1. A laser directed infrared countermeasures ("LDIRCM") system mountable on a platform, comprising:

a plurality of operatively independent sector units, each sector unit of the plurality of operatively independent sector units comprising:

a semiconductor laser unit adapted to generate a laser beam for jamming a guidance system of at least one threat;

a collimating lens for collimating the laser beam by reducing a divergence angle of the laser beam; and

a laser guidance module, the laser guidance module being adapted to direct at least the collimated laser beam towards a threat within a certain sector relative to the sector unit, thereby enabling jamming of the threat located within a certain sector relative to the sector unit, and

a plurality of staring array missile warning system ("MWS") modules for providing a respective plurality of pixelated frames, each pixelated frame of the plurality of pixelated frames representing a specific sector relative to a corresponding MWS module,

wherein each MWS module of the plurality of staring array MWS modules enables both detection and tracking of at least one threat within the respective pixelated frame;

wherein each MWS module of the plurality of staring array MWS modules comprises a plurality of staring sensors, each staring sensor of the plurality of staring sensors being configured to provide a pixelated representation of an instantaneous field of view ("IFOV") of the staring sensor such that the IFOV of each pixel of the plurality of pixelated frames is

~~smaller than a full width half max ("FWHM") far field divergence angle of the laser beam~~ generated by the semiconductor laser unit from the plurality of operatively independent sector units,

wherein each MWS module of the plurality of staring array MWS modules is rigidly attachable to a respective sector unit for maintaining the IFOV of each pixel of plurality of pixelated frames to be within an overlapping coverage sector of the respective staring array MWS module and the respective sector unit.

2. The LDIRCM system according to claim 1, wherein the semiconductor laser unit includes a semiconductor laser that is configurable to provide a laser beam at a wavelength from 3 μm to 5 μm.

3. The LDIRCM system according to claim 1, wherein the laser unit includes a laser selected from a group consisting of a quantum cascade laser; an interband cascade laser and an externally pumped semiconductor laser that is configurable to provide a laser beam at a wavelength between 3 μm to 5 μm.

4. The LDIRCM system according to claim 1, wherein:

the plurality of staring array MWS modules are mountable on the platform such that each one of the plurality of staring array MWS modules is configured to detect a threat located within a different sector relative to the platform, which results in a combined threat detection and tracking capability that covers substantially a full perimeter of the platform, and

the at least one staring array MWS module of the plurality of staring array MWS modules is rigidly attachable to one or more of the plurality of operatively independent sector units that are mounted on the platform, such that tracking data provided by the at least one staring array MWS module to a sector unit to which it is rigidly attached is ~~substantially unaffected by physical distortions of the platform.~~

5. The LDIRCM system according to claim 1, wherein the plurality of staring array MWS modules is rigidly attachable to one or more of the plurality of operatively independent sector units while mounted on the platform, such that an angular error between a location of a threat as represented by tracking data provided by the at least one of the plurality of staring array MWS modules and a centerline of the laser beam directed by the one or more sector units based upon the tracking data towards the threat as represented by tracking data, is smaller than a far field divergence of the laser beam.

6. The LDIRCM system according to claim 1, wherein the at least one staring array MWS module of the plurality of staring array MWS modules is operable for:

implementing a first mode of operation for locating a signal that includes a signature of a threat directed towards the platform at a first frame rate and within a first frame, and

implementing a second mode operation for tracking the threat directed towards the platform and detected during the first mode of operation, the second mode of operation including:

defining a subframe within the first frame around the signature of the threat detected during the first mode of operation, and

sampling the subframe at a second frame rate that is substantially higher than the first frame rate.

7. The LDIRCM system according to claim 1, wherein each one of the plurality of operatively independent sector units when mounted on the platform is configurable to provide a jamming capability within a coverage sector that is approximately 90° horizontal to the platform and tens of degrees vertical to the platform.

~~8. The LDIRCM system according to claim 1, wherein each one of the~~ plurality of operatively independent sector units when mounted on the platform is configurable to provide a jamming capability within a coverage sector that is approximately 60° horizontal to the platform and tens of degrees vertical to the platform.

9. The LDIRCM system according to claim 1, wherein the laser guidance module of each sector unit includes one or more beam steering elements rotatable about a first and a second axes, thereby enabling the one or more beam steering elements to steer at least the laser beam generated by the semiconductor laser unit towards the threat, and wherein the plurality of operatively independent sector units are mountable on the platform such that a motion of the one or more beam steering elements about the first axis does not cause an orientation of the second axis of the one or more beam steering elements to change with respect to the platform and vice versa.

