## BRIEF DESCRIPTION OF THE DRAWINGS

The disclosed technique will be understood and appreciated more fully from the following detailed description taken in conjunction with the drawings in which:

Figure 1 is a block diagram of a threat warning system, constructed and operative in accordance with an embodiment of the disclosed technique;

Figure 2A is a front view schematic illustration of an exemplary sensor unit configuration, constructed and operative in accordance with an embodiment of the disclosed technique;

Figure 2B is a perspective view schematic illustration of another exemplary sensor unit configuration, constructed and operative in accordance with another embodiment of the disclosed technique;

Figure 3 is a top view schematic illustration of the sensor unit of Figure 2A;

Figure 4 is a top view schematic illustration of an armored military vehicle installed with components of the threat warning system of Figure 1, constructed and operative in accordance with an embodiment of the disclosed technique; and

Figure 5 is a flow diagram of a method for detecting radiation associated with an incoming threat, operative in accordance with an embodiment of the disclosed technique.

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## DETAILED DESCRIPTION OF THE EMBODIMENTS

The disclosed technique overcomes the disadvantages of the prior art by providing a threat warning system and method that utilizes multiple discrete sensors for detecting different parameters associated with incoming radiation and determining if the radiation is a light flash associated with the launching of an explosive projectile, or laser radiation transmitted by a weapon source. An incoming threat may be subsequently identified and characterized, allowing for the implementation of a suitable countermeasure.

The term "flash event", and any variations thereof, as used herein, refers to any type of light flash or sparks associated with the launching of a threat which involves some form of combustion that triggers the firing of an explosive projectile and which is generally transient in nature. Examples of flash events include, but are not limited to: the light flash resulting from the launching of a rocket, missile or torpedo; and the firing of an artillery projectile or ammunition via a mortar, cannon, gun or any other form of weaponry.

Reference is now made to Figure 1, which is a block diagram of a threat warning system, generally referenced 100, constructed and operative in accordance with an embodiment of the disclosed technique. Threat warning system (TWS) 100 includes a sensor unit 102 and a

control unit 104. Sensor unit 102 is coupled with control unit 104. Sensor unit 102 includes a sensor module 106 and a processing module 108. Sensor module 106 is coupled with processing module 108. Sensor module 106 includes at least one impact recognition sensor 112 (also referred to herein as a "hit sensor"), a plurality of azimuth sensors 114, a plurality of elevation sensors 116, at least one spectral sensor 118, at least one frequency sensor 120, a plurality of power (intensity) sensors 122, spectral filters 124, and pulse profile filters 126. Hit sensors 112 are coupled with sensors 114, 116, 118, 120, 122. Pulse profile filters 126 are coupled with sensors 112, 114, 116, 118, 120, 122. Processing module 108 includes an analog to digital (A/D) converter 128, a processor 130, and pulse train filters 132. Central control unit 104 includes a memory 134, a processor 136, and a database 138. TWS 100 further includes a user interface 140, which is coupled with central control unit 104.

Each of the components of TWS 100 may be embodied by at least one hardware device, at least one software module, or a combination thereof. Furthermore, each of the components may be integrated within a more general hardware device or software module, or may be embodied by a dedicated hardware device or software module. Processing module 108 is generally embodied by an integrated circuit, such as a field-programmable gate array (FPGA). Sensor unit 102 and

control unit 104 may be disposed within a single housing, or alternatively may be situated at separate remote locations and linked to each other via a wireless connection (e.g., in accordance with the ZigBee network protocol). It is appreciated that Figure 1 represents an exemplary configuration of the threat warning system of the disclosed technique, and any of the components of TWS 100 may be disposed or embodied in an alternative manner. For example, at least one of spectral filters 124 may be integrated with at least one of hit sensors 112. It is further noted that some of the components of TWS 100 depicted in Figure 1 may be optional. For example, TWS 100 may alternatively include only a subset of sensors 114, 116, 118, 120, 122.

Hit sensors 112 are operative to detect the presence of an incident laser pulse (or other forms of radiation). Each hit sensor 112 may be associated with a particular threat type or with particular characteristics of the incoming radiation. For example, at least one hit sensor 112 is configured to detect laser rangefinder (LRF) pulses; at least one hit sensor 112 is configured to detect laser target designator (DES) pulses; at least one hit sensor 112 is configured to detect beam-riding (BR) laser guidance pulses; at least one hit sensor 112 is configured to detect projected infrared (IR) radiation; at least one hit sensor 112 is configured to detect continuous wave (CW) pulses; at least one hit sensor 112 is

configured to detect larger bandwidth pulses (e.g., 1kHz-100kHz); and at least one hit sensor 112 is configured to detect smaller bandwidth pulses (e.g., 3Hz to 100Hz). The isolation of particular types of input may be realized via an amplifier or filter of the hit detector 112, such as by only passing through radiation with a particular bandwidth. For example, a spectral filter 124 coupled with an LRF hit detector 112 is configured to pass through wavelengths associated with LRF transmissions while blocking out all other wavelengths.

