International Civil Aviation Organization
North American, Central American and Caribbean Office

INFORMATION PAPER

ANI/WG/2 — IP/12
26/05/15

Second NAM/CAR Air Navigation Implementation Working Group Meeting (ANI/WG/2)
Puntarenas, Costa Rica, 1 to 4 June 2015

Agenda Item 4: Follow-up on the NAM/CAR Regional Performance Based Air Navigation Implementation Plan (NAM/CAR RPBANIP)
4.1 Progress reports of the Task Forces and the ANI/WG

FAA WIDE AREA AUGMENTATION SYSTEM (WAAS) STATUS UPDATE

(Presented by United States of America)

EXECUTIVE SUMMARY

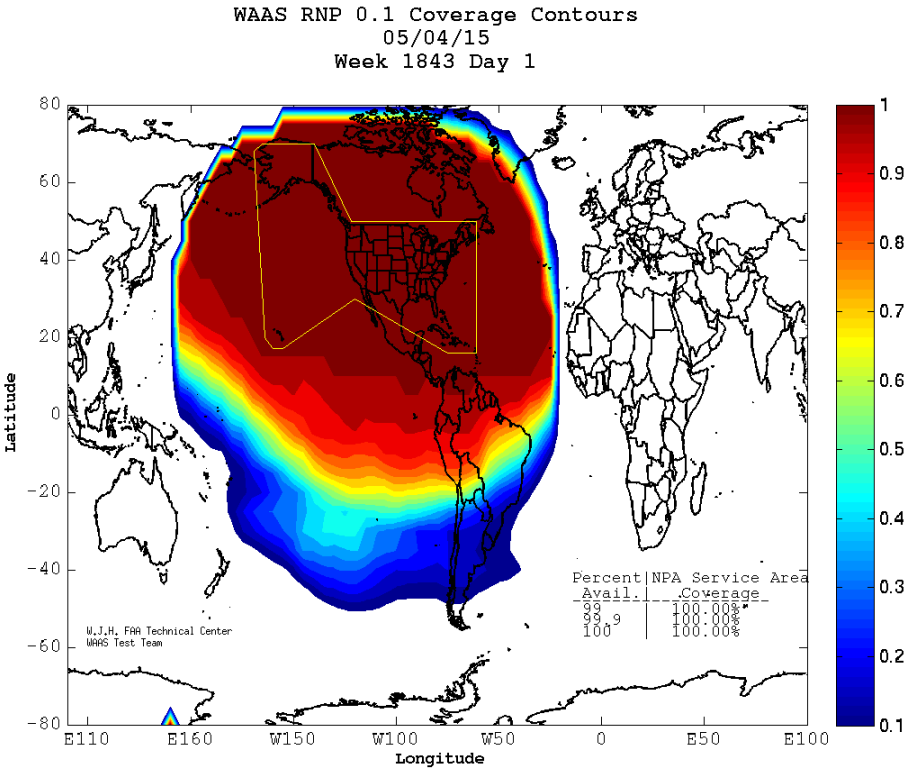
The Wide Area Augmentation System (WAAS) was commissioned by the FAA in July of 2003. The FAA is currently in Phase IV of the program where system modifications will support future dual-frequency user capabilities. Multi-constellation user capabilities are being supported in conjunction with the SBAS Interoperability Working Group (SBAS IWG) efforts.

Strategic Objectives:	• Safety • Air Navigation Capacity and Efficiency • Environmental Protection

