Enabling Industrial Robotics Capabilities in Space
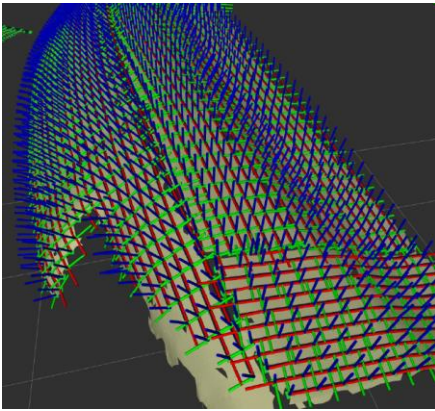
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Why are industrial robotics capabilities useful in space?
Advances in industrial automation have enabled:
- Ability to adapt in unexpected circumstances
- Less human interaction required
- More efficient image processing

Enables missions farther away from Earth and makes spaceflight less expensive

Tool paths generated based on a scan of the surface and process-specific inputs (e.g., angle of attack, standoff distance)

Scan-n-Plan™ identifies 3D geometries and plans paths for industrial processes
- Developed using Robot Operating System (ROS)
- No prior knowledge of part required
- Can be used to match/compare to solid model

- Free-space
- Approach
- Process
- Departure
- Transition
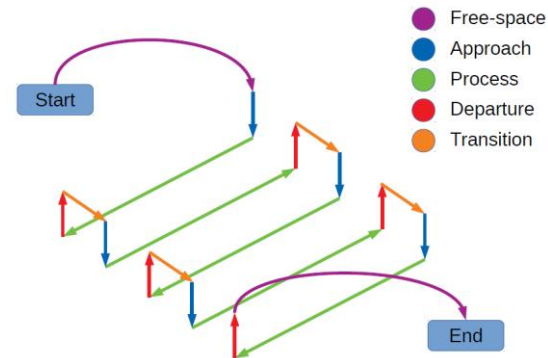
Scan-n-Plan™ components
- Automated calibration tools
- Scan acquisition software
- Automated tool path planning tools
- Process coverage simulation tools
- Automated robot path planning tools
- Image classification tools

Event-based (neuromorphic) cameras identify changes in lighting intensity on a per-pixel basis at the sensor
- Reduced bandwidth and processing requirements
- Vision algorithms only operate on relevant portions of the image
- Perform well in high speed environments that are dark or poorly lit
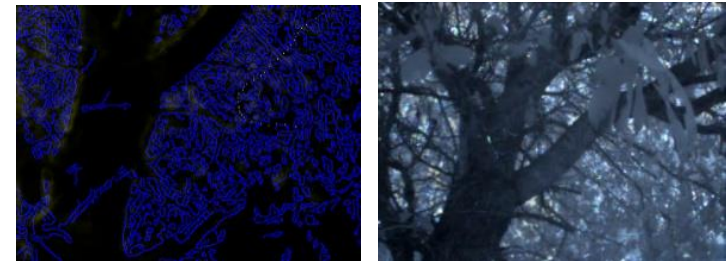
Event-based camera image processed to show edges (left); equivalent image from normal camera (right)

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