

**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of:)
) GN Docket No. 12-353
Petitions That Urge The Commission To)
Alter Policies To Respond To The)
Ongoing Technological Transition Of)
Voice Networks)

COMMENTS OF HARRIS CORPORATION

HARRIS CORPORATION
600 Maryland Avenue, S.W.
Suite 850E
Washington, D.C. 20024
(202) 729-3700

_____/s/_____
Tania W. Hanna
Vice President, Government Relations
Harris Corporation

Patrick Sullivan
Director, Government Relations
Harris Corporation

January 28, 2013

TABLE OF CONTENTS

I.	SUMMARY.....	1
II.	HARRIS AND THE FAA TELECOMMUNICATIONS INFRASTRUCTURE (FTI) PROGRAM.....	3
III.	THE FAA WILL UTILIZE TDM FACILITIES GOING FORWARD TO SECURE AIR TRAFFIC.....	5
	a. Use of Serving Wiring Centers and TDM Services.....	5
	b. FAA’s Current Reliance on TDM Services from Commercial Providers.....	6
IV.	AT&T’S “TRIAL WIRE CENTERS” PLAN COULD PUT FAA OPERATIONS AT RISK.....	7
	a. AT&T’s Trial Wire Center Proposal.....	7
	b. Impact Upon FAA’s National Airspace System From Cessation to TDM Services.....	8
	c. The FAA’s Transition to NextGen Does Not Fully Mitigate Ongoing Need for TDM Services.....	8
V.	CONCLUSION.....	11

**Before the
Federal Communications Commission
Washington, DC 20554**

In the Matter of:)
) GN Docket No. 12-353
Petitions That Urge The Commission To)
Alter Policies To Respond To The)
Ongoing Technological Transition Of)
Voice Networks)

COMMENTS OF HARRIS CORPORATION

The Harris Corporation (Harris) respectfully submits comments on two Petitions filed by AT&T and the National Telecommunications Cooperative Association (NTCA), respectively, to change policies related to provision of time-division multiplexed (TDM) services.¹ Harris greatly appreciates the opportunity to bring to the Commission’s attention how TDM facilities, applications, and services are used by the Federal Aviation Administration (FAA) to ensure the safety of air travel in the United States. As an integrator and reseller of TDM services to the FAA, we urge that no Commission policy be altered in a manner that would adversely impact the availability of TDM services used for critical air traffic operations.

I. SUMMARY.

Proposals to remove obligations upon commercial telecommunications carriers to provide TDM services to their customers could put at risk the FAA’s ability to effectively control our nation’s air traffic. The FAA’s Telecommunications Infrastructure (FTI) Program,

¹ AT&T Petition to Launch a Proceeding Concerning the TDM-to-IP Transition (filed Nov. 7, 2012) (AT&T Petition); Petition of the National Telecommunications Cooperative Association for a Rulemaking to Promote and Sustain the Ongoing TDM-to-IP Evolution (filed Nov. 19, 2012) (NTCA Petition).

which provides the telecommunications services the FAA needs for the National Airspace System, uses TDM applications and services extensively to deliver those services. Further, digital services do not extend to many of the FAA's remote locations. While efforts are being made through the FAA's "NextGen" Programs to upgrade the National Airspace System to communications interfaces based upon Internet Protocol (IP) standards, over 92% of FTI services continue to be TDM-based. Moreover, support for TDM technologies will be required for the foreseeable future until methods of replacing TDM-centric services and delivery of IP-based and digital services to remote sites can be achieved.

AT&T's proposal of selecting TDM Serving Wire Centers (SWCs) for IP transition and cessation of TDM services could cripple ongoing FAA NAS telecommunications services vital to national air traffic security. Essential FAA applications and services, reliant upon TDM, could be halted, leaving the FAA without feasible alternatives. If serving wire centers that provide the FAA with vital TDM services are selected for AT&T's experiment to exclude TDM services to customers, air travel in this nation could become less safe and secure.

For these reasons, Harris urges the Commission to proceed with extreme caution and concern for the impact upon air traffic safety when considering allowance of cessation of TDM services as AT&T proposes. At the very least, none of the more than 3,300 serving wire centers that provide the FAA with TDM services² should be selected for experimentation that would discontinue TDM services in any manner. Moreover, it is

² For security reasons, the identities of these serving wire centers are not disclosed in this filing.

essential that, should the Commission consider eliminating requirements to provide TDM services, careful coordination be undertaken with the FAA so that the Commission is aware of what services FAA uses will be compromised by its actions.

