METHODS AND SYSTEMS FOR SHARING AN AIRSPACE WIDE UNMANNED AIRCRAFT SYSTEM DATABASE ACROSS A PLURALITY OF SERVICE SUPPLIERS

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application claims priority to (i) U.S. Patent Application Serial No. 15/997,556, filed on June 4, 2018, and (ii) U.S. Patent Application Serial No. 62/515,262, filed on June 5, 2017, the entire contents of both of which are herein incorporated by reference.

BACKGROUND

An unmanned aircraft system ("UAS"), which may also be referred to as an autonomous vehicle, is a vehicle capable of travel without a physically-present human operator. A UAS may operate in a remote-control mode, in an autonomous mode, or in a partially autonomous mode.

When a UAS operates in a remote-control mode, a pilot or driver that is at a remote location can control the UAS via commands that are sent to the UAS via a wireless link. When the UAS operates in autonomous mode, the UAS typically moves based on pre-programmed navigation waypoints, dynamic automation systems, or a combination of these. Further, some UASs can operate in both a remote-control mode and an autonomous mode, and in some instances may do so simultaneously. For instance, a remote pilot or driver may wish to leave navigation to an autonomous system while manually performing another task, such as operating a mechanical system for picking up objects, as an example.

Various types of UASs exist for various different environments. For instance, UASs exist for operation in the air, on the ground, underwater, and in space. Examples include quad-copters and tail-sitter UASs, among others. UASs also exist for hybrid operations in which multi-environment operation is possible. Examples of hybrid UASs include an amphibious craft that is capable of operation on land as well as on water or a floatplane that is capable of landing on water as well as on land. Other examples are also possible.

SUMMARY

In one aspect, a system is provided. The system can include:

a first unmanned aircraft system ("UAS") service supplier computing system, wherein the first UAS service supplier ("USS") computing system provides service to a first service area, wherein the first USS computing system is operable to:

(a) receive, from UAS operators, first operation data for a first plurality of UASs operating in the first service area, wherein the received first operation data comprises, for each UAS in the first plurality of UASs: a unique UAS identifier, location data, and time-of-day data corresponding to the location data, respectively;

(b) receive, from a second USS computing system, second operation data for a second plurality of UASs operating in a second service area, wherein the received second operation data comprises, for each UAS in the second plurality of UASs: a unique UAS identifier, location data, and time-of-day data corresponding to the location data, respectively;

(c) maintain the first operation and second operation data in a UAS database, wherein the UAS database does not include owner information; and

(d) provide a publicly accessible application interface for obtaining at least a portion of the first operation data and second operation data from the UAS database.

In another aspect, a system is provided. The system includes an unmanned aircraft system (UAS) registry comprising a plurality of UAS accounts, wherein each UAS account comprises (a) owner information data and (b) a unique UAS identifier. The system also includes a plurality of UAS registration computing systems operable to create UAS accounts

CLAIMS

1. A system comprising:

a first unmanned aircraft system ("UAS") service supplier computing system, wherein the first UAS service supplier ("USS") computing system provides service to a first service area, wherein the first USS computing system is operable to:

(a) receive, from UAS operators, first operation data for a first plurality of UASs operating in the first service area, wherein the received first operation data comprises, for each UAS in the first plurality of UASs: a unique UAS identifier, location data, and time-of-day data corresponding to the location data, respectively;

(b) receive, from a second USS computing system, second operation data for a second plurality of UASs operating in a second service area, wherein the received second operation data comprises, for each UAS in the second plurality of UASs: a unique UAS identifier, location data, and time-of-day data corresponding to the location data, respectively;

(c) maintain the first operation and second operation data in a UAS database, wherein the UAS database does not include owner information; and

(d) provide a publicly accessible application interface for obtaining at least a portion of the first operation data and second operation data from the UAS database.

2. The system of claim 1, wherein the first USS computing system is further operable to provide the first operation data to the second USS computing system.

3. The system of claim 1, wherein the first USS computing system is further operable to receive, from a detection system, third operation data for a third plurality of UASs

operating in the first service area, wherein the received third operation data comprises, for each UAS in the third plurality of UASs: location data and time-of-day data corresponding to the location data, respectively, wherein the third plurality of UASs may include some or all the of the first plurality of UASs.

4. The system of claim 3, wherein the location data associable with third operation data includes altitude.

5. The system of claim 3, wherein the first USS computing system is further operable to:

for a given UAS in the third plurality of UASs, compare the respective third operation data for the given UAS with the first operation data; and

based on the comparison, determine whether the given UAS is an authenticated UAS, wherein an authenticated UAS is in the first plurality of UASs and has a unique UAS identifier.

6. The system of claim 5, wherein the first USS computing system is further operable to:

if the given UAS is an authenticated UAS, determine whether the given UAS is operating in accordance with the first operation data for the given UAS.

7. The system of claim 6, wherein the first USS computing system is further operable to:

in response to a determination that the given UAS is not operating in accordance with the first operation data, cause an alert to be transmitted to a UAS operator associated with the given UAS.

8. The system of claim 1, wherein the first USS computing system is further operable to:

receive an indication of a location of a given UAS at a time of day;

for the given UAS, compare the received indication of the location of the given UAS at the time of day with the first operation data; and

based on the comparison, determine whether the given UAS is an authenticated UAS, wherein an authenticated UAS is in the first plurality of UASs and has a unique UAS identifier.

9. The system of claim 8, wherein the first USS computing system is further operable to:

in response to a determination that given UAS is an authenticated UASs, determine whether the given UAS is authorized to be present at the location.

10. The system of claim 9, wherein the first USS computing system is further operable to:

in response to a determination that the given UAS is not authorized to be present at the location, cause an alert to be displayed.

11. The system of claim 9, wherein determining whether or not the given UAS is authorized to be present at the location comprises comparing the unique UAS identifier of the UAS with a unique UAS identifier whitelist, wherein the unique UAS identifier whitelist comprises a list of one or more unique UAS identifiers associated with one or more UASs that are authorized to operate at the location.

12. The system of claim 1, wherein the owner information comprises personally identifiable information of owners of each UAS in the first plurality of UASs and each UAS in the second plurality of UASs.

13. The system of claim 1, wherein each unique UAS identifier in the first operation data and the second operation data corresponds to a UAS account maintained in a UAS registry, wherein the UAS registry is separate from the first USS computing system and the second USS computing system.

14. The system of claim 1, wherein the unique UAS identifier comprises a unique human-readable identifier that is traceable through a UAS registry to an owner associated with the unique UAS identifier, wherein the UAS registry is separate from the first USS computing system and the second USS computing system.

15. The system of claim 1, wherein the publicly accessible application interface comprises a map displaying a location of one or more UASs operating in the first service area.

16. The system of claim 15, wherein the publicly accessible application interface is configured to receive a user input selecting a given UAS of the one or more UASs operating in the first service area, and responsively display a unique UAS identifier associated with the given UAS on the publicly accessible application interface.

17. The system of claim 1, wherein the publicly accessible application interface comprises a map displaying a location of one or more UASs operating in the second service area.

18. The system of claim 1, wherein the publicly accessible application interface comprises a map displaying a location of one or more UASs operating in the first service area and the second service area.

19. The system of claim 1, wherein each USS computing system is further operable to:

delete the first operation data and the second operation data after a predetermined period of time.

20. The system of claim 1, wherein the location data associable with at least one of the first operation data and the second operation data includes altitude.