Fixed wing drone for blood transportation in Africa

Project & challenges: EPFL is a part of the Red Line project, which aims to develop air transportation of blood between drone ports in Africa. Blood is a perishable material, thus it has to be transported fast and in appropriated temperatures. The goal was to design a fixed wing drone able to cover long distances with a compartment for temperature sensitive materials. The drone has a modular design in order to easily transport, store, and repair it in case of damages.

Goals & guidelines: 100 km range 3 kg payload  
+ Modularity  
+ Thermal insulation of blood

 modularity

- Main wings, are exactly the same for both sides
- Extreme part of wings are also used as rudder for the tail
- Spare parts in each drone port
- Fast and easy to repair by replacing damaged modules

THERMALLY INSULATED BOX FOR BLOOD

- Rectangular-shaped box with inner and outer shells made of fibreboard
- One layer of insulating material (polyurethane foam)
- Addition of coolant maintain blood between 2° C and 10°C for ~ 1 hour

TRANSPORTATION

Transportation configurations
Folded volume reduced by:

1 : 70%
2 : 86%

CONCLUSION

Theoretically, the drone meets project's requirements. The next step is to build it, in order to validate the design.

Authors
Per Wingaard Sjøqvist / Thibault Macherel
Imane Bennani / Nelson Wenger
Luca Gaspari / Sélim Sfar

Supervisors
Premyslaw Kornatowski / Dario Floreano