II. HARRIS AND THE FAA TELECOMMUNICATIONS INFRASTRUCTURE (FTI) PROGRAM.

Harris Corporation is the Prime Systems Integrator for the FAA Telecommunications Infrastructure (FTI) Program. FTI is the primary means through which the FAA acquires the telecommunications services required for National Airspace System (NAS). The NAS, consisting of thousands of people, procedures, facilities, and pieces of equipment, enables safe and expeditious air travel in the United States and over large portions of the world's oceans.

Harris leads a team of telecommunications companies, consisting of Sprint, AT&T, CenturyLink, and Verizon Communications, to interconnect over 4,400 FAA sites and over 20,000 services through a dedicated, secure Wide Area Network (WAN). FTI interoperates with hundreds of non-FAA facilities, including the Department of Defense (DoD), the National Weather Service, and all major U.S. telecommunications wireline service providers. Harris manages 16,800 distributed network devices containing over 104,000 manageable components. Through FTI, Harris also provides network engineering services and order fulfillment for evolving FAA communications needs. Since the network is a key contributing system to the Next Generation (NextGen) Air Transportation System, Harris implemented a dedicated Optical Network Backbone and private Metropolitan Area SONET rings throughout the entire Continental United States.

We are continually identifying initiatives implementing upgrades to this infrastructure providing increased capacity, greater flexibility, and improved system performance.

Key components of the FTI network, the largest non-military network in the U.S.

Government, include:

- 1) Support for hundreds of services classes that represent several availability levels, protocols, interface types and security levels. The services utilize TDM and IP technologies and are delivered to urban and rural locations.
- 2) The Harris dedicated Optical Network Backbone is made up of over 22,378 miles of fiber utilizing Dense Wavelength Division Multiplexing (DWDM) over SONET in 2.5Gbps and 10 Gbps segments. It contains 42 Points of Presence (POPs) connecting 18 Dual Metropolitan Area SONET rings at the FAA's primary Air Route Traffic Control facilities.
- 3) The Harris Primary Network Operations and Control Center (PNOCC) monitors more than 100,000 pieces of communications equipment, and enables the management of a field maintenance workforce of 250-plus people nationwide, 24/7/365. A Backup Network Operations Control Center (BNOCC) is used for disaster recovery.
- 4) The FTI Mission Support Network transports administrative functions, such as payroll and e-mail to most of the FAA's 50,000 employees at more than 800 sites across the U.S.
- 5) The FTI satellite (FTI-SAT) network provides the FAA with a "best value" solution as part of an initiative to reduce more costly earth/satellite stations and deploy a more cost-effective mix of satellite, microwave, and landline services.

The FTI-SAT network is currently comprised of 165 Hubs, 25 of which are OCONUS.

- 6) The FTI Microwave network converted and migrated FAA Owned Microwave Systems (FOMS) operating within the 1.7 GHz frequency band to an FTI service-based solution.

III. THE FAA WILL UTILIZE TDM FACILITIES GOING FORWARD TO SECURE AIR TRAFFIC.

a. Use of Serving Wiring Centers and TDM Services.

To ensure our nation's air traffic is safely managed, FTI is highly reliant on the commercial telecommunications offerings provided by the Local Exchange Carriers (LECs) and Inter eXchange Carriers (IXCs) in the Continental United States, Alaska, Hawaii, Southern Caribbean, Canada, and Mexico. To implement the FTI services required by the FAA, Harris contracts with over 200 carrier organizations to establish Last Mile, Intra LATA and Inter LATA connections using the commercially available telecommunications service offerings. These connections are established at over 3,300 SWCs and are represented by tens of thousands of individual circuit and product orders. The great majority of the services FTI receives from these providers are traditional TDM, circuit switched, private line services.

Figure 1 illustrates the typical circuit design for critical NAS services between two FAA sites. Each FAA site has a Primary SWC and critical sites have an Alternate SWC to protect from cable cuts and telecommunications equipment failures impacting air traffic operations. Harris leases carrier provided circuits from commercial service providers between the FAA sites. Those circuits traverse SWCs and WAN facilities to provide

end-to-end FTI service connections. In total, there are over 3,300 SWCs and WAN facilities delivering services to the 4,400 FAA sites.

