1 Introduction

- Project definition
- Why gimbal isn't perfect

1.1 Heading controller

Heading is normally controlled by using the ailerons to roll the aircraft, with the resulting difference between the lift vectors of each wing causing the aircraft to turn. This strategy is used because it gives because it's most common in larger, manned aircrafts as it is causes little drag and is most comfortable for the passengers [1]. The main reason for why the same strategy is used with UAVs as it will be familiar for other pilots and it is a well-tested way of heading control.

When using UAVs for ground operations the roll used to turn the aircraft is a big problem which is mostly avoided by attaching the camera to a gimbal that is counteracting the effects of the roll. When the UAV is not equipped with a gimbal different control strategies can be used to reduce the roll needed to turn or to ensure that the camera stays focused on the object. There is a benefit to creating new controllers for this as controllers allows for using existing trajectory planners.

1.1.1 Rudder as a heading control surface

1.1.2 PID-controller

References

[1] Mills, S., Ford, J. J., Mejias, L. (2011) *Vision Based Control for Fixed Wing UAVs Inspecting Locally Linear Infrastructure using Skid-to-Turn Maneuvers*, Australian Research Centre for Aerospace Automation (ARCAA), Queensland University of Technology, Australia