PROJECT SUMMARY

NAME OF INSTITUTION (INCLUDE BRANCH/CAMPUS AND SCHOOL OR DIVISION)

University of Louisiana at Lafayette  
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PRINCIPAL INVESTIGATOR(S)

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TITLE OF PROJECT

CONTROLLER TECHNOLOGY FOR FAIL-SAFE OPERATIONS IN AIRCRAFT SYSTEMS UNDER ADVERSE FLYING CONDITIONS

ABSTRACT (DO NOT EXCEED 250 WORDS)

The ultimate goal of the project is to develop new fault tolerant control technology for actuator failures compensation in aircraft systems. Loss of actuator efficiency is a critical fault scenario in flight control which can cause control system performance deterioration and even lead to instability and catastrophic accidents [1]-[3]. Most of the safety problems posed by such failures still remain unsolved from the control theoretic as well as implementations point of view. In this project, a novel method based on self tuning adaptive control is proposed to maintain high performance and stability even in the event of loss of actuator efficiency. The proposed control technology is expected to increase survivability, safety and reliability leading to retention of stability and maneuverability of aircraft when adverse conditions occur.

Within the project period, we expect to accomplish the following tasks:

1. Develop self tuning adaptive control algorithms for actuator failures compensation,
2. Implement the proposed control strategies to aircraft systems,
3. Train two graduate students in aerospace control systems technology,
4. Publish scientific contributions in form of journal articles and conference papers,
5. Visit the NASA Langly Research Center.

This project builds on, and expands, the PI’s expertise gained through her experience as a PI for a concluded LaSPACE project and her work in the field of advanced control technology design [4]-[17]. Success of the proposed project is expected to help build a new structure of controllers that guarantee increased survivability, safety and security in aircraft systems. Moreover, this project will contribute to the critical issue of training the next generation of aerospace scientists through graduate student’s involvement in aerospace related research projects. This project will be crucial in continuing and further developing a long term and fruitful research program in aerospace technology at UL Lafayette. The project will be implemented in one year with the tentative starting date of January 16, 2009.