RADIATING ELEMENT FOR FOCUSSED ENERGY

TECHNICAL FIELD

The present invention relates to a radiation emitter for directional energy with a device for coupling in radiation from at least one radiation generator and one radiation combination device, which combines the radiation to bundled radiation, according to the preamble of claim 1.

PRIOR ART

Based on EP 21823596 A1 from the applicant, a radiation emitter is known for directional energy, which can also be called a tactical radiation emitter or an energy weapon and, for example, can be embodied as a laser weapon.

This known radiation emitter comprises a device for coupling in radiation from at least one radiation generator and one radiation combination device, in order to combine the radiation to a high-energy combined beam. The radiation generator may represent an industrially available laser, with the use of generic laser weapons being seen in the defense against missiles, where here, via a bundled laser beam, thermal impact is applied upon the exterior skin of a missile at long distances of up to several hundred kilometers, allowing the destruction of the missile. An example is here the airborne laser weapon system Boeing YAL-1 of the U.S. Air force.

Another application of such a high energy radiation weapon is seen in the battlefield at a distance from a few hundred meters to several kilometers. Here, by using the high-energy beam, thermal effects can be applied upon weapons or ammunition rendering them ineffective.

In any case it is required, however, to provide a radiation emitter for directional energy which is capable of emitting very high radiation and directing it precisely to the target such that the radiation upon impact on the target object is still sufficiently high to cause the desired thermal effect.

For a successful defense against grenade launchers and similar targets using a high-energy laser weapon, they must be able to generate a focal point on the target with its intensity exceeding 10 kW/cm^2 at a distance from approximately one to approximately three kilometers. In order to fulfill these requirements, the laser weapon needs a laser source with a capacity exceeding 100 kW.

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Claims

1. An emitter (1) for targeted energy, having a device for coupling beams, said device consisting of at least one beam generator (34) and one beam combination device (1') which merges the beams into combined beams,

characterized in that

the beam combination device (1) has a telescope lens with a collimation mirror (2) and a secondary mirror (3), and the device for receiving targeted beams from a plurality of light guide devices (35) is constructed out of the at least one beam generator (34) [*sic*].

2. An emitter according to claim 1,

characterized in that

the emitter (1) is designed to couple beams from at least one high-energy laser light source in a manner which is substantially coaxial in space.

3. An emitter according to claim 1 or 2,

characterized in that

the emitter (1) is designed to focus the beams into a parallel beam, by means of a parabolic mirror (7), and to guide the beams to different subapertures of the telescope lens in individual beam axes, by means of a beam splitting mirror (6).

4. An emitter according to one of the previous claims,

characterized by

at least one mirror (5) which can move about two axes, and one multi-faceted mirror (4), wherein the mirror (5) is designed to deflect beams in the direction of the multi-faceted mirror (4), and the multi-faceted mirror (4) is designed to deflect beams in the direction of the secondary mirror (3).

5. An emitter according to one of the previous claims,

characterized in that

the secondary mirror (3) is designed to be able to be moved along a longitudinal axis (33) of the telescope lens relative to the collimation mirror (2).

6. An emitter according to one of the previous claims,

~~**characterized by**~~

~~at least one camera (12) and one control device for the purpose of evaluating image data captured by the camera (12), and by a device for aiming the emitter (1) by means of the control device and the image data.~~

~~7. An emitter according to one of the previous claims,~~

~~**characterized by**~~

~~a laser device (11) which illuminates a target object, said laser device (11) emitting laser beams 37 of a wavelength which is different from the wavelength of the beams, wherein the collimation mirror (2) and a multi-faceted mirror (4) are designed for deflecting laser light, the same reflected by the target object, in the direction of beam paths of the beam generator (34).~~

~~8. An emitter according to claims 4 to 7,~~

~~**characterized by**~~

~~at least one position-sensitive detector (9) and/or a camera for the purpose of capturing laser light reflected by the target object, and one regulating device for the purpose of determining relative angular deviations in beam paths based on data from the detector (9) and/or the camera, and the correction thereof by means of the mirror (5) and/or the secondary mirror (3).~~

~~9. An emitter according to claim 8,~~

~~**characterized by**~~

~~at least one laser light source (11) which emits a laser beam (38) which is coupled into the beam path of the beam generator (34), wherein the course of said laser beam (38) can be detected by means of the detector (9) and/or the camera to adjust beam paths.~~

~~10. An emitter according to claim 8 or 9,~~

~~**characterized by**~~

~~means for the emission of a light beam (39) which is aimed at a position-sensitive detector (9) and/or a camera by means of a wavelength-sensitive beam splitting mirror (6) , wherein said light beam (39) can be detected for the purpose of determining an angular deviation.~~

1. A radiation emitter (1) for directional energy with a device for coupling in radiation from at least one radiation generator (34) and a radiation combination device (1') comprising a telescopic optic, which combines radiation into bundled radiation,

characterized in that

the telescopic optic comprises a collimation reflector (2) and a secondary mirror (3), which can be displaced in reference to the collimation reflector (2) along a longitudinal axis (33) of the telescopic optic, and the device is embodied to accept directional radiation from a plurality of light conducting devices (35) from the at least one radiation generator (34).

