

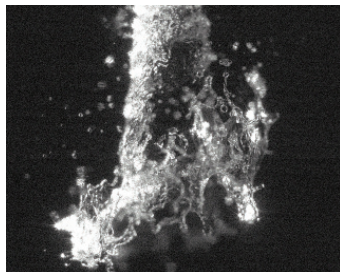
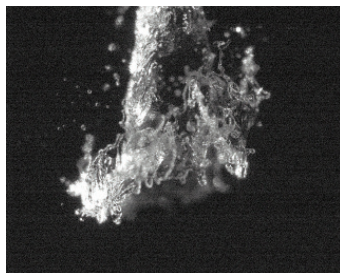
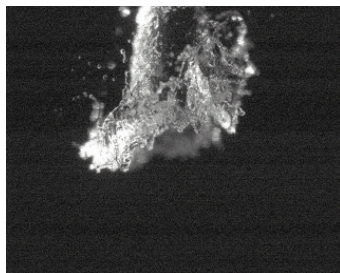
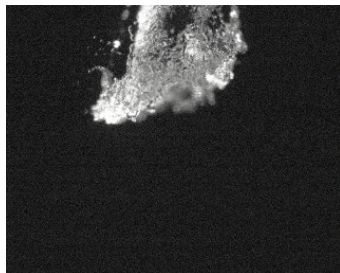


# LAVISION

WE COUNT ON PHOTONS

## EngineMaster High-Speed

digital kHz imaging  
highest spatial resolution  
crank angle synchronized  
recording



up to 4000  
full frames



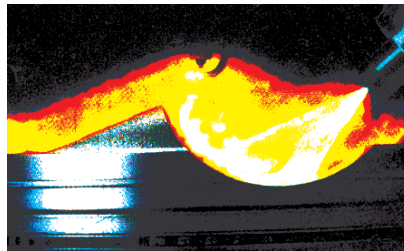
**EngineMaster High-Speed** imaging system incorporates a state-of-the-art CMOS camera synchronized to a diode pumped solid state laser. The system can record image sequences with up to 12 kHz frame rate (corresponds to 2000 rpm with 1° resolution). Each frame can be synchronized to crank angle or time based upon an external start trigger. A recording contains up to 4000 frames with 1024 x 1024 pixels each.

Triggered digital image recording is a big improvement to film recording. Online monitoring enables fast optical alignment. The data is ready on demand and data storage is performed according to the user's test run parameters. No time-consuming film digitization and image postprocessing is needed with this synchronized digital imaging system.

The diode pumped solid state („DPSS“) laser yields high beam quality at outstanding output power of up to 30 W. The reliability and life time is excellent.

### applications

- ▶ crank angle resolved imaging
- ▶ flame front propagation
- ▶ injection visualization
- ▶ color imaging (e.g. flame) combined with light scattering (e.g. spray)



### Software integrated device control of ...

#### ... triggered recording:

- ▶ synchronization to crank angle encoder
- ▶ cycle synchronization
- ▶ synchronization to external event (e.g. injection)

#### ... digital high-speed imaging:

- ▶ online-monitoring
- ▶ automatic data storage
- ▶ AVI-movie generation

#### ... high repetition rate solid state laser:

- ▶ 30 W power maximum
- ▶ high beam quality

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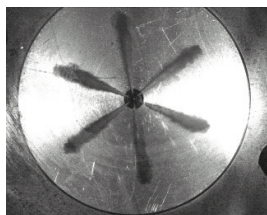
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# EngineMaster High-Speed



## crank angle resolved recording

- ▷ max. 2000 rpm with 1° resolution (12 kHz frame rate)  
4000 rpm with 2° resolution
- ▷ start trigger synchronization
- ▷ cycle to cycle imaging

## injection recording

- ▷ external start trigger
- ▷ time based recording

## high-speed camera

- ▷ CMOS color or monochrome
- ▷ global shutter down to 10 µs
- ▷ data storage up to 4000 frames with 1024 x 1024 pixels
- ▷ 1024 x 1024 pixels @ 1 kHz
- ▷ higher frame rates with reduced pixel resolution

resolution [x, y]	max. frame rate [kHz]
1024 x 1024	1
512 x 512	3.8
256 x 256	12
128 x 256	22
64 x 256	38
32 x 256	60

### Do you need higher frame rates?

LaVision's **UltraSpeedStar** runs  
up to 1 MHz!

## high repetition rate laser

typical values:

- ▷ DPSS (Nd:YLF)
- ▷ output power: 30 W
- ▷ wavelength: 527 nm
- ▷ pulse width: < 130 ns

pulse energy [mJ]	repetition rate [kHz]
20	1
7.5	3.8
2.5	12

- ▷ double pulse "PIV" operation available

Data provided by LaVision is  
believed to be true. However, no  
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possible inaccuracies or omissions.  
All data are subject to change  
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#### LA Vision GmbH

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