CLAIMS

~~What is claimed is:~~

~~1. An apparatus, the apparatus comprising:~~

an array of polarized light filter cells, each cell comprises a first polarized filter having a first polarization direction and a second polarized filter having a second polarization direction, said second polarization direction different from said first polarization direction;

an optical system to direct light onto said array of polarized light filters; and

a first light sensor to produce data from light received through said first polarized filter and a second light sensor to produce data from light received through said second polarized filter.

2. An apparatus according to claim 1, further comprising a processing unit to derive polarization pattern based on said data.

3. An apparatus according to claim 1, wherein said second polarization direction is substantially perpendicular to said first polarization direction.

4. An apparatus according to claim 2, wherein said processing unit is for calculating at least one of intensity and direction of polarization by measuring a difference between a light intensity received through said first polarized filter and a light intensity received through said second polarized filter and for deriving said polarization pattern based on said calculations.

5. An apparatus according to claim 1, further comprising a wavelength separator to separate at least one wavelength band from light directed by said optical system.

6. An apparatus according to claim 5, , further comprising a processing unit for calculating a pattern of polarized light in at least one wavelength band separated by said wavelength separator.

7. An apparatus according to claim 5, wherein said wavelength separator comprises an array of color filters arranged in groups of at least one color filter, each group being ~~juxtaposed to a polarized filter.~~

~~8. An apparatus according to claim 1, wherein said first and second light sensors are~~ comprised in an array of light sensors, having at least one light sensor juxtaposed to each polarized filter.

9. An apparatus according to claim 1, wherein said filter cells are arranged in co-centered rings.

10. An apparatus according to claim 1, further comprising a memory for storing complementary data of at least one of a list comprising a sun path table, an astronomical chart, a calendar chart, an ephemeris table, a time standard, a skylight polarization chart, a calibrated chart of true north, magnetic north and grid north.

11. An apparatus according to claim 1, further comprising an inclinometer for detecting the inclination of said apparatus.

12. An apparatus according to claim 2, wherein said processing unit is for calculating location data of a celestial body based on said polarization pattern.

13. An apparatus according to claim 12, wherein said location data comprises at least one of azimuth and elevation of said celestial body.

14. An apparatus according to claim 12, wherein said processing unit is for calculating navigational data based on said location data of a celestial body.

15. An apparatus according to claim 14, wherein said processing unit is for calculating navigational data further based on complementary data stored in a memory.

16. A method, the method comprising:

directing light onto an array of polarized light filter cells, each cell comprises a first polarized filter having a first polarization direction and a second polarized filter having a second polarization direction different from said first polarization direction;

producing data from light received through said first polarized filter by a first light sensor and through said second polarized filter by a second light sensor; and

~~deriving polarization pattern based on said data.~~

~~17. A method according to claim 16, wherein said second polarization direction~~ substantially perpendicular to said first polarization direction.

18. A method according to claim 16, further comprising calculating at least one of intensity and direction of polarization by measuring the difference between the light intensity received through said first polarized filter and the light intensity received through said second polarized filter and creating said polarization pattern based on said calculations.

19. A method according to claim 16, further comprising separating at least one wavelength band from said directed light.

20. A method according to claim 19, wherein said calculating a pattern of polarized light is in at least one separated wavelength band.

21. A method according to claim 16, further comprising detecting the inclination of said apparatus.

22. A method according to claim 16, further comprising calculating location data of a celestial body based on said polarization pattern.

23. A method according to claim 22, wherein said location data comprises at least one of azimuth and elevation of said celestial body.

24. A method according to claim 22, further comprising calculating navigational data based on said location data of a celestial body.

25. A method according to claim 24, wherein said calculating navigational data is further ~~based on complementary data stored in a memory.~~

claims:

1. An apparatus for use in determining location of a celestial body, the apparatus comprising:

a polarizer comprising an array of polarized light filter cells comprising at least a first polarization direction and a second polarization direction different from said first polarization direction, said polarizer thereby producing polarized light of at least first and second different polarizations; and

a light sensor array configured to receive the polarized light from said polarizer and produce data indicative of a pattern of at least one of light polarization intensity and direction, said pattern being indicative of at least one of azimuth and elevation of the celestial body.

2. An apparatus according to claim 1, comprising a processing unit configured and operable to receive and process said data indicative of the pattern of at least one of light polarization intensity and direction, to derive therefrom a polarization pattern, and utilizing the polarization pattern to determine said at least one of azimuth and elevation of the celestial body.

3. An apparatus according to claim 1, wherein the sensor array is configured to provide said data indicative of the pattern of at least one of light polarization intensity and direction in the form of analogue signal corresponding to a difference in intensity of detected light passed through the filter cells of different polarization directions.

4. An apparatus according to claim 1, wherein said second polarization direction is substantially perpendicular to said first polarization direction.

5. An apparatus according to claim 1, wherein said polarizer comprises circular array of said polarized filter cells arranged in the form of co-centric rings.

6. An apparatus according to claim 2, wherein said processing unit is configured and operable for determining data indicative of at least one of intensity and direction of collected light polarization, by measuring a difference between light intensity received through polarized filter cell having said first polarization direction and light intensity received through polarized filter cell having said second polarization direction and for deriving said polarization pattern based on said data.

7. An apparatus according to claim 1, comprising a wavelength selective filter configured to separate at least one wavelength band from light input to the apparatus.

8. An apparatus according to claim 2, wherein said processing unit is configured and operable for calculating the polarization pattern for at least one wavelength band.

9. An apparatus according to claim 7, wherein said wavelength selective filter comprises one or more groups of filter cells comprising one or more filter cells configured to allow passage of at least two wavelength bands different from each other, each group being associated with corresponding polarized filter.

10. An apparatus according to claim 1, wherein said polarizer comprises at least a region thereof configured as a radial polarizer.

11. An apparatus according to claim 1, wherein said polarizer comprises at least a region thereof configured as a tangential polarizer.

12. An apparatus according to claim 2, comprising a memory unit configured and operable for storing complementary data of at least one of a list comprising a sun path table, an astronomical chart, a calendar chart, an ephemeris table, a time standard, a skylight polarization chart, a calibrated chart of true north, magnetic north and grid north.

13. An apparatus according to claim 1, comprising an inclinometer for detecting the inclination of said apparatus with respect to a predetermined plane.

14. An apparatus according to claim 2, wherein said processing unit is configured and operable for utilizing said at least one of azimuth and elevation of said celestial body for determining at least one of the following parameters: (a) location of said apparatus, (b) time of measurement, (c) headings of said apparatus, and (d) location of said celestial body.

15. An apparatus according to claim 2, wherein said processing unit is configured for calculating navigational data based on said at least one of azimuth and elevation of said celestial body.

16. An apparatus according to claim 1, defining a certain effective aperture, wherein the polarizer is aligned with the entire effective aperture.

17. An apparatus according to claim 1, defining a certain effective aperture, wherein the polarizer is aligned with a part of the effective aperture, said sensor array thereby concurrently producing said data indicative of the pattern of at least one of light polarization intensity and direction, and data indicative of an image formed by light passing towards the sensor array through a part of the effective aperture outside said part aligned with the polarizer.

18. An apparatus according to claim 1, defining one or more fields of view and being configured and operable to concurrently direct light collected with said one or more field of view onto said light sensor array.

19. An apparatus according to claim 1, comprising an optical system, said optical system comprising one or more optical elements accommodated upstream or downstream of the polarizer, or at both sides of the polarizer.