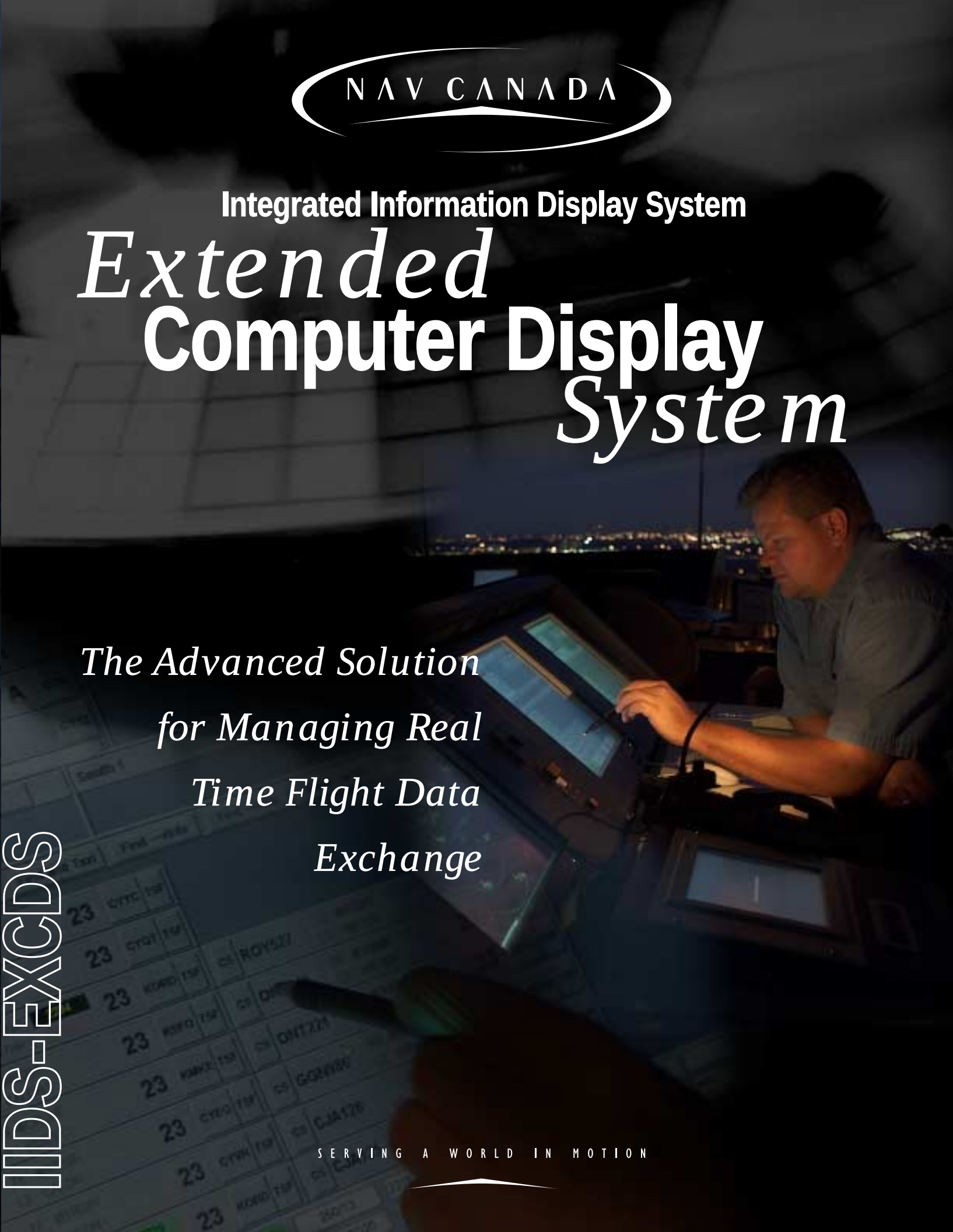

NAV CANADA

Integrated Information Display System

Extended Computer Display *System*

The Advanced Solution for Managing Real Time Flight Data Exchange

IIDS-EXCDS

SERVING A WORLD IN MOTION

Integrated Information Display System

Extended Computer Display System

(IIDS-EXCDS)

An Integrated Approach To Air Traffic Control

Modern Air Traffic Control (ATC) requires the controller to have fast, reliable and easy access to a wealth of information. This requirement has driven the development of modern air traffic control systems, placing heavy demand on controller workspace and attention. NAV CANADA has responded to this challenge in a unique and practical manner - by integrating ATC applications into one display system.

