

CLAIMS

What is claimed is:

1. A computer-implemented method comprising:
generating a transport task to fulfill a request for delivery of a temperature-sensitive item, wherein the transport task includes maintaining a temperature of the temperature-sensitive item within a preferred temperature range during delivery;
calculating an amount of required energy to perform the transport task for each available unmanned vehicle (UV) of a fleet of UVs;
based on (i) the amount of required energy for each available UV, and (ii) a respective remaining battery energy level for each available UV, selecting a first UV to perform the transport task; and
assigning the transport task to the first UV.
2. The method of claim 1, wherein generating a transport task to fulfill a request for delivery of a temperature-sensitive item comprises:
determining the preferred temperature range for the temperature-sensitive item.
3. The method of claim 2, wherein the preferred temperature range is based on a type of the temperature-sensitive item.
4. The method of claim 1, wherein the respective remaining battery energy level for each UV is indicative of a respective remaining amount of battery energy, and wherein selecting the first UV to perform the transport task comprises:
for each available UV, comparing the amount of required energy to the respective remaining amount of battery energy for the UV;
based on the comparing, determining, from the available UVs, a subset of UVs that are capable of performing the transport task; and
selecting the first UV from the subset of UVs.
5. The method of claim 4, wherein determining a subset of UVs that are capable of performing the transport task comprises:
based on the comparing, including in the subset of UVs one or more UVs for which the respective remaining amount of battery energy exceeds the amount of required energy.
6. The method of claim 4, wherein selecting the first UV from the subset of UVs comprises:
calculating a respective delivery efficiency for each UV in the subset; and

based on the respective delivery efficiencies of the UVs in the subset, selecting the first UV, wherein the first UV has a greatest respective delivery efficiency amongst the respective delivery efficiencies of the UVs in the subset.

7. The method of claim 4, wherein selecting the first UV from the subset of UVs comprises:

calculating a respective delivery time for each UV in the subset; and

based on the respective delivery times of the UVs in the subset, selecting the first UV, wherein the first UV has a fastest respective delivery time amongst the respective delivery times of the UVs in the subset.

8. The method of claim 1, wherein the amount of required energy to perform the transport task for each available UV is calculated based on at least one of: (i) a respective estimated travel distance for the UV to perform the transport task, (ii) a respective weight of the UV, and (iii) the preferred temperature range for the temperature-sensitive item.

9. The method of claim 8, wherein the respective estimated travel distance comprises: (i) a first distance from a respective current location of the UV to a pick-up location of the temperature-sensitive item, (ii) a second distance from the pick-up location to a delivery location of the temperature-sensitive item, and (iii) a third distance from the delivery location to a UV charging station near to the delivery location.

10. A system comprising:

a fleet of unmanned vehicles (UVs) that are configured to transport temperature-sensitive items;

at least one communication interface operable to communicate with item-provider computing devices;

at least one processor; and

program instructions stored on a non-transitory computer readable medium and executable by the at least one processor to perform functions including:

generating a transport task in response to receiving from an item-provider computing device a request for delivery of a temperature-sensitive item, wherein the transport task involves delivering the temperature-sensitive item while maintaining a temperature of the temperature-sensitive item within a preferred temperature range;

calculating an amount of required energy to perform the transport task for each available unmanned vehicle;

based on (i) the amount of required energy for each available UV, and (ii) a respective remaining battery energy level for each available UV, select a first UV to perform the transport task; and

assigning the transport task to the first UV.

11. The system of claim 10, wherein each respective UV comprises a respective temperature control unit.

12. The system of claim 11, wherein the respective temperature control unit comprises one of: a heating element or a cooling element.

13. The system of claim 11, wherein the respective temperature control unit comprises one or more temperature sensors that are configured to monitor at least a temperature of a compartment of the respective temperature control unit.

14. The system of claim 11, wherein the respective temperature control unit comprises a rechargeable energy storage device, wherein the rechargeable energy storage device is configured to provide power to at least one of: the respective temperature control unit or the respective UV.

15. The system of claim 11, wherein the respective temperature control unit is electrically coupled to the respective UV via an electrical coupling element.

16. The system of claim 11, wherein the respective temperature control unit comprises a communication module configured to establish a communication link between the respective temperature control unit and the respective UV.

17. The system of claim 10, wherein generating a transport task to fulfill a request for delivery of a temperature-sensitive item comprises:

determining a preferred temperature range for the temperature-sensitive item.

18. The system of claim 10, wherein the respective remaining battery energy level for each UV is indicative of a respective remaining amount of battery energy, and wherein selecting the first UV to perform the transport task comprises:

for each available UV, comparing the amount of required energy to the respective remaining amount of battery energy for the UV;

based on the comparing, determining a subset of UVs that are capable of performing the transport task; and

selecting the first UV from the subset of UVs.

19. The system of claim 18, wherein determining a subset of UVs that are capable of performing the transport task comprises:

based on the comparing, including in the subset of UVs one or more UVs for which the respective remaining amount of battery energy exceeds the amount of required energy.

20. The system of claim 18, wherein selecting the first UV from the subset of UVs comprises:

calculating a respective delivery efficiency for each UV in the subset; and

based on the respective delivery efficiencies of the UVs in the subset, selecting the first UV, wherein the first UV has a greatest respective delivery efficiency amongst the respective delivery efficiencies of the UVs in the subset.

21. The system of claim 18, wherein selecting the first UV from the subset of UVs comprises:

calculating a respective delivery time for each UV in the subset; and

based on the respective delivery times of the UVs in the subset, selecting the first UV, wherein the first UV has a fastest respective delivery time amongst the respective delivery times of the UVs in the subset.

22. A computer-implemented method comprising:

generating a transport task to fulfill a request for delivery of a temperature-sensitive item, wherein the transport task involves delivering the temperature-sensitive item while maintaining a temperature of the temperature-sensitive item within a preferred temperature range;

based on the transport task, selecting an manned vehicle (UV) tier from which to select a UV to perform the transport task;

calculating an amount of required energy to perform the transport task for each available UV of the selected UV tier;

based on (i) the amount of required energy for each available UV, and (ii) a respective remaining battery energy level for each available UV, select a first UV to perform the transport task; and

assigning the transport task to the first UV.

23. The computer-implemented method of claim 22, wherein the respective remaining battery energy level for each unmanned vehicle (UV) is indicative of a respective remaining amount of battery energy, and wherein selecting the first UV to perform the transport task comprises:

for each available UV, comparing the amount of required energy to the respective remaining amount of battery energy for the UV;

based on the comparing, determining a subset of UVs that are capable of performing the transport task; and
selecting the first UV from the subset of UVs.