

POLARIS PNT PBC (“Polaris”)
FCC OET Application EL260727 0007-EX-PN-2018
Attachment Regarding Applicant Eligibility

The relevant rule is the following:

Rule § 5.302 Eligibility.

Program experimental licensees may be granted to the following entities: a college or university with a graduate research program in engineering that is accredited by the Accreditation Board for Engineering and Technology (ABET); a research laboratory; a hospital or health care institution; a manufacturer of radio frequency equipment; or a manufacturer that integrates radio frequency equipment into its end product. Each applicant must meet the following requirements:

- (a) The radiofrequency experimentation will be conducted in a defined geographic area under the applicant's control;
- (b) The applicant has institutional processes to monitor and effectively manage a wide variety of research projects; and
- (c) The applicant has demonstrated expertise in radio spectrum management or partner with another entity that has such expertise.

Polaris PNT PBC and its Application listed above are qualified under §5.302 because:

(a) Under §5.302(a): The geographic area submitted in the application is a relatively small area, in and around the University of California Berkeley campus and adjacent State and Regional-governments’ parks and undeveloped lands; and Polaris staff know this area well from residing in and visiting all of this area for decades.

(b) Under §5.302(b): Polaris has institutional purposes and processes to monitor and effectively manage the wide variety of research projects described in this Application. Polaris was formed for these purposes, shown in Its Certificate of Incorporation attached hereto as Exhibit A. The Polaris web pages further describe its purposes and this research: www.polarispnt.space. One of its radio-systems consultants is Robert Mawrey, PhD, under a contract attached hereto as Exhibit B which including his resume describing radio systems and monitoring expertise. Polaris owns and controls radio system testing equipment, and will obtain and control as is needed and useful additional equipment for these purposes and processes. See also ‘(c)’ below.

(c) Under §5.302(c): Polaris, including its principals and consultants, have demonstrated expertise in radio spectrum management, and also, as needed and useful, partner with other entities that have the same. This is reflected in ‘(b)’ above, and in FCC and other public records showing the Polaris President Warren Havens as manager of various FCC radio spectrum licenses and systems, and related research, in part described in Exhibit C hereto.

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EXHIBIT A

State of Delaware
Certificate of Incorporation of
POLARIS PNT, PBC
A Delaware Public Benefit Corporation

State of Delaware
Secretary of State
Division of Corporations
Delivered 02:33 PM 07/05/2016
FILED 02:33 PM 07/05/2016
SR 20164773956 - File Number 6088706

Article 1. The Corporation's name is Polaris PNT, PBC.

Article 2. The Corporation's Registered Office in the State of Delaware is at 1209 Orange Street, New Castle County, Wilmington, Delaware, 19801. The Registered Agent in charge thereof is The Corporation Trust Company.

Article 3. The Corporation's character and public benefit purposes are the following:

Public benefit corporation. The Corporation shall be a public benefit corporation as contemplated by subchapter XV of the Delaware General Corporation Law (the "DGCL"), or any successor provisions, that it is intended to operate in a responsible and sustainable manner and to produce a public benefit or public benefits, and is to be managed in a manner that balances the stockholders pecuniary interests, the best interests of those materially affected by the corporation's conduct and the public benefits identified in this certificate of incorporation. Accordingly, it is intended that the business and operations of the Corporation create material positive impacts on human society ("society") and the natural environment ("environment"), taken as a whole. If the DGCL is amended to alter or further define the management and operation of public benefit corporations, then the corporation shall be managed and operated in accordance with the DGCL, as so amended.

General purpose. The Corporation's general purpose is to engage in any lawful act or activity for which a corporation may be organized under the DGCL, and, as to use of radio spectrum in the United States of America, the laws of the Federal Communications Commission and the National Telecommunications Information Agency.

