

# TECHWATCH Bulletin

NAV CANADA

Edition 20

September 2006

<b>PART I: SYSTEMS, EQUIPMENT AND FACILITIES</b> .....	<b>1</b>
GFDPS (GANDER FLIGHT DATA PROCESSING SYSTEMS) .....	1
• GAATS (Gander Automated Air Traffic System) .....	1
• GAMES (Gander-AFTN Message Extractor System) .....	2
• GEM (GAATS Error Monitor) .....	2
SASS (SCHEDULING AND SEQUENCING SYSTEM) .....	2
FIMS (FSS INFORMATION MANAGEMENT SYSTEM) .....	3
ASDE (AIRPORT SURFACE DETECTION EQUIPMENT) .....	3
MDS/MLAT (MULTILATERATION DISPLAY SYSTEM) .....	4
SLI (SECONDARY LINK INTERFACE) .....	5
NAVCAN STAR .....	7
AWWS (AVIATION WEATHER WEB SITE) .....	8
FIC (FLIGHT INFORMATION CENTRE PROJECT) .....	9
<b>PART II: PROCEDURES</b> .....	<b>9</b>
AREA NAVIGATION (RNAV) STANDARD DEPARTURE/ARRIVAL ROUTES (SIDS & STARS) .....	9
ANS PLAN 2005 .....	10

For further information contact [service@navcanada.ca](mailto:service@navcanada.ca)

## **PART I: SYSTEMS, EQUIPMENT AND FACILITIES**

### **GFDPS (Gander Flight Data Processing Systems)**

- **GAATS (Gander Automated Air Traffic System)**

**Description:** The Gander Automated Air Traffic System (GAATS) and the Situation Display (GSIT) are used to assist in the control of aircraft over the North Atlantic. Flight plans are stored in GAATS, strips produced on a timely basis, and conflict detection performed based on a current weather model. GAATS automatically sends initial oceanic clearances via ARINC to pilots and exchanges flight data with other North Atlantic States via ground/ground data link. GSIT provides Oceanic controllers with a graphical depiction of the traffic, and advanced functions, like Automatic Dependent Surveillance (ADS) and Controller Pilot Data Link Communications (CPDLC), for traffic management.

Current GAATS Software: GAATS 22.4F

**Customer Benefits:** With GAATS controllers are able to provide the most efficient routes across the North Atlantic saving fuel costs for each flight. Aircraft with the capability to provide ADS position reports reduce the load on the HF

communications network. As a result they receive a reduction in their HF voice communications charges.

- **GAMES (Gander-AFTN Message Extractor System)**

**Description:** GAMES is a PC based system which interfaces between GAATS and AFTN. GAMES is used by the support staff (ATOS), and performs the following functionality:

- Extraction of data from an FPL message received on AFTN and automatic entry into GAATS.
- Processing of all messages received on the AFTN circuit with appropriate alerting and printing capabilities.
- GAMES is the main system used by Gander ACC to transmit messages on AFTN.

Current GAMES Software: GAMES 6.6

**Customer Benefits:** Provides controllers with timely flight data enabling the efficient management of air traffic. It is being used operational in Toronto and Winnipeg.

- **GEM (GAATS Error Monitor)**

**Description:** GEM is a PC based system developed in-house by Nav Canada and was successfully implemented in November, 2005. Its main role is to improve the error monitoring and corrective action process performed by the ATOS group. GEM is connected to GAATS through a number of ports. Using a system of queues, visual and audible alarms, the ATOS are better able to monitor and action errors in a timely manner. Site adaptation allows Gander to determine queue contents, sorting, and priority alerting criteria.

Current GEM Software: GEM 1.1

**Customer Benefits:** Provides better monitoring of system errors and problems enabling quicker intervention and increasing the availability of systems critical for efficient management of air traffic.

**Contact, Ed Warren ([warree@navcanada.ca](mailto:warree@navcanada.ca)) , Flight Data Processing Specialist, ATS, (613) 248-7107**

**SASS (Scheduling and Sequencing System)**

**Description:** SASS is a computer-based system used to maximize airport efficiency and deal with traffic surges through automation of sequencing and scheduling of arrival traffic. It assists air traffic management controllers in allocating available airport landing slots and minimizing delays. It also provides the capability

to apportion potential delays from enroute fixes to the landing runway at times when demand exceeds capacity.

