

Date: October 7, 2002  
Report Number: 4  
Project Title: Kalman Filter Library

Group Number: 3  
Group Leader: Noel Villegas  
Advisor: Professor John Kiss  
Sponsor: BAE

Cumulative Hours: ~100

#### Weekly Status:

Prior to our meeting with BAE, we prepared a couple of papers for the purpose of familiarizing ourselves with new topics. Papers on Kalman Filter theory, CORBA, and OO Library considerations were written by Greg, Aiyana, and Noel respectively. We are also amassing a list of terminology and acronyms related to our project for internal discussions and for consumption by the general public.

We met with Joseph Frisina and Ken Lieberman on Friday, October 4<sup>th</sup>. At this meeting we discussed the long and short term goals of the senior design project. Compared to the original project description, the high level purpose of the project has shifted focus from the implementation of a library to the investigation for the definition of libraries. In seeking to achieve immutable code, BAE would like us to develop a way of characterizing libraries so that they may be used in a variety of contexts while still remaining semantically valid.

As an example he discussed the Ariane 5. In its maiden flight, the Ariane 5 contained unnecessary software which was reused from the Ariane 4. Frisina went on to say how this software was not valid on the Ariane 5 hardware and consequently threw uncaught exceptions which caused the Ariane 5 to be terminated in flight.

Our objective in this senior design project as requested by BAE, is to characterize libraries in such a way that mistakes of this nature do not occur. We will realize the interface characterizations we develop through developing a reusable Kalman Filter Library. As an example we will also provide a couple simpler examples demonstrating these characterizations, possibly a trigonometric function and a matrix library. In the example of the Kalman Filter Library, a couple ways to characterize it are by the number of acceptable states, its performance (memory and speed), and the error propagation.

Frisina has stated that the project and its requirements are flexible with our ability to deliver. By the 18<sup>th</sup> we will have delivered a rough outline of these library characterizations to BAE. By early November we will the full outline with our results.