Public benefit purposes. The Corporation shall research, promote, and carry out public-interest radio-frequency-based technologies and systems, including for positioning, navigation, and timing ("PNT") with high precision ("pPNT") to enable efficient and effective ("smart" or "intelligent"): (i) transportation, energy, telecommunication and other infrastructure systems and services; (ii) terrestrial and atmospheric environment science, monitoring, protection, and prediction; (iii) citizen-direct internet and computing mesh networks; and (iv) public safety systems and services. It is intended that the business and operations of the Corporation create material positive impacts on society and the environment, taken as a whole. The Corporation may (i) pursue its purposes in relationships with government, private nonprofit, private public-benefit, and private for-profit organizations with purposes in accord with those of the Corporation, and (ii) obtain and exercise membership rights in nonprofit organizations, including Skybridge Spectrum Foundation (a Delaware corporation), with purposes in accord with those of the Corporation.

State of Delaware
Certificate of Incorporation of Polaris PNT, PBC

Public benefits statements under third party standards. The Corporation shall make and deliver its public benefit statements, no less than biennially, on its website, or upon request at any time it does not have a website. In addition, the Corporation shall, unless the Board decides otherwise for any time period, prepare the public benefit statements in accordance with standards of a nationally recognized organization for defining, reporting, and assessing a corporation's social and environmental performance that:

(a) assesses the effect of the business and its operations on all of the interests materially affected by the corporation's conduct;

(b) is developed by an organization that is not under the control of the corporation or its affiliates; and

(c) has information publicly available concerning: (i) the criteria and relative weighting the standard uses to assess the corporation's overall social and environmental performance; (ii) the process by which the standard is developed and revised; and (iii) the character and independence of the organization that developed the standard, including: its material owners, its governing body members and how they are selected, and its material financial support and sources.

In addition to the requirements under Section 366(b) of the DGCL, the statement shall include all of the following:

(a) a narrative description of the process and rationale for selecting the third-party standard used to prepare the statement;

(b) a statement of any connection between, on the one hand, the entity that established the third-party standard, or its directors, officers, or material owners, and on the other hand, the Corporation, or its directors, officers, and material owners; including any financial or governance relationship that might materially affect the credibility of the objective assessment of the third-party standard; and

(c) an assessment of material positive impacts on society and the environment, taken as a whole, from the business and operations of the Corporation.

Severability. To the extent that any provision of this Article 3 is found to be invalid or unenforceable, such invalidity or unenforceability shall not affect the validity or enforceability of any other provision of this Article.

Article 4. As applied to each director of the Corporation: to the fullest extent permitted by law, the director shall not be personally liable to the Corporation or its stockholders for monetary damages for breach of fiduciary duty as a director. If the Delaware General Corporation Law is amended to authorize corporate action further eliminating or limiting the personal liability of directors, then the liability of the director shall be eliminated or limited to the fullest extent permitted by the Delaware General Corporation Law, as so amended. Any disinterested failure to satisfy DGCL § 365 shall not, for the purposes of Sections 102(b)(7) or 145 of the DGCL, or for the purposes of any use of the term "good faith" in this certificate of incorporation or the Corporation's bylaws or other documents in regard to the indemnification or advancement of expenses of officers, directors employees and agents, constitute an act or omission not in good faith, or a breach of the duty of loyalty. Any repeal or modification of

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this Article 4 shall not adversely affect any right or protection of any director existing at the time of such repeal or modification.

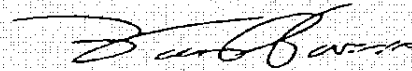
Article 5. The total amount of stock the Corporation is authorized to issue is 10,000,000 (ten million) shares with a par value of \$0.001 per share.

Article 6. The name and mailing address of the incorporator are as follows:

Warren C. Havens
2649 Benvenue Avenue
Berkeley CA 94704

I, The Undersigned, for the purpose of forming this Public Benefit Corporation under the laws of the State of Delaware, do make, file and record this Certificate, and do certify that the facts herein stated are true, and I have accordingly hereunto set my hand this 4th day of July, A.D. 2016.