Today, NAV CANADA's cornerstone air traffic control system for control towers, terminals and area control centres is the Integrated Information Display System (IIDS) and its associated applications. IIDS is a broadly capable system of modern computing hardware and proven air traffic control software that provides controllers with the ability to view, manipulate and manage air traffic data.

SYSTEM OVERVIEW

IThe IIDS system hosts ten different software applications and is easily expandable. Each of the ATC (Air Traffic Control) applications presents information in its own window that can be sized, moved or hidden depending on controller preference and operational need. These applications are engineered and certified to meet individual application requirements without affecting the stand-alone performance of other integrated systems.

- *Extended Computer Display System (EXCDS)* is a non-verbal tower-terminal coordination system, transforming the control tower and the terminal control into a "paper-free" operation.
- *Computer Visual Information Display System (CVIDS)* displays approach charts, maps, manuals and other graphical material.
- *Operational Information Display System (OIDS)* displays airport and meteorological data, navaid status and approach information.
- *Air Traffic Flow Management System (ATFM)* displays flow status information, bedpost and runway data, and provides flow messaging.
- *NAV CANADA Radar Display System (NARDS)* is an advanced PC-based radar display system that includes the Converging Runway Display Aid (CRDA).
- *Clearance Delivery List (CDList)* displays oceanic, clearance delivery information from the Gander Automated Air Traffic Control System (GAATS).
- *Power Terminal (PT32)* is the terminal interface from GAATS.
- *Airfield Lighting Control System (ALCS)* controls airfield and stopbar lighting.
- *NAV CANADA Aircraft Movement System (NCAMS)* records aircraft movements for billing, statistical and information purposes and sends these movements via email to the requesting agencies.
- *Digital Automatic Terminal Information Service (D-ATIS)* records airport-specific information in digital format and sends the information via ARINC protocol to the cockpit.

A combination of requirements - including the need for high performance, reliability, low cost supportability and a substantial inherent growth capability - led NAV CANADA to design IIDS around proven Commercial Off the Shelf (COTS) products. IIDS uses modern PC and workstation technology to achieve high performance. Yet, because of its design, it is highly flexible and scalable, permitting low-cost inclusion of new technologies as they are proven and certified.

IIDS is currently in operational use in seven Area Control Centres and in the busiest air traffic control towers in Canada. EXCDS, the paper-free flight data system is operational in Toronto, Ottawa, Winnipeg, Edmonton, Calgary and Vancouver. In the new Toronto Pearson Control Tower, IIDS is the backbone of a totally "glass" operation.

EXCDS ground control position integrated with CVIDS

IIDS with applications at night

A PREMIER APPLICATION - THE EXTENDED COMPUTER DISPLAY SYSTEM (EXCDS)

The premier software application of IIDS is NAV CANADA's Extended Computer Display System (EXCDS). EXCDS is an air traffic control system that provides electronic flight data transfer and co-ordination, transforming the tower and terminal control into a "paper-free" operation.

Among its many functions, EXCDS automates tower data workflow, provides transfer and coordination of flight data between internal and external agencies, and provides peer visibility of flight data among users. Examples of these particular features include the negotiation and display of departure slot times between a tower and a centre, the negotiation of route swapping due to delays and/or weather, or the coordination of real time flight data with airport authorities for gate or de-icing operations.

EXCDS also provides non-voice communication and coordination between tower positions and associated terminal and enroute sectors. EXCDS allows the ATC user to fully manage all flight data within their own jurisdiction faster, and with less heads-down time than with a paper strip system.

With continuous improvements to the capabilities and functionality of the system, EXCDS has demonstrated the key characteristics required of modern air traffic control systems - reliability, adaptability and scalability