**Customer Benefits:** SASS will improve domestic air traffic management by maximizing airport efficiency, minimizing customer delays and reducing the airlines annual operating expenses. It is undergoing Operational Readiness Demonstration in Toronto and Vancouver

**Contact, Larry Everett ([everetl@navcanada.ca](mailto:everetl@navcanada.ca)) , Flight Data Processing Specialist, (613) 248-6875**

### **FIMS (FSS Information Management System)**

**Description:** The FSS Information Management System (FIMS) is designed to provide flight planning, alerting, weather briefing, and aeronautical information to Flight Service Specialists located at Flight Service Stations and Flight Information Centres. FIMS will replace the Multi-Purpose Information Display System (MIDS) and FSS Weather Graphics System (FWGS) with an integrated and scalable system that includes additional functionality such as electronic flight data strips, an interface to NCAMS and an advanced sectorization capability. To mitigate risks associated with fielding the complete FIMS system, the initial FIMS will be delivered in three milestones;

Milestone 1: components required for the provision of Aviation Briefing Service

Milestone 2: components required to support flight planning and alerting service

Milestone 3: electronic flight strips and advanced connectivity with CAATS

**Customer Benefits:** Improved service delivery through more advanced briefing and flight planning tools. Continuity of service and reduction in system support costs by replacing aging computer equipment.

#### **Implementation:**

M1 North Bay FIC – Fall 2006

M2 North Bay FIC – Spring 2007

M3 North Bay FSS – Winter 2007

National rollout commence - 2008

**Contact, John Moir ([moirj@navcanada.ca](mailto:moirj@navcanada.ca)) , Implementation, OSR, (613) 248-7503**

### **ASDE (Airport Surface Detection Equipment)**

**Description:** The new Park Air X Band Airport Surface Detection Equipment (ASDE) is installed at nine sites across Canada. It provides Tower controllers with a

RADAR picture of the manoeuvring areas of the airport in all weather conditions. Integrated with the ASDE is a Runway Incursion Monitoring and Conflict Alert System (RIMCAS) which can be adapted to provide different levels of warning for various operational scenarios, such as:

- Runway incursions from taxiways
- Arrival runway alerts
- Departure runway alerts
- Arrival/Departure alerts
- Taxiway conflict alerts
- Restricted area alerts

The RIMCAS depends on the ASDE to track primary targets. It does this without the use of any type of co-operative sensor, i.e. a transponder. This reduces the functionality to a degree but this can be enhanced with the use of Multilateration Display Systems (MDS/MLAT) and/or a Vehicle Tracking System (VTS). Other limitations of the ASDE primary RADAR system can also be alleviated with the use of these systems, such as false or “multipath” returns and clutter produced by natural objects and various weather phenomenon. These cooperative systems are in place in many other airports worldwide and are being tested for NAV CANADA installations.

**Customer Benefits:** These systems greatly enhance safety and provide all weather guidance and control for aircraft and vehicles on the airport manoeuvring areas. They can also provide assistance to ramp management controllers when the airport authority coordinates for the display of this information at their ramp management facilities.

**Implementation:** The new Park Air ASDE program is complete in Toronto, Calgary, and Vancouver and undergoing acceptance testing in St. John’s, Halifax, Quebec City, Montreal, Ottawa, and Winnipeg.

**Contact, Lanny Beischer ([beischl@navcanada.ca](mailto:beischl@navcanada.ca)) , Manager, Surveillance Systems, (613) 248-7227**

### **MDS/MLAT (Multilateration Display System)**

**Description:** An MDS/MLAT system is a high performance and cost-effective source of position and identification data on transponder equipped aircraft and vehicles on an airport. It can also be used to provide enroute and terminal control in areas where it is difficult to site, or justify economically conventional radar technology. The system detects and tracks aircraft and vehicles equipped with Mode S, ATCRBS and Automatic Dependent Surveillance – Broadcast (ADS-B) transponders. It is being considered as an augmentation system for our new park Air ASDE’s. Currently NAV CANADA uses prime radar as the sole sensor for our ASDE systems, which has limitations due to the technology in use, i.e. we have trouble in snow conditions, and along edges of manoeuvring areas due to ground

clutter and reflections. NAV CANADA is presently testing an MDS/MLAT system in Calgary for enhanced airport control and terminal control in the Springbank area. We have tested a MDS/MLAT in Toronto with excellent results.