BY:



Warren C. Havens
Incorporator

EXHIBIT B

(Redactions for Confidentiality)

Professional Services Consulting Agreement

This Agreement is by and between, on the one hand: **Sentient Things, Inc.**, by Robert Mawrey ("Consultant") of the address set forth on the signature page below, and on the other hand: **Polaris PNT, PBC**, by Warren Havens, of the address set forth on the signature page below ("POLARIS") (Consultant and POLARIS together, the "Parties") (the "Agreement"). The Parties agree as follows:

1. Services

(a) Consultant will perform for POLARIS consulting services ("Services") described in the Services Subject Matter set forth in Exhibit A, per the terms set forth herein.

POLARIS will describe in writing in advance (generally by email) all Services requested: the tasks, with time and cost limits.

Consultant may typically have available, for Services under this Agreement, only very limited hours per week or month, based on his existing employment and other engagements.

(b) Services may include, if the Parties agree from time to time, particular deliverables in the form of POLARIS-specified documents and/or physical products ("Deliverables"). At the start of this Agreement, there are no Deliverables yet agreed to. (Below, "Deliverables" thus means any "Deliverables" that the Parties may later agree to.)

(c) Services will be performed and results provided per a standard of care and expertise that is customary and reasonable for an engineer with Consultant's background and experience in the wireless industry. Consultant's current resume is attached hereto as Exhibit C.

(d) POLARIS will designate and make available to Consultant qualified POLARIS personnel or representatives who will consult with Consultant in connection with the Services. Initially and unless otherwise changed by POLARIS, the persons at POLARIS for this purpose shall be Warren Havens primarily, and Jimmy Stobaugh secondarily (when Mr. Havens is not available or when in supportive roles to Mr. Havens). POLARIS will furnish such documentation or other information to Consultant as is reasonably necessary to perform the Services.

2. Place of Performance

(a) Unless otherwise provided in this Agreement, Consultant may perform the Services in whole or in part at Consultant's places of residence or business as an independent consultant, and/or such other locations as Consultant may select that is not inconsistent with his obligations hereunder, including confidentiality.

(b) If Consultant performs any of the Services at the place of business of any company or other individual, he will first obtain written approval of POLARIS.

3. Effective Date, Term

This Agreement shall be effective as of the date of the first signature below (the "Effective Date"), and shall continue in full force and effect until the Agreement has been terminated in accordance with Section 9 hereof.

4. Payment Terms

6. Confidentiality

7. Intellectual Property

8. Nature of the Relationship and Taxes

9. Termination

Either party may terminate this Agreement for any reason upon written notice to the other party, which termination shall be effective immediately upon deliver of the notice. Termination will not affect payment obligations incurred under this Agreement for Services satisfactorily performed and whose results were delivered prior to or immediately after the effective date of termination, and for POLARIS-approved expenses related thereto.

10. Limitation of Liability

11. Non-Waiver of Rights

The failure of either party to insist upon performance of any provision of this Agreement, or to exercise any right, remedy or option provided herein, shall not be construed as a waiver of the right to assert any of the same at any time thereafter.

12. Rights and Remedies Not Exclusive

Unless otherwise expressly provided herein, no right or remedy of a party expressed herein shall be deemed exclusive, but shall be cumulative with, and not in substitution for, any other right or remedy of that party.

13. Severability

If any covenant, condition, term, or provision contained in this Agreement is held or finally determined to be invalid, illegal, or unenforceable in any respect, in whole or in part, such covenant, condition, term, or provision shall be severed from this Agreement, and the remaining covenants, conditions, terms and provisions contained herein shall continue in force and effect, and shall in no way be affected, prejudiced or disturbed thereby.

15. Conflicting Provisions

This Agreement and all of the exhibits, schedules, and documents attached hereto are intended to be read and construed in harmony with each other, but in the event any provision in any attachment conflicts with any provision of this Agreement, then this Agreement shall be deemed to control, and such conflicting provision to the extent it conflicts shall be deemed removed and replaced with the governing provision herein.

