

# Delta-ray UAV

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The Delta-ray is a multi-role intelligence, surveillance and recognizance (ISR) and interceptor drone concept. The UAV is designed for being light weight, fly fast, easy to deploy and easy to mass produce, also in Norway, contributing to national capability. It is made without exposed movable control surfaces (ailerons, rudder, flaps) and the material is resistant to icing. But active propulsion control for maneuvering the platform.

We are looking two students, preferably a duo, that can work together where one is the main responsible for the modelling and control and the other responsible for the inertial-visual odometry. As a student on this topic, you will have access to the platform, electronics and flight controller.

## **Assignment 1: Modelling and control of a delta wing**

The control system is very important here since due to the platform design. Potential tasks:

- Calculating aerodynamic coefficient with open-source CFD SW
- Design of control laws and thrust allocation for 3DOF attitude and velocity control
- Guidance laws

Possible extension: Advance guidance, path and mission planning

## **Assignment 2: Visual-inertial odometry for GNSS denied delta wing UAV navigation**

Sensor fusion will also be very important since it is not given that GPS/GNSS will be available during operation. Main task(s):

- Multi-sensor fusion using IMU with camera and pressure sensors using factor graph optimization

Possible extension: Graph-based SLAM algorithms.