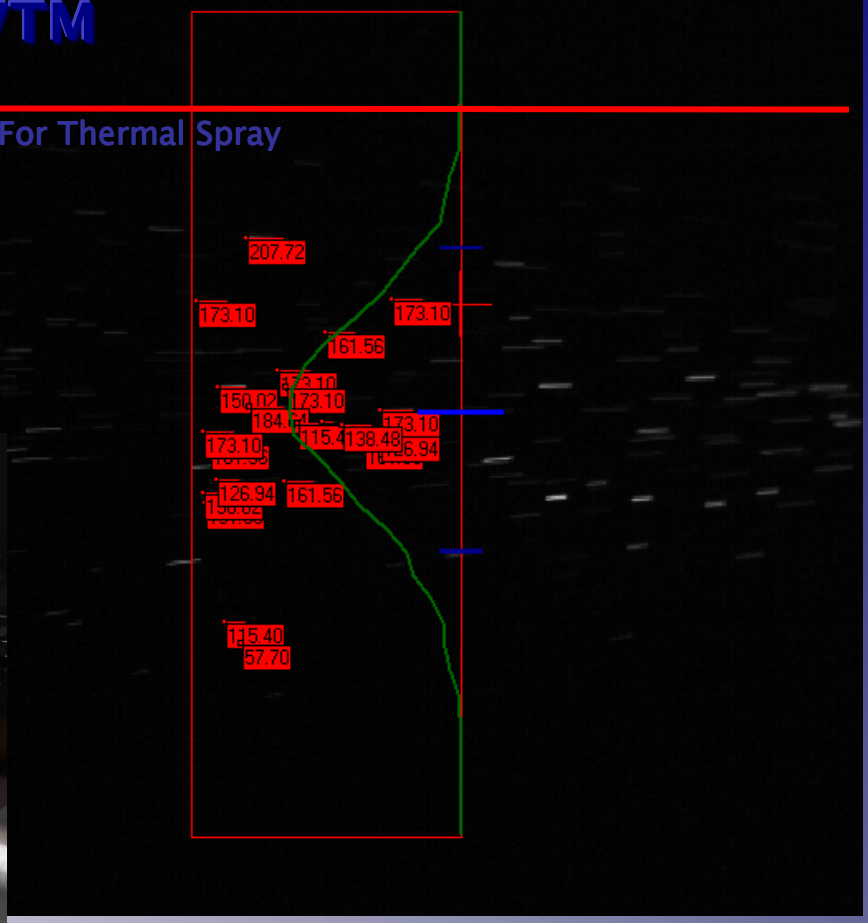
SprayCamPPV™

Low Cost Particle Plume and Velocity Sensor For Thermal Spray



Key Features

-Low Cost, Low Maintenance, Easy to Use, Robust Particle Plume and Velocity Sensor, Ensuring Reliability and Consistency for all Thermal Spray Processes

-Particle Plume Detection Software Measures and Tracks Plume Position, Plume Width, Plume Stability, and Molten Flux

-Detects Particles with Diameters Greater than 10µm and with Velocities Less than 1500m/s

Benefits

-Reduce coating variability by up to 50% by optimizing injection and ensuring particle trajectory remains in the “Sweet Spot” of the Plasma

-Improve deposition efficiency reducing overall cost

-Once a baseline is established, consistent coatings are applied reliably despite minor changes in process parameters