16. Assignment

Neither party will assign, transfer, or otherwise convey any of its obligations under this Agreement without the prior written consent of the other party. POLARIS may sell, assign, transfer, or otherwise convey any of its rights under this Agreement without the prior written consent of Consultant. Consultant will not assign any of the tasks he undertakes to perform the Services to any other party without the written consent of POLARIS.

17. Applicable Law

This Agreement shall be governed by and construed under the laws of the State of Delaware, without regard to its laws relating to conflict or choice of laws.

18. Interpretation

The captions and headings used in this Agreement are solely for the convenience of the parties, and shall not be used in the interpretation of the text of this Agreement. Each party has read and agreed to the specific language of this Agreement; therefore no conflict, ambiguity, or doubtful interpretation shall be construed against the drafter.

19. [Reserved.]

20. Force Majeure

Neither party shall be liable for any failure of or delay in performance of its obligations (except for payment obligations) under this Agreement to the extent such failure or delay is due to acts of God, acts of a public enemy, fires, floods, power outages, wars, civil disturbances, sabotage, terrorism, accidents, insurrections, blockades, embargoes, storms, explosions, labor disputes, failure of common carriers, Internet Service Providers, or other communication devices, acts of cyber criminals, terrorists or other criminals, acts of any governmental body (whether civil or military, foreign or domestic), failure or delay of third parties or governmental bodies from whom a party is obtaining or must obtain approvals, authorizations, licenses, franchises or permits, inability to obtain labor, materials, power, equipment, or transportation, or other circumstances beyond its reasonable control (collectively referred to herein as "Force Majeure Occurrences"). Any such delays shall not be a breach of or failure to perform this Agreement or any part thereof and the date on which the obligations hereunder are due to be fulfilled shall

be extended for a period equal to the time lost as a result of such delays. Neither party shall be liable to the other for any liability claims, damages or other loss caused by or resulting from a Force Majeure Occurrence.

21. Multiple Copies or Counterparts of Agreement

This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. This Agreement shall not be effective until the execution and delivery between each of the parties of at least one set of the counterparts.

22. Notices

All notices or other written communication required or permitted to be given under any provision of this Agreement shall be deemed to have been given by the notifying party if mailed by certified mail, return receipt requested, to the receiving party addressed to the mailing address set forth in the first paragraph of this Agreement, or such other address as the parties may designate in writing to the other parties. Additionally, notices sent by any other means (i.e., facsimile, overnight delivery, courier, etc.) may be acceptable subject to written confirmation of both the transmission and receipt of the notice.

23. Relationship of Parties

Consultant is an independent contractor in all respects with regard to this Agreement. Nothing contained in this Agreement shall be deemed or construed to create a partnership, joint venture, agency, or other relationship other than that of contractor and customer.

24. Third Party Beneficiaries

This Agreement does not create, and shall not be construed as creating, any rights or interests enforceable by any person not a party to this Agreement.

25. Waiver or Modification

This Agreement may be modified, or part or parts hereof waived, only by an instrument in writing specifically referencing this Agreement and signed by an authorized representative of the party against whom enforcement of the purported modification or waiver is sought.

26. Entire Agreement

This Agreement, including any and all Exhibits attached hereto, which are hereby incorporated by reference, constitutes the entire agreement and understanding between the parties and supersedes and replaces any and all prior or contemporaneous proposals, agreements, understandings, commitments or representations of any kind, whether written or oral, relating to the subject matter hereof or the Services or Deliverables to be provided hereunder.

27. Survival

The provisions of sections 4, 6, 7, 8, 10, 11, 12, and 20 shall survive the termination or expiration of this Agreement, as well as any other provisions whose language and context so indicates.