**Customer Benefits:** These systems will provide accurate positional information for all vehicles and aircraft equipped with a cooperative transponder. This will provide even higher levels of safety and greatly enhances the information which can be provided to ATC and the users, where coordination and agreements are in place.

**Implementation:** Enroute systems are being evaluated for the northern airspace not already covered by conventional radar technology. Advanced studies are progressing for other uses such as Calgary/Springbank, Fort St. John, Sioux Lookout and the Vancouver Harbour area. NAV CANADA is also looking at proposals at the four major airports for fusion MDS/MLAT with the existing ASDE systems.

**Contact, Lanny Beischer ([beischl@navcanada.ca](mailto:beischl@navcanada.ca)), Manager, Surveillance Systems, (613) 248-7227**

### **SLI (Secondary Link Interface)**

**Description:** NAV CANADA is adding a layer of telecommunications redundancy to selected remote radio transmitter/receiver sites, thereby helping to ensure users continue to receive preferred routes and altitudes, even if we experience commercial telecommunications outages. There are currently a number of remote radio sites throughout the country, called PALs for Peripheral Audio Links, which have limited or no telecommunications circuit diversity. These PALs allow a controller in the Winnipeg Area Control Centre, for example, to have direct communications with an aircraft operating in the area of Churchill. Normally, the last link to a PAL is serviced by a single source commercial landline or microwave facility and therefore, diversity is not available from the last central telecommunications office (CO) to the remote site. Other sites have only one landline link for a certain distance because the telecommunications service provider cannot provide a commercially viable second line. The sites affected tend to be remote and as such, response time for service/repair is slow and usually delayed. The results of a breakdown or failure of the single link are possible delays and reductions in preferred routes and altitudes. Without direct communications aircraft need to be restricted to specific routes/tracks, and they may not get a requested altitude change.

The following sites are currently equipped with this technology:

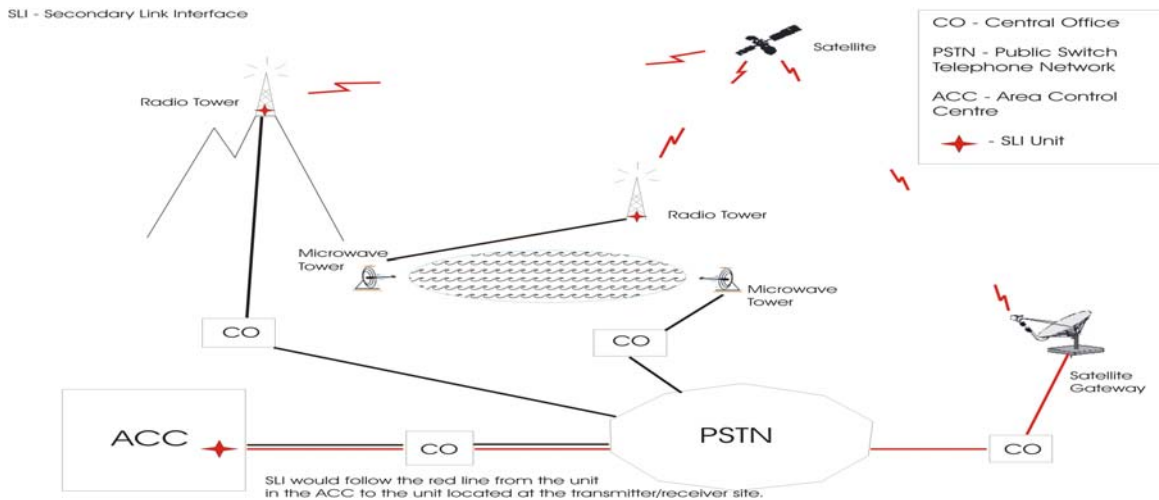
VR ACC, Sandspit, B.C. - 133.4	WG ACC, Ogoki Post, ON - 135.47
EG ACC, Lynn Lake, MB - 133.0	WG ACC, Marathon, ON - 134.07
EG ACC, Thompson, MB - 134.5	QX ACC, Stephenville, NL - 132.3

