

# LARES: Lifesaving Aerial Rescue and Emergency Service

## DSE Group 10

*Providing timely delivery of fire escape masks to facilitate successful evacuation in fire emergencies.*

Last year, in the Netherlands alone, approximately 22 people died due to oxygen deprivation caused by smoke.<sup>12</sup> The aim of DSE Group 10 is to design an unmanned aerial vehicle (UAV) that can prevent these deaths, by delivering fire emergency masks to high-rise buildings. This project was executed in eleven weeks with nine bachelor students.

Multiple possible solutions within the constraints were explored in an iterative process. This resulted in a X8-copter design able to deliver 6 masks to people in despair. A CATIA-render of the UAV is presented in Figure 1. The design challenges encountered during the project include resisting temperatures up to 300 degrees Celsius, breaching a window to deliver the masks and adhering to a building. To solve these challenges, a thermal barrier coating and insulation were used, a glass cutting mechanism was designed and a suction system was used to adhere to the building. Additionally, a focus was placed on sustainability, ease-of-use and the maintainability of the design.

This design process resulted in an UAV of 39 kilograms that can deliver masks in a range of 8 kilometers within 15 minutes after dispatch. The drone can be resupplied on site if more masks are needed. The overall cost for this system will be below ten thousand euros.

Furthermore, the design is accompanied by a manufacturing and assembly plan, a market analysis, an estimated product cost, and other organisational documents that minimise the loss of resources during the implementation of the design in the real world. A prototype is expected to be delivered in around a year from now.



Figure 1: Concept art of the drone made in CATIA.

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<sup>1</sup><https://www.ifv.nl/kennisplein/Documents/20210321-BA-Jaaroverzicht-fatale-woningbranden-2020.pdf>, Retrieved on 17/06/2021

<sup>2</sup><https://www.stanfordchildrens.org/en/topic/default?id=fire-safety-and-burns--injury-statistics-and-incidence-rates-90-P02978>, Retrieved on 17/06/2021