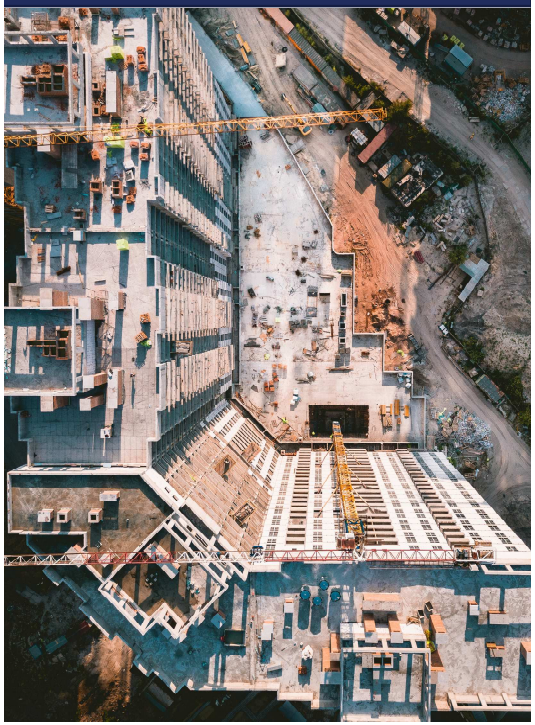
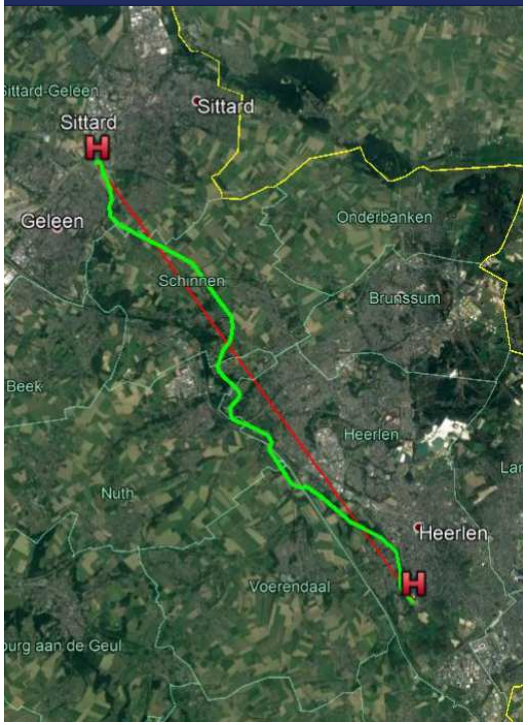
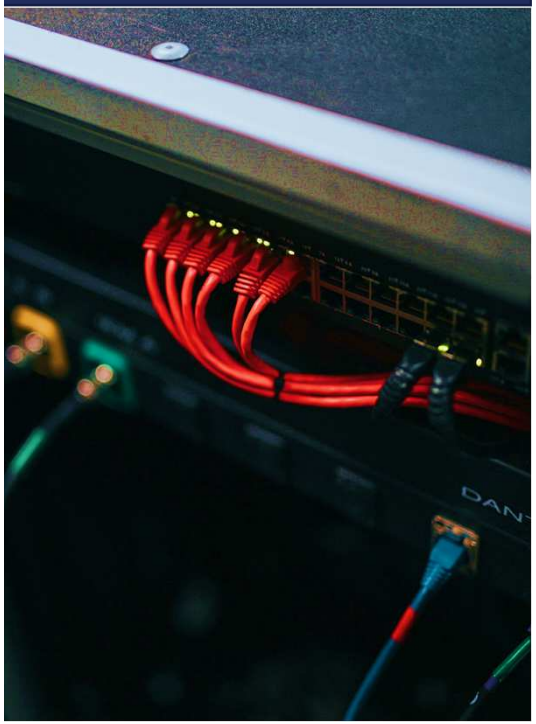
Specific

- Autorisation required before start of flight based on SORA
- Declaration suffices if standard scenario
- Self-authorisation

Certified

- Authorisation required by Certified operator
- Certified UAS with CoA licensed pilot

Hospital collaborations

VISION	INFRASTRUCTURE	AVIATION	ICT
			

THANK YOU

ANY QUESTIONS?

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