Context and Motivation
This research addresses issues arising from the convergence of two important trends in embedded systems:

1. Many safety-critical applications are subject to certification requirements.
2. There is an increasing trend towards integrated architectures that support multiple functionalities, often of different criticalities, upon a single computing platform.

As such systems become increasingly more complex, obtaining required certifications becomes more challenging. This project investigates the following thesis:

*Scheduling theory in its current form is unsuited to the design of mixed-criticality (MC) systems that are subject to multiple certification requirements; efficient resource use in such systems requires the development of fundamentally new scheduling techniques.*

Methodology
The methodology adopted in investigating this thesis is to first identify major weaknesses with current approaches, that render certification cumbersome. Once these weaknesses are understood, new models are proposed for representing MC systems, and metrics derived for quantifying the effectiveness of techniques for building these systems. A systematic study of resource allocation and scheduling issues in certifiable systems is then conducted, aimed at providing quantitatively superior resource allocation methodologies.

Outcomes
We expect that the outcomes of this project will enable embedded safety-critical systems designers to provide systems that make far more efficient use of platform resources than is currently possible, and that pass certification at a significantly lower cost.

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National Science Foundation
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U.S. Air Force Office of Scientific Research

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