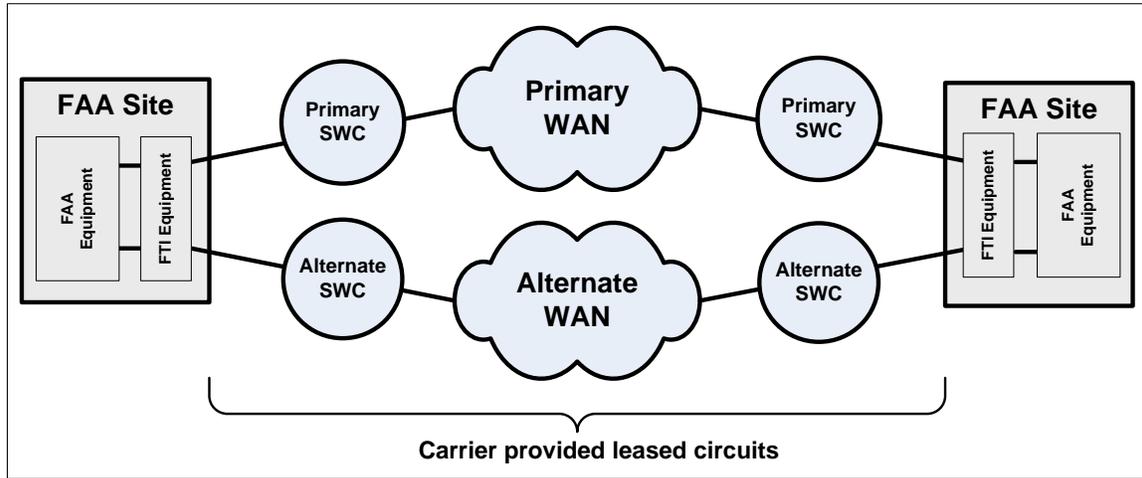


Figure 1 – Typical circuit design for critical NAS services.

b. FAA’s Current Reliance on TDM Services from Commercial Providers.

NAS applications have evolved to be highly dependent on the synchronous nature of TDM telecommunications infrastructure. In circuit-switched networks such as the Public-Switch Telephone Network (PSTN) used heavily by FTI, the FAA’s NAS operations are highly reliant on the ability to create channels or tributaries allowing transmission of multiple subscribers' data along the same transmission medium without the risk of contention for resources or intrusions from other users. This inherent Constant Bit Rate (CBR) capability of TDM services enables NAS applications to establish clock synchronization as well as deterministic latency and jitter performance. TDM’s circuit mode communication paradigm is based on a fixed number of channels and constant bandwidth per channel, ensuring the underlying NAS applications do not suffer from the Variable Bit Rate (VBR), “best effort” nature of Packet Switched networks. While FTI

currently provides many IP services for these programs, over 92% of FTI services continue to be TDM-based.

IV. AT&T'S "TRIAL WIRE CENTERS" PLAN COULD PUT FAA OPERATIONS AT RISK.

a. AT&T's Trial Wire Center Proposal.

AT&T has proposed that the Commission engage in an "incremental" initiative before eliminating TDM-related regulations on a nationwide basis.³ AT&T proposes that specific wire centers be identified for experimenting with alleviating TDM regulations.⁴ Once these Trial Wire Centers are selected, AT&T proposes the following actions from the Commission:

- 1) Eliminate in Trial Wire Centers regulations requiring carriers to maintain TDM-based networks and services after IP-based replacement services are in place;⁵
- 2) Preclude carriers and carrier customers in Trial Wire Centers from demanding service or interconnection in TDM format in those wire centers;⁶ and
- 3) Permit service providers in Trial Wire Centers to notify customers that such providers will no longer provide them legacy services once the TDM network is retired.⁷

In essence, AT&T's plan suggests targeting wire centers that will be forced to input IP-based services and preventing customers from utilizing TDM services going forward.

³ AT&T Petition at 20.

⁴ *See id.*

⁵ *See id.*

⁶ *See id.*

⁷ *See id.* at 21-22.

b. Impact Upon FAA's National Airspace System From Cessation of TDM Services.

This proposal could dramatically harm the ability of the FAA and those companies supporting the NAS to execute the shared mission to provide our nation a system that supports safe and efficient air travel. The FAA's NAS applications, which operate natively using synchronous protocols, require a highly reliable synchronization source with exceptional stability. Without the inherent synchronous capability of TDM, applications will experience out of sync clocks, resulting in buffer overflows, lost frames and variable latency; such a result will have a detrimental impact on the operation of these critical NAS applications. The very nature of packet-based switching networks relies on dynamic routing and application retries which result in variable and non-deterministic latency. Simply put, without TDM service availability, the FAA's National Airspace System is at best degraded and at worst put at significant risk.

c. The FAA's Transition to NextGen Does Not Fully Mitigate Ongoing Need for TDM Services.