10. The LDIRCM system according to claim 1, wherein at least one staring array MWS module of the plurality of staring array MWS modules is operatively associated with a thermoelectric cooler or is not actively cooled.

11. The LDIRCM system according to claim 1, wherein at least one staring array MWS module of the plurality of staring array MWS modules includes a short-wavelength infrared ("SWIR") detector having a cutoff wavelength that is from 1.5 μm to 3 μm.

12. The LDIRCM system according to claim 1, further comprising a radar threat detection unit.

13. A laser directed infrared countermeasures ("LDIRCM") system mountable on a platform, comprising:

a plurality of operatively independent sector units, each sector unit of the plurality of ~~operatively independent sector units comprising:~~

a semiconductor laser unit adapted to generate a laser beam for jamming a guidance system of at least one threat; and

a laser guidance module, the laser guidance module being adapted to direct at least the collimated laser beam towards a threat within a certain sector relative to the sector unit, thereby enabling jamming of the threat located within a certain sector relative to the sector unit, and

a plurality of staring array missile warning system ("MWS") modules for providing a respective plurality of pixelated frames, each pixelated frame of the plurality of pixelated frames representing a specific sector relative to a corresponding MWS module,

wherein each MWS module of the plurality of staring array MWS modules enables both detection and tracking of at least one threat within the respective pixelated frame;

wherein each MWS module of the plurality of staring array MWS modules comprises a plurality of staring sensors, each staring sensor of the plurality of staring sensors being configured to provide a pixelated representation of an instantaneous field of view ("IFOV") of the staring sensor such that the IFOV of each pixel of the plurality of pixelated frames is smaller than a full width half max ("FWHM") far field divergence angle of the laser beam generated by the semiconductor laser unit from the plurality of operatively independent sector units, and

wherein each MWS module of the plurality of staring array MWS modules is rigidly attachable to a respective sector unit for maintaining the IFOV of each pixel of plurality of pixelated frames to be within an overlapping coverage sector of the respective staring array MWS module and the respective sector unit.

14. A laser directed infrared countermeasures ("LDIRCM") system mountable on a platform, comprising:

a plurality of operatively independent sector units, each sector unit of the plurality of operatively independent sector units comprising:

a semiconductor laser unit adapted to generate a laser beam for jamming a guidance system of at least one threat;

a collimating lens for collimating the laser beam by reducing a divergence angle of the laser beam; and

a laser guidance module, the laser guidance module being adapted to direct at least the collimated laser beam towards a threat within a certain sector relative to the sector unit, thereby enabling jamming of the threat located within a certain sector relative to the sector unit, and

a plurality of staring array missile warning system ("MWS") modules for providing a respective plurality of pixelated frames, each pixelated frame of the plurality of pixelated frames representing a specific sector relative to a corresponding MWS module,

wherein each MWS module of the plurality of staring array MWS modules enables both detection and tracking of at least one threat within the respective pixelated frame; and

wherein each MWS module of the plurality of staring array MWS modules comprises a plurality of staring sensors, each staring sensor of the plurality of staring sensors being configured to provide a pixelated representation of an instantaneous field of view ("IFOV") of the staring sensor such that the IFOV of each pixel of the plurality of pixelated frames is smaller than a full width half max ("FWHM") far field divergence angle of the laser beam generated by the semiconductor laser unit from the plurality of operatively independent sector units.

The invention claimed is:

1. A LDIRCM system mountable on a platform, comprising:

a sector unit, comprising:

a laser unit adapted to generate a laser beam;

a controller for controlling operation of the laser unit;

and

a laser guidance module adapted to cause the laser beam to steer towards a threat within a certain sector relative to the sector unit;

a staring array MWS module adapted to provide a pixilated frame representing a specific sector relative to the MWS module for enabling detection and tracking of the threat within the sector relative to the MWS module,

wherein the staring array MWS module comprises a plurality of staring sensors that are each configured to provide a pixilated representation of an IFOV of the staring sensor, such that the IFOV of each pixel in the pixilated frame meets a accuracy criterion that is related to an optical property of the laser beam, and

wherein the staring array MWS module is rigidly attachable to the sector unit, such that data provided by the staring array MWS module to the sector unit is substantially unaffected by physical distortions of the platform and is maintained in compliance with the accuracy criterion.

2. The system according to claim 1, wherein the accuracy criterion requires that the IFOV of each pixel in the pixilated frame be smaller than a FWHM far field divergence angle of the laser beam that is omitted by the respective sector unit.