Azimuth sensors 114 are operative to detect the azimuth angle of arrival of the incoming radiation, where each azimuth sensor 114 may be associated with a particular threat type. For example, at least one azimuth sensor 114 is configured to detect LRF pulses, DES pulses and/or IR projections, respectively. Elevation sensors 116 are operative to detect the elevation angle of arrival of the incoming radiation, where each elevation sensor 116 may be associated with a particular threat type. For example, at least one elevation sensor 116 is configured to detect LRF pulses, DES pulses and/or IR projections, respectively. Sensor unit 102 may further include at least one crude elevation sensors 117 (see Figure 2A below), operative for coarse elevation angular detection with a lower accuracy than elevation sensors 116, but which may be sufficient for certain purposes. For example, crude elevation sensors 117 may include

three sensors configured to categorize the incoming radiation into up/middle/down elevation ranges. Spectral sensors 118 are operative to detect the bandwidth or spectral range of the incoming radiation. For example each spectral sensor 118 is associated with a particular bandwidth range. Frequency sensors 120 are operative to detect the signal frequency of the incoming radiation (e.g., the pulse frequency). For example each frequency sensor 120 is associated with a particular set of frequencies. Power sensors 122 are operative to detect the power or signal intensity of the incoming radiation. For example each power sensor 122 is associated with a particular power range.

During steady state operation of TWS 100, all of the sensors of sensor module 106 are initially in a "standby mode" with the exception of hit sensors 112. In other words, each of sensors 114, 116, 118, 120, 122 are deactivated, i.e., in an "off state", while only hit sensors 112 remain activated, i.e., in an "on state". As soon as a pulse is detected by at least one hit sensor 112, the other sensors 114, 116, 118, 120, 122 become activated. In particular, the hit sensor 112 triggers the other sensors, such as by "opening" and then "closing" at least a subset of the other sensors 114, 116, 118, 120, 122 upon detection of incoming radiation.

Each of the sensors (114, 116, 118, 120, 122) may be, for example, silicon (Si) based or indium gallium arsenide (InGaAs) based (or

extended-InGaAs) sensors. Hit sensors 112 are high sensitivity sensors (e.g., orders of magnitude greater than that of standard CCD or CMOS cameras), and are generally larger in size and operate asynchronously, in contrast to the other sensors of sensor module 106. It is noted that a hit sensor 112 may also determine additional parameters or characteristics of the incident pulse, in addition to detecting its mere presence. For example, a hit sensor 112 may also provide crude frequency or spectral (bandwidth) measurements, which may be sufficient for certain applications (i.e., while spectral sensors 118 and frequency sensors 120 provide more accurate measurements of these respective parameters).

Reference is now made to Figures 2A and 2B. Figure 2A is a front view schematic illustration of an exemplary sensor unit configuration, generally referenced 102A, constructed and operative in accordance with an embodiment of the disclosed technique. Figure 2B is a perspective view schematic illustration of another exemplary sensor unit configuration, generally referenced 102B, constructed and operative in accordance with another embodiment of the disclosed technique. Sensor unit 102A has a rectangular box shape and the sensors (112, 114, 116, 118, 120, 122) are arranged along a substantially planar surface, i.e., such that the detection surfaces lie along a common plane. In contrast, sensor unit 102B is generally cylindrically-shaped and the sensors are arranged along a

circular perimeter spanning across an azimuthal plane. Thus, an individual sensor unit 102B is operative to obtain full hemispherical detection coverage (e.g. spanning 360° azimuth), whereas similar full hemispherical detection coverage can be obtained by deploying four separate sensor units 102A spread out, each one providing approximately 90° field of coverage (such as in the sensor unit deployment of Figure 4 discussed hereinbelow). Sensor unit 102B however may not be suitable for deployment in all types of vehicles.

