CLAIMS:

1. A method of detecting a signal reflected from a target illuminated by a modulated CW light source configured to generate a modulated laser signal at a predefined modulation frequency, the method comprising:

receiving a signal comprising true laser signal portions reflected from said target, and noise;

filtering the signal for selecting laser signal portions at a modulation frequency band; and

detecting the true signal portions in the signal, if the energy at the modulation frequency band is greater than a given threshold.

2. The method according to claim 1 further comprising:

sampling the received signal at a sampling rate greater than the modulation frequency, thereby generating a plurality of samples;

performing the filtering with the help of a digital filter; the filtering comprising:

dividing the samples into different frequency bands and integrating energy of samples at the modulation frequency band during a given time window; and

detecting the true signal portions in the signal, if the integrated energy of the samples at the modulation frequency band is greater than a given threshold.

3. The method according to claim 2 wherein the digital filter is a Fast Fourier filter.

4. The method according to any one of the preceding claims wherein the signal is received by a 4 quarters laser sensor, each quarter is associated with a respective processing channel, wherein said filtering is performed in each of the processing channels for signals received at the respective quarter, the method further comprising:

determining a direction to a spot illuminated by the laser signal based on the distribution of the energy at the modulation frequency band across the 4 quarters of the sensor.

5. The method according to any one of claims 2 to 4 further comprising: filtering the signal with an anti-aliasing filter; wherein the sampling is at a rate greater than the band-limit of the anti-aliasing filter.

6. The method according to any one of the preceding claims further comprising:

upon receiving a laser signal with a given intensity,

detecting true signal portions based on signal intensity if the given intensity of the signal is greater than a predefined threshold; otherwise

detecting the true signal portions based the energy at the modulation frequency band.

7. The method according to any one of claims 2 to 6 further comprising:

summing energy of signals received in at least each pair of adjacent quarters, thereby generating 4 intermediate processing channels; and

performing said filtering on in each of the intermediate processing channels.

8. The method according to any one of claims 2 to 7 further comprising:

summing energy of signals received in all quarters, thereby generating a fifth intermediate processing channel; and

performing said filtering on the fifth processing channel.

9. A laser sensor unit operable for detecting a signal reflected from a target illuminated by a modulated CW light source configured to generate a laser signal modulated at a predefined modulation frequency, the sensor comprising:

a sensor head associated with at least one processing channel; said processing channel comprising a sampler and an energy integration module;

the sensor head is operable to receive a signal comprising true signal portions reflected from said target, and noise;

the sampler is configured to sample the received signal at a frequency which is at least greater than the modulation frequency;

the energy integration module is configured to integrate energy received at different frequency bands of the sampled signal during a given time window; and

the laser sensor is further configured to detect the true signal portions in the signal, if the integrated energy at the modulation frequency band is greater than a given threshold.

10. The laser sensor according to claim 9 is a 4 quarters laser sensor, each quarter being connected to a respective processing channel, wherein said integration is performed in each of the processing channels for signals received at the respective quarter, the laser sensor further comprising a target detection unit configured to determine a direction to a spot illuminated by the laser signal based on the distribution of the integrated energy at the modulation frequency band across the 4 quarters of the sensor.

11. The laser sensor according to claim 10 wherein each processing channel comprises an anti-aliasing filter configured to filter the received signal at the respective quarter in order to avoid folding; wherein the sampling is at a rate greater than the band-limit of the anti-aliasing filter.

12. The laser sensor according to any one of claims 9 to 11 wherein the energy integrating module comprises a Fast Fourier Transform filter configured to divide the received signal into different frequency bands and integrate the energy at different frequency bands.

13. The laser sensor according to any one of claims 10 to 12 wherein each processing channel comprises a respective frequency F cell selection module configured for selecting the integrated energy at the frequency band of the modulation frequency received at the respective quarter.

14. The laser sensor according to any one of claims 9 to 13 wherein each processing channel comprises a respective energy threshold detector configured to determine whether the integrated energy at the modulation frequency band is greater than a predefined threshold.

