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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 6.7

Customer Benefits: Provides controllers with timely flight data enabling the efficient management of air traffic.

- **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 1.2

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.

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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 and minimizing customer delays, thereby reducing the airlines annual operating expenses. SASS is undergoing Operational Readiness Demonstration in Toronto and Vancouver.

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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: North Bay FIC will receive FIMS in three milestones. For the national rollout a complete FIMS will be deployed.

M1 North Bay FIC – Installed fall 2006
M2 North Bay FIC – Spring 2007
M3 North Bay FSS – Winter 2007
National rollout commence - 2008

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ADS-B (Automatic Dependent Surveillance-Broadcast)

Description: NAV CANADA signed a contract in March 2007 with the Sensis Corporation, based in Syracuse, New York, to provide the equipment that will facilitate surveillance coverage over most of the Hudson Bay area using ADS-B technology. Six ground receiver stations: Churchill, Rankin Inlet, Coral Harbour, Akulivik, Inukjuak and Fort Severn will complete the ADS-B network around Hudson Bay. A test system at the Technical System Center (TSC) in Ottawa and a training system for the NAV CANADA Training Institute (NCTI) are also part of the contract.

The purpose is to provide radar-like coverage in this enroute environment from FL290 to 410. ADS-B aircraft transmit (squit) on the 1090 MHz SSR frequency at a rate of up to two times per second their identification, position, and altitude amongst a variety of information that is available from their avionics systems. The position data will be primarily based on the GPS system to meet the accuracy requirement for implementing a 5-NM surveillance separation standard in this non-radar airspace.

Customer Benefits: It is estimated an average of 100 aircraft per day at the beginning will benefit from the introduction of this new technology in the Hudson Bay area. The introduction of a surveillance technology comparable to radar will greatly enhance the quality of ATC services available in the region by increasing controllers' situational awareness, traffic monitoring capability and decreasing frequency congestion. Advanced tools such as conflict alert (CA) will provide an additional layer of safety. Aircraft operators will benefit by more direct, preferential routes and optimal altitudes as well as a significantly reduced separation between aircraft and faster response time to aircrew requests. This will increase efficiency and appreciably reduce operator costs. This equipment will significantly increase airspace capacity for future growth in the coming years.

Implementation: Installation is scheduled to begin in September 2007, with operational use tentatively planned for the summer of 2008.

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WAM (Wide Area Multilateration)

As part of the combined ADS-B and WAM contract, NAV CANADA also purchased from Sensis two WAM systems to provide low level surveillance coverage in the Fort St. John, BC and in the Vancouver Harbour areas using multilateration technology. A test system at the Technical System Center (TSC) in Ottawa and a Training System for the NAV CANADA Training Institute (NCTI) are also included in the contract.

The purpose is to provide/augment radar-like coverage in these areas. WAM interrogates aircraft transponders on Mode 3/A, C and S on the SSR frequency bands with receiver sites measuring transponder responses "Time Difference of Arrival" to determine aircraft position.

Customer Benefits: This technology produces an accurate radar-like picture of air traffic at a fraction of the cost of a standard radar site. This is expected to significantly reduced IFR delays in the Fort St. John area, especially when the weather is below VFR limits. In the Vancouver Harbour area, it will provide a radar-like picture of low level VFR traffic at the entrance as well as inside the harbour, two areas not adequately serviced by the Vancouver or Victoria radars. VFR controllers and FSS specialists at these two locations will be in a position to improve air traffic services with the addition of this surveillance data.

Implementation: Installation of the operational systems is scheduled to begin in June 2007 with operational use tentatively planned for December 2007.

