



*International Civil Aviation Organization*

**Third Meeting Of The  
Trans-Regional Airspace and Supporting ATM Systems  
Steering Group (TRASAS/3)**

**Paris, France, 19-20 October 2010**

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**Agenda Item 3:            Work currently underway to enhance the ATS route  
                                 network**

**Cross Polar Trans-East Air Traffic Management Working  
Group – Communications North of 80N Task Force**

**(Presented by Canada  
on behalf of the Cross Polar Working Group)**

**SUMMARY**

This paper provides information on the activities of the  
Communications North of 80N Task Force

**1        Introduction**

- 1.1       The Communications North of 80N Task Force was established in June 2009 under the work program of the Cross Polar Trans-East Air Traffic Management Providers' Working Group (CPWG) to fulfil the mandate assigned by the 33<sup>rd</sup> Meeting of the North Atlantic Implementation Management Group. The Task Force was asked to:
- a) assess current capabilities in surveillance and communication north of 80N;
  - b) determine the future requirements for surveillance and communication facilities;
  - c) propose ways and means to meet the requirements; and
  - d) report to Trans-Regional Airspace and Supporting ATM Systems Group (TRASAS) through the CPWG.
- 1.2       The Task Force is composed of representatives from Canada, Iceland, Norway, the Russian Federation, the United States, IATA, and industry representatives as appropriate.
- 1.3       This paper highlights relevant work accomplished by the Task Force.

**2        Status of Work**

- 2.1       An assessment of current capabilities in the areas of surveillance and communications has been conducted. The results of that assessment can be found in the Arctic Communications, Navigation and Surveillance (CNS) Table of Current and Planned Capabilities at **Appendix 1** to this paper. Given the limitations of geostationary satellite systems, there is at present no

operational coverage north of approximately 84N, effectively limiting Automatic Dependent Surveillance (ADS) to lower latitudes. Communications capability does exist throughout the high arctic airspace, however it is composed almost entirely of High Frequency (HF) voice and data link which is subject to interruption by solar activity. HF services are provided by a number of States and their Air Navigation Service Providers (ANSPs) as well as by commercial service providers.

- 2.2 The future requirements for surveillance and communication facilities are driven by the demand on the airspace and the capacity necessary to meet that demand. Capacity is currently constrained by the procedural separation standards currently in place, which are a minimum of 60NM or 50NM laterally and 15 minutes or 10 minutes longitudinally, depending on the ANSP. This capacity currently exceeds the demand on the airspace, however, there are peaks of traffic which result in less than optimal altitude or route availability and require the active management of traffic using a reservation system. While it is difficult to determine with certainty the rate at which cross polar traffic will continue to grow, it is worth noting that positive rates of growth have been observed over the last several years, a period during which air traffic in other regions contracted. In the twelve months ending 30 September 2010, traffic from North America into Russia grew by just over seven percent. Traffic from Russia to North America grew by more than eleven percent. The traffic volumes on the three Polar routes north of 80N are shown below in Figure1.