EG ACC, Churchill, MB - 123.9	QX ACC, St. Anthony, NL - 134.3
EG ACC, Trout Lake, ON - 133.6	QX ACC, Goose Bay, NL - 133.425
EG ACC, Ogoki Post, ON - 132.6	QX ACC, Trepassey, NL - 134.7
EG ACC, Peawanuk, ON - 124.3	QX ACC, Hopedale, NL - 128.325
EG ACC, Island Lake, MB - 134.35	YZ ACC, Bellevue, ON - 134.425
WG ACC, Swift Current, SK - 132.8	YZ ACC, Barrie, ON - 124.675
WG ACC, Lynn Lake, MB - 135.05	UL ACC, Mont Laurier, QC - 126.575
WG ACC, Island Lake, MB - 132.82	UL ACC, Puvirnituk, QC - 134.725

**Customer Benefit:** The SLI, which has been developed by NAV CANADA, provides an emergency link to a PAL via either a public switched telephone network (PSTN) or a satellite dialup network (SDN). The system enables air traffic controllers to continue to communicate with pilots over the functioning PAL in the event of main communications link failure.

**Implementation:** Over thirty sites are currently installed across the country with another thirty installations expected over the next two to three years. The majority of new PAL installations will include an SLI as well.

VR ACC, Bruce Peak, BC - 133.85	EG ACC - Rankin Inlet - 134.0 MHz
VR ACC, Kamloops, BC - 134.4	EG ACC - Cambridge Bay – New PAL installation
VR ACC, Mt Wallensteen, BC - 133.5	EG ACC, Watt Mt., AB - 132.15
VR ACC, Mt Wallensteen, BC - 135.5	WG ACC - Thunder Bay - 133.25 MHz
VR ACC, Port Hardy, BC - 132.2	WG ACC, Lloydminster, AB - 132.375
VR ACC, Prince Rupert, BC - 128.0	WG ACC - Swift Current - 134.975 MHz
VR ACC, Bruce Peak, BC - 133.95	WG ACC, Thompson, MB - 133.15
VR ACC - Castlegar, BC, 134.2 MHz	YZ ACC, North Bay, ON - 121.225
VR ACC - Burns Lake, BC, 128.8 MHz	YZ ACC, Sudbury, ON - 135.5
VR ACC - Bruce Peak 125.95 MHz	YZ ACC, London, ON - 135.3
VR ACC - Kamloops - 132.35 MHz	YZ ACC, Timmins, ON - 128.3
VR ACC, Prince George, BC - 133.8	YZ ACC, Sault Ste. Marie - 132.65
EG ACC, Coral Harbour, NT - 133.7	UL ACC, Puvirnituk, PQ - 134.725
EG ACC, Baker Lake, NT - 133.4	UL ACC, Kuujuuaq, PQ - 132.45
EG ACC, Lupin, NWT - 134.2	QX ACC, Allen's Island, NL - 124.05
EG ACC, Stony Rapids, SK - 133.075	QX ACC, Stephenville, NL - 132.3
EG ACC - Mayo, YT, 124.15 MHz	QX ACC, Wabush, NL - 134.0
EG ACC, Whitehorse, YT- 132.1	



## NAVCAN STAR

**Description:** NAVCAN STAR is a computer-based system that will be employed, as an interim measure, in the provision of satellite voice communications between select ATS units and appropriately equipped aircraft. Originally designed as an in-house solution by some enterprising individuals in Montreal ACC, stewardship of this system has been assumed by ATS OSR and CNS Engineering for further development and national implementation.

The NAVCAN STAR computer will listen for message traffic on AFTN and then track and store flight plan messages which contain critical information needed for completing the satellite telephone call. A query is entered into the system by the operator and, after a computer search of the database is complete and the desired aircraft found, the operator is offered the option of completing the call. If this option is selected the 34 character telephone number is automatically dialed.