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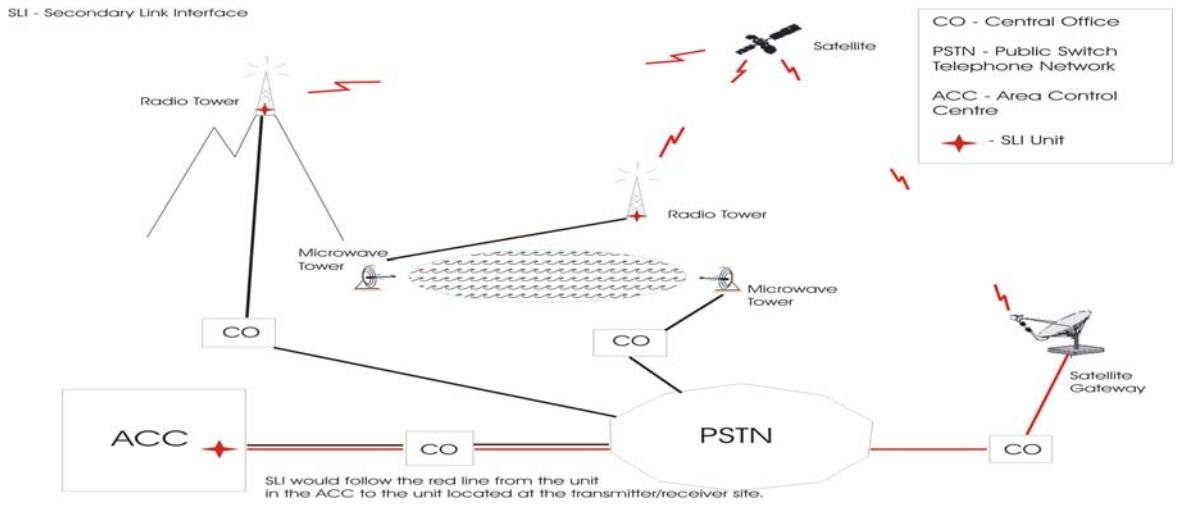
SLI (Secondary Link Interface)

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 (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.

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)[1]. 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.

[1] SLI utilizing SDN will still require PSTN to connect to the satellite gateway.



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 at the 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 dialled.

NAVCAN STAR is deployed to Gander, Edmonton and North Bay 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 and responses are 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.

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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 selected information via e-mail on their own schedule. Today, there are more than 25,000 registered users of which 3,300 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, especially during peak periods.

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

- Modify products for a "print friendly" format; (2007)
- Improve FD's display and selection (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.(3 more to come in British Columbia)
- Add a looping capability for radar imagery ; (2007/2008)
- Link to FIC phone numbers and contact information (January 2007)
- Replace the Western Canada (WCA) satellite picture with the new North West Canada (NWC) which offer improved coverage to the North (January 2007)
- Adding Upper Winds charts for FL390 and FL450 (2007)
- Ability for airport authority to enter their own NOTAM/AMSCR reports via the Internet (summer 2007)

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PART II: PROCEDURES

Area Navigation (RNAV) Standard Departure/Arrival Routes (SIDS & STARS) and Required Navigation Performance (RNP) Procedures

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. 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-four (54) published RNAV STAR procedures in Canada located at sixteen 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 *Canada Air Pilot*. 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. They started in the summer of 2004 with American Airlines. The YUL SID trial is being expanded to include aircraft that have DME/DME/IRU equipment with automatic runway updating. A MOU has been signed by Transport Canada (TC), the Montreal Airport Authorities and NAV CANADA outlining procedures for its use. Three carriers are, or soon will be, participating in the use of these quiet hour procedures.

RNAV SID procedures are being developed for the Lester B. Pearson International Airport (LBPIA) 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 and enroute airspace has been reviewed and changed to address the current traffic increase and the expected increase for the Olympics in 2010. New RNAV STAR procedures have been developed that will have aircraft join the downwind leg instead of the final approach. The downwind procedure will be used during heavy arrival traffic periods. This new procedure is also being introduced at Abbotsford and Victoria.

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. STAR and SID procedures, including transitions to the enroute structure, have already been published for Grande-Prairie.

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 was conducted at the Edmonton International Airport last December for a new short approach procedure from the downwind leg to runway 20. The “Short Approach” will save approximately 10 NM of flying time for each WestJet aircraft issued the approach. The procedure has now become a routine procedure at Edmonton. WestJet is planning on expanding this procedure to other airports in Canada. There are currently seventy-nine (79) RNAV (RNP) procedures published in the RCAP.

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ANS PLAN 2007

NAV CANADA’s revenues are derived 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 2007 is published on the NAV CANADA Website at www.navcanada.ca under Publications (go to Corporate Publications, then Additional Publications, then ANS Plan 2007) and can be accessed by clicking on the link below:

ANS Plan 2007 [PDF]