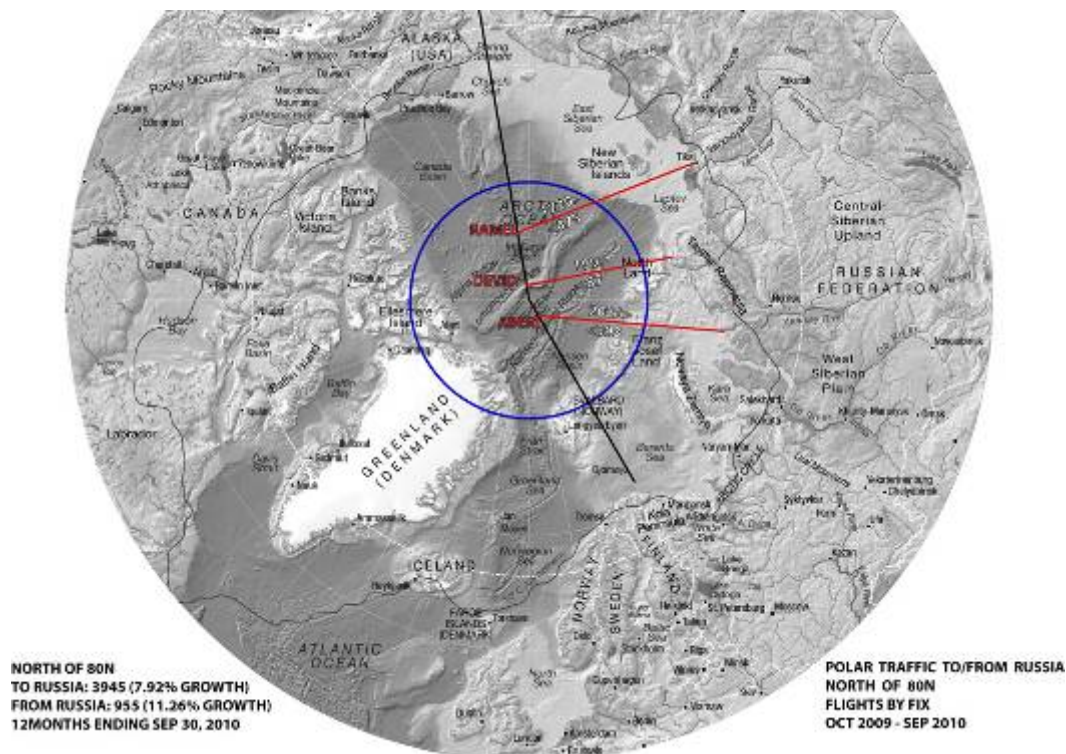


Figure 1

- 2.3 The opportunity exists to address this forecast growth in the short, medium and long terms. In the short term, capacity increases are being realized through the introduction of additional entry fixes and routes into the Russian Federation. The introduction of Reduced Vertical Separation Minima (RVSM) in the airspace of the Russian Federation will make additional flight levels available for use. These measures taken together will significantly increase the capacity of the airspace ensuring a high level of efficiency in operations in the short term.
- 2.4 As traffic volumes continue to grow, the need for more efficient communications, both air-to-ground and between ANSPs, becomes more evident.. The use of HF Voice and data link is

quite efficient when functioning normally, however, when HF services are interrupted by solar activity, that efficiency is lost. Coordination between ANSPs is also subject to degradation under certain conditions when satellite or microwave links are affected. In the short term, Air Traffic Services Interfacility Data Communications (AIDC) initiatives will result in some improvement in this area.

- 2.5 If it is assumed that demand will continue to grow in the medium and long terms, further gains in capacity can only be realized through a reduction in the separation minima required. This in turn requires direct controller pilot communications either via voice or data link.
- 2.6 One solution poised to satisfy the need for improved communication in the medium term is the Iridium satellite constellation. A recent Boeing 787 test flight operated on a 19 hour mission to evaluate communication in the polar area using the Iridium satellite network for ADS and controller pilot data link communication (CPDLC) reports. The flight was coordinated with Anchorage Air Route Traffic Control Center, Magadan Area Control Centre (ACC), Murmansk ACC and Edmonton ACC, and demonstrated that ADS could be maintained throughout the flight which made seven passes of the North Pole. Boeing reported that in the portion of the flight conducted north of 80N, 121 ADS reports and 16 CPDLC messages were exchanged through the Iridium network with average delivery times of seventeen seconds. The closest of these reports to the Pole was at 89 59.6 N. The route of flight is shown below in Figure 2.

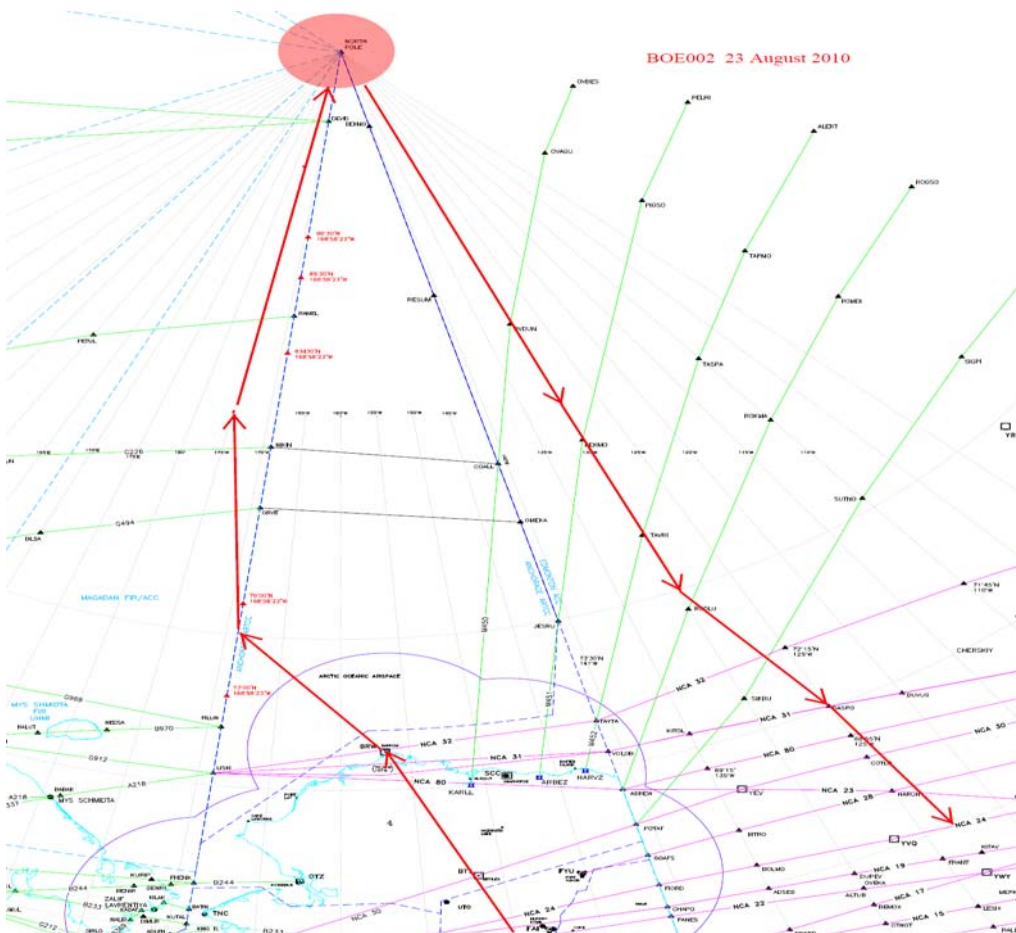
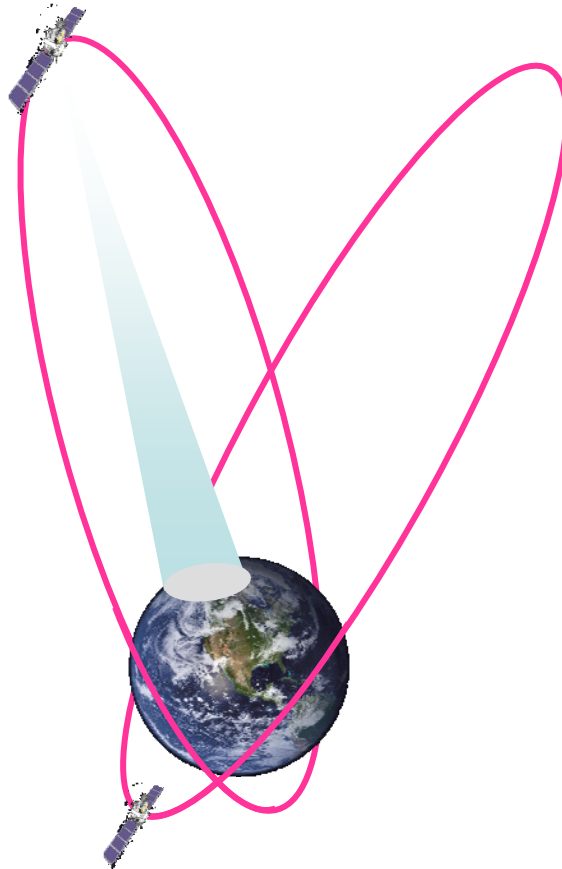


