INTERNSHIP (followed by a Phd thesis)

A/C design parameters uncertainties on Handling Qualities sizing criteria.

CONTEXT:

During A/C pre-sizing phases, many multi-disciplinary tasks are leaded to find an optimal configuration relative to recurrent cost and operational cost under certification rules, competition and time schedule constraints. The A/C architecture convergence is needed earlier during A/C development with a robust design solution. These tasks are applied on conventional A/C, derivatives up to less conventional.

INTERNSHIP OBJECTIVES:
The aim of the internship is to study the A/C design parameters uncertainties on specific Handling Qualities sizing criteria (stability, manoeuvers). Based on existing Handling Qualities sizing toolbox where all HQ criteria are defined, inputs data are available for different A/C, flight domain is defined and all inputs parameters are identified, response surfaces can be elaborated in terms of control surfaces need (aerodynamic coefficient, controller deflections). The objective is to modify the data inputs to check the impact on response surfaces in order to identify the parameters that drive the design for handling qualities, and check the design robustness.

MAIN STEPS OF THE STUDY:
The internship will proceed in several phases:
- Launch analysis with sizing toolbox on existing set of data.
- Analyze sizing response surfaces and pre-select more relevant ones.
- Test different methods to identify main sizing parameters of selected response surfaces with MACROS (generic toolset for predictive modeling and optimization based on enhanced data handling).
- Provide a Handling Qualities status with main sizing criteria on one given A/C.
- Explore other methods that are not implemented into MACROS.

RECOMMENDED SKILLS AND BACKGROUND:
- Mathematical skill is mandatory to understand MACROS methods and/or explore other methods.
- Algorithm skill to integrate easily methods prototype and test it.
- Experience with MatLab and Simulink programming is mandatory.
- Knowledge in flight mechanics and automation.
- Intermediate level of English.

Location: Airbus Toulouse, France

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