2. A radiation emitter according to claim 1,

characterized in that

the radiation emitter (1) is embodied for the spatially largely coaxial coupling in of radiation from at least one high-energy laser light source.

3. A radiation emitter according to claim 1 or 2,

characterized in that

the radiation emitter (1) is embodied for bundling radiation to a parallel beam via a parabolic reflector (7) and for guiding the radiation in individual beam axes via a beam splitter (6) to different sub-apertures of the telescopic optic.

4. A radiation emitter according to one of the previous claims,

characterized in that

at least one reflector (5), articulate about two axes, and a beveled reflector (4), with the reflector (5) being embodied for deflecting radiation in the direction towards the beveled reflector (4) and the beveled reflector (4) being embodied for deflecting radiation in the direction of the secondary mirror (3).

5. A radiation emitter according to one of the previous claims,

characterized in that

at least one camera (12) and a control device are provided for analyzing image data recorded by the camera (12) and in a device for aligning the radiation emitter (1) via the control device and image data.

6. A radiation emitter according to one of the previous claims,

characterized in that

a laser device (11) illuminating a target object, which emits laser beams (37) with a wavelength different from the wavelength of the radiation, with the collimation reflector (2) and a beveled reflector (4) being embodied for deflecting laser light reflected by the target object in the direction of radiation paths of the radiation generator (34).

7. A radiation emitter according to one of claims 4 to 6,

characterized in that

at least one position-sensitive detector (9) and/or a camera for recording laser light reflected by the target object and a control device for determining relative angular misalignments in the radiation paths based on data of the detector (9) and/or the camera and their correction via the reflector (5) and/or the secondary mirror (3).

8. A radiation emitter according to claim 7,

characterized in that

at least one laser light source (11), emitting a laser light beam (38) coupled in the radiation path of the radiation generator (34) with its progression being detected by the detector (9) and/or the camera for adjusting radiation paths.

9. A radiation emitter according to claim 7 or 8,

characterized in that

means for emitting a light beam (39), directed via a wavelength-sensitive beam splitter (6) to a position-sensitive detector (9) and/or a camera, wherein the light beam (39) can be detected to determine angular misalignments.

Claims

1. A radiation emitter (1) for directional energy with a device for coupling in radiation from at least one radiation generator (34) and a radiation combination device (1') comprising a telescopic optic, which combines radiation into bundled radiation,
   characterized in that
   the telescopic optic comprises a collimation reflector (2) and a secondary mirror (3), which can be displaced in reference to the collimation reflector (2) along a longitudinal axis (33) of the telescopic optic, and the device is embodied to accept directional radiation from a plurality of light conducting devices (35) from the at least one radiation generator (34).

2. A radiation emitter according to claim 1,
   characterized in that
   the radiation emitter (1) is embodied for the spatially largely coaxial coupling in of radiation from at least one high-energy laser light source.

3. A radiation emitter according to claim 1 or 2,
   characterized in that
   the radiation emitter (1) is embodied for bundling radiation to a parallel beam via a parabolic reflector (7) and for guiding the radiation in individual beam axes via a beam splitter (6) to different sub-apertures of the telescopic optic.

4. A radiation emitter according to one of the previous claims,
   characterized in that
   at least one reflector (5), articulate about two axes, and a beveled reflector (4), with the reflector (5) being embodied for deflecting radiation in the direction towards the beveled reflector (4) and the beveled reflector (4) being embodied for deflecting radiation in the direction of the secondary mirror (3).

5. A radiation emitter according to one of the previous claims,
   characterized in that

at least one camera (12) and a control device are provided for analyzing image data recorded by the camera (12) and in a device for aligning the radiation emitter (1) via the control device and image data.

6. A radiation emitter according to one of the previous claims,
characterized in that
a laser device (11) illuminating a target object, which emits laser beams (37) with a wavelength different from the wavelength of the radiation, with the collimation reflector (2) and a beveled reflector (4) being embodied for deflecting laser light reflected by the target object in the direction of radiation paths of the radiation generator (34).

7. A radiation emitter according to one of claims 4 to 6,
characterized in that
at least one position-sensitive detector (9) and/or a camera for recording laser light reflected by the target object and a control device for determining relative angular misalignments in the radiation paths based on data of the detector (9) and/or the camera and their correction via the reflector (5) and/or the secondary mirror (3).

8. A radiation emitter according to claim 7,
characterized in that
at least one laser light source (11), emitting a laser light beam (38) coupled in the radiation path of the radiation generator (34) with its progression being detected by the detector (9) and/or the camera for adjusting radiation paths.

9. A radiation emitter according to claim 7 or 8,
characterized in that
means for emitting a light beam (39), directed via a wavelength-sensitive beam splitter (6) to a position-sensitive detector (9) and/or a camera, wherein the light beam (39) can be detected to determine angular misalignments.