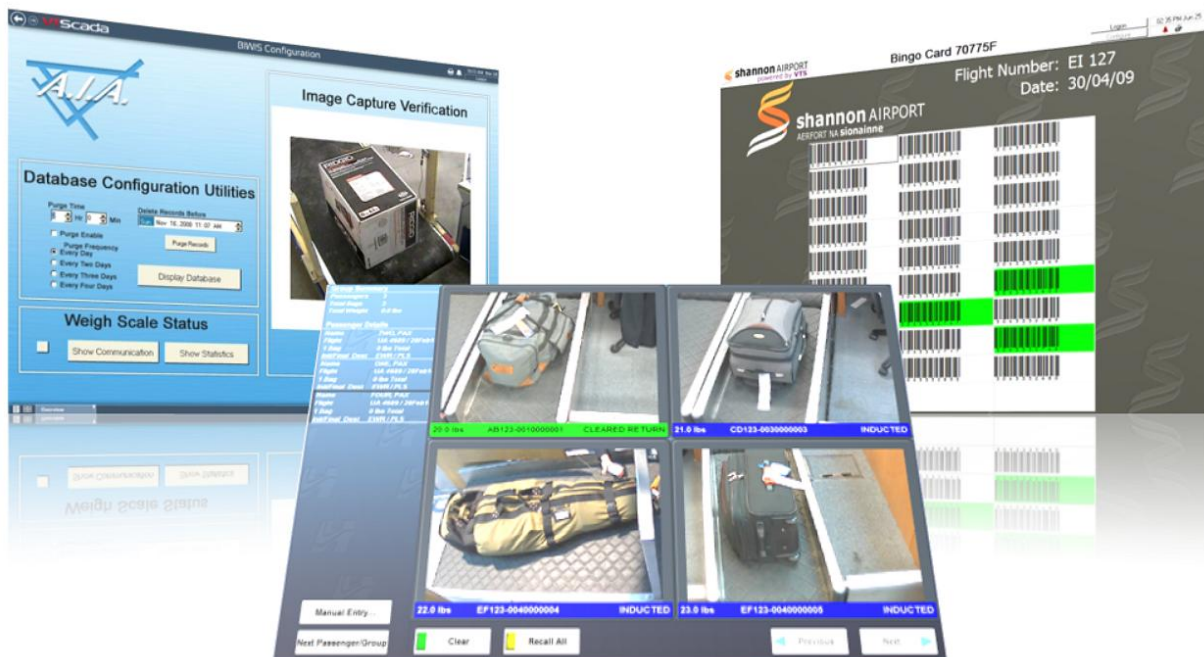# Trihedral

Airport Solutions

An overview of Trihedral's airport solutions developed using VTScada™, their commercially available off-the-shelf (COTS) monitoring and control software.

Baggage Image Weight Identification (BIWIS)

Air Traffic Control - Navigational Aid Monitoring

Baggage Handling System Monitoring

27 Years of Experience

Trihedral has sold over 6,000 copies of VTScada worldwide for use in numerous industries. The software is compatible with most industry standard protocols allowing Trihedral to provide integration services based on a variety of control hardware, such as Allen Bradley®, Siemens®, Omron®, GE®, Koyo®, and Control Microsystems®. Trihedral maintains several of the largest supervisory control and data acquisition (SCADA) systems in Canada.

- NAVCanada's Ground Navigation Aid Management System (described herein)
- Ontario Power's Niagara and Central Hydro Plant Groups
- The Canadian Broadcast Corporation's (CBC) National Alarm Center

Updated: May 12, 2014

Baggage Image Weight Information System (BIWIS)

For US Customs Pre-Clearance Facilities

US Customs and Border Protection (USCBP) officials use Trihedral's BIWIS application to help make informed decisions when admitting passengers attempting to enter the US at pre-clearance facilities located at foreign airports. The end result is increased security and a smoother and more efficient travelling experience for passengers.

The system includes direct high-speed interfaces to cameras and scales that collect baggage information of passengers travelling through the airport on their way to US destinations.

It displays summarized information for USCBP officers at primary inspection points to help them determine which passengers are candidates for secondary inspections.

Highly-Scalable Architecture - Systems have been designed with as few as two client interfaces and as many as 60. The architecture is easily expanded to support direct interfaces with baggage handling systems and other airport data management systems. Like all VTScada-based applications, this system supports full-system redundancy, automatic failover, and online configuration. The open-architecture of VTScada also allows for seamless integration with baggage conveyance control systems.

