Title: RESCUE DRONE

FIG. 5

Abstract: To provide a rescue drone (20), for rescuing an idle drone (21), it consists of an adjustable length hook (22) to engage with the idle drone, to carry it away, an L-shaped metallic tool (27) to push the idle drone away from the middle of the road, or to help in repositioning it to be at a side that permits for the hook (22) to engage with it, an emergency light (SOS) (28), to assist while hovering over the idle drone located in a road, an electric shock stick (29), which is to be used against any person approaching the idle drone to steal it, a speaker (30) and camera (31), to assist a security person in a command center to assess the case, talk with and warn any person who is trying to steal the idle drone, or to advise and guide a volunteer who is trying to help and assist in rescuing the idle drone.
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RESCUE DRONE

Description of the Invention

Technical Field of Invention

This invention relates to an unmanned aerial vehicle, for rescuing idle drones.

Background Art

Unmanned aerial vehicles, which are also called pilotless aircraft or remote piloted vehicle, are finding their way to market recently, and in the near future, in numerous commercial and civil uses. From thermal or video camera imaging, to parcels delivery, farming, surveying of crops, acrobatic aerial footage in filmmaking, search and rescue operations, construction industry, inspecting powerlines, dams, pipelines, counting wildlife, delivering medical supplies to remote or otherwise inaccessible regions, determining of illegal hunting by animal-rights advocates, livestock monitoring, wildfire mapping, pipeline security, home security, road patrol, and anti-piracy, search and rescue, dropping life preservers to plural swimmers, damage assessment, all-weather imaging through the clouds, rain, or fog, and in a daytime or night times conditions, all in real-time.

Drones are also used for remote sensing tasks, their remote sensing functions include multiple electromagnetic spectrum sensors, gamma ray sensors, biological sensors, chemical sensors, optical sensors, infrared camera, and synthetic aperture radar.

To be capable to carry out such tasks, the drones themselves should perform some inner operations and functions, like Sensing, data manipulation, and communication. To avoid accidents, or missing the target, they should have the followings capabilities:

Path planning: determining an optimal path for vehicle to follow while meeting certain objectives and mission constraints, such as obstacles or fuel requirements.

Trajectory generation (sometimes called motion planning): determining an optimal control maneuver to take in order to follow a given path or to go from one location to another.
Trajectory regulation: The specific control strategies required to constrain a vehicle within some tolerance to a trajectory.

Task allocation and scheduling: Determining the optimal distribution of tasks among a group of agents within time and equipment constraints.

Cooperative tactics: Formulating an optimal sequence and spatial distribution of activities between agents to maximize the chance of success in any given mission scenario.

All of these factors related to the vast and variable tasks of the drones, with the capabilities they should earn to control their paths, trajectories, targets, means thousands of drones will be operating at the same time in a medium-sized country, which means these capabilities will face too much complications related to the high traffic of the drones, as it is unlike automobiles which are following specific roads, and unlike aircrafts which have the atmosphere wide enough to provide easy control of their traffic, drones should move and work in between the buildings, trees, over the roads, as a result many of them at the same time will be crossing near each other and near other physical things, it is of no doubt such busy traffic will create an increasingly dangerous accidents, accidental failures, loss of control, all of which lead to fall down of the idle drone with its expensive parcels, it may fall in a road, a tree, water, or in a hard to reach place. Some people may steal the idle (fallen) drones with its valuable parcels.

It is hard to send with each drone another drone guarding it, but according to a recent applications for the inventors of this inventions, wherein mini drones are not supposed to cross far distances individually, rather they are carried by drone aero-carriers to over a specific points on the ground, to be released there to deliver the parcels, in such a case, a rescue drone can be provided with each aero-carrier drone, such that when any mini-drone get idle, a rescue drone can perform the required security, safety, and rescue operations toward that idle mini-drone instantly.
Disclosure of Invention

Brief Description

To provide a rescue drone for rescuing idle drones after it got idle and fell down, idle drones are normally carrying valuable parcels, which need to be retrieved before getting spoiled or damaged like when a loaded drone fall in a road.

The rescue drone is a normal drone, little bigger than the normal service drones, the rescue drone is more powerful so that it can carry the required rescuing tasks.

The rescue drone is provided with a rescue kit, such as an adjustable length hook, to engage with the idle drone, pull it up toward the rescue drone until a safe distance from its body, to guarantee that it will not fall down, because the rescue drone should carry up the rescued drone to its place of origin, or to a nearby drones retrieval hub.

The rescue drone is also provided with L-shaped tool, to push the idle drone away from the middle of the road, or to help in positioning it to be at a side that permits for the hook to engage with it, to be carried up.

The rescue drone is provided too with an emergency light (SOS), to assist while hovering over the idle drone located in a road, such that the coming vehicles distinguish from a distance the emergency incident.

The rescue drone is also provided with an electric shock stick, which is to be used against any person approaching the idle drone to steal it, or even an animal trying to step over it, so it keeps away the danger of such assault and futility.

The rescue drone is provided with a speaker and camera, so that the security person in the command center can assess the case, talk with and warn any person who is trying to steal the idle drone, or to advise and guide a volunteer who is trying to help and assist in rescuing the idle drone.
Brief Description of the Drawings:

- FIG.s 1, 2: Illustrates a 3-D view for the rescue drone with its rescue kit installed.
- FIG. 3: Illustrates a 3-D view for the rescue drone adjustable hooking mechanism.
- FIG. 4: Illustrates a 3-D view for the rescue drone while pushing or repositioning the idle drone.
- FIG. 5: Illustrates a transparent 3-D view for the rescue drone carrying the idle drone.