The NAS is composed of hundreds of surveillance, navigation, communications, automation and weather systems to ensure safe departure, arrival and taxi of thousands of flight operations each day. The FAA is currently implementing several NAS transformational programs under the Next Generation (NextGen) Air Transportation System. These programs will provide increased air traffic capacity while maintaining world leading air travel safety. The programs will primarily communicate via IP technology instead of the TDM technology predominantly used by the FAA today.

While Harris expects a continued migration to IP for NAS operations, support for TDM and the 92% of FTI services that are currently TDM-based will be required for the

foreseeable future. As detailed below, three significant issues must be overcome before there can be a shift in which the majority of NAS services evolve from TDM to IP:

- 1) The preponderance of TDM-exclusive VG-x analog interfaces used in NAS voice switch equipment and Radio Control Equipment (RCE);
- 2) The transition of thousands of low-speed serial communication services to IP; and
- 3) The lack of “last mile” digital circuit availability at thousands of remote sites.

VG-x analog transition. The elimination of VG-x analog interfaces will require an upgrade to hundreds of NAS voice switches through the deployment of planned Voice over IP (VoIP)-based NAS Voice System (NVS) switches and/or other modernization activities. The NVS contract was awarded in 2012. A success-based migration to upgrade all switches will require at least a five year transition period and a significant increase to the program’s current funding level. Due to the critical nature of voice services in the NAS, particularly Air-to-Ground (A/G) voice, a more likely lowrisk transition approach to upgrade/replace all NAS voice switches will require a 10 year transition period. This means the complete elimination of VG-x interfaces in the NAS will occur somewhere between 2017 and 2022.

Low Speed Serial Communications. Support for thousands of low speed serial communications services is required. A large number of these services are Flight Data Input/Output (FDIO) and Automated Surface Observing System (ASOS) weather sensors which are not programs specifically targeted by NextGen’s planned initiatives. Therefore, the funding required to upgrade these services will be challenging to obtain. FTI uses router technology and “pseudo-wire”

technology for some of these services today, but the pseudo-wire technology used (Cisco Circuit Emulation) is no longer offered because of the reduced market demand. Pseudo-wire technology is evolving but it is better suited for higher data rates of 1Mbps and above. Below those data rates, serialization delay and jitter become significant challenges and have proven to be difficult to operate and maintain. As a result of all of these factors, FTI has moved away from pseudo-wire implementations, particularly for low speed serial services. Additional funding would be required for the FAA to upgrade these systems to use IP interfaces and protocols.

Last-Mile IP Transition. FAA air/ground radios and navigational aids have to be located in rural areas to provide the required airspace coverage. Last mile digital circuit availability continues to be a challenge on FTI today, especially in rural areas. There have been several instances of substantial special construction costs to convert FAA sites with analog services to digital. However, there is no “silver bullet” for this problem where one technology or service is likely to emerge that will satisfy requirements while remaining cost effective in all locations. A vendor and technology agnostic approach is needed to solve this problem whereby a combination of technologies and services can be assessed and designed to address the specific need. In the interim, the FAA will continue to depend upon analog voice services to its numerous facilities that are located in rural areas.

For these reasons, and even amidst its transition to IP technology, it is unreasonable to expect the FAA to be able to function effectively for several years without TDM service from commercial carriers.

V. CONCLUSION

The desire to cease provision of TDM services must be contextualized with the impact of such a proposal upon the FAA's critical effort to secure our nation's air traffic. The FAA, through the FTI program, currently has a 92% reliance rate upon TDM services provided by commercial telecommunications providers. These services and applications utilizing these TDM provisions form the backbone of the telecommunications structure for the NAS. Without use of such services for years to come, even as the FAA transitions to IP-based services, the FAA's efficacy in securing our nation's skies is compromised.

In the event that the Commission approves a plan to experiment with the cessation of TDM in targeted wiring centers, it must avoid including the more than 3,300 SWCs that currently provide the FAA with TDM services. Without such protection, the FAA's operations will be put at risk.

Additionally, any planned allowance of permanent discontinuation of TDM service by commercial providers must be carefully analyzed for impact upon the FAA's operations. Without such coordination, arbitrary losses of TDM services could jeopardize air traffic safety.

Harris greatly appreciates the opportunity to serve the FAA and the travelers it protects, and looks forward to working with the Commission to ensure that proposed regulatory alterations do not adversely impact air travel safety in this nation.

Respectfully submitted,

HARRIS CORPORATION

600 Maryland Avenue, S.W.

Suite 850E

Washington, D.C. 20024

(202) 729-3700

_____/s/_____

Tania W. Hanna

Vice President, Government Relations

Harris Corporation

Patrick Sullivan

Director, Government Relations

Harris Corporation

January 28, 2013