Slurry Image Analyzer Version 2

Image Analysis Software

Theory of Operation

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| Document Version | 1.0 |

# Purpose of Document

This document offers an in-depth understanding of how the software works, including its underlying principles, algorithms, and operational logic.

# Introduction and Purpose

The purpose of the Slurry Image Analyzer Version 2 (SIA V2) custom image analysis software is to efficiently process and analyze images of bitumen in oil sand slurry captured by the system with a 4 sensor JAI Line Scan camera. This includes tasks such as identifying bitumen droplets in the images, measuring droplet characteristics, and calculating droplet statistics. The primary focus is on providing a robust and easily maintained system that can deliver accurate results.

Some of the section included will be:

• Introduction and Purpose: A brief introduction that explains the purpose and

significance of the SIA image analysis software.

• System Architecture: Describe the software's architecture, including high-level

components, modules, and their interactions.

• Data Flow: Details how data flows through the system, from input (e.g., image files)

to processing, analysis, and output (e.g., measurement results and summary

statistics).

• Image Processing Algorithms: Explain the algorithms and techniques used for image

processing, segmentation, and droplet analysis.

• Configuration and Parameters: Describe how configuration parameters (e.g., region

of interest, any thresholds, or other variables) influence the analysis process.

* Droplet Measurement Logic: Elaborate on how the SIA measures characteristics like

droplet diameter, speed, and axis lengths. Includes formulas and calculation

methods where applicable.

• Output Generation: Clarify how the software generates output, such as CSV files for

measurement data or segmented images, and how this data is formatted.

• Interactions with Control Software: Explains the communication and integration

between the image analysis software and the control software. This includes details

on how the control software runs the image analysis software, defines input

parameters and output data, and the mechanisms for returning any relevant results

or error codes to the control software.

• Performance Considerations: Comments on performance-related aspects, such as

processing speed, memory usage, and scalability.

• Results of testing and verification should they be valuable in understanding how the

system works.