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 non-zero angle with respect to a normal to the light beam,

wherein:

the off-axis optical element comprises a thin-film reflective element having a combined deflection and lens profile,

the off-axis optical element is configured to deflect the light beam onto a target, and

the off-axis optical element is configured to suppress backscattered light.

2. 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.

3. The system of claim 2, wherein the diverging optical element comprises a negative lens arranged at a second non-zero angle with respect to the normal to the light beam.

4. The system of claim 3, wherein the first non-zero angle is equal and with a same direction as the second non-zero angle.

5. The system of claim 3, wherein the first non-zero angle has a different direction from the second non-zero angle.

6. The system of claim 1, wherein a change of the first non-zero angle allows variation of a level of suppression of the backscattered light.

7. A remote sensing system comprising an off-axis optical system of claim 1, 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 the off-axis optical element,

wherein the off-axis optical element is configured to deflect the TX light beam to a target.

8. The system of claim 7, further comprising fiber optics coupled to the optical switch and configured to guide the TX light beam to the off-axis optical element.

9. The system of claim 8, wherein the fiber optics comprises optical fiber and one or more optical elements.

10. The system of claim 9, wherein the off-axis optical element is further configured to collimate a return light beam from the target into the fiber optics.

11. The system of claim 10, wherein the optical switch comprises a transmit/receive switch and is configured to direct the return light beam to a receiver.

12. The system of claim 11, wherein the receiver is configured to receive the return light beam and generate an electrical signal corresponding to optical characteristics of the target.

13. The system of claim 12, wherein the TX light beam comprises a modulated light beam.

14. The system of claim 12, wherein the receiver further comprises a demodulator configured to demodulate the received return light beam.

15. A method comprising:

generating a light beam;

setting up an off-axis optical element at a first non-zero 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,

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.

16. The method of claim 15, wherein a change of the first non-zero angle allows variation of a level of suppression of the backscattered light.

17. The method of claim 15, 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 non-zero angle with respect to the normal to the light beam, and wherein the first non-zero angle is equal and with a same direction as the second non-zero angle.