

Method and Device for Capturing An Image of A Target Object

Abstract

A method for capturing the image of a target object (Z) illuminated by an illumination laser (1) includes the following steps:

- 5 a) Illuminating the target object (Z) by means of a pulsed laser beam (L) emitted by the illumination laser (1), which beam is aimed at the target object (Z) in the form of an illumination (L_2) beam by an illumination optics unit (2);
- b) Receiving the illumination beam laser light reflected from the target object (Z) by means of a receiving optics unit (3);
- 10 c) Directing the received reflected illumination beam laser light to an image capturing device (4) to generate an image of the target object on the image capturing device (4);
- d) Detecting the angular offset of the image of the target object with respect to a reference axis of the receiving optics unit (3);
- 15 e) Stabilising the visual axis of the image capturing device (4) detected by imaging of the target object device by means of a first optical correcting element (30) of the receiving optics unit (3) that compensates for the angular offset;

wherein the following additional steps are carried out to stabilise the imaging of the target object:

- a'1) Decoupling a partial beam (L_1) from the laser beam (L) emitted by the illumination laser (1);
- a'2) Delaying the decoupled partial beam (L_1) in an optical delay device (62);
- a'3) Illuminating the target object (Z) by means of the partial beam (L_1) that is directed at the target object (Z) by the receiving optics unit (3);
- 25 b'1) Receiving the partial beam laser light which is reflected by the target object (Z) and which defines a reference wavefront by the receiving optics unit (3);
- b'2) Decoupling the received reflected partial beam laser light from the light that is received by the receiving optics unit (3);
- 30 c') Directing the decoupled reflected partial beam laser light to a wavefront sensor (50);

- d') Detecting a wavefront error in the received reflected partial beam laser light,
and
- e') Fine tuning the receiving optics unit to compensate for the detected wavefront
error by means of a second optical correcting element (32) of the receiving
5 optics unit (3).

(Fig. 1)