CLAIMS

1. An unmanned aerial vehicle (UAV) comprising:

a body having a plurality of rotors that enable the UAV to fly;

three or more legs connected to the body and configured to land and perch the flying UAV on a curved ferromagnetic surface, each leg including:

a first portion connected to the body;

a second portion comprising a magnet and configured to magnetically attach the leg to the ferromagnetic surface during the landing and to maintain the magnetic attachment of the leg to the ferromagnetic surface during the perching; and

a passive articulation joint connecting the first portion to the second portion and configured to passively articulate the second portion with respect to the first portion in response to the second portion approaching the ferromagnetic surface during the landing; and

a releasable crawler comprising magnetic wheels configured to:

detach the crawler from the body during the perching; and

maneuver the crawler on the ferromagnetic surface while magnetically attaching the crawler to the ferromagnetic surface after the detaching.

2. A UAV according to Claim 1, in which the crawler further comprises a probe or tool configured to inspect or maintain the ferromagnetic surface during the maneuvering.

3. A UAV according to Claim 1, in which the crawler further comprises a wireless communication circuit configured to communicate wirelessly with the UAV or a base station.

4. A UAV according to Claim 1, in which the magnetic wheels are further configured to re-dock the crawler with the body after the maneuvering.

5. A UAV according to Claim 1, in which each magnet comprises a permanent magnet.

6. A UAV according to Claim 5, in which each magnet comprises a switchable permanent magnet.

7. A UAV according to Claim 6, in which each magnet comprises an electro-permanent magnet.

8. A UAV according to Claim 5, further comprising a detachment actuator configured to apply leverage to the second portion of one or more of the legs magnetically attached to the ferromagnetic surface, in order to assist with magnetically detaching the one or more of the magnetically attached legs from the ferromagnetic surface during takeoff of the perched UAV from the ferromagnetic surface.

9. A UAV according to Claim 1, further comprising a laser scanner connected to the body and configured to provide sensing data to orient the UAV during the landing.

10. A UAV according to Claim 1, in which the magnetic wheels comprise four magnetic wheels, and the crawler further comprises two motors each configured to drive two of the four magnetic wheels.

11. A UAV according to Claim 1, in which the magnetic wheels comprise omniwheels or Mecanum wheels.

12. An unmanned aerial vehicle (UAV) comprising:

a first body having a plurality of rotors that enable the UAV to fly and having a plurality of first attachment points; and

an undercarriage comprising:

a second body having a corresponding plurality of second attachment points and mounted to the first body at corresponding pairs of the first and second attachment points;

three or more legs connected to the second body and configured to land and perch the flying UAV on a curved ferromagnetic surface, each leg including:

a first portion connected to the second body;

a second portion comprising a magnet and configured to magnetically attach the leg to the ferromagnetic surface during the landing and to maintain the magnetic attachment of the leg to the ferromagnetic surface during the perching; and

a passive articulation joint connecting the first portion to the second portion and configured to passively articulate the second portion with

respect to the first portion in response to the second portion approaching the ferromagnetic surface during the landing; and

a releasable crawler comprising magnetic wheels configured to:

detach the crawler from the second body during the perching; and

maneuver the crawler on the ferromagnetic surface while magnetically attaching the crawler to the ferromagnetic surface after the detaching.

13. A UAV according to Claim 12, in which the crawler further comprises a probe or tool configured to inspect or maintain the ferromagnetic surface during the maneuvering.

14. A UAV according to Claim 12, in which the crawler further comprises a wireless communication circuit configured to communicate wirelessly with the UAV or a base station.

15. A UAV according to Claim 12, in which the magnetic wheels are further configured to re-dock the crawler with the second body after the maneuvering.

16. A UAV according to Claim 12, in which each magnet comprises a permanent magnet.

17. A UAV according to Claim 16, in which each magnet comprises a switchable permanent magnet.

18. A UAV according to Claim 17, in which each magnet comprises an electro-permanent magnet.

19. A UAV according to Claim 16, further comprising a detachment actuator configured to apply leverage to the second portion of one or more of the legs magnetically attached to the ferromagnetic surface, in order to assist with magnetically detaching the one or more of the magnetically attached legs from the ferromagnetic surface during takeoff of the perched UAV from the ferromagnetic surface.

20. A UAV according to Claim 12, further comprising a laser scanner connected to the first body and configured to provide sensing data to orient the UAV during the landing.

21. A UAV according to Claim 12, in which the magnetic wheels comprise four magnetic wheels, and the crawler further comprises two motors each configured to drive two of the four magnetic wheels.

22. A UAV according to Claim 12, in which the magnetic wheels comprise omniwheels or Mecanum wheels.

23. A UAV according to Claim 12, in which the undercarriage further comprises:

a docking mechanism configured to secure the crawler to the second body during the flying; and

a height adjustment mechanism configured to adjust the height of the crawler with respect to the ferromagnetic surface during the perching.

24. A UAV according to Claim 12, in which:

the first body further has a corresponding plurality of third attachment points; and

the second body is configured to detach from the first body at the first attachment points and to mount to the first body at corresponding pairs of the third and second attachment points.

25. A UAV according to Claim 12, in which the first body comprises a movable attachment platform having the first attachment points and configured to move the first attachment points relative to a remainder of the first body.

26. A UAV according to Claim 25, further comprising a motor configured to move the attachment platform during the flying.

27. A UAV according to Claim 25, in which the movable attachment platform is further configured to rotate the first attachment points about an axis of the first body.