EXCDS touch screen

EXCDS

FEATURES	BENEFITS
An extremely adaptable Computer-Human Interface using a touch screen with colour, flashing and advanced graphical representation	• EXCDS adapts to the needs of the ATC operation, rather than the operation adapting to use EXCDS. • Controllers are able to assess the changes to data and quickly determine its impact. • System interaction is economical in movement and time. • Less "heads down" time in the tower. • High controller acceptance.
All transactions recorded on an advanced database platform	• Aircraft movements are easily retrieved from a commercial database for billing, movement reporting, statistical or other purposes. • Taxi times, delays and other information are available for viewing.
Pre Departure Clearance (PDC) Interface	• Relieves congestion of Clearance Delivery frequencies. • Provides hard copy printout of IFR clearance to the cockpit.
Modular ATC applications	• Designed with modular architecture that permits upgrades on a component basis, rather than requiring a complete system upgrade. • Allows for quick replacement of hardware with minimal disruption.
A PC-based system with Windows NT, standard COTS components and IP net-working	• Lower cost than a similar UNIX-based solution. • Has a greater variety of off-the-shelf hardware & software for integration into a Windows NT system. • Reduces need for customized training for support personnel.
Local Area Network (LAN) and Wide Area Network (WAN) Implementation	• EXCDS operates today over an IP Wide Area Network. ATC units requiring the exchange of flight data can be located remotely.
Proven reliability and performance	• Designed to operate on a 24/7 basis. • Has been in operation for more than two years at Toronto, NAV CANADA's busiest control tower with more than 2,000 itinerant departures and arrivals per day. • In Toronto, the system operates over two Wide Area Networks (WAN) and on more than 100 workstations.
System includes application and system health monitoring and redundancy	• Has enhanced application monitoring. • Servers operate in a hot-standby configuration on a dual redundant diverse network for enhanced system reliability. • Software is designed for fault tolerant operation. • Dual LAN operation.
Includes a graphical editor for system adaptation as well as detailed documentation and user's manuals	• System can easily be adapted to the operation with the included adaptation tools.
ISO 9002 compliant IIDS-EXCDS training courses	• Three separate training streams (technical, operations and adaptation) have been developed and are available for delivery.
System and Software Certification	• The IIDS-EXCDS system is certified for ATC operational use by NAV CANADA's Engineering Management Quality System's three-step certification process.

SYSTEM ARCHTECTURE

IIDS-EXCDS is an open, scalable system developed using Commercial-Off-The-Shelf COTS) products. Based on high performance n-tier architecture, IIDS-EXCDS provides extensibility, application performance and fault tolerance. The system configuration is flexible and can be tailored easily to meet air traffic control requirements in any environment.

Hardware

Workstation

- Pentium processor based
- 256 MB SDRAM
- 20 GB hard drive
- Matrox G450 dual head video card
- Dual head NIC

Server

- Pentium processor based
- 512 MB SDRAM
- Dual 20 GB SCSI hard drive in RAID configuration
- Matrox G450 dual head video card
- Dual head NIC

Network

- Dual redundant switch based networking
- 100 BASE-T switches
- Cisco-based IP routing

Monitors

- NEC 2110 (1600 x 1200 resolution)
- Touch screen, mouse or keyboard operation
- Multiple monitor capability
- Highly adaptable Human-Machine Interface

Software

- Windows NT
- Microsoft Visual C++
- All data transactions recorded with Microsoft SQL server

Integrated Information Display System - Extended Computer Display System

FOR FURTHER INFORMATION

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A demonstration video is available on request.

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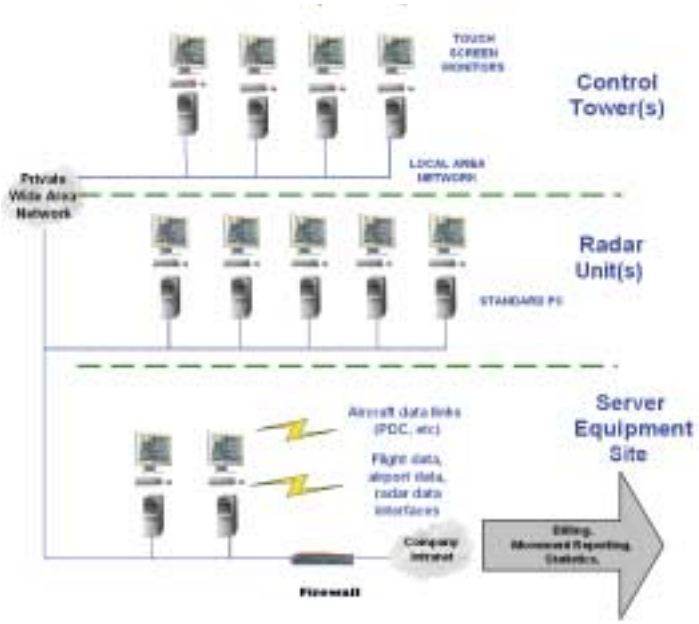
Également disponible en français.

IIDS NETWORK



Typical IIDS system depicting an EXCDS configuration

Centre IIDS console with EXCDS at the Toronto Pearson Control Tower

IIDS-EXCDS

Integrated Information Display System - Extended Computer Display System