

## Web Imaging



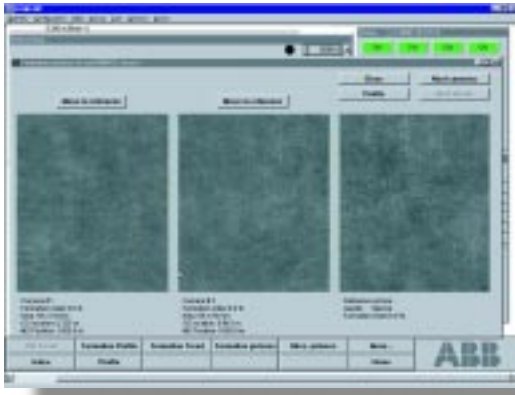
### Executive Summary

Ever increasing demands for printability and runnability in today's modern high speed converting processes is driving the need for higher and more consistent quality in the delivered roll good material.

Unquestionably, variations in formation are critical to the paper's overall properties and therefore is of great interest to the papermaker. Traditionally, papermakers have relied upon off -line formation analysis in the lab or light boxes on the machine floor. With these approaches, variations in formation could only be identified at reel turn-up and therefore corrective actions could only be taken every hour or so.

In addition, defective edges can cause runnability problems at winders and other subsequent processing stages. Tools have not been available up until now to monitor edges in real time.

ULMA NT*i* "Web Imaging" has been developed to give machine operators a powerful on-line tool to monitor both formation and edge condition within a single reel without the need for manual cut sample evaluation. The ULMA NT*i* provides a real time, "virtual light box" which gives the operator an on-line view of formation across the entire sheet.



Changes in formation caused by such factors as jet to wire ratio variation, refining and other process parameters can be immediately viewed with the ULMA NTi's web imaging snapshots

in real time. Now it is possible to capture "virtual sheets" and to immediately view formation on the system's video screen. ULMA also mathematically analyzes the optical values of the virtual sheets allowing the operator to quickly assess the formation in quantitative as well as qualitative terms, allowing an easy comparison between actual and desired formation quality.

ULMA NTi Web Imaging is part of the new ULMA Web Analyzer product family that is now providing papermakers unprecedented power for defect detection, analysis and advanced quality reporting. Web Imaging can be applied to all ULMA NTi systems that are equipped with the Defect Imaging basic package for transmission applications.

The ULMA NTi Imaging platform provides an architecture that future software product developments can be easily added to. These advanced products will increase system functionality, thereby securing the customer's Web Inspection System investment.

## ULMA NTi Web Imaging

### Description

Web imaging utilizes ABB's ultra high-speed smart CCD cameras to capture digital photographs of the web. The system automatically analyzes optical formation and compares it with reference data. Automatic or manual image triggering modes are available. ULMA cameras transmit the snapshots to the operator station where the images are viewed by the operators and automatically analyzed by the system's workstation. The Web Imaging feature can also be used as a high speed camera to take

photos of specific problematic areas of the sheet utilizing the manual triggering mode.

### Improved Process Feed Back

Formation snapshots provide a live view of the optical formation of the reel. Operators can immediately see formation deviations in CD as compared to the target level. Operators can witness the effects of control actions in real time and evaluate the effectiveness of these changes.

### Improved Quality

Improved on line information promotes better overall quality while enabling the operators to immediately correlate and fully understand formation control action/reaction scenarios. Shipped quality along with end user customer satisfaction can be elevated.

### Edge Condition Control

Edge sampling provides the operator real time information to evaluate edge trimming quality e.g. edge roughness or nonuniformity of the edge. This is an innovative new tool for immediate troubleshooting of edge conditions. No longer will the operator have to wait for complaints from the winder operator to take corrective action.

## System Architecture

Web Imaging is an optional software package for ULMA NTi systems already equipped with basic defect imaging. If included as part of a new system, the software will be pre-loaded and configured. Imaging ready ULMA NTi systems can be upgraded through a software update.

## Features

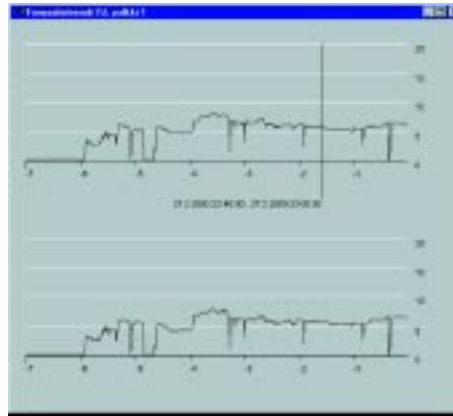
### Automatic Formation Snapshots

ULMA NTi automatically takes samples of the running sheet at the desired location inside the reel (defined by an adjustable parameter) and stores the results in system memory. The operator can retrieve this information at any time for viewing on the video screen to verify the results. Formation snapshots are presented from each camera across the web. The display also presents the target formation value for each grade. The operators can change target value (grade standard) by

selecting a new, alternative formation photo example as a new target value.

### Reel Formation Profile

The reel formation profile gives operators a quick view of the current formation situation based on formation samples across the web. This profile display provides information about the formation value at each specific sensor. The system automatically calculates the average formation value for the reel and a target value level based on reference picture.



### Manual Snapshots

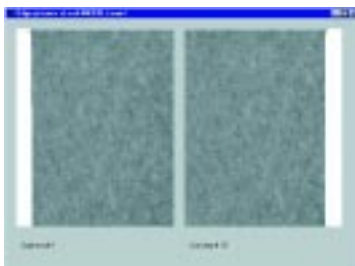
For normal day to day troubleshooting, ULMA NTi provides an excellent tool to monitor specific areas of the web. This manual snapshot feature allows operators to define a specific interesting area of the web for closer evaluation.



Multiple snapshots can be taken to monitor the specific area while evaluating corrective actions taken.

### Edge Pictures

Paper edge quality is critical for paper runnability. Variations in the edge can be monitored by the operator by capturing pictures of the paper edge for visually evaluation. Similar to formation, representative edge photos are also archived for later evaluation.



### Formation Signal Trends and Profile

All standard ULMA NT systems include a simplified formation tool that follows the basic formation signal changes across the web (profile) and in MD (trend). This feature gives a useful and complementary analysis to the advanced Web Imaging feature. Changes in formation level can be easily tracked back in time for troubleshooting purposes. Based on experience gained with high formation sheets like cigarette paper, this formation trend can provide extremely valuable information to the operators about sheet quality variations.

### ULMA iWeb Analyzer Product Family

These new features have been developed to give our customers additional value for their ULMA NT Web Inspection System investment. New advanced features are being continuously developed to create additional value for our ULMA NT Web Inspection System users. Future features will add functionality to the ULMA system and thus will give the customer possibilities to increase system performance without abandoning their initial investment. As requirements for quality inspection increase in the future, ABB's goal is to continuously develop new feature upgrades for the ULMA NT base platform to meet those demands.

ULMA **Web Imaging** is a complementary feature to Defect Imaging. ULMA NT Defect Imaging is a prerequisite for more advanced features like Web Imaging.

ULMA Web Analyzer package includes: *Defect Imaging, Web Imaging and SDI (Subtle Defect Imaging)*. Each feature is described in separate data sheets.

