NOTICE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

NextGen Organization

N NG 6100.23

Effective Date:
October 16, 2015

Cancellation Date:
October 15, 2016

SUBJ: TDM-to-IP Transition Requirements for NAS Systems

1. Purpose of This Notice.

a. This notice advises affected parties of the FAA's intent to discontinue the provisioning of Time Division Multiplexing (TDM)-based telecommunications services for use by NAS and NON-NAS systems. This notice also provides guidance to NAS programs and system owners on developing plans to standardize on the use of both Ethernet interfaces and the Internet Protocol (IP) for voice and all data communications and information exchanges.

b. The NextGen (ANG), Air Traffic (ATO), and Finance and Management (AFN) organizations have established a joint working group to work with the management teams and key stakeholders to identify high-level impacts and develop a strategy through 2025 to help the agency meet these goals. These combined working groups will work together to prioritize and help shepherd affected users through the process.

c. This notice directs programs and systems owners to standardize on the use of both Ethernet interfaces and the IP protocol for voice and all data communications and information exchange. For programs that are planning any improvements before 2025, each program will be required to assess and address the impacts of this notice as they progress through the Joint Resource Council (JRC) and Capital Investment Team (CIT) funding. The AJM-31 telecommunications review processes will integrate these assessments as programs progress through the JRC milestone. Programs that are planning improvements and only going to the CIT will work directly with ANG-B2 to aid the program performing the assessment. Programs affected by this policy, but were not planning improvements, will also work with ANG-B2 and AJM-31 to assess the impacts to be potentially submitted for funding for this specific improvement. The outcome of the assessments must show the specific impacts of this notice and note them as distinct line items when combined with other funding requests in the JRC or CIT.

2. Audience. This notice applies to all existing and planned FAA Programs, Systems and application owners that provide voice or exchange data with any other systems and capabilities within the Air Traffic Organization's (ATO) NAS and R& D Next Generation (NextGen) domains. This notice also applies to any person or entity that has a written agreement with the FAA involving the NAS for providing, use, management, or oversight of FAA information or information systems.

3. Where to Find This Notice. This notice can be found on the FAA.GOV website under the "Regulations & Policies" tab and select "Orders & Notices" or on the MyFAA Employee website**.** Use "Tools & Resources" tab and select "Orders & Notices."

4. Technology Requirements.

a. New systems obtaining Initial Investment Decision (IID) approval after fiscal year 2015 (FY2015) and programs/systems modernizing, performing technical refresh upgrades, or making other infrastructure changes after FY2015 must utilize Ethernet-based technology and associated IP protocols (including both IPv4 and IPv6 implementations) to exchange or provide information and data. This applies to the following communications interfaces:

(1) To other computers/devices or systems within the systems/program boundaries (intra-system communications);

(2) To other systems, programs or applications beyond the responsibility of the program owner (inter-system communications);

(3) Across the FAA's NAS Operational IP Network (NAS Inter-facility communications); and

(4) To external systems, programs or applications outside of the FAA domains through approved security gateways and boundary protection.

b. When communications interfaces are required to exchange information and data with legacy systems that do not support Ethernet-based physical interfaces and IP, the modernization/tech refresh program must:

(1) Identify solution alternatives including a description of the required changes; and

(2) Develop an impact statement that identifies the associated technical, cost, and schedule impacts of implementing each alternative.

c. If the technology is not available for an individual systems or component, the system operator or program owner must:

(1) Justify why the Ethernet technology and IP protocols CANNOT be supported natively and;

(2) Develop a solution that augments the technology limitation but provides a common Ethernet Interface and use of IP protocol to:

(a) Exchange data with other systems within the same facility (intra-facility); and

(b) Exchange data with other FAA applications, systems and programs in other locations (inter-facility).

d. In addition to requiring applications and programs to transition and standardize the use of IP protocols natively, NAS applications and systems owners must also ensure their systems are enabled to communication using one or both of the following:

(1) Communicate and exchange data with internal NAS applications and systems to external Non-NAS applications and systems through approved NAS gateways utilizing IP

Version 4 (IPv4) natively. IPv4 is the current standard for IP communications, however the long-term support of this version of IP is unclear as the future standard will become IPv6.

(2) Communicate and exchange data with internal NAS applications and systems to external non-NAS applications and systems through approved NAS gateways utilizing IP Version 6 (IPv6) natively. IPv6 will be the future standard for IP protocol and programs should support the operations of IPv6 by 2025.

5. Background:

a. Commercial telecommunications carriers have notified the Federal Communications Commission (FCC) and their customers that they will no longer provide services based on Time Division Multiplexing (TDM) technology. The majority of NAS systems depend on TDM-based telecommunications services to support their inter-facility connectivity requirements. Many NAS systems have not modernized their communications technology because of budgetary, system dependencies or other factors because of priorities over delivering new capabilities and supporting the tactical needs of the FAA customers.

b. Across the continental United States (CONUS) and outside the CONUS (OCONUS), they are planning to standardize on the use of Ethernet technology and IP communications protocols. The actual transition may begin in 2016 and be completed as early as 2022. The availability of TDM-based technologies will decrease over time. The FAA intends to transition all voice and data communications from TDM-based communications to Ethernet-based communications interfaces and standardize on the use of the IP protocol. For the NAS, a joint working group (AJM, AJW, ANG) along with a waterfall schedule for a proposed NAS transition concept is developing a transition strategy for the NAS. This planning effort must be started immediately to stay ahead of the pace of the carriers' transition efforts and avoid disruption to NAS operations.

6. Definitions.

a. Ethernet – An communications technology that provides a standard way for systems to communicate between devices or systems over a local area network (LAN) or Wide Area Network (WAN) over a wired connection. It provides a simple communications interface intended for connecting multiple devices, such as computers, routers, and switches. There are multiple standards for Ethernet based interfaces; these can be found on the Internet Engineering Task Force (IETF) website "www.ietf.org" or The Institute of Electrical and Electronics Engineers website "standards.ieee.org"

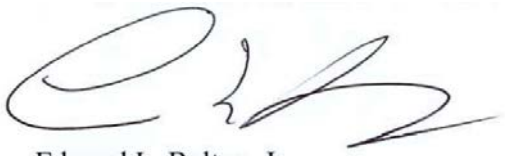
b. Internet Protocol (IP) – A connectionless protocol used to route data packets across a network. Use of IP can occur in private networks and does not imply use of the public Internet. Multiple standards are available for the IP protocol on the Internet Engineering Task Force (IETF) website "www.ietf.org" or The Institute of Electrical and Electronics Engineers website "standards.ieee.org". The FAA has standardized on IPv4 and plans to support IPv6 in the future.

c. Serial Interface - A serial communications interface is a shared boundary between a system and a communications channel that sequentially transfers data, one bit at a time. There are multiple standards and types of serial interfaces are available on the Internet Engineering

Task Force (IETF) website "www.ietf.org" or The Institute of Electrical and Electronics Engineers website "standards.ieee.org."

d. Time Division Multiplexing (TDM) – A method of combining multiple serial interfaces with unique data within a single larger data stream by separating the signal into many segments separated in time, each assigned a duration and location within a defined frame. The receiving end will reassemble the data stream based on the time and location assignments. TDM-based protocols generally require a dedicated "full period" connection at the communications interface. There are many standards for these interfaces and are available on the Internet Engineering Task Force (IETF) website "www.ietf.org" or The Institute of Electrical and Electronics Engineers website "standards.ieee.org."

7. Distribution. This notice is available electronically as described in paragraph 3.



Edward L. Bolton, Jr.
Assistant Administrator for NextGen