

## Claims

What is claimed is:

1. An imaging system comprising a lens, a first partial reflector, a second partial reflector, and a sensor, wherein light transmits through the lens, undergoes multiple partial reflections between the partial reflectors, wherein the lens and the second partial reflector are a distance less than 30 mm; and the lens, the first partial reflector, the second partial reflector are arranged on an optical axis to transmit, focus, and reflect light from an object to ultimately the sensor.
2. The imaging system of claim 1, wherein the distance is less than 18mm.
3. The imaging system of claim 1, wherein the distance is less than 10mm.
4. The imaging system of claim 1, further comprising a signal processing unit to process the signal to form an image.
5. The imaging system of claim 1, wherein a focal length of the lens allows light from the object to produces a focused image on a time-integrating sensor when undergoing a desired number of round trips between the partial reflectors.
6. A imaging system comprising a lens, a one way mirror, a partial reflector, and a sensor, wherein light transmits through the lens, undergoes multiple partial reflections between the partial reflectors, and is subsequently imaged by the camera, wherein the lens and the second partial reflector are a distance less than 30 mm, wherein the one-way mirror fully transmits light that has passed through the lens, and fully reflects light that has been reflected from the partial reflector.
7. The imaging system of claim 1 or 6, further comprising additional lenses that are placed before, after, or in-between the first partial reflector or the second partial reflector.
8. The imaging system in claim 1 or 6, further comprising additional lenses that are placed before, after, and/or in-between the partial reflectors.
9. The imaging system of claim 1 or 6, wherein a pre-determined plurality of wavelengths comprises one or more continuous wavelength ranges.
10. The imaging system of claim 1 or 6, wherein at least one lens is replaced by at least one partially reflective curved mirror.

11. The imaging system of claim 1 or 6, wherein the lens has a diameter and the diameter is larger than the thickness of the device.

12. The imaging system of claim 1 or 6, wherein it is placed into a mobile device to maintain a thin form-factor.

13. A imaging system comprising at least two partially reflective curved mirrors, wherein light transmits through the mirrors, undergoes multiple partial reflections between the mirror, and is subsequently imaged by the camera, wherein the mirror reflector are a distance less than 10 mm.

14. A method to optically image an object or scene using a lens, at least two partial reflectors, a time-integrating sensor, and a signal processing unit such that incoming light undergoes multiple partial reflections before hitting the sensor, enabling the signal processing unit to generate an image a lens whose back focal length is longer than the physical distance between the lens and sensor.

15. The method in claim 14 where one of the partially reflective elements is replaced by a one-way mirror

16. The method in claim 14 where additional lenses are placed before, after, and/or in-between the partial reflectors in order to correct for imaging aberrations.

17. The method in claim 14 where additional lenses are placed before, after, and/or in-between the partial reflectors in order to correct for imaging aberrations.

18. The method in claim 14 where the lens is replaced by at least one partially reflective curved mirror.

19. The method in claim 14 where the lens is replaced by at least one partially reflective curved mirror.

20. The method in claim 14 where some or all of the lenses are replaced by partially reflective curved mirrors.

21. The method in claim 14 where some or all of the lenses are replaced by partially reflective curved mirrors.

22. The method of claim 14, wherein software and hardware process an input an image that is a sum of an in-focus image and several out-of-focus copies of the same image, and that produces at its output the in-focus image.

23. A camera comprising the imaging system of claim 1 or 6.

24. The camera of claim 1 wherein the plurality of partial reflectors have an average optical reflectance of at least 10% in a pre-determined plurality of wavelengths.

25. The imaging system of claim 1 or 6, wherein the lens is a glass lens, a molded plastic lens, a zone plate, or a fresnal lens.

26. A camera or smart phone comprising a lens, a first partial reflector, a second partial reflector, and a sensor, wherein light transmits through the lens, undergoes multiple partial reflections between the partial reflectors, and is subsequently imaged by the camera, wherein the lens and the second partial reflector are a distance less than 30 mm; and the lens, the first partial reflector, the second partial reflector are arranged on an optical axis to transmit, focus, and reflect light from an object to ultimately the sensor.

27. The camera or smart phone of claim 26, wherein the distance is less than 18mm.

28. The camera or smart phone of claim 26, wherein the distance is less than 10mm