the sensor monitors the state of the vertiport, there is a problem that the type of obstruction that hinders take-off and landing of the VTOL aircraft cannot be found. When the type of obstruction is not found, an administrator or the like of the vertiport cannot easily remove the obstruction in some cases.

[0005] The present disclosure has been made in order to solve the above problem, and an object of the present disclosure is to obtain a take-off and landing site monitoring device capable of specifying the type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft.

SOLUTION TO PROBLEM

[0006] A take-off and landing site monitoring device according to the present disclosure includes: an image data acquiring unit to acquire, from an imaging device to image a take-off and landing site, image data indicating a captured image of the take-off and landing site; and an obstruction detecting unit to determine a type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired by the image data acquiring unit, wherein the obstruction detecting unit acquires a wind direction and a wind speed at the take-off and landing site and determines a type of the obstruction including an object at the take-off and landing site and an event occurred at the take-off and landing site on a basis of the image data and each of the wind direction and the wind speed acquired.

ADVANTAGEOUS EFFECTS OF INVENTION

[0007] According to the present disclosure, it is possible to specify the type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft.

BRIEF DESCRIPTION OF DRAWINGS

[0008] FIG. 1 is an explanatory diagram illustrating a take-off and landing site 1 to which a take-off and landing site monitoring system according to a first embodiment is

landing site monitoring device 30 illustrated in FIG. 15 can specify the type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft, and can enhance wind direction specifying accuracy and wind speed specifying accuracy as compared with the take-off and landing site monitoring device 30 illustrated in FIG. 3.

[0105] Fifth embodiment.

In a fifth embodiment, a take-off and landing site monitoring device 30 including a visibility information acquiring unit 55 and a suspicious flying object detecting unit 56 will be described.

[0106] FIG. 17 is a configuration diagram illustrating a take-off and landing site monitoring system according to the fifth embodiment. In FIG. 17, the same reference numerals as in FIGS. 3, 9, 13, and 15 indicate the same or corresponding parts, and therefore description thereof is omitted.

FIG. 18 is a hardware configuration diagram illustrating hardware of the take-off and landing site monitoring device 30 according to the fifth embodiment. In FIG. 18, the same reference numerals as in FIGS. 4, 10, 14, and 16 indicate the same or corresponding parts, and therefore description thereof is omitted.

The take-off and landing site monitoring device 30 illustrated in FIG. 17 includes an image data acquiring unit 41, an identification information acquiring unit 42, a position detecting unit 43, a wind specifying unit 44, an obstruction detecting unit 45, and a removal device activating unit 46.

In addition, the take-off and landing site monitoring device 30 illustrated in FIG. 17 includes the visibility information acquiring unit 55 and the suspicious flying object detecting unit 56.

In the take-off and landing site monitoring device 30 illustrated in FIG. 17, the

electromagnetic environment information from the electromagnetic environment information acquiring unit 58.

Unlike the obstruction detecting unit 45 illustrated in FIG. 3, the obstruction detecting unit 45 illustrated in FIG. 19 also determines electromagnetic obstruction as the type of obstruction on the basis of the electromagnetic environment information.

For example, the obstruction detecting unit 45 illustrated in FIG. 19 compares the level of radio wave interference indicated by the electromagnetic environment information with a radio wave interference threshold, and recognizes electromagnetic obstruction as the type of obstruction when the level of radio wave interference is equal to or more than the radio wave interference threshold.

The obstruction detecting unit 45 illustrated in FIG. 19 does not recognize electromagnetic obstruction as the type of obstruction when the level of radio wave interference is less than the radio wave interference threshold. The radio wave interference threshold may be stored in an internal memory of the obstruction detecting unit 45 or may be given from the outside of the take-off and landing site monitoring device 30.

The obstruction detecting unit 45 illustrated in FIG. 19 outputs a determination result of the obstruction type to the removal device activating unit 46.

[0137] The removal device activating unit 46 acquires a determination result of the obstruction type from the obstruction detecting unit 45 illustrated in FIG. 19.