NAVCAN STAR will be deployed to Gander, Edmonton and North Bay in the near future to support an international trial set for the North Atlantic (NAT) Region as well as a northern organized track structure (NOR OTS) trial in Canada's high north.

The long term solution to NAV CANADA's Satcom voice needs will see the incorporation of a satellite communications capability into all ACC voice switches. A 'Request For Proposal' has been issued to the voice switch manufacturer and their response is expected shortly. Full implementation could come within a year of placing the order.

**Customer Benefits:** Customers will benefit from having access to more reliable communications and be less reliant upon marginal HF radio services. Originally the satellite voice telephone capability was employed to establish (or re-establish) contact between controllers and an aircraft once all other communications options had been exhausted. Soon, however, a significant expansion of this capability will be required to support increased voice traffic when trials commence over the NAT Region and in the high north that are intended to prove the viability of the

operational satellite voice telephone concept as a mainstream communications method, supplanting HF as the primary communications tool for those regions outside of VHF coverage. This capability is also intended to complement future developments such as Controller-Pilot Datalink Communications (CPDLC) and will help furnish the tactical voice component of ATS communications. NAVCAN STAR has been developed to supply the means for ATS to meet these needs.

**Contact, Barry Winch ([winchb@navcanada.ca](mailto:winchb@navcanada.ca)) , Manager, Communications & Facilities, (613) 248-6979**

### **AWWS (Aviation Weather Web Site)**

**Description:** The Aviation Weather Web Site is a reliable online service which is provided at no direct cost to aviation clients. The web site provides pilots and dispatchers with flight planning information (Weather, NOTAM, some publications, and a flight plan filing capability). The system also allows users to receive this information via e-mail on their own schedule. Today, there are 22,000 registered users of which 2,800 are also registered to file flight plans online.

**Customer benefits:** The Aviation Weather Web Site is a convenient, time-saving service which meets the basic flight planning needs of aviation users, thereby reducing demand for routine updates and briefings from FIC's.

**Implementation:** Future plans include the gradual addition of the following features over the next one-to-five years:

- Add new graphic products such as the Local Graphic Forecast (LGF) for the West coast (VFR) (2006)
- Add a "AWWS NEWS" banner where adhoc information pertinent to pilots and dispatchers will be displayed.(2006)
- Add "Live RVR" for 29 Canadian airports (as a start) (Winter 2006/2007)
- Modify products for a "print friendly" format; (2006)
- Add the ability to navigate back without using the browser "back" button; (2007)
- Improve FD's display and selection (2006/2007)
- Design a "mouse-over" capability for the GFA, where location names, METAR/SPECI and TAF will appear when a user's mouse cursor touches a reference point; (2007)
- Add weather camera imagery as new sites are installed across the country.( 8 more to come in British Columbia as well as 1 in Nova Scotia)
- Add a looping capability for radar imagery ; (2007/2008)

**Contact, John Foottit ([john.foottit@navcanada.ca](mailto:john.foottit@navcanada.ca)) , Manager Aviation Weather Services, (613) 563-5603.**

## FIC (Flight Information Centre Project)

**Description and Customer Benefit:** The Flight Information Centre Project (FIC) is seeing flight information services such as pre-flight weather briefings, flight planning and en-route radio communications centralized across Canada into eight facilities.

**Implementation:** In order to ensure consistent service delivery at all times, the FICs have been implemented progressively in two phases. The first phase saw Flight Information Centres established at Halifax, Quebec, London, Winnipeg, Edmonton and Kamloops. The second phase involves implementation of the two northern Flight Information Centres of North Bay and Whitehorse. North Bay Operations has moved to the new DND facility, and is operational with all the new systems and equipment. The implementation of Yellowknife was reviewed and a decision to consolidate Yellowknife operations to North Bay was announced in May 2006. The Yellowknife operations will be transferred in two stages one in November 2006 and the other during January 2007. The implementation of Whitehorse is scheduled for the fall of 2007. The work involved for the northern FICs is primarily the installation of new systems and equipment in order to be brought up to current FIC standards.

