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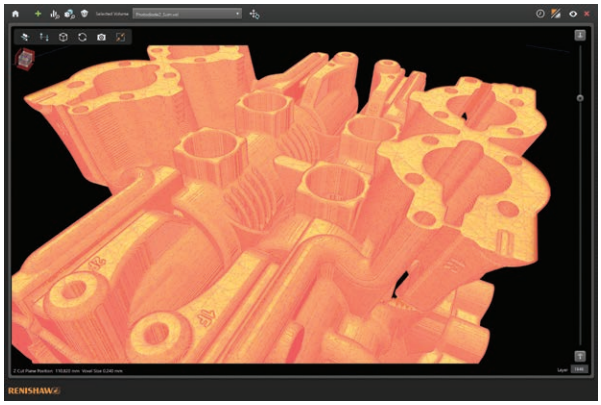
InfiniAM Spectral

InfiniAM is Renishaw's additive manufacturing process monitoring system. InfiniAM Spectral provides feedback on the energy input, melt-pool and plasma emissions from Renishaw AM systems.

InfiniAM Spectral

InfiniAM Spectral software is designed to operate with Renishaw's LaserVIEW and MeltVIEW hardware, to provide feedback on energy input and emissions from the AM build process. InfiniAM Spectral software is available by subscription. This process feedback is essential in understanding component build quality throughout the build process, monitoring laser, plasma and melt-pool characteristics to provide a 2D and 3D view of the build.

At the heart of InfiniAM Spectral are Renishaw's laser monitoring system, LaserVIEW, and melt-pool monitoring system, MeltVIEW. The data from these sensors is collected and compiled in DataHUB, providing a near real-time view and record of the AM process.



Section through RenAM 500 series galvanometer housing

MeltVIEW hardware

MeltVIEW monitors the optical emissions from the AM process across a wide spectral range. Near infra-red plasma emissions in the range 700 nm to 1040 nm and melt-pool emissions in the near-infrared range 1090 nm to 1700 nm are detected by multiple photodiodes.

At the heart of Renishaw RenAM systems is the digital machine controller with operating system software that precisely controls the delivery of laser energy to the powder bed. MeltVIEW is embedded into the on-board control system to ensure precise synchronisation between the sensor signals and the motion control system.

LaserVIEW hardware

LaserVIEW measures the output intensity of the laser in Renishaw RenAM systems, capturing the energy contained in every laser pulse during a build.

The system is embedded within the Renishaw optical module and captures the filtered light passing through a fixed mirror. This gives a relative measurement of laser power that can be combined with system calibration data to indicate laser performance on a layer-by-layer basis.

DataHUB software

DataHUB is the 2D and 3D data collection and volume generation software supplied as part of the InfiniAM Spectral system. It compiles and collates raw data from the system sensors, including LaserVIEW, MeltVIEW and the system controller, into a volume that is rendered and stored for viewing and analysis using InfiniAM Spectral software.

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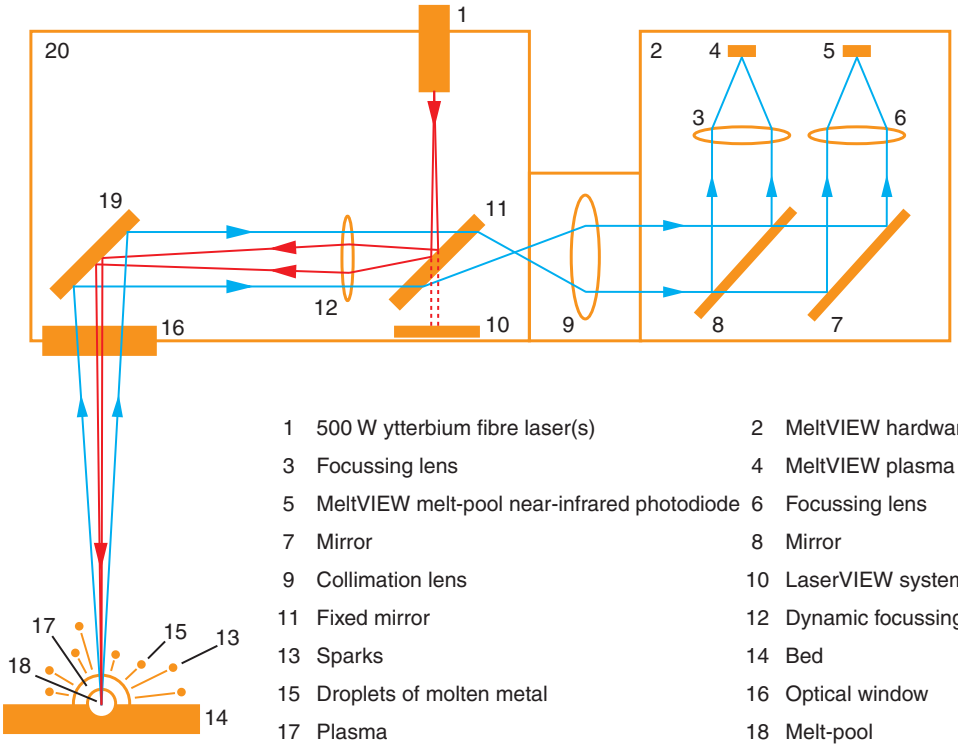
Features and benefits

- Fully embedded into Renishaw RenAM systems
- Co-axial/in-line optical configuration
- 3 high-speed sensors:
  - Plasma
  - Laser
  - Melt-pool
- Wide spectral sensitivity:
  - Plasma 700 nm to 1040 nm
  - Laser 1050 nm to 1080 nm
  - Melt-pool 1090 nm to 1700 nm
- Narrow, high resolution field-of-view – 2.6 mm diameter melt-pool and 6.3 mm diameter plasma capture window
- Streaming of raw data to DataHUB and then onwards to viewing PC's via a storage and backup server
- Automated data capture and handling
- Compatible with all Renishaw supplied AM metal powders
- Compatible with 1 Gigabit Ethernet networks
- High accuracy position feedback data from galvanometer

Data collector PC and viewing PC hardware specification

A recommended and minimum hardware specification for the data collector PC and viewing PC can be supplied by Renishaw upon request.

The anatomy of an InfiniAM Spectral equipped AM system



1	500 W ytterbium fibre laser(s)	2	MeltVIEW hardware module
3	Focussing lens	4	MeltVIEW plasma near-infrared photodiode
5	MeltVIEW melt-pool near-infrared photodiode	6	Focussing lens
7	Mirror	8	Mirror
9	Collimation lens	10	LaserVIEW system photodiode
11	Fixed mirror	12	Dynamic focussing lens
13	Sparks	14	Bed
15	Droplets of molten metal	16	Optical window
17	Plasma	18	Melt-pool
19	Galvanometer mirrors	20	Renishaw optical module

Refer to the InfiniAM Spectral brochure H-5800-3916 for further information.

For worldwide contact details, visit www.renishaw.com/contact

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