The removal device activating unit 46 selects an obstruction removing device used for removal of obstruction from among the obstruction removing devices 31-1 to 31-3 on the basis of the type of obstruction determined by the obstruction detecting unit 45.

The removal device activating unit 46 activates the selected obstruction removing device.

via the removal device activating unit 46. When determining that snow melting is necessary, the obstruction detecting unit 45 melts accumulated snow, by, for example, activating a snow melting device via the removal device activating unit 46.

[0139] In the above sixth embodiment, the take-off and landing site monitoring device 30 illustrated in FIG. 19 is configured to include the aeronautical weather information providing unit 57 that acquires aeronautical weather information indicating an observation result of aeronautical weather from the aeronautical weather observing meter 91 that observes the aeronautical weather, and transmits the aeronautical weather information to a vertical take-off and landing aircraft using the take-off and landing site 1. Therefore, similarly to the take-off and landing site monitoring device 30 illustrated in FIG. 3, the take-off and landing site monitoring device 30 illustrated in FIG. 19 can specify the type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft, and can notify the vertical take-off and landing aircraft of the aeronautical weather.

[0140] In addition, in the above sixth embodiment, the take-off and landing site monitoring device 30 is configured to include the electromagnetic environment information acquiring unit 58 that acquires, from the electromagnetic environment monitoring device 92 that monitors an electromagnetic environment at the take-off and landing site 1, electromagnetic environment information indicating a monitoring result of the electromagnetic environment, in such a manner that the obstruction detecting unit 45 determines electromagnetic obstruction as the type of obstruction on the basis of the electromagnetic environment information acquired by the electromagnetic environment information acquiring unit 58. Therefore, the take-off and landing site monitoring device 30 can also specify the electromagnetic obstruction as the type of obstruction.

[0141] Note that the present disclosure can freely combine the embodiments to each

CLAIMS

1. A take-off and landing site monitoring device comprising:

an image data acquiring unit (41) to acquire, from an imaging device to image a take-off and landing site, image data indicating a captured image of the take-off and landing site; and

an obstruction detecting unit (45) to determine a type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired by the image data acquiring unit, wherein

the obstruction detecting unit acquires a wind direction and a wind speed at the take-off and landing site and determines a type of the obstruction including an object at the take-off and landing site and an event occurred at the take-off and landing site on a basis of the image data and each of the wind direction and the wind speed acquired.

2. A take-off and landing site monitoring device comprising:

an image data acquiring unit (41) to acquire, from an imaging device to image a take-off and landing site, image data indicating a captured image of the take-off and landing site;

an obstruction detecting unit (45) to determine a type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired by the image data acquiring unit; and

a wind specifying unit to specify each of a wind direction and a wind speed at the take-off and landing site on a basis of the image data acquired by the image data acquiring unit, wherein

the obstruction detecting unit determines the type of obstruction on a basis of the image data and each of the wind direction and the wind speed specified by the wind specifying unit.

3. A take-off and landing site monitoring device comprising:

an image data acquiring unit (41) to acquire, from an imaging device to image a take-off and landing site, image data indicating a captured image of the take-off and landing site;

an obstruction detecting unit (45) to determine a type of obstruction that

hinders take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired by the image data acquiring unit; and

an operation state determining unit to determine an operation state of the take-off and landing site on a basis of a determination result of the obstruction type determined by the obstruction detecting unit.

4. A take-off and landing site monitoring device comprising:

an image data acquiring unit (41) to acquire, from an imaging device to image a take-off and landing site, image data indicating a captured image of the take-off and landing site;

an obstruction detecting unit (45) to determine a type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired by the image data acquiring unit; and

a visibility information acquiring unit to acquire, from a visibility meter to measure visibility of a take-off and landing airspace at the take-off and landing site, visibility information indicating the visibility, wherein

the obstruction detecting unit determines visibility obstruction as the type of obstruction on a basis of the visibility information acquired by the visibility information acquiring unit.

