

SENIOR DESIGN ORGANIZATION SYNOPSIS – SPRING 2013

UNMANNED AERIAL VEHICLE WITH FIRE EXTINGUISHING GRENADE RELEASE AND INSPECTION SYSTEM

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Fires spread around the U.S. in an unpredictable way. Because of this, it is hard for firefighting departments across the country to control them, as well as eradicate the flames and smoke of the affected area in an inexpensive and timely manner. On the other hand, by the year 2030, Unmanned Aerial Systems will be allowed by the Federal Aviation Administration (FAA) to operate in the National Airspace system and provide a wide range of services.

The sky fighter team will design and build an unmanned aerial vehicle (UAV) that will have two purposes: firefighting and inspection. An UAV is an aircraft without a human pilot on board. Its flight is controlled by the components on the vehicle, and remote controlled through radio signal under the direct command of a person. The firefighting method will consist of using a fire extinguishing grenade. The grenade has the form of a sphere, weights 1.5 kilograms and is filled with a chemical that suppresses oxygen to extinguish fire. The grenade activates by itself when it senses temperatures above 85 degrees Celsius around it.

During the development of the design, this team will focus on the creation of a mechanism to release the fire extinguishing grenade from the UAV. The vehicle will be capable of delivering the grenade in areas that are hard to reach by conventional methods or where expensive procedures are required. Once the delivery system is completely installed, a camera will be added to the UAV. The purposes of the camera are for inspection and guidance by live video recording.

The requirements of the UAV are the following: load one extinguishing grenade, drop it off in area chosen by the operator, and have the camera record what is happening in front of the UAV. In order to do this, a multi copter was chosen by the team. A multi copter is an UAV with four or more rotors with the capability of lifting and carrying a load. A global positioning system will be implemented in the copter. This system will allow the operator to indicate the location of the fire and thus the target.

The team will have the restriction of the lifting power and temperature resistance of the UAV. To make sure the grenade is going to be carried safely and the quad copter is going to be easily controlled during flight, several stability and power tests will be performed. The plan is that in all of the tests, time is recorded. Another big aspect to test for is ease of maneuverability once the quad copter is placed in the locations where it is supposed to drop the grenade and how accurate is the release of the grenade according to the target desired.