Project Request

Title:	Autonomous sUAS swarming to augment CG assets		
Sponsor:			
POC:		Phone:	- -
Co-Sponsor:	*LT Jonathan White*		

Description of Project:

This project presents the design and construction of autonomous small Unmanned

Aerial System (sUAS). The sUAS of focus is a fixed wing aircraft ~~of up to 6 feet in wing~~ *w/a wing span of 3or less.*

~~span.~~ *Belongs in the section below* A requirement for the system is an implemented behavior called "swarming."

Swarming can best be defined as coordinating multiple sUAS in an intelligent manner

towards a common goal. The second requirement would be for the swarm to complete

image processing to identify objects. The educational purpose of this project is for

students to learn: 1) design and implementation of control systems 2) embedded

systems programming 3) machine learning 4) communications systems 5) computer
ambitious   ~~are you going~~   *ambitious*

vision 6) flight mechanics

Sponsor Needs / Requirements

The Coast Guard is interested in UAS that can remain on station for extended periods

of time, expand maritime domain awareness, and disseminate actionable intelligence.

Currently the USCG is leveraging developmental work from other services and
such as Seawatch

agencies. The sUAS can be integrated into ~~bridge~~ *C2* systems and replace a large portion
or supplement   *interrogated and*

of shipboard helicopter operations. Vessels that are barely a pip on the radar can be

intercepted quickly using sUAS, which will gather actionable intelligence aiding in the

decision making process. ~~A sUAS system can get on scene much quicker than a~~

~~helicopter or small boat, traveling at speeds of 100kts, with virtually zero risk and cost.~~

~~Additionally,~~ a shipboard helicopter is restricted to eight hours of flight per day, whereas

Move to section above

a swarm of sUAS can *theoretically* run 24/7. This project would set up the frame work to allow these goals and requirements to be fulfilled.

Design Component:

1. Develop control system ~~for the sUAS~~ to establish stable flight of an sUAS
2. Develop a navigation system to command sUAS flight via waypoints
2. ~~Establish~~ *Research* swarm communication *and coordination*

3. Develop easy to use user interface for controlling ~~the swarm~~ an sUAS vehicle, scalable to swarm control

4. Active monitoring of system health for deploying and recall of assets ✓✓✓

Expectations at Conclusion / Deliverables:

1. sUAS performing basic ~~swarm~~ flight and ~~coordination for tasks~~ *maneuvers* *completion/report*

2. User interface allowing for easy control of the ~~swarm~~ *sUAS system*

3. Image processing ~~to allow for tracking of~~ targets *of interest* ↳*system able to*

4. Efficient flight planning to maximize time on scene ✓✓

5. Video and state telemetry streamed back to asset ✓✓

1) Great proposal

2) Remember you have 2 semesters, which is really only about 1-2 months of solid work.

3) establish necessary objectives and "bonus" objectives

4) focus on the basics. You are not deploying a system to the user, this is R&D.