

# High Energy Laser (HEL) Target Spot Radiometer

## Technology Utility

This technology addresses the basic problem of determining if a high energy laser (HEL) beam aimed at a distant target is actually hitting that target or not. For this, one needs to measure the return of the HEL beam from that target to affirm a hit. If there is no return, it is highly likely that the HEL beam missed the intended target. To measure the target return from near the HEL source, one needs to image the target through the HEL beam. Since the atmospheric return is far brighter than the target return, this is like "looking for a needle in a haystack."

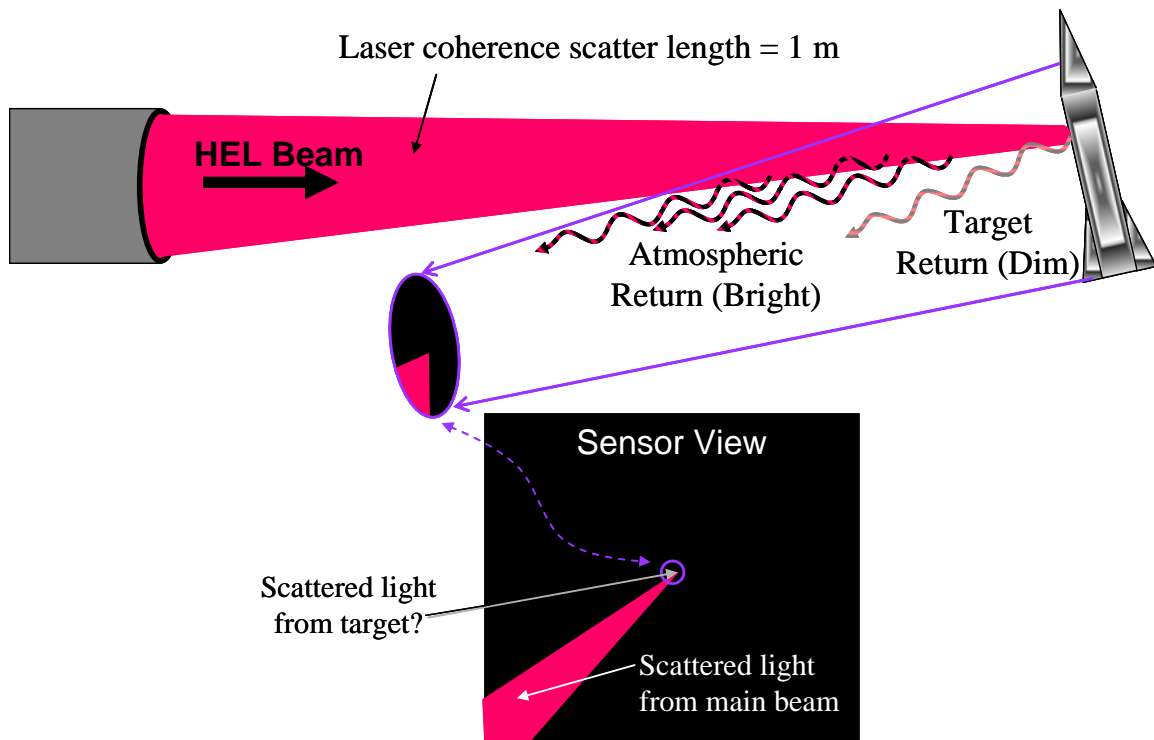


Figure 1. Affirming a hit, one needs to image the target through the HEL beam. The basic problem is how to discriminate the light scattered by aerosols and molecules in the main beam from light scattered by the target.

### Technology Highlights

The key to the solution of this problem is finding the characteristics that allow for discriminating between the HEL light scattered by a target from aerosol scatter, plume glow, sky background, moon and sun when the background is much greater than the signal return from the target.

OPC has developed a new processing algorithm that makes this distinction. The result is shown in Figure 2. The dim target is located between bins 6 and 7. It is much dimmer than the aerosol scatter. It becomes possible to discern only after processing.

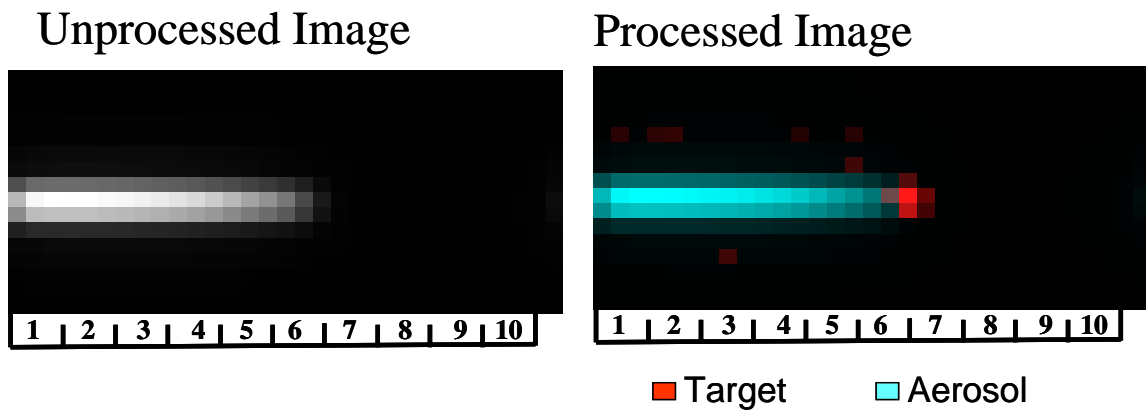


Figure 2. The processing can distinguish between target scatter and aerosol scatter. In the above example image, one can detect the return from the target (located between bins 6 and 7) only in the processed image. It is overwhelmed by the aerosol scatter in the unprocessed image.