According to an embodiment of the disclosed technique, at least some of the sensors of sensor module 106 are discrete sensors, as opposed to array or matrix sensors. Discrete sensors are basic sensors that provide a binary output, by indicating whether the measured variable is above or below a specified setpoint. Matrix sensors, such as for example a high angular resolution laser irradiance detector (HARLID), are arranged in an array along the individual matrix sensor module. Matrix sensors therefore cover a smaller surface area as compared to discrete sensors, which are spread out across the sensor module and thus provide a larger surface area for detection. Furthermore, a matrix sensor module will cease operating correctly if even a single portion fails or malfunctions, whereas a sensor module with discrete sensors provides redundancy and can maintain operation even when some of the sensors are

malfunctioning. An additional distinction is modularity, as individual sensors cannot be replaced in a matrix sensor module (e.g., in order to fix a malfunctioning sensor or to upgrade to an enhanced sensor version) without replacing the entire module, as opposed to a discrete sensor module which allows for the replacement of the individual sensors. Discrete sensor modules are also generally less expensive than a corresponding matrix sensor module.

Reference is now made to Figure 3, which is a top view schematic illustration of the sensor unit 102A of Figure 2A. A pair of sensor boards 141 that include hit/frequency/spectral/power sensors are disposed at opposite ends of sensor unit 102A with their detection surfaces facing frontwards. A pair of azimuth sensor boards 142, including BR/IR azimuth sensors, are aligned at an inclination relative to sensor boards 141. Another azimuth sensor board 143 includes LRF/DES azimuth sensors and is disposed at a middle section of sensor unit 102A behind sensor boards 141, 142. Sensor unit 102A further includes an optomechanical mechanism 144 coupled with sensor boards 141, 142 and 143, each of which may be embodied by printed circuit boards (PCB). Sensor unit 102A further includes a processing/communication unit 146, which obtains data from the various sensors, performs initial processing of the data, and organizes the data for subsequent comprehensive

processing. Sensor unit 102A further includes a wiring connector 148 for external connection.

The direction determining sensors of sensor module 106 (i.e., azimuth sensors 114 and elevation sensors 116) may be implemented with an encoded mask technique. In particular, an encoded mask having a gray code matrix pattern of opaque and transparent sections is disposed in front of the detector array, the masking pattern arranged such that different incident angles of the incoming radiation results in different detection patterns. The encoding scheme may be based on multiple gray code masks, such as using at least one pair of complementary encoded masks, as described for example in PCT Patent Application Publication No. WO2006/061819 entitled "Complementary Masks".

Reference is now made to Figure 4, which is a top view schematic illustration of an armored military vehicle, generally referenced 150, installed with components of the threat warning system 100 of Figure 1, constructed and operative in accordance with an embodiment of the disclosed technique. Sensor units 102 are arranged along the outer perimeter of military vehicle 150 spaced apart substantially equidistantly, such that the coverage area of all of the sensor modules 106 together encompasses the entire surrounding area (i.e., providing 360° azimuth field of coverage). In an exemplary implementation of the disclosed

technique, military vehicle 150 is disposed with four sensor units 102, such that each sensor unit 102 is aligned towards a respective corner of vehicle 150 and receives incoming radiation emanating from that respective direction. The incoming radiation typically propagates to multiple sensor units 102, although may be detected at only one sensor unit 102. Central control unit 104 is situated at a suitable location on the upper region of vehicle 150, such as off to one side near the turret 152. Vehicle 150 further includes an external threat countermeasures unit, which may be partially embodied by main gun 154. Armored military vehicle 150 may be, for example, a battle tank, an armored personnel carrier, an armored jeep, and the like. TWS 100 may alternatively be mounted onto other types of vehicles, such as aircrafts or marine vessels. It is appreciated that TWS 100 is not limited to use with military vehicles or vehicles in general. For example, TWS 100 may alternatively be deployed in a different type of military setting, such as in the vicinity of a guard post or station, or any other suitable structure, whether stationary or mobile. TWS 100 may further alternatively be deployed in a non-military setting, such as at a general structure or location that is intended to be secured or protected. Yet further alternatively, at least one sensor unit 102 of TWS 100 may be held by a person, or otherwise worn by or attached to personal clothing or equipment.

In general, when an enemy military force activates a weapon system that involves a flash event or laser transmission directed toward armored military vehicle 150, at least one sensor module 106 detects the incoming radiation. Sensor module 106 filters out noise and irrelevant radiation sources (e.g., via filters 124, 126), and processing module 108 and/or central control unit 104 processes the detected radiation and associated characteristics and determines if the radiation is a flash event (e.g., a light flash associated with the launching of an explosive projectile) or laser radiation that is actively transmitted by a threat source (e.g., a laser-guided weapon). If the detected radiation is deemed to not be either of these sources, then it may be ignored. If however a threat is positively determined, TWS 100 may proceed to characterize the threat, determine additional information about the threat, and then respond to the threat in a suitable manner.