15. The laser sensor according to any one of claims 9 to 14 is a dual purpose laser sensor configured to detect both high power laser signal and low power laser signal generated by the modulated CW light source; wherein each processing channel further includes a respective high power processing pathway for processing high power laser signals;

said laser sensor is configured, upon receiving a signal with intensity greater than a given threshold, to process the signal via the high power processing pathway and detect the true signal portions based on signal intensity.

16. The laser sensor according to any one of claims 10 to 15 is further configured to sum energy of signals received in at least each pair of adjacent quarters, thereby generating 4 intermediate processing channels; and integrate energy in each of the intermediate processing channels.

17. The method according to any one of claims 10 to 16 is further configured to sum energy of signals received in all quarters, thereby generating a fifth intermediate processing channel; and integrate energy in the fifth processing channel.

18. The laser sensor according to any one of claims 9 to 17 being integrated in a laser system, the laser system further comprising the modulated CW light source.

19. The laser sensor according to any one of claims 9 to 18 being integrated in a laser system, the laser system further comprising a high power laser designator.

20. A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps of detecting a signal reflected from a target illuminated by a CW light source configured to generate a modulated laser signal modulated at a predefined modulation frequency, the method comprising:

receiving information indicative of a plurality of samples of a signal, the signal comprising true signal portions reflected from said target, and noise;

dividing the samples into different frequency bands and integrating energy of samples at the modulation frequency band during a given time window; and

detecting the true signal portions in the signal, if the integrated energy of the samples at the modulation frequency band is greater than a given threshold.

21. The program storage device of claim 20 wherein the method further comprising:

sampling the received signal at a sampling rate greater than the modulation frequency, thereby generating a plurality of samples;

performing the filtering with the help of a digital filter; the filtering comprising:

dividing the samples into different frequency bands and integrating energy of samples at the modulation frequency band during a given time window; and

detecting the true signal portions in the signal, if the integrated energy of the samples at the modulation frequency band is greater than a given threshold.

CLAIMS:

1. A method of detecting a signal reflected from a target, the method comprising:

receiving light signals by sampling continuous wave (CW) input signals at a sampling rate selected to be greater than a frequency corresponding to predefined frequency bands used for signal modulation, and generating a plurality of samples;

processing said plurality of samples, said processing comprising:

applying filtering to said samples for dividing the samples into different frequency bands during a given time window; and

analyzing the divided samples and determining the energy integrated at frequency bands including the energy integrated at a modulation frequency and the energy integrated at frequencies different from the modulation frequency;

determining a threshold as a function between the energy integrated at frequencies different from the modulation frequency and the energy integrated at the modulation frequency; and

applying said threshold to the divided samples thereby detecting true signal portions reflected from said target corresponding to the modulation frequency band greater than said determined threshold.

2. The method according to claim 1 wherein:

said filtering applied to the plurality of samples is performed with the help of a digital filter.

3. The method according to claim 2 wherein the digital filter is a Fast Fourier filter.

4. The method according to any one of the preceding claims wherein the signal is received by a 4 quarters laser sensor, each quarter is associated with a

respective processing channel, wherein said filtering is performed in each of the processing channels for signals received at the respective quarter, the method further comprising:

determining a direction to a spot illuminated by the laser signal based on the distribution of the energy at the modulation frequency band across the 4 quarters of the sensor.

5. The method according to any one of the preceding claims, wherein said filtering applied to the plurality of samples is performed with an anti-aliasing filter; the sampling rate being greater than a band-limit of the anti-aliasing filter.

6. The method according to any one of the preceding claims further comprising:

upon receiving a laser signal with a given intensity,

detecting true signal portions based on signal intensity if the given intensity of the signal is greater than a predefined threshold; otherwise

detecting the true signal portions based the energy at the modulation frequency band.

7. The method according to any one of the preceding claims further comprising:

summing energy of signals received in at least each pair of adjacent quarters, thereby generating 4 intermediate processing channels; and

performing said filtering on in each of the intermediate processing channels.

8. The method according to any one of the preceding claims further comprising:

summing energy of signals received in all quarters, thereby generating a fifth intermediate processing channel; and

performing said filtering on the fifth processing channel.