Polaris PNT, PBC:



By: Warren Havens, President

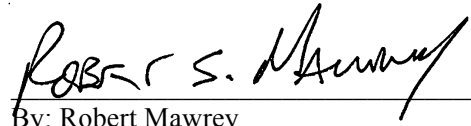
Dated: 10-31-2017

Contact information:

wrrnvns@gmail.com
jimmy.stobaugh@outlook.com

2649 Benvenue Ave.
Berkeley, CA 94704

Sentient Things, Inc., Consultant:



By: Robert Mawrey

Dated: 10 / 31 / 2017

Contact information:

robert@mawrey.com

Business Address:
Robert Mawrey
6 Liberty Square #2211
Boston, MA 02109

Mailing Address:
c/o 44 Orchard Road
Ashland, MA 01721

Exhibit A

Services Subject Matter

Meteor burst communication systems, wireless systems infrastructure, other radio spectrum systems, Internet of Things, and related matters.

Exhibit B

Rates, payments, and billing

Exhibit C

Resume of Robert Mawrey, Ph.D.



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Robert Mawrey • 3rd

Internet of Things

Sentient Things, Inc. • University of KwaZulu-Natal

Greater Boston Area • 500+ [👤](#)

Experience



Founder and CEO

Sentient Things, Inc.

Sep 2017 – Present • 4 mos
Boston, MA



Principal, Internet of Things

The MathWorks

Nov 2014 – Sep 2017 • 2 yrs 11 mos
Natick, MA

Contributing to the application of analytics and algorithms to the Internet of Things using MATLAB and the ThingSpeak.com IoT platform.



Chief Executive Officer

ioBridge, Inc.

Mar 2010 – Nov 2014 • 4 yrs 9 mos
Marlborough, MA

ioBridge provides patented Internet of Things technology that enables manufacturers, professionals and casual users to control and monitor devices or things over the Internet. ioBridge's technology is applied to a wide range of applications from simple environmental data logging to being integrated into consumer products or remotely controlling industrial systems. ioBridge's technology and services were used to develop one of the first connected pool systems as well as one of the first connected pet feeders. ioBridge had a successful private exit in 2014. The most popular ioBridge IoT platforms is ThingSpeak.com. ThingSpeak is now owned by MathWorks.



Consultant

Independent Consulting

Sep 2008 – Apr 2010 • 1 yr 8 mos

Ashland, MA

Former Chief Information Officer of American Tower Corporation providing independent consulting services.



CIO and Senior Vice President of Information Technology

American Tower Corporation

Jul 1999 – Aug 2008 • 9 yrs 2 mos

Boston, MA

Based on the success at UNIsite was hired as Vice President and Chief Information Officer by American Tower in 1999 to establish and build a new IT organization and to transfer technology developed at UNIsite. Grew the organization to 100 people with a budget of \$20M to support American Tower's very successful growth.

[See more positions](#) ✓

Education



University of KwaZulu-Natal

PhD, Electronic Engineering

1988 – 1991

Activities and Societies: Sub Warden (Resident Advisor) of John Bews Hall.



University of KwaZulu-Natal

Master of Science (MSc), Electrical and Electronics Engineering

1986 – 1987

Cum Laude



University of KwaZulu-Natal

Bachelor of Science (BSc), Electrical and Electronics Engineering

1982 – 1985

Cum Laude

EXHIBIT C

Exhibit C

Regarding Polaris PNT PBC President Warren Havens as manager of FCC radio spectrum licenses and systems, and related research, the following are examples.

