€ Reserve

POWERED BY **BOULDER IMAGING**

With industry-leading speed, accuracy and resolution, the **RESERVE** machine vision inspection solution **detects**, **measures**, and **classifies defects and non-conformities** in banknote and security paper.

Boulder Imaging (BI) is pleased to introduce **RESERVE**, our high performance machine vision inspection system dedicated to the banknote and security paper industry. For the past eight years, BI has focused innovation on developing, engineering, implementing and certifying machine vision inspection technology for a **leading global producer of currency products** in the United States. Having succeeded in meeting and exceeding the industry's most demanding specifications, BI is pleased to offer the technology to meet the inspection needs and challenges of the global industry.

INDUSTRY LEADING SPEED AND RESOLUTION

BI's Vision Inspector software has been designed for the currency industry and is embedded with a patented technique for surface inspection. Multiple views offer diverse users the ability to review and filter data based on their roles ranging from viewing a map of the entire papermaking or sheeter run to viewing individual defects, as well as the ability to monitor defects at a glance during production. Today's – and future – security features are inspected 100 percent.

RESERVE is capable of meeting the inspection needs of processes where speeds up to **450m per minute** (over 1,200 feet per minute) and **100µm resolution at the imaging surface** (both cross-web and down-web) are required. Positional accuracy is maintained consistent with the speeds and resolution through calibration. For security thread manufacturing including slitting, higher resolution systems with advanced pattern-matching algorithms are scoped.

PROVEN PERFORMANCE

€ BI's Vision Inspector suite of machine vision software is utilized 24/7 in a **multitude of industries and environments to provide inspection solutions for precision applications,** including architectural products manufacturing, aerospace and wind farms.

€ In addition to providing inspection technology for a global producer of currency products, BI is the high-speed **machine vision technology provider for a leading manufacturer of technical paper** used in consumer goods packaging and medical products.

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Highest Performance Inspection Capabilities in the World

RESERVE excels in meeting the most demanding inspection requirements in the industry. Lab and inline trials are used to demonstrate efficacy. BI engineers welcome customer collaboration to develop inspection methods in parallel to security feature development. Each of RESERVE's servers can process incoming **inspection data in excess of 2 GB per second**. Storage allows for **12 months of inspection results data.** RESERVE is capable of inspecting and reporting on a number of banknote features.

BANKNOTE FEATURE	VALIDATION, DEFECT DETECTION, AND REPORTING
Thread Detection	Staggered thread position validation
	Oscillating thread position, amplitude, and wavelength
	Running direction validation for patterned threads
	Thread bobbin and handling defects: flipped threads, distortion, or stretch, width
	Unique thread types to include translucent threads, non-rectangular threads, color threads, or motion threads
	Thread defects: missing thread, thread splices, thread pieces missing, holes in threads, or burst threads
	Paper formation around thread: Proper thread coverage on backside or light around thread
Reference Marks	Cut marks, start marks, and tracking lines
	Missing, broken, or faint
	Size, shape, or position deviations
Watermarks	Unique electrotypes, watermarks, thread windows, and cornerstones
	Overlapping watermarks and electrotypes
	Watermark defects: rotation, missing, broken, faint, size, shape, or position deviations
	Thread window defects: deformed windows or incorrect thread coverage
Banknote Area and Paper Formation	Count and density of security fibers
	Paper formation defects: clustered security fibers, pulp lumps
	Paper process defects: dust, dirt, holes, wrinkles, and oil spots
Dimensions	Sheet length, width, and standard deviations
	Sheet skew and bow
	Banknote length and width

FLEXIBLE AND ADAPTIVE

€ RESERVE can be implemented throughout the production process to provide manufacturers with the ability to identify and correct problems in real time in the paper making process, as well as in security thread manufacturing (on a printing press) and slitting (for post-processing).

€ The user interface is configurable to display results from live or recorded inspections and multiple views are available so that users can review individual defects or a complete roll map.

€ The modular nature of RESERVE's architecture allows any number of inspection views to be networked together to provide a complete inspection in an integrated user interface.

€ Diverse sensor integration is possible. BI has proven success with bright and dark field, transmissive, color and monochrome, visible, infrared and fluorescent methods.

€ RESERVE delivers the highest data rates in the industry without compromising inspection accuracy. Technology encompasses a combination of speed and defect detection with extremely low false positive rates.

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TRANSFORMING PERFORMANCE THROUGH MACHINE VISION

By leveraging machine vision technologies perfected for the defense, aerospace and industrial products industries, Boulder Imaging offers a growing suite of integrated systems and software that "Inspect the Unexpected™". From the manufacturing lines of flooring and ceiling tile producers to the precision printing of banknotes or rugged wind farm environment, our inspection technology provides revealing visual data for our clients.

SUPERIOR CUSTOMER SERVICE AND PROJECT DELIVERY

While we are proud of our technology, we are also passionate about our customer care. Boulder Imaging supports you as a trusted partner throughout the life of your business. Our staff is composed of some of the industry's most experienced software, optical, and mechanical engineers. Further complemented by highly qualified, versatile and experienced project managers, trainers and field application engineers, our staff acts as an extension of your team to help you every step of the way.

To learn more, visit our webpage at **www.boulderimaging.com** or email us at **sales@boulderimaging.com**.