



Searching student for 6 months internship in Toulouse (France)

Risk model for landing to support Decision-Making Assistance for Aircraft Pilots

Length : 6 months maximum.

Background:

Today automatic landing is certified within limit of wind, runway state, runway slope, airport altitude, temperature range aircraft weight and CG in nominal range. The demonstration of performance is done on a statistical basis to demonstrate an acceptable risk to land on the runway with adequate vertical speed. If the planned landing is not in the certified conditions, then the crew has to land manually. The risk is currently computed using Monte-Carlo method using close loop simulation.

For future aircraft with reduced crew, the option of manual landing may not be available. Expending the automatic landing performance up to maximum limits of certified domain might be challenging if cumulating all unfavorable factors (max cross wind + max landing weight + max runway slope + contaminated runway + engine failure....).

The purpose of the internship is to explore and evaluate several methods to develop a “risk model” allowing to know in advance the probability of successful landing with known forecasted conditions at destination (some may vary during the approach, some can be assumed to be constant):

- Known destination runway altitude, slope,
- Runway status (dry/wet/contaminated)
- Wind direction and gust
- Temperature at destination
- Expected aircraft weight and CG at landing
- Failure (*i.e.* engine failure prior to approach)

Tasks to be done

Analyze possible methods to develop risk model that would be computationally affordable for an onboard computer.

Develop, test and evaluate several methods to generate the risk model. Data needed to generate the model will be derived from existing means allowing performing significant number of close loop simulations with varying inputs.

Results of the risk model will be compared to actual risk that can be computed by existing technics, including effect of possibly degrading conditions such as increasing wind and / or gust, change in wind directions, degradation of runway status....

If a successful method would be found, the capability to use it real time while performing an approach to trigger a warning supporting crew decision to abort the landing due to increasing risk will be investigated.

Required skills

Knowledge in statistics, data science, programming, modelling.

Basic knowledge in aeronautics would be appreciated.

Contact:

Thierry BOURRET : Auto Flight System Expert

Phone: +33 (0)5 67 19 14 82

Mailto : thierry.bourret@airbus.com