

## ***Title: Tracking a Known Shape on Moving Truck using a Quadrotor***

In this project I want to implement a 4-phase moving target detection and tracking. The problem is stated as below.

There is a small truck with a known shape printed on top of it (Fig. 1) that is moving in a large field.

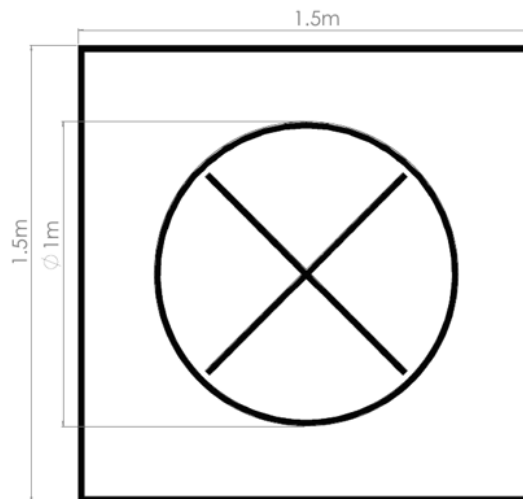


Fig. 1. The shape of the target.

An autonomous quadrotor intends to detect the moving truck in the field and follow it while decreasing its distance with the truck. The problem is that since the initial distance is large, the known shape cannot be detected initially. Therefore, the quadrotor should detect the moving truck and track it using the on-board camera until the known shape can be detected and tracked. In overall, the whole system will be as follows:

- 1- The moving truck is detected in the field using the existing vision methods.

- 2- The detected truck is tracked in the image sequence from the camera.
- 3- Whenever the quadrotor is near enough to the truck that the known shape is seen in the image sequence, the known shape is detected.
- 4- The detected known shape is tracked in the sequence.

Every time that a phase fails to do the task, the system tries the previous phase.

I intend to produce my own dataset, moving a small truck with the known shape on top of it in a field. Then a quadrotor will approach it from different angles and distances, recording the camera data. It will be done in a sunny day (probably).

## **References**

- [1] Rodríguez-Canosa, G.R.; Thomas, S.; del Cerro, J.; Barrientos, A.; MacDonald, B. A Real-Time Method to Detect and Track Moving Objects (DATMO) from Unmanned Aerial Vehicles (UAVs) Using a Single Camera. *Remote Sens.* **2012**, *4*, 1090-1111.
- [2] Breckon, T.P.; Barnes, S.E.; Eichner, M.L.; Wahren, K. Autonomous Real-time Vehicle Detection from a Medium-Level UAV.  
<http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.144.7194t>