Sensor Fusion for Parameter Estimation of an Aircraft in the Approach Phase

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Abstract: Landing and takeoff are the two most critical and dangerous phases of flight. In recent years the aircraft industry has seen a stark increase in automated systems taking over both of these phases of flight, but more emphasis has been on landing. Many commercial aircraft are capable of performing fully autonomous landings and rollouts without pilot intervention. These systems however are heavily dependent on expensive ground based systems which makes it unfeasible for smaller, lesser used airports to acquire and operate. Other approaches such as Localizer Performance with Vertical guidance (LPV) approaches separate the aircraft from the ground based systems using GPS coordinates to guide the aircraft. This however is not perfect as LPV approaches only have a decision height of 200ft which introduces a place for human error to occur. A furthering of this technology would allow for cheaper airport construction and operation as well as further improving the capabilities of commercial and more directly general aviation aircraft as general aviation is where LPV approaches are primarily used. Presented here are the first steps of a broader investigation into the usage of advanced computer vision techniques as well as the introduction of GPS and RADALT data through data fusion algorithms to estimate landing parameters. This is done in an effort to improve the existing LPV approach by reducing the decision height to 0 ft.

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