**Contact:** Roger Brown ([service@navcanada.ca](mailto:service@navcanada.ca)) , Manager Airport Operations Systems, 613-248-7172.

## **PART II: PROCEDURES**

### Area Navigation (RNAV) Standard Departure/Arrival Routes (SIDS & STARS)

**Description:** RNAV procedures allow aircraft to transition between an airport and the enroute structure on pre-determined routes which are programmed into the aircraft Flight Management System. The FMS provides information and guides the aircraft under the control of the pilot. These procedures are called SID and STAR RNAV procedures.

**Customer Benefits:** RNAV procedures offer a multitude of benefits for all. It is a win-win operation. There is a greater pilot awareness, less voice communication between pilots and controllers, better fuel efficiencies as well as a reduction in noise exposure and fuel emissions.

**Current Situation:** There are fifty-two (52) published RNAV STAR procedures in Canada located at fourteen airports including three in Hamilton which are connected to RNAV approaches. The Hamilton procedure represents the first time that aircraft flying an RNAV STAR can transition to an approach system without the need for ground-based navigation aids. The STAR procedures are for public use and are published in the CAP. It is NAV CANADA's intent to introduce RNAV STAR procedures at more domestic airports.

RNAV SID trials are on-going at the Pierre Elliott Trudeau Airport in Montreal. These trials started in the summer of 2004 and American Airlines is currently the main participant. The YUL SID trial is being expanded to include aircraft that have DME/DME/IRU equipment with automatic runway updating. Three other carriers have shown interest and may soon participate in the trial.

RNAV SID procedures are being developed for the Lester B. Pearson International Airport in Toronto. Already established to meet this goal is a Greater Toronto Airport Authority RNAV SID Working Group. Members of this working group include staff from GTAA, TC, Air Canada and NAV CANADA. This group will focus on the development and implementation of RNAV SID procedures at Toronto's LBPIA. The Vancouver terminal/enroute airspace is being reviewed and changed to address the current traffic increase and the expected increase for the Olympics in 2010. RNAV STAR procedures are being developed that will have aircraft join the downwind leg in lieu of the final approach.

In addition, Calgary terminal airspace is being reviewed with the goal of re-designing the airspace and developing changes that will introduce more RNAV procedures including RNAV SID procedures. The change is to reduce the complexity of the TCA for both pilots and controllers.

The "Oil Patch" airports (Fort McMurray, Grande Prairie, Fort St. John and Fort Nelson) are being reviewed with the intent of introducing RNAV procedures which will streamline the operation and reduce voice communication between pilots and controllers. It is expected that the STAR and SID procedures, including transitions to the enroute structure, will be published in November 2006.

NAV CANADA is also co-coordinating directly with WestJet on the development of RNAV (RNP) procedures that will eliminate non-precision approaches at airports used by Westjet. A trial is being coordinated which will look at a shortened approach procedure from the downwind leg to the runway. The "Short Approach" will save approximately 10 NM of flying time for each Westjet aircraft issued the approach. There are currently seventy-nine (79) RNAV (RNP) procedures published in the RCAP.

**Contact, Doug Buchanan ([buchadh@navcanada.ca](mailto:buchadh@navcanada.ca)) , Manager, ATC RNAV Operations, (613) 563-5986.**

### **ANS PLAN 2005**

NAV CANADA's revenue comes from our customers, who operate aircraft in Canada and in specific international airspace where we provide service. Our goal is to find the best ways to provide services that support our customers' requirements to operate safely and efficiently.

The ANS Plan reflects NAV CANADA's stated Vision, Mission and Values and the broader directions defined in the Corporate Business Plan. The document describes NAV CANADA's near-term projects aimed at meeting customers' requirements, taking account of expected corporate budget allocations. It also provides an outlook for the longer term to generate discussion among customers, staff and other stakeholders, with the goal of choosing the most beneficial path to the ANS of the future.

The ANS Plan 2005 is published on the NAV CANADA Website at [www.navcanada.ca](http://www.navcanada.ca) under Publications (go to Corporate Publications, then Additional Publications, then ANS Plan 2005) and can be accessed by clicking on the link below:

[ANS Plan 2005](#)