

Review & outlook

Meeting | April 22nd
2021

Bureau de coordination du pilier
Sciences



elcod
sky solution



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The Idea of ELCOD



"[...] Development of a low cost, environmentally friendly and cost-effective long-range UAV [...]"

Endurance Low Cost Drone

Web site : www.elcod.eu

Project Partners



Associated partners :

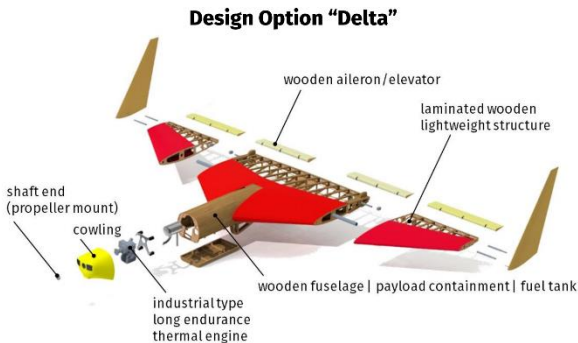


Video form ELCOD project

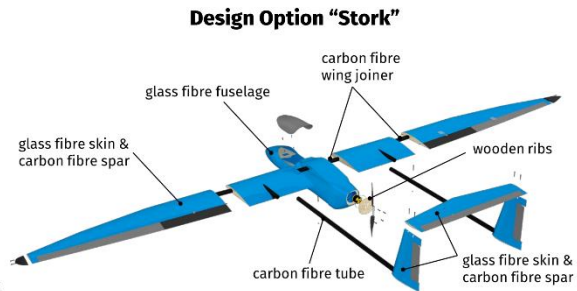
<https://science.rmtmo.eu/actualites/le-projet-interreg-elcod-se-presente-en-video/>

Status Quo...

- Successfully developed, manufactured, tested, and operated two alternative ELCOD designs !
- Successful modification and adaptation of different propulsion solutions for mid- to long-range operation !
- MTOW : 25kg
- Cruise speed 90-110km/h
- CNRS (ICPEES) : air quality and pollution sensor development



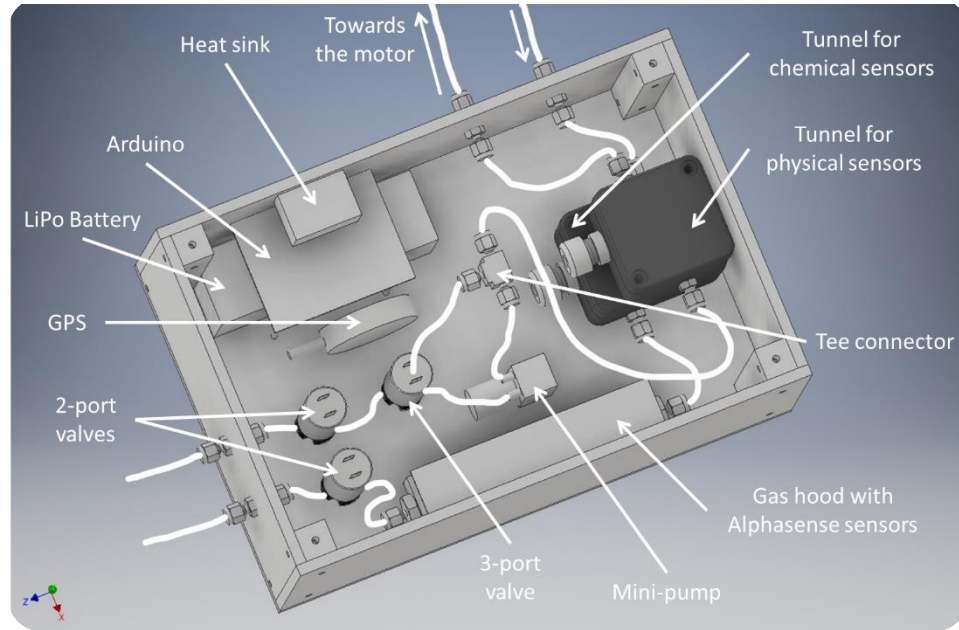
Wing span : 2,60m ; MTOW : 25kg ; Cruise speed 90-10km/h
Optimized thermal motor , flight autonomy up to 30H



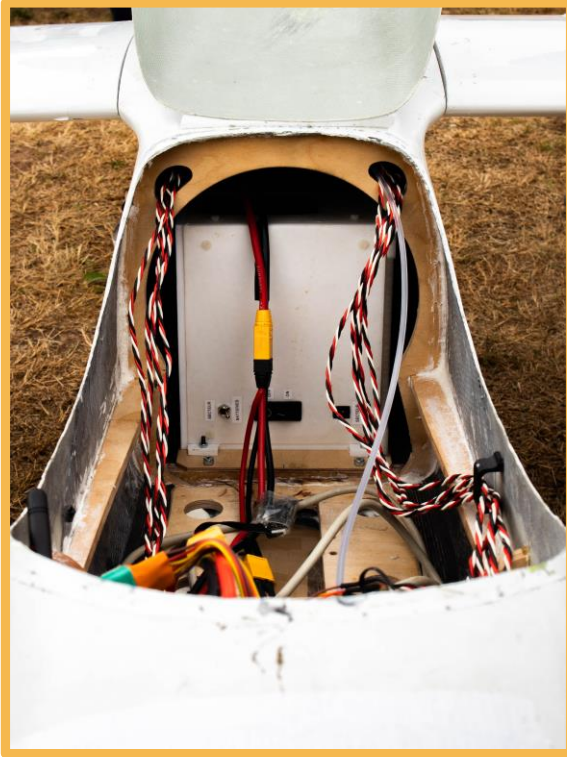
Wing span : 5 m ; MTOW : 25kg ; Cruise speed 90-110km/h
Hydrogen Fuel cell : 1000W, Electric flight autonomy 5-6H

Status Quo...

