



USE CASE /

Flight Path Visualization

Flight path visualization provides private pilots with supplementary navigational guidance during flight and landing, permitting them to visualize the flight trajectory in real time. The system guides pilots by superimposing virtual flight path markers (based on global positioning and aircraft orientation references) on to their field of view, and provides guidance in all weather conditions.

Technologies

AR-enhanced flight path visualization is potentially supported by the following systems and technologies:

- Navigation equipment such as a GPS/GLONASS receiver for providing global positioning coordinates as a reference for estimating the pose of the AR device (and thus the pilot's orientation if wearing a head-mounted display).
- AR device such as a head-mounted display with a built-in camera, gyroscopes and accelerometers for determining pose in relation to global positioning coordinates.
- AR system software for calculating pose and other parameters necessary for precise overlay of virtual objects in the pilot's field of view. AR software may optionally run on a separate computer or device such as a smartphone.

- Other components for additional system support such as reference data inputs and real time calculations.

The AR device and smartphone for flight path visualization or private pilots are compact and easily carried and worn by pilots in flight.

Data Sources

Sources for AR-enabled flight path visualization include:

- Global positioning coordinates furnished by GPS and GLONASS navigation satellites
- Cockpit yaw coordinates in relation to a local reference system
- Automatic dependent surveillance data for visualization of nearby aircraft
- Digital flight plans

Benefits

- Enhanced spatial navigation for flight and landing, even in low or zero visibility conditions
- Lower pilot training requirements for using the system due to intuitive user interface (in comparison with standard instrumentation)
- Small size of portable components for carrying and wearing, including autonomous power supply
- Lower-cost solution in comparison with military systems of comparable functionality

Users

Private or commercial pilots of light aircraft (e.g., all models of Piper and propeller-driven Cessna) or of smaller business or very light jets (e.g., Cessna CitationJet and Eclipse 500).

Example Scenario

After beginning descent, the pilot directs the nose of the propeller