5. A take-off and landing site monitoring device comprising:

an image data acquiring unit (41) to acquire, from an imaging device to image a take-off and landing site, image data indicating a captured image of the take-off and landing site;

an obstruction detecting unit (45) to determine a type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired by the image data acquiring unit; and

an electromagnetic environment information acquiring unit to acquire, from an electromagnetic environment monitoring device to monitor an electromagnetic environment at the take-off and landing site, electromagnetic environment information indicating a monitoring result of the electromagnetic environment, wherein

the obstruction detecting unit determines electromagnetic obstruction as the

type of obstruction on a basis of the electromagnetic environment information acquired by the electromagnetic environment information acquiring unit.

6. A take-off and landing site monitoring device comprising:

an image data acquiring unit (41) to acquire, from an imaging device to image a take-off and landing site, image data indicating a captured image of the take-off and landing site;

an obstruction detecting unit (45) to determine a type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired by the image data acquiring unit;

a removal device activation unit to select an obstruction removal device used for removal of the obstruction on a basis of a type of the obstruction determined by the obstruction determining unit out of a plurality of the obstruction removal devices whose type of the obstruction removed is different to each other and activate the obstruction removal device selected;

an identification information acquiring unit to acquire the identification information from a reception device receiving identification information of the vertical take-off and landing aircraft; and

a position detecting unit to detect a position of the vertical take-off and landing aircraft on a basis of the image data acquired by the image data acquiring unit, wherein

the obstruction detecting unit recognizes an aircraft other than the vertical take-off and landing aircraft as a type of the obstruction on a basis of the image data, the identification information acquired by the identification acquiring unit and a position detected by the position detecting unit,

the removal device activation unit selects the obstruction removal device removing an aircraft other than the vertical take-off and landing aircraft.

7. The take-off and landing site monitoring device according to any one of claims 1 to 5, comprising a removal device activating unit (46) to select the obstruction removing device used for removal of obstruction from among a plurality of obstruction removing devices whose types of obstruction to be removed are different from each other on a basis of the type of obstruction determined by the obstruction detecting unit, and to activate the selected obstruction removing device.

8. The take-off and landing site monitoring device according to any one of claims

1 to 5, comprising an identification information acquiring unit (42) to acquire, from a receiver to receive the identification information of the vertical take-off and landing aircraft, the identification information, wherein

the obstruction detecting unit determines the type of obstruction on a basis of the image data and the identification information acquired by the identification information acquiring unit.

9. The take-off and landing site monitoring device according to claim 8, comprising a position detecting unit (43) to detect a position of the vertical take-off and landing aircraft on a basis of the image data acquired by the image data acquiring unit, wherein

the obstruction detecting unit determines the type of obstruction on a basis of the image data, the identification information, and the position detected by the position detecting unit.

10. The take-off and landing site monitoring device according to any one of claims 1 to 5, wherein

the obstruction detecting unit

specifies an appearance of a marking applied to a take-off and landing position in the take-off and landing site on a basis of the image data acquired by the image data acquiring unit, and determines an occupation state of the take-off and landing position by either the vertical take-off and landing aircraft or an obstacle on a basis of the appearance of the marking, and

specifies an appearance of the marking applied to a parking position in the take-off and landing site on a basis of the image data, and determines an occupation state of the parking position by either the vertical take-off and landing aircraft or the obstacle on a basis of the appearance of the marking applied to the parking position.

11. A take-off and landing site monitoring device comprising:

an image data acquiring unit to acquire, from an imaging device to image a take-off and landing site, image data indicating a captured image of the take-off and landing site; and

an obstruction detecting unit to determine a type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired by the image data acquiring unit,

wherein

the obstruction detecting unit

specifies an appearance of a marking applied to a parking position in the take-off and landing site on a basis of the image data acquired by the image data acquiring unit, and determines an occupation state at the take-off and landing position by either a vertical take-off and landing aircraft or an obstacle on a basis of the appearance of the marking, and

specifies an appearance of a shape of the take-off and landing site indicated by a marking applied to a parking position in the take-off and landing site on a basis of the image data and determines an occupation state at the take-off and landing position by either a vertical take-off and landing aircraft or an obstacle on a basis of the appearance of a shape of the take-off and landing site indicated by the marking applied to the parking position.