3. The system according to claim 2, wherein the MWS is rigidly attachable to the sector, such that the IFOV each pixel in the pixilated frame is stabilized relative to the sector unit.

4. The system according to claim 1, wherein the MWS is rigidly attachable to the sector unit, such that an angular error between a location of the threat as represented by tracking data provided by the MWS and a centerline of the laser beam directed by the sector unit towards the threat based on the tracking data is smaller than a far field divergence angle of the laser beam.

5. The system according to claim 1, further comprising a radar detection unit which is configured to detect a threat in proximity of the platform.

6. The system according to claim 5, wherein the radar detection unit is used in combination with the MWS module.

7. The system according to claim 6, wherein the radar detection unit is configured to provide data that can be used for detecting and/or tracking the threat, and wherein the data from the radar detection unit is cross referenced with data from the MWS module.

8. The system according to claim 7, wherein the data from the radar detection unit is used to identify a false alarm from the MWS module.

9. The system according to claim 1, wherein the MWS module is adapted to:

implement a first mode of operation for locating a signal that includes a signature of the threat at a first frame rate and within a first frame, and

implement a second mode operation for tracking the threat that was detected during the first mode of operation, the second mode of operation including:

defining a subframe within the first frame around the signature of the threat that was detected during the first mode of operation, and

sampling the subframe at a second frame rate that is substantially higher than the first frame rate.

10. The system according to claim 1, wherein the laser guidance module includes one or more beam steering elements rotatable about a first and a second axes for steer at least the laser beam generated by the laser unit towards the threat, and wherein the sector unit is mountable on the platform such that a motion of the one or more beam steering elements about the first axis does not cause an orientation of the second axis of the one or more beam steering elements to change with respect to the platform and vice versa.

11. The system according to claim 1, comprising a plurality of sector units, and for each one of the

plurality of sector units, the system comprises a respective staring array MWS module that is rigidly attachable to the sector unit, such that data provided by the staring array MWS module to the sector unit to which it is rigidly attached is substantially unaffected by physical distortions of the platform, and is maintained in compliance with the accuracy criterion.

12. The system according to claim 11, wherein at least one of the plurality of sector units is operable independently of the operation of any of the other sector units.

13. The system according to claim 11, wherein each one of the plurality of sector units when mounted on the platform is configurable to provide a jamming capability within a sector that is approximately 90° horizontal to the platform and tens of degrees vertical to the platform.

14. The system according to claim 11, wherein each one of the plurality of sector units when mounted on the platform is configurable to provide a jamming capability within a sector that is approximately 60° horizontal to the platform and tens of degrees vertical to the platform.

15. An airborne platform, comprising:

a LDIRCM system mounted on the platform, comprising:

a sector unit, comprising:

a laser unit adapted to generate a laser beam;

a controller for controlling operation of the laser unit;

and

a laser guidance module adapted to cause the laser beam to steer towards a threat within a certain sector relative to the sector unit;

a staring array MWS module adapted to provide a pixilated frame representing a specific sector relative to the MWS module for enabling detection and tracking of the threat within the sector relative to the MWS module,

wherein the staring array MWS module comprises a plurality of staring sensors that are each configured to provide a pixilated representation of an IFOV of the staring sensor, such that the IFOV

of each pixel in the pixilated frame meets a accuracy criterion that is related to an optical property of the laser beam, and

wherein the staring array MWS module is rigidly attached to the sector unit, such that data provided by the staring array MWS module to the sector unit is substantially unaffected by physical distortions of the platform and is maintained in compliance with the accuracy criterion.

16. The airborne platform according to claim 15, wherein the accuracy criterion requires that the IFOV of each pixel in the pixilated frame be smaller than a FWHM far field divergence angle of the laser beam that is omitted by the respective sector unit.

17. The airborne platform according to claim 15, where said LDIRCM system comprises a plurality of sector units, and for each one of the plurality of sector units, the LDIRCM system comprises a respective staring array MWS module that is rigidly attached to the sector unit, such that data provided by the staring array MWS module to the sector unit to which it is rigidly attached is substantially unaffected by physical distortions of the platform, and is maintained in compliance with the accuracy criterion.

18. The system according to claim 15, further comprising a radar detection unit which is configured to detect a threat in proximity of the platform.

19. The system according to claim 18, wherein the radar detection unit is used in combination with the MWS module.

20. The system according to claim 19, wherein the radar detection unit is configured to provide data that can be used for detecting and/or tracking the threat, and wherein the data from the radar detection unit is cross referenced with data from the MWS module.

21. The system according to claim 20, wherein the data from the radar detection unit is used to identify a false alarm from the MWS module.