9. A laser sensor unit operable for detecting a signal reflected from a target illuminated by a modulated CW light source configured to generate a laser signal modulated at a predefined modulation frequency, the sensor comprising:

a sensor head associated with at least one processing channel, the sensor head being operable to receive light input comprising true signal portions reflected from said target, and noise; and said at least one processing channel comprising:

a sampler configured to sample the light input being received with a sampling rate which is greater than a frequency corresponding to predefined frequency bands used for signal modulation, and thereby generating a plurality of samples;

an energy integration module configured to process the plurality of samples and divide the samples into different frequency bands and integrate energy of the divided samples at said different frequency bands during a given time window, said energy integrated at different frequency bands including energy integrated at the modulation frequency and energy integrated at frequencies different from the modulation frequency; and

an energy threshold detector configured for processing said energy integrated at said different frequency bands for determining a threshold as a function between the energy integrated at frequencies different from the modulation frequency and the energy integrated at the modulation frequency, and applying the determined threshold to thereby detect the true signal portions in the signal, corresponding to the modulation frequency band greater than said threshold.

10. The laser sensor according to claim 9 is a 4 quarters laser sensor, each quarter being connected to a respective processing channel, wherein said integration is performed in each of the processing channels for signals received at the respective quarter, the laser sensor further comprising a target detection unit configured to determine a direction to a spot illuminated by the laser signal based on the distribution of the integrated energy at the modulation frequency band across the 4 quarters of the sensor.

11. The laser sensor according to claim 10 wherein each processing channel comprises an anti-aliasing filter configured to filter the received signal at the respective quarter in order to avoid folding; wherein the sampling rate is greater than the band-limit of the anti-aliasing filter.

12. The laser sensor according to any one of claims 9 to 11 wherein the energy integrating module comprises a digital filter configured to divide the received signal into different frequency bands and to enable to integrate the energy at different frequency bands.

13. The laser sensor according to any one of claims 10 to 12 wherein each processing channel comprises a respective frequency F cell selection module configured for selecting the integrated energy at the frequency band of the modulation frequency received at the respective quarter.

14. The laser sensor according to any one of claims 9 to 13 wherein each processing channel comprises a respective energy threshold detector configured to determine whether the integrated energy at the modulation frequency band is greater than a predefined threshold.

15. The laser sensor according to any one of claims 9 to 14 is a dual purpose laser sensor configured to detect both high power laser signal and low power laser signal generated by the modulated CW light source; wherein each processing channel further includes a respective high power processing pathway for processing high power laser signals;

said laser sensor is configured, upon receiving a signal with intensity greater than a given threshold, to process the signal via the high power processing pathway and detect the true signal portions based on signal intensity.

16. The laser sensor according to any one of claims 10 to 15 is further configured to sum energy of signals received in at least each pair of adjacent

quarters, thereby generating 4 intermediate processing channels; and integrate energy in each of the intermediate processing channels.

17. The laser sensor according to any one of claims 10 to 16 is further configured to sum energy of signals received in all quarters, thereby generating a fifth intermediate processing channel; and integrate energy in the fifth processing channel.

18. The laser sensor according to any one of claims 9 to 17 being integrated in a laser system, the laser system further comprising the modulated CW light source.

19. The laser sensor according to any one of claims 9 to 18 being integrated in a laser system, the laser system further comprising a high power laser designator.

20. A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps of detecting a signal reflected from a target, the method comprising:

receiving light signals by sampling continuous wave (CW) input signals at a sampling rate selected to be greater than a frequency corresponding to predefined frequency bands used for signal modulation, and generating a plurality of samples;

processing said plurality of samples, said processing comprising:

applying filtering to said samples for dividing the samples into different frequency bands during a given time window; and

analyzing the divided samples and determining the energy integrated at frequency band including the energy integrated at a modulation frequency and the energy integrated at frequencies different from the modulation frequency;

determining a threshold as a function between the energy integrated at frequencies different from the modulation frequency and the energy integrated at the modulation frequency; and

applying said threshold to the divided samples thereby detecting true signal portions reflected from said target corresponding to the modulation frequency band greater than said determined threshold.

21. The program storage device of claim 20 wherein:

said filtering applied to the plurality of samples is performed with the help of a digital filter.