USCBP Acceptance - The VTScada BIWIS system was accepted for use by US customs officers after demonstrating compliance with the stringent performance and privacy standards set out by US Customs and Border Protection.

Passenger Privacy - The system erases baggage data automatically according to a set schedule. Configuration changes can only be made by authorized system administrators with valid user accounts and passwords.
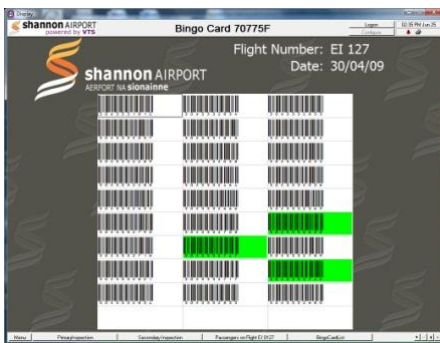
## BIWIS Applications In Focus

Shannon International Airport
Shannon, County Clare, Ireland

- 16 primary officers workstations, 2 secondary
- 3 supervisor and 3 general aviation workstations
- 47 baggage induction points, 5 baggage reconciliation points
- 2 SCADA servers on a high-availability VLAN network
- BA001 preclears - Former old Concorde flight designator
- "Bingo Card" retrieval system helps baggage hall staff easily locate and remove bags selected for secondary inspection

Stanfield International Airport
Halifax, Nova Scotia, Canada

- 6 primary officer workstations, 3 secondary, and 4 baggage induction points
- 2006 VTScada BIWIS system enhanced in 2014
- At check in, the system imports Baggage Source Messages (BSMs) from airlines via the airport's message broker system
- During induction, the system adds bag weight and photos to baggage record
- Publishes Baggage Processed Messages (BPMs) for easy tracking and retrieval of bags throughout the system
- Automatically tracks bags for flight changes, transfers, and standby passengers
- Quick Connect Station controls flow of transfer passengers entering US customs
- Statistical reports including baggage tracking, lookup, and throughput
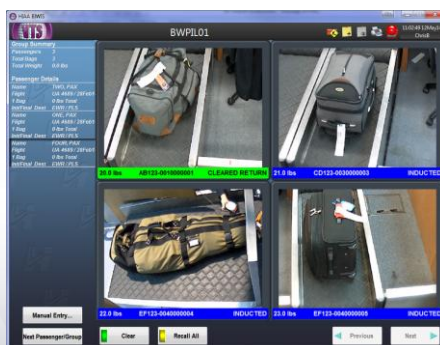
Air Traffic Control Management

Navigational Aid Monitoring

VTScada uses VTScada to develop systems that monitor the status and health of various kinds of standalone equipment designed to provide critical information to air traffic control systems.

Applications In Focus

NAVCanada

This nationwide Air Traffic Control Instrumentation monitoring and control application for NAVCanada includes:

- Six regional VTScada applications located at Vancouver, Winnipeg, Toronto, Montreal, Moncton, and Gander
- A technical training application in Kingston
- A centralized configuration admin application at Ottawa Tech center
- A centralized data collections and storage application, located at NAVCanada's National office
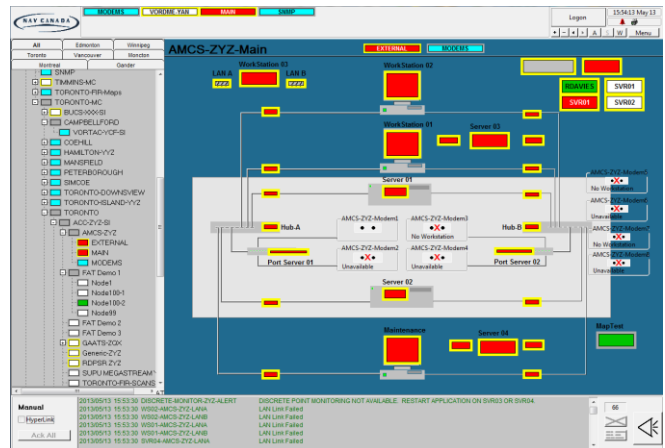
Regional Operations Centers - Local systems interface with Staticraft ILS® and runway lighting systems, radar systems, UPS and genset controllers, Monco runway glidepath and guidance systems, and Marconi® VOR systems. System alarms are disseminated via NAVCanada's internal paging system.

