

# HiCATT

High-speed Intensified Camera Attachment



**The HiCATT is designed for use with a high-speed camera.**

It increases the sensitivity of your camera and enables low-light imaging at frame rates up to 1 MHz (10 MHz in burst). The HiCATT features overexposure protection and can be configured with a wide range of image intensifiers. Our experienced engineers will help you pick the right image intensifier for your application.

## **High-speed Imaging**

The HiCATT upgrades your high-speed camera to the next level of performance. It boosts the intensity of incoming light at speeds up to 1,000,000 fps.

## **In situ Focus Adjustment**

An outer-body focus ring adjusts the internal relay optics, allowing the focus of the intensifier output onto the sensor to be changed without altering total length.

## **Easy Swap Relay Optics**

User can easily exchange the relay optics between 1:1, 2:1, and 3:1 to optimise speed by making full use of the intensifier on a cropped sensor.

## **Ultra-short Exposures**

The gated image intensifier enables exposure times down to 3 ns. At such short exposure times, motion blur is eliminated completely to ensure sharp images.

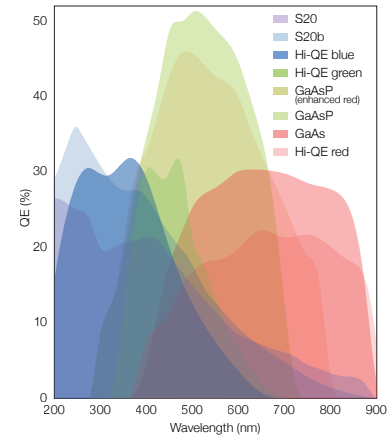
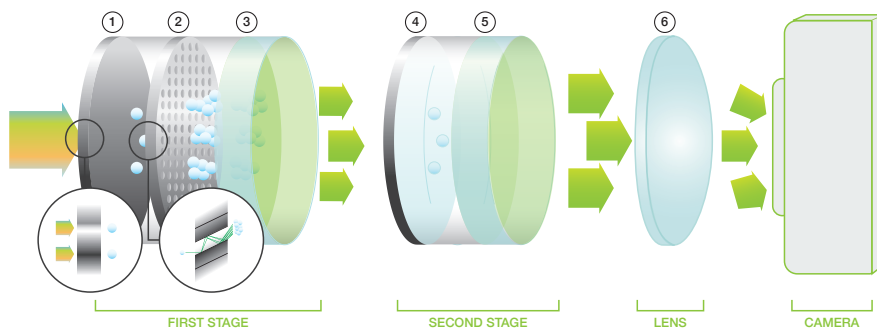
## **Cycled Bursts**

Adjust for changing light levels by cycling through three different gate widths and optionally combine this with the burst mode to optimize the dynamic range.

## **Rotating Camera Mount**

Safe and easy camera coupling keeping the HiCATT and the camera in their intended orientation.

## Intensifier working principle



On the photocathode (1) photons get converted into electrons. These are accelerated in an electric field towards the Multi Channel Plate (MCP) (2) and hit the channel walls. Depending on the voltage across the channel, multiple electrons are generated by secondary emission. This cloud of electrons gets accelerated towards the anode screen (3), where the electrons are converted back into photons by the phosphor layer,

and these photons are guided by a fiber-optic faceplate to the entrance of the second stage (booster).

Again photons are converted to electrons by the photocathode (4) and accelerated to the anode screen (5) where the image appears. The relay lens (6) transfers the image from the back of the intensifier onto the mounted camera.

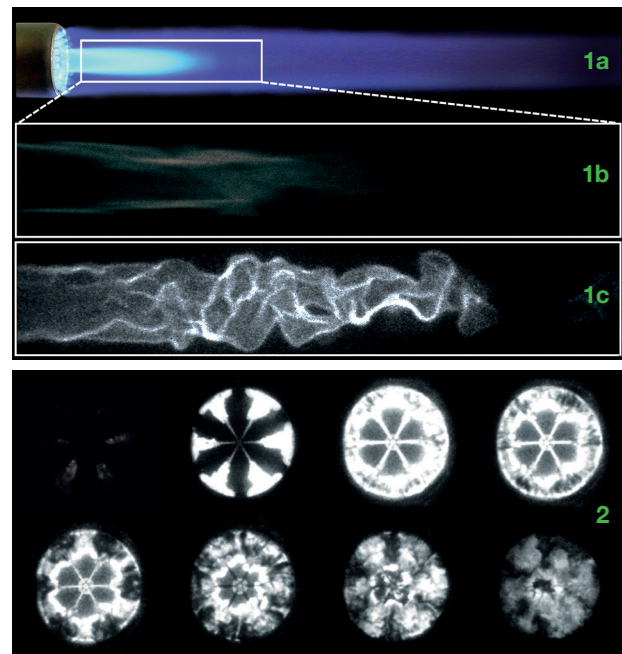
## Applications

**1a.** Recording a blue gas flame from a Bunsen burner at high frame rates poses a challenge. The light intensity of the flame is low and to be able to see any details, especially in close-ups, very short exposure times are required.

**1b.** Recording made with a standard high-speed camera at 1000 fps and 1 ms exposure time. On the one hand, a long exposure time is needed to increase the sensitivity of the camera. On the other hand, a short exposure time is necessary to prevent motion blur.

**1c.** Recording made with the HiCATT in front of the high-speed camera at 2000 fps and 15  $\mu$ s exposure time (using gating). The HiCATT makes it possible to capture flames at frame rates up to >1,000,000 (1 MHz). By gating the image intensifier, the HiCATT can be used as a fast electro-optical shutter, to limit exposure time to a value at which motion blur is no longer an issue.

**2.** Recording sequence made with the HiCATT in combination with a high-speed camera. The recording shows a combustion cycle of a fuel injection engine at 22,000 fps.



Lambert Instruments BV  
Leonard Springerlaan 19  
9727 KB Groningen  
The Netherlands

T: +31 50 501 8461

E: sales@lambertinstruments.com

DS002-SF / HiCATT / rev02 / Sept2022

Lambert Instruments is dedicated to development, production and worldwide sales of products for **time resolved imaging at low-light levels.**

Our mission is to enable our users to **reveal previously unseen phenomena.** Our products provide a possibility to record fast events at low-light conditions. Together with our software, we **reimagine detection** to offer complete solutions to challenging imaging problems.