Detailed description for carrying out the Invention:

Best Mode for Carrying out the Invention:

In order to make it easy to carry out the invention, a detailed description of the parts of the invention, supported with figures, is provided here, wherein the main parts are arranged sequentially, according to the importance of the part, it is made easy to read, by referring to each feature, with a number included in the parts description text, and in the parts numbering list, the numbering of parts features is indicated here, by starting it sequentially from number 20, whenever a part feature appears in a text, it will be directly assigned its required serial number. As example in FIG. 1, the parts' features are arranged sequentially from number 20, 21, 22...

As it is expected in the near future that thousands of drones will be used in civil and commercial services in each country; idle drones falling on the roads, trees, water, hard to approach locations... need to be rescued for two major reasons:

1- Falling idle drones on the roads can create accidents, and can block the traffic.

2- Idle drones will be normally carrying expensive parcels, tools, data...etc.
So even serious damages may occur specially in the roads when idle drones fall down, but still such emergency cases should be handled as soon as possible, through the use of a rescue drone, which will interfere to warn drivers from the emergency, and to push away the drone, to carry it up then.

The rescue drone 20 disclosed in this invention (Fig.s 1, 2), for rescuing idle drones 21 is a normal drone, little bigger than the normal service drones 21, the rescue drone 20 is more powerful, so that it can carry the required rescuing tasks. It is provided with the following kit and techniques:

1- An adjustable length hook 22 (Fig.s 1, 2, 3, 5), to engage with the idle drone 21, pull it up toward the rescue drone 20 bottom body, until a safe distance from it, to guarantee that it will not fell down, because the rescue drone 20 should carry up the rescued drone 21 to its place of origin, or to a nearby drones retrieval hub. The hook 22 can move down far from the bottom side of the body of the rescue drone 20, depending conventionally on mechanism, wherein the mechanism consists of an electric motor 23 a rack 24 and pinion 25 gears, wherein the hook's 22 extended side is toothed to be like a rack 24, engaged with a pinion gear 25 installed at the drive shaft 26 of the motor 23.

2- An L-shaped metallic tool 27 (Fig. 4) to push the idle drone 21 away from the middle of the road, or to help in positioning it to be at a side that permits for the hook 22 to engage with it, to be carried up.

3- An emergency light (SOS) 28, to assist while hovering over the idle drone 21 located in a road, such that the coming vehicles distinguish from a distance the emergency incident.

4- An electric shock stick 29, which is to be used against any person approaching the idle drone 21 to steal it, or even an animal trying to step over it, or play with it, so it keeps away the danger of such assault and futility.

5- A speaker 30 and camera 31, so that the security person in the command center can assess the case, talk with and warn any person who is trying to steal the idle drone 21, or to advise and guide a volunteer who is trying to help and assist in rescuing the idle drone 21.
Industrial applicability:

1- Rescue drone kit, tools, and mechanisms, made from available tools, parts, mechanisms, with applicable modifications.

2- Multiple uses in civil service rescue, safety, security tasks, as unmanned first rescue assistance.

3- Conventionally remotely controlled, to use the command data from the command center to approach the idle drone, where via its camera and speaker, the security controller can use the rescue kit of it to rescue the idle drone.

4- It can be provided with each drones service aero-carrier hovering nearby a distribution location of mini drones, or it can be located on groups on drones rescue hub.
Parts Drawing Index:

20  Rescue drone.
21  Idle drone.
22  Hook.
23  Motor.
24  Rack.
25  Pinion.
26  Drive shaft.
27  L-Shaped metallic tool.
28  SOS Emergency hazard.
29  Electric shock stick.
30  Speaker.
31  Camera.
Claims

1- A rescue drone (20), for rescuing idle drones (21), comprising:
   a rescue drone (20);
   a hook (22);
   an electric motor (23);
   a rack gear (24);
   a pinion gear (25);
   a drive shaft (26);
   an L-Shaped metallic tool (27);
   an SOS Emergency hazard (28);
   an Electric shock stick (29);
   a speaker (30);
   a camera (31).

2- The rescue drone (20) according to claim 1, wherein the adjustable length hook (22) is controlled remotely from a command center to be inserted around a suitable part of the idle drone, then depending conventionally on a mechanism consisting of an electric motor (23) a rack (24) and pinion (25) gear the hook is pulled up, to pull the idle drone toward the body of the rescue drone, The hook’s (22) extended side is toothed to be like a rack (24), engaged with a pinion gear (25) installed at the drive shaft (26) of the motor (23).

3- The rescue drone (20) according to claim 1, wherein the L-shaped metallic tool (27), is located at two sides of the rescue drone (20), such that when the rescue drone (20) is moving horizontally toward the idle drone (21), the L-shaped metallic tool (27) pushes the idle drone (21) away from the middle of the road, and to reposition it to be hooked by the hook (22).

4- The rescue drone (20) according to claim 1, wherein the emergency light (SOS) (28), is installed on the blades rings, to assist while hovering over the idle drone (21) located in a road, such that the coming vehicles distinguish from a distance the emergency incident.

5- The rescue drone (20) according to claim 1, wherein the electric shock stick (29), is installed and extending from the bottom center side of the
rescue drone (20), to be used against any person approaching the idle drone (21) to steal it, or even an animal trying to step over it, so it keeps away the danger of such assault and futility.

6- The rescue drone (20) according to claim 1, wherein the speaker (30) and camera (31), are installed at the bottom center side of the rescue drone (20), such that depending on them, a security person in a command center can assess an emergency case for an idle drone, talk with, and warn any person who is trying to steal the idle drone (21), or to advise and guide a volunteer who is trying to help and assist in rescuing the idle drone (21).