Claims

1. A device for estimating the elevation angle of one or more objects surrounding a user terminal, the device comprising:

a light-collecting lens arrangement for collecting sky scene light from a wide angle;

an eyepiece lens arrangement for collimating the sky scene light collected by the light-collecting lens arrangement; and

an elevation limit marking superimposed over the sky scene light, the elevation limit marking defining an elevation angle above a horizon of the earth that all the one or more objects in a field of view of the device must remain below so that the user terminal has an unobstructed view of the sky in all azimuthal directions.

2. The device of claim 1, wherein the elevation angle defined by the elevation limit marking comprises a maximum elevation angle.

3. The device of claim 1 or claim 2, further comprising an image-reflecting surface for reflecting the sky scene light onto the light-collecting lens arrangement.

4. The device of claim 3, wherein the image-reflecting surface or a periphery of the image-reflecting surface defines the elevation limit marking.

5. The device of claim 3 or claim 4, wherein the elevation limit marking has an elliptical shape.

6. The device of claim 1 or claim 2, further comprising an image-reflecting surface for reflecting the sky scene light collimated with the eyepiece lens arrangement, onto a user's eye.

7. The device of claim 1 or claim 2, further comprising an image-reflecting surface for reflecting the sky scene light collected with the light-collecting lens arrangement, onto the eyepiece lens arrangement.

8. The device of claim 6 or claim 7, further comprising a transparent sighting surface, the transparent sighting surface including the elevation limit marking.

9. The device of claim 8, wherein the elevation limit marking has a circular shape.

10. The device of any of claims 3-9, wherein the image-reflecting surface comprises a mirror.

11. The device of any of claims 1-10, wherein the light-collecting lens arrangement comprises a concave lens.

12. The device of claim 11, wherein the concave lens comprises a simple lens or a compound lens.

13. The device of any of claims 1-12, wherein the eyepiece lens arrangement comprises a convex lens.

14. The device of claim 13, wherein the convex lens comprises a simple lens or a compound lens.

15. The device of any of claims 1-14, further comprising an auxiliary lens arrangement for extending a field of view of the device.

16. The device of claim 15, wherein auxiliary lens arrangement comprises a convex-concave lens.

17. The device of claim 16, wherein the convex-concave lens comprises a simple lens or a compound lens.

18. The device of any of claims 1-17, further comprising a housing, the light collecting lens arrangement and the eyepiece lens arrangement disposed in the housing, the housing, the light collecting lens arrangement and the eyepiece lens arrangement forming an optical unit.

19. The device of claim 18, wherein the auxiliary lens arrangement is disposed in the housing of the optical unit.

20. The device of claim 18 or claim 19, further comprising a base, the optical unit mounted on the base.

21. The device of claim 20, wherein the image-reflecting surface is mounted on the base and optically aligned with the optical unit.

22. The device of claim 21, further comprising a stand, the base mounted on the stand, the stand allowing the base to be rotated relative to the stand.

23. The device of any of claims 1-22, wherein if the one or more objects is substantially outside the elevation limit marking, the one or more objects are estimated to be below the elevation angle.

24. The device of any of claims 1-22, wherein if a portion of the one or more objects is substantially inside the elevation limit marking, the one or more objects are estimated to be above the elevation angle.

25. A user terminal comprising a housing, an antenna associated with the housing, and the device of any of claims 1-19, 23, or 24, disposed on or integrated into the housing.

26. A method for estimating the elevation angle of one or more objects surrounding a user terminal, the method comprising:

superimposing an elevation limit marking over sky scene light, the elevation limit marking defining an elevation angle above a horizon of the earth that all the one or more objects must remain below so that the user terminal has an unobstructed view of the sky in all azimuthal directions;

collecting the sky scene light from a wide angle with a light-collecting lens arrangement that is disposed on, attached to, integrated with, or disposed adjacent, to the user terminal;

collimating the sky scene light collected by the light-collecting lens arrangement with an eyepiece lens arrangement; and

viewing the sky scene light to ascertain the location of each of the one or more objects in the image relative to the elevation limit marking.

27. The method of claim 26, wherein if all the one or more objects are substantially outside the elevation limit marking, the one or more objects are estimated to be below the elevation angle, and wherein if a portion of the one or more objects is substantially inside the elevation limit marking, the portion of the one or more objects is estimated to be above the elevation angle.