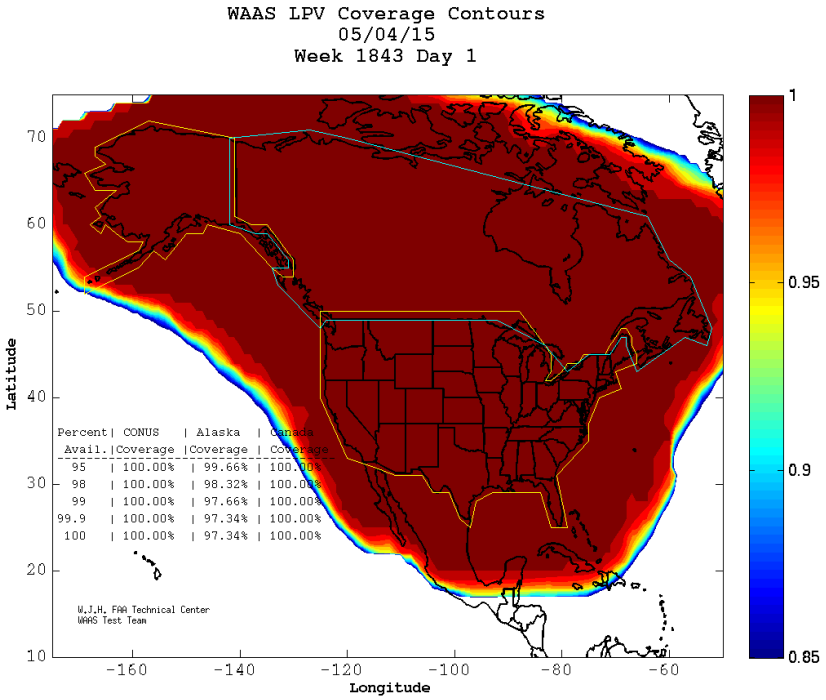
1. Introduction

1.1 The WAAS Program currently plans to implement a WAAS Dual-Frequency User capability that will provide near Cat-I levels of service (LPV Approach) over the United States, Canada, Mexico and as far south as South America. The efforts have been broken up into two segments (Segment 1 and Segment 2). Segment 1 will make the necessary infrastructure changes to support the reception and processing of new GPS signals. Segment 2 will begin once a full constellation of GPS satellites is on orbit that broadcast the new L5 frequency. Currently the start date for Segment 2 is 2020 but is contingent on GPS availability.

1.2 Current WAAS Required Navigation Performance (RNP) 0.1 performance is shown below and depicts that WAAS availability of RNP 0.1 includes North America, Central America and a portion of South America. RNP 0.3 performance would extend southward into South America down to the northern portion of Chile.



WAAS also currently provides a CAT I equivalent approach service known as Lateral Precision with Vertical guidance (LPV). The approach can support decision heights down to 200 ft. The current LPV service available in the US is pictured below. It can be noted that performance for LPV extends will into Mexico.



2. Discussion

2.1 The FAA plans to implement a new dual-frequency user capability once there is a full constellation of GPS satellites that broadcast the L5 signal. Current plans for the timing of this upgrade are being reconsidered as there are delays in when GPS L5 will be fully available. This activity will likely be delayed out beyond 2025.

2.2 In the interim, WAAS single-frequency service will continue to be maintained. Currently over 80,000 aircraft in the United States have equipped with WAAS and there are over 4,000 WAAS procedures published. WAAS service area extends over Canada and Mexico. For information on procedure numbers, airports served, etc. for the United States and Canada, please go to the following link: http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/navservices/gnss/approaches/. There are currently four airports in Mexico that have completed surveys that would support the development of future procedures.

2.3 WAAS is preparing to initiate a complete cutover to a new communication network to include circuits and routers. This upgrade will commence in the summer of 2015 and complete in the spring of 2016. In conjunction with this modification, the new G-III receiver will replace all of the reference receivers at the 38 WAAS Wide-Area Reference Stations (WRSs). The new receiver can receive and process all GPS civil signals, but will initially operate as a legacy receiver by sending back L1 C/A and L2 P(Y) measurements for processing. GPS L5 data will be forwarded to the WAAS master stations for data analysis and to support algorithm development. In parallel, the DFO vendor will develop the system modification required to implement the replacement of all system processors along with a new Operating System (OS).

2.4 Segment 2 of Phase IV is currently planned to begin in 2020. Segment 2 includes the replacement of a WAAS GEO satellite and updates to any equipment due to obsolescence. Once a sufficient number of GPS L5 satellites are available (currently deemed as 24 satellites), the FAA will deploy a system modification supporting delivery of a new L1/L5 dual-frequency message for dual frequency users. The planning for completion of this release is contingent on having a full constellation of GPS L5 satellites.

2.5 To support development of a future DFU service, the FAA is also supporting efforts within both RTCA and the Satellite Based Augmentation System (SBAS) Interoperability Working Group (IWG) to develop minimum operational performance standards (MOPS) for future avionics. These future avionics are envisioned to be capable of supporting multiple GNSS constellations in addition to dual frequency GPS. Efforts at the IWG have resulted in the development of a DFMC Interface Control Document (ICD) along with an overarching DFMC SBAS Definition Document.

3. Conclusion

3.1 The Meeting is invited to note the information in this paper.

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