Reliable System Architecture - All applications are autonomous but maintain connectivity for data transfer. Each regional system consists of two redundant application servers, two I/O servers and three workstations. Network availability and traffic are monitored using the VTScada SNMP driver.

Time-Saving Templates - To maintain consistency across applications, each system is built upon a standardized software toolset layer, including customized communications drivers, graphics, functions, and other elements. This toolset is maintained and expanded by Trihedral. Updates are sent to NAVCanada for testing and deployment.

Maximo® Support - The system integrates with NAVCanada's national Maximo installation, initiating work order requests via Web Services. VTScada stores work order numbers, to be used by operators to launch the Maximo client interface.

Kuala Lumpur International Airport
Kuala Lumpur

- Expanded to include new runway #3
- Navigational Aid Monitoring
  - Doppler VHF Omni Range (DVOR) radar
  - Instrument Landing System (ILS)
  - Glide Path
  - Localiser
- Environmental Monitoring of Equipment Rooms
- Heating, Ventilation and Air Conditioning (HVAC)
- Flight Data Processing System (FDPS)

## Changi International Airport
Singapore

- Integrator Lee Dickens created VTScada-based "Sitewatch" monitoring and control system
- Sitewatch monitors Navaid equipment on two islands
  - Doppler VHF Omni Range (DVOR) radar
  - Distance Measuring Equipment (DME)
- Dual VHF radio links to each island ensure high availability
- Operators access Navaid sites from geographically separated Fault Control Room and Navaids Repair Center
- Control tokens ensure one center controls each site at a time

Baggage Handling System (BHS) Management Information System

Stanfield International Airport
Halifax, Nova Scotia, Canada

Trihedral developed and installed a centralized monitoring system for the Halifax International Airport Authority, providing monitoring of the airport's domestic and international baggage handling systems. The system includes fully redundant server/client computer architecture with data storage to ODBC-compliant databases for external reporting software access. Networked clients utilize the VTScada Internet Client, which is a fully-functionality Microsoft ActiveX® control available as part of the VTScada software suite. Client views are shown below.
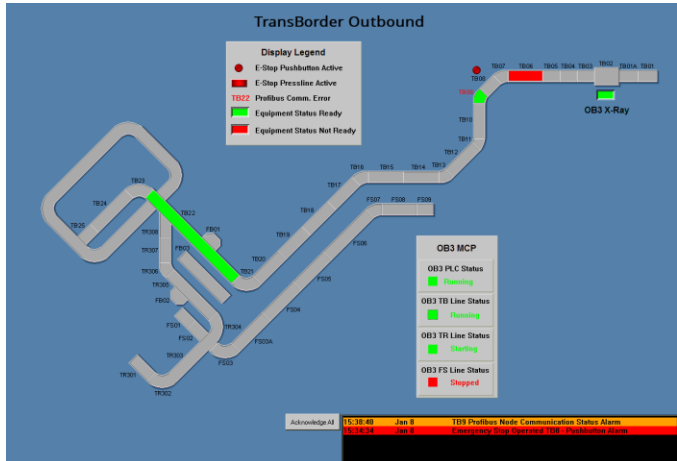
The system monitors 1,600+ values from conveyor, diverter/pusher, fire and security door, and X-ray equipment. PLC communications are via Siemens S7-400 series and Allen Bradley 5 series, and SLC series PLCs. All control device connectivity was made redundant by converting serial PLC connectivity to Ethernet.

Various components of the system are displayed across 17 display screens. Screens are navigated using simple menus and submenus. Additionally, buttons along the bottom provide single-click access to frequently used screens.

Alarms and events are automatically color coded to match predefined levels of priority (i.e., red = critical alarm, orange = high alarm). The color of each alarm/event is then recorded in an alarm/event history list. Furthermore, a dynamically updated alarm list is placed at the bottom of all screens. Additionally, a full screen alarms list allows filtering by priority, sorting by time or area (i.e., sub-system), acknowledging, silencing, muting and printing of alarms.

The VTScada report generator tool allows reports of alarms/event lists and screen shots to be printed from any server or Internet client computer running the application.

User profile data will be stored in VTScada's encrypted security manager database.

VTScada used a unified security system across all servers, clients, and Internet clients. Security is privilege based, allowing each user's account to be 'tuned' to his/her specific needs. Security changes populated immediately and network wide, extending to all clients and Intranet clients. Additionally, Intranet client activity can be monitored closely, allowing administrators to remotely disconnect users as necessary or to send messages to users, informing them of planned network service interruption or pending disconnections.

For More Information

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