12. The take-off and landing site monitoring device according to claim 3, comprising a management information acquiring unit (47) to acquire management information indicating maintenance of the take-off and landing site, wherein

the operation state determining unit determines an operation state of the take-off and landing site on a basis of a determination result of the obstruction type determined by the obstruction detecting unit and the management information acquired by the management information acquiring unit.

13. The take-off and landing site monitoring device according to claim 3, comprising an operation planning unit (50) to create or update an operation plan of the take-off and landing site on a basis of an operation state of the take-off and landing site determined by the operation state determining unit.

14. The take-off and landing site monitoring device according to claim 13, comprising:

an operation information acquiring unit to acquire operation information of the vertical take-off and landing aircraft; and

an identification information acquiring unit (42) to acquire, from a receiver to receive identification information of the vertical take-off and landing aircraft, the identification information, wherein

the operation planning unit updates the operation plan on a basis of the

operation information acquired by the operation information acquiring unit and the identification information acquired by the identification information acquiring unit.

15. The take-off and landing site monitoring device according to claim 10, comprising:

an identification information acquiring unit (42) to acquire, from a receiver to receive identification information of the vertical take-off and landing aircraft, the identification information; and

a charging management unit (52) to calculate a usage fee of the vertical take-off and landing aircraft for the take-off and landing site on a basis of a determination result of the occupation state determined by the obstruction detecting unit and the identification information acquired by the identification information acquiring unit.

16. The take-off and landing site monitoring device according to claim 15, comprising a supply information acquiring unit (51) to acquire supply information indicating a fuel supply amount to the vertical take-off and landing aircraft or a charge amount to the vertical take-off and landing aircraft from a power source supplying device, wherein

the charging management unit calculates the usage fee of the vertical take-off and landing aircraft on a basis of the determination result of the occupation state determined by the obstruction detecting unit, the identification information, and the supply information.

17. The take-off and landing site monitoring device according to claim 2, comprising:

a wind measurement data acquiring unit (53) to acquire, from a wind measuring instrument to measure wind at the take-off and landing site, wind measurement data indicating a measurement result of the wind; and

a weather information acquiring unit (54) to acquire weather information indicating a wind prediction result at the take-off and landing site from a weather observing device, wherein

the wind specifying unit specifies each of a wind direction and a wind speed at the take-off and landing site on a basis of the image data acquired by the image data acquiring unit, the wind measurement data acquired by the wind measurement data acquiring unit, and the weather information acquired by the weather information

acquiring unit.

18. The take-off and landing site monitoring device according to claim 8, comprising a suspicious flying object detecting unit (56) to transmit suspicious flying object detecting information when the type of obstruction determined by the obstruction detecting unit is presence of the suspicious flying object.

19. The take-off and landing site monitoring device according to any one of claims 1 to 6, comprising an aeronautical weather information providing unit (57) to acquire, from an aeronautical weather observing meter to observe aeronautical weather, aeronautical weather information indicating an observation result of the aeronautical weather, and to transmit the aeronautical weather information to the vertical take-off and landing aircraft using the take-off and landing site.

20. The take-off and landing site monitoring device according to claim 19, wherein the aeronautical weather information providing unit determines whether or not weather at the take-off and landing site is visual weather on a basis of the aeronautical weather information, and transmits a determination result of the visual weather to the vertical take-off and landing aircraft.

21. The take-off and landing site monitoring device according to claim 9, wherein the position detecting unit acquires, from a radar device to receive a reflected wave from the vertical take-off and landing aircraft and to detect a position of the vertical take-off and landing aircraft from the reflected wave, position information indicating the position of the vertical take-off and landing aircraft.