- Successfully developed, manufactured, tested, and operated air quality and pollution sensors !



Integration into the drone and Flight test



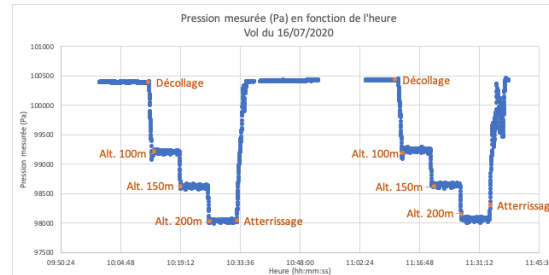
Air pollutants sensors installation into the drone

Sensors of air pollutants tested and calibrated:

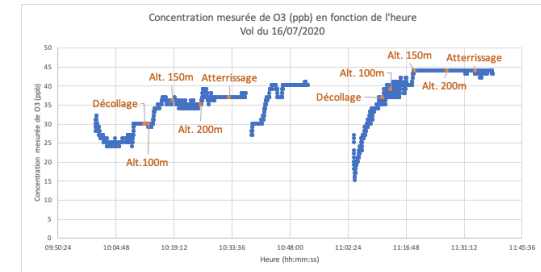
Ozone : O_3

Nitrogen oxides: NO_2 and NO

CO , etc.



Pressure versus time and altitude



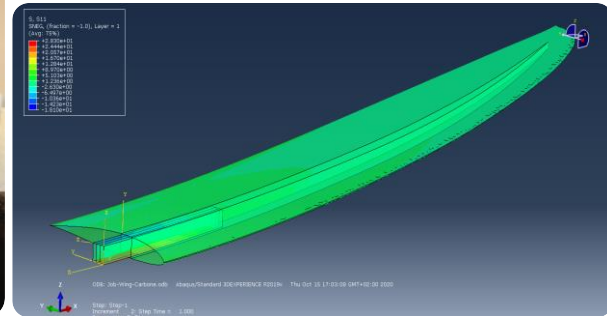
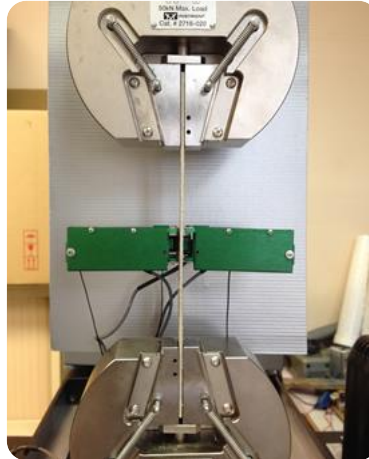
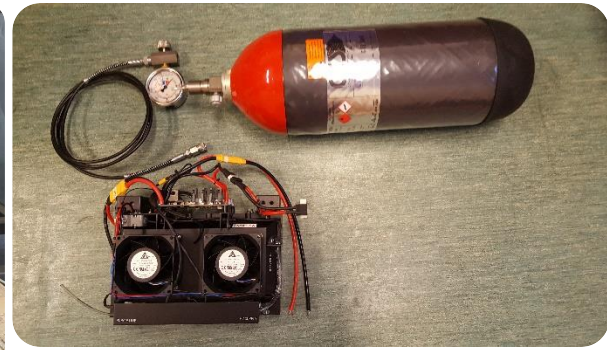
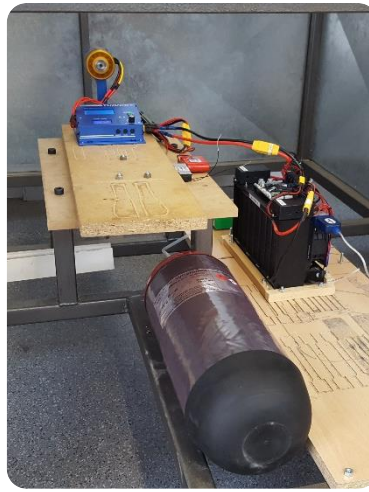
Ozone concentration versus time and altitude

Recent activities...

- Two PhD thesis...

“Optimization of energy management in a drone equipped with a fuel cell-based hybrid source”
(beginning 1st October 2020, Thomas PAVOT)

“Multiscale studies of flax fibers & flax fiber composites to design the world first long range biobased drone”
(beginning 1st December 2019, Martin Lefebvre)



Follow up activities...



Follow Up Project

current state: both prototypes are flying!



TRL 2
proof of concept
sketches



TRL 5
UAV prototype
basic features

TRL 1/2/3
solutions for improved...
reliability,
heavy duty operation,
security & safety,
usability

TRL 6
optimised prototype
demonstrated in
real conditions

Follow Up Project



Follow Up Project

- **Collaboration with fire fighters (SDIS67) with development of air pollution and Particulate Matter (PM) with drones**
- **Collaboration with the Olympic Center of Freiburg for athletes monitoring with drones**
- **Collaboration with Arkema and Eco-technilin for the development of the first bio composite drone with hydrogen fuel cell propulsion and flax fibers**
- **7 publications in international reviews or conferences**
- **3rd place for the “team Cigogne” at the conference/competition IMAV2019 (www.imav.org)**

Remarks for future project

- **Modification of the project beginning dates : September-October instead of April**
- **Involvement of the companies if they have a founding**

Thanks for your attention !



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