Reference is now made to Figure 5, which is a flow diagram of a method for detecting radiation associated with an incoming threat, operative in accordance with an embodiment of the disclosed technique. In procedure 202, incoming radiation is received at at least one sensor module. Referring to Figures 1 and 4, radiation arrives at a sensor module 106 of at least one sensor unit 102 of TWS 100.

In procedure 204, the incoming radiation is filtered based on at least one filtering criteria. Referring to Figure 1, spectral filters 124 filter out radiation beyond a certain spectral range. For example, spectral filters 124 may be configured to pass wavelengths within approximately 0.3-2.2 μm, encompassing at least a portion of the visible (VIS), near infrared (NIR) and short-wavelength infrared (SWIR) spectral regions, while blocking out wavelengths outside this range.

In procedure 206, the incoming radiation is detected at an impact recognition sensor of at least one of the sensor modules. Referring to Figures 1, 2A and 2B, at least one hit sensor 112 detects and samples an incoming laser pulse or flash radiation. Hit sensors 112 operate in an activated state during steady state operation mode of TWS 100.

In procedure 208, the activation of other sensors of the sensor module is triggered. Referring to Figures 1, 2A and 2B, sensors 114, 116, 118, 120, 122 are deactivated or in an "off state" during steady state operation mode of TWS 100. For each detected laser pulse or flash radiation, hit sensor 112 activates or "turns on" at least a subset of the other sensors 114, 116, 118, 120, 122 for a brief duration (e.g., approximately 10ns). For example, hit sensor 112 may trigger the activation of azimuth sensors 114, elevation sensors 116, spectral

sensors 118, and frequency sensors 120. The selection of which sensors to activate may be based on characteristics of the incoming radiation, such that if the detected pulse has certain characteristics then only certain sensors are activated.

In procedure 210, the azimuth/elevation/bandwidth/frequency/intensity of the incoming radiation is detected with at least one corresponding azimuth/elevation/spectral/frequency/power sensor. Referring to Figures 1, 2A and 2B, the data from the activated sensors 114, 116, 118, 120, 122 is sampled to obtain the respective characteristics of the incoming radiation. For example, azimuth sensors 114 detect the azimuth angle of arrival; elevation sensors 116 detect the elevation angle of arrival; spectral sensors 118 detect the bandwidth; frequency sensors 120 detect the signal frequency; and power sensors 122 detect the intensity. The sensors 114, 116, 118, 120, 122 acquire data for the brief interval during which they are in an activated state (triggered by hit sensors 112), which may relate to an individual input pulse or a sequence of input pulses. Subsequently, the input pulses optionally undergoes further filtering via pulse profile filters 126, which are analog filters that filter out noise and attempt to pass through only threat related data. The pulses are then

converted into corresponding digital signals via A/D converter 128 and forwarded to processor 130.

In procedure 212, it is determined whether the incoming radiation is resulting from a light flash associated with the launching of a threat or resulting from laser radiation transmitted by a threat source, based on spectral characteristics and temporal characteristics of the incoming radiation. Referring to Figure 1, processor 136 (and/or processor 130) determines a temporal profile and spectral signature of the radiation based on the detected characteristics (e.g., azimuth and elevation angle of arrival, spectral range, frequency, intensity, pulse width, pulse shape), and classifies the radiation accordingly as a flash event or an active laser transmission. In general, active laser transmissions may be characterized by smaller bandwidths (e.g., on the order of nanometers) and shorter durations (e.g., a few nanoseconds), whereas flash events may involve a wider spectral profile (e.g., on the order of micrometers) and longer durations (e.g., tens of milliseconds). It is appreciated that the use of discrete (non-matrix) sensors in particular for both flash event detection and laser detection provides various useful features, such as: spectral mapping, large surface area coverage, sufficiently high sampling rate (e.g., capable of also detecting in the nanosecond range), and the ability to sample a wide range of parameters simultaneously. In addition,

discrete sensors have benefits relating to their cost, reliability, design flexibility, and maintenance and repair. TWS 100 may also rely on additional criteria for the classification or for filtering out noise, such as by taking into account relative timing information. For example, if three different sensor modules 106 (i.e., at different sensor units 102) receive incoming radiation substantially concurrently, then it is determined which sensor module 106 detected the radiation first (along with additional information), and then proceed to analyze only the data from the first arrival sensor module 106. It is noted that the analysis of both spectral and temporal characteristics serves to minimize the false alarm rate (FAR) of TWS 100, for example by avoiding false detections of photography flashes, lightning flashes, solar reflections, and the like. It is further noted that the detection channel may differ between flash event detections and active laser transmission detections for a given sensor, in that each sensor feeds data to different amplification circuitry that relate to the different threat detection mechanisms. At least some of the same sensor circuitry may also be used for the detection of both types of events.