22. A take-off and landing site monitoring method comprising:

acquiring, by an image data acquiring unit (41), from an imaging device to image a take-off and landing site, image data indicating a captured image of the take-off and landing site;

determining, by an obstruction detecting unit (45), a type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired by the image data acquiring unit;

specifying, by a wind specifying unit, each of a wind direction and a wind

speed at a take-off and landing site on a basis of the image data acquired by the image data acquiring unit; and

determining, by the obstruction detecting unit, the type of the obstruction on a basis of the image data and each of the wind direction and the wind speed specified by the wind specifying unit.

23. A take-off and landing site monitoring method comprising:

acquiring, by an image data acquiring unit, from an imaging device to image a take-off and landing site, image data indicating a captured image of the take-off and landing site;

determining, by an obstruction detecting unit, a type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired by the image data acquiring unit; and

determining, by an operation state determining unit, an operation state of the take-off and landing site on a basis of a determined result of a type of the obstruction by the obstruction detecting unit.

24. A take-off and landing site monitoring method comprising:

acquiring, by an image data acquiring unit, from an imaging device to image a take-off and landing site, image data indicating a captured image of the take-off and landing site;

determining, by an obstruction detecting unit, a type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired by the image data acquiring unit; and

acquiring, by a visibility information acquiring unit, from a visibility meter to measure visibility of a take-off and landing airspace at the take-off and landing site, visibility information indicating the visibility, wherein

the obstruction detecting unit determines visibility obstruction as the type of obstruction on a basis of the visibility information acquired by the visibility information acquiring unit.

25. A take-off and landing site monitoring method comprising:

acquiring, by an image data acquiring unit, from an imaging device to image a take-off and landing site, image data indicating a captured image of the take-off and landing site;

determining, by an obstruction detecting unit, a type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired by the image data acquiring unit; and

acquiring, by an electromagnetic environment information acquiring unit, from an electromagnetic environment monitoring device to monitor an electromagnetic environment at the take-off and landing site, electromagnetic environment information indicating a monitoring result of the electromagnetic environment, wherein

the obstruction detecting unit determines electromagnetic obstruction as the type of obstruction on a basis of the electromagnetic environment information acquired by the electromagnetic environment information acquiring unit.

26. A take-off and landing site monitoring method comprising:

acquiring, by an image data acquiring unit, from an imaging device to image a take-off and landing site, image data indicating a captured image of the take-off and landing site;

determining, by an obstruction detecting unit, a type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired by the image data acquiring unit;

selecting, by a removal device activation unit, an obstruction removal device used for removal of the obstruction on a basis of a type of the obstruction determined by the obstruction determining unit out of a plurality of the obstruction removal devices whose type of the obstruction removed is different to each other and activate the obstruction removal device selected;

acquiring, by an identification information acquiring unit, the identification information from a reception device receiving identification information of the vertical take-off and landing aircraft; and

detecting, by a position detecting unit, a position of the vertical take-off and landing aircraft on a basis of the image data acquired by the image data acquiring unit, wherein

the obstruction detecting unit recognizes an aircraft other than the vertical take-off and landing aircraft as a type of the obstruction on a basis of the image data, the identification information acquired by the identification acquiring unit and a position detected by the position detecting unit, and

the removal device activation unit selects the obstruction removal device removing an aircraft other than the vertical take-off and landing aircraft.

27. A take-off and landing site monitoring system comprising:

an imaging device to image a take-off and landing site;

an image data acquiring unit (41) to acquire, from the imaging device, image data indicating a captured image of the take-off and landing site;

an obstruction detecting unit (45) to determine a type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired by the image data acquiring unit; and

a wind specifying unit to specify each of a wind direction and a wind speed at the take-off and landing site on a basis of the image data acquired by the image data acquiring unit, wherein

the obstruction detecting unit determines the type of obstruction on a basis of the image data and each of the wind direction and the wind speed specified by the wind specifying unit.