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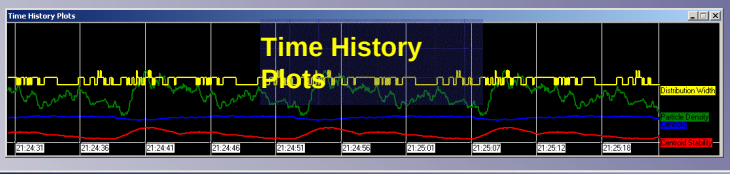
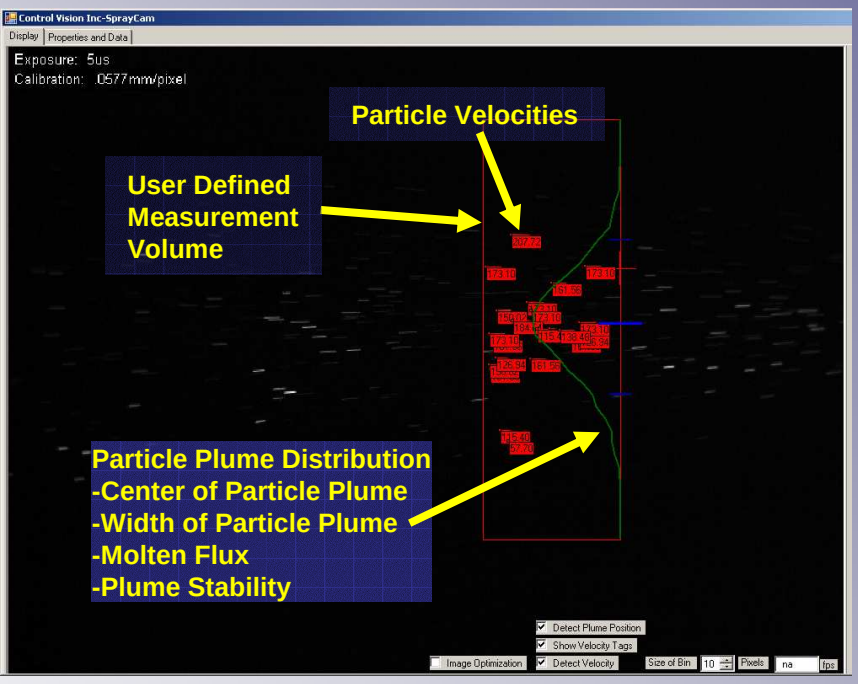
Control Vision Inc.

Imaging Systems for Extreme Industrial and Scientific Applications

SprayCam Software





Base System Features

- Small convenient rugged package allows system to be mounted almost anywhere
- Gigabit ethernet interface allows the controlling computer to be 100 meters from the SprayCam system
- Easy to follow procedure for particle injection optimization.
- System cooled using plant air

Additionally Available System Features

- Custom image recognition software to detect various torch problems
- Training and installation
- Ability to display images on network
- Software customization and integration
- Particle temperature
- Extended warranty or service contract available for an additional fee

Recent research (Ref 1 and 2) demonstrated that an optimum particle trajectory exists which will ensure maximum energy transfer to injected particles regardless of Primary and Secondary Gas Flow Rates, Particle Shape and Sizes, Particle Injection Angles, and Particle Feed Rates. At this trajectory "Sweet Spot", particle temperature and velocity are optimized, deposition efficiency will be maximized, and coating variability is at a minimum. This "Sweet Spot" can be maintained using only one parameter: Carrier Gas Flow Rate.

Once this "Sweet Spot" is found by optimizing Deposition Efficiency using the Carrier Gas Flow Rate, SprayCam will remember its position and limits can easily be set. Before, during, and after the thermal spray process, SprayCam can be quickly used to ensure the consistency and reliability of your process by locating the particle distribution and alerting an operator if it falls outside of the "Sweet Spot" limits. If this occurs the operator simply makes a few adjustments to the Carrier Gas Flow Rate to adjust the trajectory of the particles, bringing them into the "Sweet Spot" and ensuring a consistent coating.

For Example: A new lot of powder is received which has a slightly different size distribution than what is usually sprayed. This will cause the particles to have a different trajectory in the plasma which will cause variability in the coating. SprayCam will test the particle position distribution to ensure it is within the set limits prior to spraying the component. If the distribution falls outside of the "Sweet Spot", SprayCam will alert the operator who can then adjust the Carrier Gas Flow Rate until the proper particle trajectory is obtained. Once this has been done, the operator can spray the component with confidence that the new lot of powder won't affect the coating being sprayed.

1. V. Srinivasan, A. Vaidya, T. Streibl, M. Friis, and S. Sampath, "On the Reproducibility of Air Plasma Spray Process and Control of Particle State", J. Thermal Spray Technology, 2006, 15:739-743.
2. V. Srinivasan, M. Friis, A. Vaidya, T. Streibl, S. Sampath, "Particle Injection in Direct Current Air Plasma Spray: Salient Observations and Optimization Strategies", Plasma Chem Plasma Process, 2007, 27:609-623.

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