1. Mr. Havens is the sole author of and has a depth of knowledge in the radio-systems and methods described in the following websites and all of the contents but for the publishes materials by listed other sources used in these websites: www.polarispnt.space and www.terranautx.com.
2. Mr. Havens was the originator, a contributor to, and the grant provider to the University of California Berkeley Study on high accuracy location wireless. Copy at: https://people.eecs.berkeley.edu/~kannanr/assets/project_loc/CHALOCBA.pdf. The Acknowledgements refer to a gift from ATLIS Wireless, LLC that was formed and managed by Havens, of Berkeley California to support various FCC-licensed spectrum based programs.
3. Mr. Havens was invited to, and prepared and submitted the following presentation to, the National Public Safety Telecommunications Counsel on certain new digital radio technologies and systems. Copy at: <http://www.npstc.org/download.jsp?tableId=37&column=217&id=1094&file=20080618-Havens-TETRA-v2.pdf>
4. Mr. Havens is the originator and author of “Advanced Railroad Wireless Using PTC as a Foundation...”. January 2014. By Warren Havens involving the 'Skytel' companies he managed. Copy at: <https://ecfsapi.fcc.gov/file/7521064429.pdf>
5. Mr. Havens is the originator, commissioned, and contributed to the paper: “LTE Deployments in the LMS band for ITS Radio Communications and Location,” by Nishith D. Tripathi, Ph. D. Copy at: <https://wireless2.fcc.gov/UlsEntry/attachments/attachmentViewRD.jsp?applType=search&fileKey=96967609&attachmentKey=18943468&attachmentInd=applAttach>
As this paper states, it was commissioned by the 'Skytel' companies (listed in item 4 above) managed by Mr. Havens. This paper is in FCC docket 06-49 regarding the LMS radio service.
6. Mr. Havens prepared the radio-frequency and licenses partition and disaggregation design for the Amtrak "corridor" license using AMTS spectrum shown in FCC records. See FCC DA 15-287 and related granted assignment applications, attached below with the corridor map.
7. Mr. Havens is the originator, commissioned and contributed to the study and paper: “Nationwide High Accuracy Positioning Infrastructure and Services, Including for Intelligent Transportation Systems: Background, Technology, Uses, Developments and Challenges. April 2, 2010, by C. Rizos to Skybridge Spectrum Foundation... Berkeley California (“SkyTel”). Copy at: <https://www.scribd.com/document/31932756/Chris-Rizos-to-Sky-Tel-Nationwide-High-Accuracy-Positioning-Infrastructure-and-Services-GNSS-Terrestrial-Including-for-Intelligent-Transportation-S>
8. Mr. Havens is the originator, commissioned and contributed the paper: Wireless for Railroads, by Ron Lindsay, 2011. Copy at: <https://www.scribd.com/document/53478557/Wireless-for-Railroads-By-Ron-Lindsey-April-2011>

Exhibit C
Item 6 - Attachment

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of	)	
	)	
National Railroad Passenger Corporation (d/b/a Amtrak)	)	File Nos. 0006590008, 0006591371,
	)	0006591407, 0006591411, 0006591789,
	)	0006591792, 0006591797, 0006591802,
	)	0006595882, 0006595960, 0006596057,
	)	0006596073, 0006596254, 0006596258,
	)	0006596264 and 0006596268
	)	
Request for Waiver of Certain Part 80 Automated Maritime Telecommunications System Rules to Implement Positive Train Control	)	WT Docket No. 11-27
	)	

ORDER

Adopted: March 4, 2015

Released: March 4, 2015

By the Deputy Chief, Mobility Division, Wireless Telecommunications Bureau:

I. INTRODUCTION

1. In this Order, we approve an assignment and lease of spectrum and grant a related request for waiver, which will enable the National Railroad Passenger Corporation (d/b/a Amtrak) to deploy a positive train control (PTC) system as required by the Rail Safety Improvement Act of 2008 (RSIA of 2008).¹ Together, the assignment and lease transactions will provide Amtrak critical spectrum coverage of an 18-mile wide corridor that runs nine miles on each side of Amtrak's rail lines from New York City to Washington, D.C., from New York City to Albany, New York, and from Philadelphia to Harrisburg, Pennsylvania.²

II. BACKGROUND

2. In December 2014, Environmental LLC and Skybridge Spectrum Foundation (collectively, the Assignors) filed the above-captioned applications seeking to assign portions,³ and lease other portions,⁴ of the geographic licenses for Automated Maritime Telecommunications System (AMTS) Stations WQCP801, WQID629, WQCP811 and WQJW652 to Amtrak. In conjunction with each application, Amtrak filed an essentially identical request for waiver of certain Part 80 rules (2014 Waiver

¹ Rail Safety Improvement Act of 2008, Pub. L. No. 110-432, 122 Stat. 4848 (2008).