28. A take-off and landing site monitoring system comprising:

an imaging device to image a take-off and landing site;

an image data acquiring unit to acquire, from the imaging device, image data indicating a captured image of the take-off and landing site;

an obstruction detecting unit to determine a type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired by the image data acquiring unit; and

an operation state determining unit to determine an operation state of the take-off and landing site on a basis of a determination result of the obstruction type determined by the obstruction detecting unit.

29. A take-off and landing site monitoring system comprising:

an imaging device to image a take-off and landing site;

an image data acquiring unit to acquire, from the imaging device, image data indicating a captured image of the take-off and landing site;

an obstruction detecting unit to determine a type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired by the image data acquiring unit; and

a visibility information acquiring unit to acquire, from a visibility meter to measure visibility of a take-off and landing airspace at the take-off and landing site,

visibility information indicating the visibility, wherein

the obstruction detecting unit determines visibility obstruction as the type of obstruction on a basis of the visibility information acquired by the visibility information acquiring unit.

30. A take-off and landing site monitoring system comprising:

an imaging device to image a take-off and landing site;

an image data acquiring unit to acquire, from the imaging device, image data indicating a captured image of the take-off and landing site;

an obstruction detecting unit to determine a type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired by the image data acquiring unit; and

an electromagnetic environment information acquiring unit to acquire, from an electromagnetic environment monitoring device to monitor an electromagnetic environment at the take-off and landing site, electromagnetic environment information indicating a monitoring result of the electromagnetic environment, wherein

the obstruction detecting unit determines electromagnetic obstruction as the type of obstruction on a basis of the electromagnetic environment information acquired by the electromagnetic environment information acquiring unit.

31. A take-off and landing site monitoring system comprising:

an imaging device to image a take-off and landing site;

an image data acquiring unit to acquire, from the imaging device, image data indicating a captured image of the take-off and landing site;

an obstruction detecting unit to determine a type of obstruction that hinders take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired by the image data acquiring unit;

a removal device activation unit to select an obstruction removal device used for removal of the obstruction on a basis of a type of the obstruction determined by the obstruction determining unit out of a plurality of the obstruction removal devices whose type of the obstruction removed is different to each other and activate the obstruction removal device selected;

an identification information acquiring unit to acquire the identification information from a reception device receiving identification information of the vertical take-off and landing aircraft; and

a position detecting unit to detect a position of the vertical take-off and landing aircraft on a basis of the image data acquired by the image data acquiring unit, wherein

the obstruction detecting unit recognizes an aircraft other than the vertical take-off and landing aircraft as a type of the obstruction on a basis of the image data, the identification information acquired by the identification acquiring unit and a position detected by the position detecting unit, and

the removal device activation unit selects the obstruction removal device removing an aircraft other than the vertical take-off and landing aircraft.

32. A take-off and landing site monitoring device according to any one of claims 1 to 6, wherein the obstruction detecting unit recognizes occurrence of fire or a strong wind as a type of the obstruction.

33. A take-off and landing site monitoring device comprising:

an image data acquiring unit to acquire image data indicating imaged image of the take-off and landing site, from the imaging device imaging the take-off and landing site; and

an obstruction detecting unit to determine a type of an obstruction hindering take-off and landing of a vertical take-off and landing aircraft using the take-off and landing site on a basis of the image data acquired from the image data acquiring unit, wherein

the obstruction detecting unit specifies a wind direction and a wind speed at the take-off and landing site on a basis of windsock state in the imaged image obtained by analyzing the imaged image indicating the image data and recognizes whether it is a strong wind, on a basis of comparison result with determining threshold and average wind speed or maximum wind speed.

34. A take-off and landing monitoring device according to claim 9, wherein the position detecting unit receives a reflected wave by the vertical take-off and landing aircraft and acquires a position information indicating a position of the vertical take-off and landing aircraft from a Lidar device detecting a position of the vertical take-off and landing aircraft from a reflection.

35. A take-off and landing site monitoring device according to claim 10, wherein the marking is a circle or a line.