CLAIMS

WHAT IS CLAIMED IS:

1. A mesh sensor deployment system for real-time environmental data gathering, the system comprising:

one or more drop pods, wherein each of the one or more drop pods comprise:

a connection interface for an aircraft;

a pod mesh radio module;

a pod battery module; and

one or more pod sensor modules, wherein the one or more pod sensor modules comprise one or more sensors consisting of cameras, microphones, gas sensors and temperature sensors;

wherein the one or more deployed drop pods are configured to be retrieved or repositioned by the aircraft.

2. The system of claim 1, wherein the aircraft connection interface comprises an electromagnet.

3. The system of claim 1, wherein each of the one or more drop pods comprise:

a first camera disposed on a first side of the drop pod; and
a second camera disposed on a second opposite side of the drop pod.

4. The system of claim 1, wherein each of the one or more drop pods comprise:
a mesh radio module configured to create a mesh wireless network with other drop pods and/or to create a mesh wireless network with the aircraft.

5. The system of claim 1, further comprising:

one or more aircrafts, wherein each of the one or more aircrafts carries a payload of one or more of the one or more drop pods, and wherein each of the one or more aircrafts further comprises:

one or more aircraft sensor modules;

a drop pod connection interface; and

an aircraft battery module.

6. The system of claim 5, further comprising:

an aircraft mesh radio module in communication with a Ground Control Station (GCS) and the one or more drop pods, and wherein the aircraft mesh radio module is configured to:

receive data and instructions from the GCS;

transmit instructions to the one or more drop pods;

receive sensor data from the one or more drop pods;

send, to the GCS, aircraft sensor module data; and

relay the received sensor data to the GCS.

7. The system of claim 6, further comprising

wherein the ground control station comprises:

a GCS mesh radio module;

a GCS controller module; and

a user interface module;

wherein, for each aircraft, the GCS is configured to:

determine a drop location to drop each of the one or more drop pods carried by the aircraft, wherein the determining comprises:

receiving, over the GCS mesh radio module, data feeds from the aircraft, wherein the data feeds comprise captured image frames and a radio signal strength indicator (RSSI);

identifying, based on analysis of the captured image frames and a type associated with the one or more drop pods carried by the aircraft, one or more points of interest (POIs) for each of the one or more drop pods; and

determining, based on a selection of a deploying drop pod, a drop point from the one or more POIs associated with the deploying drop pod when the RSSI drops below a predetermined threshold; and

instruct the aircraft to drop the deploying drop pod at the determined drop point; and

wherein the GCS is further configured to:

generate, by the user interface module, a graphical representation of the received data feeds from each aircraft and each drop pod; and

display, to an operator, the generated graphical representation.

8. The system of claim 7, wherein the user interface module is further configured to generate an on screen display recommendation to the operator when the RSSI of one of the one or more aircrafts drops below the predetermined threshold, and wherein the recommendation comprises a list of drop pods carried by the aircraft and a list of POIs associated with each of the drop pods.

9. The system of claim 8, wherein the GCS is configured to generate and maintain a mission map of an environment being explored, wherein the generation of the mission map

comprises performing a simultaneous location and mapping based on the data feeds received from the one or more aircrafts and the one or more drop pods.

10. The system of claim 6, wherein the GCS is further configured to generate a mission plan for each of the one or more aircrafts based on the generated mission map.

11. The system of claim 6, wherein a mesh network is maintained between each of the deployed drop pods and the GCS.

12. The system of claim 10, wherein the mission plan further comprises one or more projected drop locations, wherein the projected drop locations are based on a current state of the mission map, wherein the state of the mission map includes sensor data, the RSSI and locations of each of the deployed drop pods, and wherein the one or more projected drop locations are determined based on a distribution of the deployed drop pods and an estimated signal strength map of the mesh network.

13. The system of claim 12, wherein the GCS is further configured to:

identify weak regions of the mesh network;

simulate changes to the mesh network coverage based on redeployment of one or more of the deployed drop pods to a redeployed location;

select one or more of the deployed drop pods based on the simulation;

send instructions to one or more of the one or more aircrafts to retrieve the selected one or more deployed drop pods from their current location and to transport and redeploy the retrieved drop pods to their associated redeployed location.

14. A method of deploying a system for real-time environmental data gathering, the system comprising:

deploying, via an aircraft, one or more drop pods, wherein each of the one or more drop pods comprise:

a connection interface for the aircraft, wherein the one or more deployed drop pods are configured to be retrieved or repositioned by the aircraft;

a pod mesh radio module; and

a pod battery module;

one or more pod sensor modules, wherein the one or more pod sensor modules comprise one or more sensors consisting of cameras, microphones, gas sensors and temperature sensors; and

receiving sensor data from the one or more sensors, the deployed one or more drop pods.

15. The method of claim 14, further comprising:

relocating, via the aircraft, the deployed one or more drop pods from a first location to a second location.

16. The method of claim 14, further comprising:

receiving, data feeds from the aircraft, wherein the data feeds comprise captured image frames received by the aircraft from the one or more drop pods.

17. The method of claim 14, wherein each of the one or more drop pods comprise:

a first camera disposed on a first side of the drop pod; and
a second camera disposed on a second opposite side of the drop pod.

18. The method of claim 14, wherein each of the one or more drop pods comprise:
a mesh radio module configured to create a mesh wireless network with other drop pods and/or to create a mesh wireless network with the aircraft.

19. The method of claim 14, further comprising:

automatically determining a location to release a carried drop pod from the aircraft; and

automatically releasing the carried drop pod from the aircraft.

20. The method of claim 14, further comprising:

establishing a mesh network between the aircraft and the one or more drop pods;

determining a drop point for the one or more drop pods; and

instructing the aircraft to drop the one or more drop pods at the drop point.