In procedure 214, the incoming threat is identified and characterized using the characteristics of the incoming radiation. Referring to Figure 1, processor 136 (and/or optionally processor 130) determines the type of threat and/or other relevant information about the

oncoming threat, based on the classification of the incoming radiation as a flash event or laser transmission, as well as the detected radiation characteristics. For example, incoming radiation may be identified as resulting from a laser rangefinder (LRF), a laser target designator (DES), or a beam-riding (BR) laser guidance transmission, if the radiation activated a particular hit detector 112 associated with the respective threat type (e.g., if a specific BR hit detector 112 was activated then the corresponding detection may be deemed a BR transmission). Furthermore, the establishment of the threat type may be performed based on a particular combination of the radiation parameters associated with that threat type (e.g., wavelength, duration, pulse shape, angle of arrival, intensity), even if the radiation activated multiple types of sensors 112, 114, 116, 118, 120, 122. Processor 130 may map the input pulses by generating a signature pattern according to the detected pulse characteristics, and subsequently use the mapping to identify or characterize the associated threat. For example, processor 130 may generated a temporal mapping of each pulse that models characteristics of the pulse as a function of time, such as frequency, amplitude, intensity, modulation, and the like. The temporal pulse mapping may then be compared with a database 138, which includes information associating different types of threats with signal characteristics. If a pulse mapping or

a sequence of pulse mappings matches a database threat record to a selected degree (e.g., if a predetermined number of mapping characteristics correspond to the database record characteristics), then the pulse is associated with that particular threat. The database may also include information associating different types of noise or interference signals with pulse characteristics, enabling the identification of such noise or interference. The database may further include supplementary data for each threat record, such as a severity rating for the threat, possible enemy sources, options for response, and the like. An example of a pulse mapping and threat characterization technique is described in PCT Patent Application Publication No. WO2012/093399 entitled "Laser Threat Warning System and Method". Once the threat is identified, TWS 100 may proceed to determine additional real-time information about the threat (e.g., speed, range, location and direction) and to prepare implementation of an appropriate countermeasure. The threat identification and classification may be implemented by at least one dedicated threat classification mechanism, which may be integrated within processing module 108 and/or central control unit 104, instead of or in addition to processors 130, 136. Central control unit 104 may generate detailed log files of operational data (e.g., information about detected radiation, timestamps, types of identified threats, threat profiles, identification

accuracy, and the like), allowing for future debriefing and implementing adjustments to TWS 100 as necessary.

The operation of TWS 100 involves relatively low average power consumption, since most of the sensors (114, 116, 118, 120, 122) are frequently in standby mode and deactivated, and only become activated after receiving a trigger from hit sensors 112. For example, a sensor operating full time under full performance (while a threat is being detected) may consume approximately 10W power, whereas in standby mode the power consumption may be orders of magnitude lower, such as approximately 100mW. As a result, TWS 100 may operate for a long time using only batteries. Furthermore, the dual-purpose integrated nature of TWS 100, i.e., the ability to obtain information regarding both a flash event and an active laser transmission by a potential threat, inherently enhances the system reliability and reduces the false alarm rate for the detection of oncoming threats. For example, if both a flash event and an active laser transmission occur substantially simultaneously, then TWS 100 may determine that both are associated with a single threat (e.g., a laser-guided missile that generates a launch flash during the initial portion of its laser transmission). TWS 100 may apply different types of warnings for flash events, for active laser transmissions, and for both events together, and may use information of each type of event to improve the

threat analysis, such as to provide an estimation of the current distance of the oncoming threat.

Sensor unit 102 may be manufactured and be provided separately from central control unit 104, which may be realized as a commercial off-the-shelf (COTS) product. The ability to connect sensor unit 102 to central control unit 104 by a wireless channel, allowing these components to be distributed over separate locations, is enabled by the standby mode/sensor triggering and the low power consumption features of the disclosed technique, as well as the relatively small amounts of data transmission involved.

