MITIGATING NOISE EXPOSURE TO UNMANNED AERIAL VEHICLES

TECHNICAL FIELD

[0001] This disclosure relates generally to unmanned aerial vehicles, and in particular but not exclusively, relates to noise mitigation of unmanned aerial vehicles.

BACKGROUND INFORMATION

[0002] An unmanned vehicle, which may also be referred to as an autonomous vehicle, is a vehicle capable of travel without a physically-present human operator. An unmanned vehicle may operate in a remote-control mode, in an autonomous mode, or in a partially autonomous mode.

[0003] When an unmanned vehicle operates in a remote-control mode, a pilot or driver that is at a remote location can control the unmanned vehicle via commands that are sent to the unmanned vehicle via a wireless link. When the unmanned vehicle operates in autonomous mode, the unmanned vehicle typically moves based on pre-programmed navigation waypoints, dynamic automation systems, or a combination of these. Further, some unmanned vehicles 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.

[0004] Various types of unmanned vehicles exist for various different environments. For instance, unmanned vehicles exist for operation in the air, on the ground, underwater, and in space. Unmanned aerial vehicles (UAVs) are becoming more popular in general. Their use over populated areas, such as suburban and urban localities, means that controlling and mitigating noise exposure to these vehicles is increasingly important.

SUMMARY OF INVENTION

[0004a] According to a first aspect of the present invention, there is provided a computer implemented method of distributing noise exposures to unmanned aerial vehicles (UAVs) over a neighborhood, the method comprising:

receiving a flight routing request to fly a first UAV of the UAVs over the neighborhood;

accessing a noise exposure map stored in a noise exposure database in response to the flight routing request, wherein the noise exposure map includes noise exposure values indexed to locations within the neighborhood, and wherein each of the noise exposure values quantifies a cumulative noise exposure of a corresponding one of the locations due at least in part to historical flight paths of the UAVs over the neighborhood; and

generating a new flight path for the first UAV over the neighborhood that load levels additional noise exposures that the new flight path will contribute to the noise exposure map.

[0004b] According to a second aspect of the present invention, there is provided a system for distributing noise exposures to unmanned aerial vehicles (UAVs) over a neighborhood, the system comprising:

a noise exposure database storing a noise exposure map for the neighborhood, wherein the noise exposure map includes noise exposure values indexed to properties within the neighborhood, and wherein the noise exposure values quantify cumulative noise exposures of the properties due at least in part to historical flight paths of the UAVs over the neighborhood;

a flight routing system coupled to the noise exposure database, wherein the flight routing system includes instructions stored on a memory, that when executed by the flight routing system, cause the flight routing system to perform operations including:

receiving a flight routing request to fly a first UAV of the UAVs over the neighborhood; and

generating a new flight path for the first UAV, in response to the flight routing request, that load levels additional noise exposures that the new flight path will contribute to the noise exposure map; and

a noise exposure updater coupled to the noise exposure database to update the noise exposure values in response to the first UAV flying the new flight path over the neighborhood.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Non-limiting and non-exhaustive embodiments of the invention are described with reference to the following figures, wherein like reference numerals refer to like parts throughout the various views unless otherwise specified. Not all instances of an element are necessarily labeled so as not to clutter the drawings where appropriate. The