Adaptive Global Solutions, LLC

Fire Extinguishing Device and System*

Adaptive Global Solutions, LLC (“AGS”) is developing an unmanned aerial vehicle that deploys blast waves, sound wave and/or high compression air waves, as a platform to move a flame off its fuel source, and can be deployed with or without other fire extinguishing materials. This is a Fire Extinguishing Device and System (“F.E.D.S.”) designed to operate within the midst of an active fire situation for an extended period of operation.

How is the FEDS different?

- Repeated, controlled, airborne blast wave without using an incendiary explosive;
- Continuous application of soundwaves;
- Continuous application of compressed air;
- Soundwave extinguishment application to chemical and electronic fire situations;
- Deployment of the above fire extinguishing applications within a drone platform that will fly and maneuver below tree top level, between trees; as standalone or combined applications;
- Energy co-generation;
- Flight and propulsion within the forest masse, between trees, without the use of a rotary wing or a fixed wing assembly;
- Second generation Drones modified for factory/commercial, transportation tunnel, high-rise, and wind turbine nacelle fires; avalanche control; research platform, and other applications.
- Multiple assets deployed in an autonomous or semi-autonomous for where the extinguishment discharge mechanisms are applied individually, sequentially, simultaneously;

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- A specialized airframe with internal and external heat shielding that will withstand the heat of most wildland, electrical and chemical fires, allowing for continual and extended operations within the fire situation;
- Using blast waves/shock waves, sound waves, or high compression air as a standalone fire extinguishment methods or in combination, within a given Drone platform;
- The fire extinguishment applications are proven technologies to move a flame off its fuel source. FEDS creates the necessary blast wave and/or high compression air force within the midst of the fire situation, recharges and continually discharges such against the fire. In the use of soundwaves, the application is continuous;

- The source that produces the blast wave/shock wave is non-incendiary, thereby eliminating the storage, transportation and delivery of an explosive to the fire situation;
- Energy co-generation is effected by harnessing heat and sound from the fire environment;
- Flight and propulsion within the forest masse, between trees is without the use of a rotary or fixed wing system.
- Using Artificial Intelligence, with deep learning, deep neural network learning, and graphics processing units, Lidar and other sensors and scanning means, the mechanism of drone swarming which is well established, FEDS can be programmed with initial search and targeting parameters, geofencing parameters to determine the approach to the search and target area, the position of other FEDs, thereby coordinating search, targeting and fire extinguishment efforts by using shared data and shared sensory data, without having to exit the fire situation between target acquisitions for reprogramming;
- The F.E.D.S. Drone, using object recognition and other parameters, operates with in an active object recognition mode, and can be deployed as a search rescue platform.

- To meet this challenge our intent is to:
  - Develop a System where 3 - 5 Drones working in concert under AI, as a swarm, that will remove a wall of flame the equivalent of at least half the length of a football field 50’ in depth, with each unified discharge;
  - That is an area of at least 480,000 cu’;
  - Subsequently, as a swarm, the same Drones will then march forward autonomously in search of a new forest fire target, then commence to discharge a blast wave, sound wave. And/or high compression air wave in the same unified manner;
  - Each Drone (asset) will recharge its non-incendiary blast wave system without requiring additional remote programming and without having to first exit the fire environment.
- A lone F.E.D.S. asset, as with all other systems, is insufficient to combat a wildland fire. With drone swarming the Drones communicate with one another, thereby forming a network of assets deployed at one time and at one moment to target a wall and area of flame.

RISK MITIGATION

1. The F.E.D.S. Project is not an invention problem (or challenge). It is the integration of known, proven technology. Therefore, this is a matter of taking such known, established technologies, and integrating them into a platform not undertaken before: making the integration work.
2. Exterior and interior heat shielding for operation of the FEDS Drone within the fire environment;
3. Separate interior he at shielding of heat sensitive components;
4. The F.E.D.S. Drone employs a non-incendiary method to create the method employed as the method to disrupt and extinguish fire;
5. The use of a non-explosive removes safety, transport, handling and usage issues associated with employing and the detonation of an explosive device;

6. An explosive is not introduced to the fire situation, where otherwise, such comes with the risk of creating or accelerating a fire;
7. It removes the risk of causing a fire and injury associated with the mishandling of a typical aircraft fuel source;
8. Reduces system weight, thereby increasing the effective payload;
9. The airframe is designed that in the event the exterior of the fuselage is compromised, operations of the F.E.D.S. Drone can continue until it is pulled out of the operating fire arena for inspection, maintenance and repair where necessary;
10. The Drones can be tailored to deliver the different fire extinguishing modalities given the need and the fire environment;
11. The F.E.D.S. will not take away jobs but instead, provide another tool within the firefighting arsenal and create an industry and opportunities.

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