In accordance with another embodiment of the disclosed technique, the discrete sensors of sensor module 106 may be utilized solely for the purposes of flash event detection. Whereas TWS 100 discussed hereinabove is a dual-purpose integrated warning system operative for detecting both flash events and laser transmissions associated with a potential threat, the same components of TWS 100 may be confined to flash event detection only. In particular, such a system would include the same types of discrete sensors, such as impact recognition sensors, spectral sensors, frequency sensors, azimuth sensors, and/or elevation sensors, which are configured to detect different aspects of the received radiation. The detected parameters are then

processed to determine whether the radiation is associated with a flash event, in a similar manner as discussed hereinabove.

It will be appreciated by persons skilled in the art that the disclosed technique is not limited to what has been particularly shown and described hereinabove.

## CLAIMS

1. A dual threat warning system, operative for detecting a flash event of a threat source and further operative for detecting a laser transmission of a threat source, the system comprising:

at least one sensor module, operative to receive incoming radiation, said sensor module comprising:

at least one discrete impact recognition sensor, operative to detect the presence of said incoming radiation;

at least one discrete spectral sensor, operative to detect the spectral range of said incoming radiation;

at least one discrete frequency sensor, operative to detect the frequency of said incoming radiation; and

at least one filter, operative for filtering said incoming radiation according to at least one filtering criteria, and

a processor, coupled with said sensor module, said processor operative for determining if said incoming radiation is resulting from a light flash associated with the launching of a threat and if said incoming radiation is resulting from laser radiation transmitted by a threat source, based on spectral characteristics and temporal characteristics of said incoming radiation.

2. The system of claim 1, wherein at least one of said sensor modules further comprises a plurality of azimuth angular sensors, operative for detecting the azimuth angle of arrival of said incoming radiation.

3. The system of claim 1, wherein at least one of said sensor modules further comprises a plurality of elevation angular sensors, operative for detecting the elevation angle of arrival of said incoming radiation.

4. The system of claim 1, wherein at least one of said sensor modules further comprises a plurality of power sensors, operative for detecting the intensity of said incoming radiation.

5. The system of claim 1, wherein said filter comprises a wavelength filter, coupled with at least one of said impact recognition sensors, said wavelength filter operative for filtering out selected wavelengths of said incoming radiation.

6. The system of claim 5, wherein said wavelength filter is operative to pass wavelengths between a spectral range of 0.3 – 2.2 μm.

7. The system of claim 1, wherein said sensor module comprises sensors arranged along a circular perimeter across an azimuthal plane and operative to obtain 360° azimuth detection coverage.

8. The system of claim 1, wherein said impact recognition sensor operates in an activated state during standby system mode and triggers the activation of at least a subset of other sensors of said sensor module upon detection of said incoming radiation.

9. The system of claim 1, wherein said processor is further operative to identify and characterize an incoming threat using the characteristics of said incoming radiation.

10. The system of claim 9, wherein said processor generates a temporal pulse mapping of said incoming radiation, and compares said mapping with a database comprising information associating different threats with radiation characteristics.

11. The system of claim 1, wherein at least one of the sensors of said sensor module is associated with a particular threat type or with particular radiation characteristics.

12. The system of claim 11, wherein said threat type or radiation characteristics is selected from the list consisting of:

laser rangefinder (LRF) pulses;

laser target designator (DES) pulses;

beam-riding laser guidance pulses;

projected infrared (IR) radiation;

continuous wave (CW) pulses; and

pulses with a selected bandwidth.

13. The system of claim 1, wherein at least one sensor of said sensor module is selected from the list consisting of:

a silicon (Si) sensor;

an indium gallium arsenide (InGaAs) sensor; and

an extended-InGaAs sensor.

14. The system of claim 1, wherein at least one sensor of said sensor module comprises multiple encoded masks with a gray code matrix pattern.

15. The system of claim 1, wherein said sensor module is comprised in a sensor unit, and said processor is comprised in a control unit situated at a separate location from said sensor unit, said control unit being wirelessly coupled with said sensor unit.

16. The system of claim 1, wherein said flash event comprises a light flash resulting from at least one event selected from the list consisting of:

a rocket launch;

a missile launch;

a torpedo launch;

an artillery projectile or ammunition firing;

a mortar firing;

a cannon firing; and

a gun firing.

17. The system of claim 1, wherein at least a portion of said system is installed on a structure selected from the list consisting of:

a vehicle;

an armored military vehicle;

an aircraft;

a marine vessel;

a guard post;

a mobile platform; and

a stationary platform.

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