CLAIMS

1. A method for reflecting microwaves and/or millimeter waves (MMWs) in a desired direction comprising:

a. providing a reflecting surface comprising a plurality of conductive patches on a surface of a dielectric substrate, each said conductive patch in wired electrical connection with at least one light-sensitive electronic component having an electrical property that is dependent on a property of light illuminating said light-sensitive component, where the values of said electrical property of said light-sensitive components collectively determine a phase-shift that said reflecting surface induces in an incident microwave/MMW beam which induced phase-shift determines the direction in which an incident beam is reflected; and

b. illuminating each said light-sensitive component with a selected value of the property of light so as to set said electrical property to a desired value,

so that a phase-shift is induced in an incident microwave/MMW beam to reflect said beam in a desired direction.

2. The method of claim 1, wherein a said electrical property that is dependent on the property of light illuminating said light-sensitive component is selected from the group consisting of capacitance, phase, permittivity, inductance and combinations thereof.

3. The method of any one of claims 1 to 2, wherein said light-sensitive components are selected from the group consisting of a PN diode, a PIN diode, a PPD, a CCD, a photoresistor, a phototransistor and a Schottky Barrier Photodiode.

4. The method of any one of claims 1 to 3, wherein said illumination light comprises light having a wavelength of between 400 micrometers and 2000 micrometers.

5. The method of any one of claims 1 to 4, wherein said light-sensitive components are arranged on a surface and said illuminating comprises projecting an image on said surface so that each said light-sensitive component is illuminated with a corresponding selected value of the property of light.

6. The method of any one of claims 1 to 5, wherein said plurality of patches are arranged on said surface of said dielectric substrate in a two-dimensional array having n rows, each said row having m said patches, n and m being integers of at least 2.

7. The method of claim 6, n and m being equal.

8. The method of any one of claims 6 to 7, wherein adjacent said patches in a same said row are in wired electrical connection through a said light-sensitive components and said patches are electrically isolated from patches in a different said row.

9. The method of any one of claims 1 to 6, wherein each said light-sensitive component is in wired electrical connection with a single said patch and with a conductive ground component.

10. A tunable microwave and/or millimeter wave (MMW) reflector (10, 38, 48, 50, 52, 54, 56, 58, 59, 60, 76), comprising:

a plurality of light-sensitive components (22) having an electrical property that is dependent on a property of light illuminating said light-sensitive component (22); and

a microwave/MMW-reflecting surface (12) including:

a dielectric substrate (18) defining an upper dielectric surface (16),

on said upper dielectric surface (16), a plurality of conductive patches (14), each said conductive patch (14) in wired electrical connection with at least one said light-sensitive component (22),

where the values of said electrical property of said light-sensitive components (22) collectively determine a phase-shift that said reflecting surface (12) induces in an incident microwave/MMW beam (68) which induced phase-shift determines the direction in which an incident beam (68) is reflected.

11. The reflector of claim 10, wherein a said electrical property that is dependent on the value of the property of light illuminating said light-sensitive component (22) is selected from the group consisting of capacitance, phase, permittivity, inductance and combinations thereof.

12. The reflector of any one of claims 10 to 11, wherein said light-sensitive components (22) are selected from the group consisting of a PN diode, a PIN diode, a PPD, a CCD, a photoresistor, a phototransistor and a Schottky Barrier Photodiode.

13. The reflector of any one of claims 10 to 12, wherein said dielectric substrate (18) is a board having a first planar surface that is said upper dielectric surface (16) and a second planar surface that is a planar lower surface of said board.

14. The reflector of any one of claims 10 to 12, wherein said dielectric substrate is a chip of semiconductor material.

15. The reflector of any one of claims 10 to 14, further comprising a second dielectric surface (28) on which said light-sensitive components (22) are arranged.

16. The reflector of any one of claims 10 to 15, wherein said patches (14) each covers a surface area of not less than 0.025 mm^2 (0.5 mm x 0.5 mm) and not more than 100 mm^2 (10 mm x 10 mm) of said upper dielectric surface (16).

17. The reflector of any one of claims 10 to 16, wherein at least 50% of said patches (14) are in wired electrical connection with two said light-sensitive components (22).

18. The reflector of any one of claims 10 to 17, wherein each one of said patches (14) is in wired electrical connection with a single said light-sensitive component (22).

19. The reflector of any one of claims 10 to 18, further comprising an illumination module (62, 78) configured to illuminate said light-sensitive components (22) with said illumination light.

20. The reflector of claim 19, said illumination module (62, 78) configured to illuminate at least one group of said light-sensitive components (22), each group comprising at least one light-sensitive component (22) with a chosen one of at least two different said illumination lights, allowing setting said electrical property to at least two different said values.