Figure 2

- 2.7 To meet continued traffic growth in the long term, further reductions in the separation standard will require improved means of surveillance. As this area is mostly under water, there is no surface based system currently available capable of the range necessary to provide

such surveillance. Space based systems do offer some potential. In addition to the Iridium constellation, the Canadian Space Agency (CSA) plans to launch a constellation of satellites in a Molniya orbit which provides a lengthy dwell time over the Arctic. Although primarily for polar communications and weather sensing, it is envisioned that the satellites will carry an air traffic management payload provided by the European Space Agency similar to that proposed for space based surveillance over Europe. The Molniya orbit is depicted below in Figure 3.



*Figure 3*

- 2.8 In order that medium and long term strategies are appropriate for sustainable traffic growth in the Polar airspace north of 80N, CPWG representatives participate in the development initiatives of these solutions. The Boeing787 test flight is a good example of the level of cooperation which exists. The group also has a representative on the requirements definition team for the CSA's satellite initiative.
- 2.9 To ensure that a harmonized approach to this region is maintained, the CPWG has recommended to member states that the Global Operational Data Link Document (GOLD) be adopted as the standard for data link communications. While every effort will be made to harmonize standards and procedures across the Arctic area, any differences required due to system requirements or local procedure will be submitted for inclusion in the GOLD.
- 2.10 As the work of the Task Force becomes more technical, States have been asked to nominate technical subject matter experts to bring the appropriate background and expertise to the discussions of the Task Force as they begin to address options and issues communications needs and requirements for the mid-term and long-term. Discussions are underway to identify

possible alliances with existing technical working groups to avoid duplication of effort in this area.

### **3 Conclusion**

- 3.1 The meeting is invited to note the information provided in this paper.

[illegible]

Appendix A: Table of Surveillance and Communication Capabilities														
	ANCHORAGE		BODO		EDMONTON		MAGADAN		MURMANSK		REYKJAVIK		STOCKHOLM	
	Current	Planned (Date)	Current	Planned (Date)	Current	Planned (Date)	Current	Planned (Date)	Current	Planned (Date)	Current	Planned (Date)	Current	Planned (Date)
COORDINATION														
Direct Voice	Yes				Yes		Yes		Yes		Yes			
AFTN	Yes		Yes		Yes		Yes		Yes		Yes			
AIDC	NAM & APAC ICD	Nov 2010***	Yes		Spring 2011		No		No		Yes			
OTHER			Yes**											

\* Automatic position report ADS  
\*\* Except towards Reykjavik and Murmansk  
\*\*\* Dependent on Edmonton ACC implementation of CAATS

# See Appendix A  
## Commercial Service