

CLAIMS

WHAT IS CLAIMED IS:

1. An off-axis optical system, the system comprising:
an optical source configured to generate a light beam; and
an off-axis optical element arranged at a first angle with respect to a normal to the light beam,
wherein the off-axis optical element is configured to deflect the light beam onto a target.
2. The system of claim 1, wherein the off-axis optical element comprises a thin-film reflective element having a combined deflection and lens profile.
3. The system of claim 1, further comprising a diverging optical element configured to diverge and direct the light beam onto the off-axis optical element.
4. The system of claim 3, wherein the diverging optical element comprises a negative lens arranged at a second angle with respect to the normal to the light beam.
5. The system of claim 4, wherein the first angle is equal and with a same direction as the second angle.
6. The system of claim 4, wherein the first angle has a different direction from the second angle.
7. The system of claim 1, wherein the off-axis optical element is configured to suppress backscattered light.
8. The system of claim 7, wherein a change of the first angle allows variation of a level of suppression of the backscattered light.

9. A remote sensing system based on off-axis optics, the system comprising:
an optical transmitter configured to generate a transmit (TX) light beam; and
an optical switch configured to direct the TX light beam to an off-axis optical element,
wherein the off-axis optical element is configured to deflect the TX light beam to a target.
10. The system of claim 9, further comprising fiber optics coupled to the optical switch and configured to guide the TX light beam to the off-axis optical element.
11. The system of claim 10, wherein the fiber optics comprises optical fiber and one or more optical elements.
12. The system of claim 10, wherein the off-axis optical element is further configured to collimate a return light beam from the target into the fiber optics.
13. The system of claim 12, wherein the optical switch comprises a transmit/receive switch and is configured to direct the return light beam to a receiver.
14. The system of claim 13, wherein the receiver is configured to receive the return light beam and generate an electrical signal corresponding to optical characteristics of the target.
15. The system of claim 14, wherein the TX light beam comprises a modulated light beam.
16. The system of claim 14, wherein the receiver further comprises a demodulator configured to demodulate the received return light beam.
17. The system of claim 9, wherein the off-axis optical element comprises a thin-film reflective element having a combined deflection and lens profile.

18. A method comprising:
- generating a light beam;
 - setting up an off-axis optical element at a first angle with respect to a normal to the light beam; and
 - configuring the off-axis optical element to deflect the light beam onto a target.
19. The method of claim 18, wherein the off-axis optical element comprises a thin-film reflective element having a combined deflection and lens profile, wherein the off-axis optical element is configured to suppress backscattered light, and wherein a change of the first angle allows variation of a level of suppression of the backscattered light.
20. The method of claim 18, further comprising diverging and directing the light beam onto the off-axis optical element by using a diverging optical element, wherein the diverging optical element comprises a negative lens arranged at a second angle with respect to the normal to the light beam, and wherein the first angle is equal and with a same direction as the second angle.