² Amtrak previously procured spectrum for the New York City to Boston portion of the Northeast Corridor (NEC). More than 260 million passenger trips are made on the NEC each year, including more than 17 million trips by Amtrak passengers. The balance of these trips is provided by eight commuter railroads that share the NEC. See Northeast Corridor Fact Sheet, available at <http://nec.amtrak.com/node/321>, website last visited March 3, 2015.

³ FCC File Nos. 0006590008, 0006591371, 0006591407, and 0006591411 (filed Dec. 19, 2014).

⁴ FCC File Nos. 0006591789, 0006591792, 0006591797, and 0006591802 (filed Dec. 22, 2014); 0006595882, 0006595960, 0006596057, 0006596073, 0006596254, 0006596258, 0006596264, and 0006596268 (filed Dec. 26, 2014).

Request) to allow it to implement its PTC system, called an Advanced Civil Speed Enforcement System (ACSES). Amtrak amended the 2014 Waiver Request for all of its applications on February 25, 2015, and amended five applications on March 2, 2015 to more precisely define the geographic spectrum corridor.⁵

3. The AMTS service originally was intended to authorize specialized systems of coast stations providing integrated and interconnected marine voice and data communications.⁶ In 1997, the Commission amended its rules to permit AMTS licensees to provide commercial service to fixed and mobile units on land, under certain conditions.⁷ In 2007, the Commission amended its rules to permit AMTS licensees to provide private mobile radio service, as well as commercial service, to units on land.⁸

4. Pursuant to the RSIA of 2008,⁹ Amtrak is required, along with certain other commuter and freight railroads, to deploy interoperable PTC systems by December 31, 2015. Once implemented, PTC systems are designed to reduce the risk of rail accidents caused by human error, including train-to-train collisions, derailments caused by excessive speed, and unauthorized train movements in work zones. PTC wireless communications networks are intended to enable real-time information sharing between trains, rail wayside devices, and control centers, regarding train movement authorities, speed restrictions, train consist, position, and speed, and the state of signal and switch devices.

5. The nation's freight railroads have acquired substantial spectrum in the 220 MHz band (220 – 222 MHz) to implement PTC systems.¹⁰ Because Amtrak shares track with and operates on tracks nearby freight rail lines, it seeks spectrum as close to the 220 MHz band as possible to ensure that its own PTC system will be interoperable with the freight railroads' planned PTC systems. Amtrak, anticipating congestion in the 220 MHz band, identified Part 80 AMTS spectrum (217-218 MHz and 219-220 MHz) as the best option for its PTC system.¹¹

6. Amtrak filed the instant applications and request for waiver to implement its PTC system on its Northeast Corridor line from New York City to Washington, D.C., and other rail lines from Philadelphia to Harrisburg, Pennsylvania and from New York City to Albany, New York.¹² Amtrak seeks to use the spectrum for a private, exclusive-use, integrated communications and information system to coordinate and control train movements.

7. Amtrak's ACSES PTC system includes passive transponders buried under the tracks that connect to rail side and wayside base station controllers. These controllers, in turn, communicate vital information such as speed and location wirelessly to computers on locomotives and to Amtrak's central

⁵ FCC File Nos. 0006591789, 0006591792, 0006591797, 0006591802, and 0006596258.

⁶ See Amendment of Parts 2 and 80 of the Commission's Rules Applicable to Automated Maritime Telecommunications Systems (AMTS), *First Report and Order*, RM-5712, 6 FCC Rcd 437 (1991).

⁷ See Amendment of the Commission's Rules Concerning Maritime Communications, *Second Report and Order and Second Further Notice of Proposed Rule Making*, PR Docket No. 92-257, 12 FCC Rcd 16949, 16965 ¶ 24 (1997).

⁸ See Maritel, Inc. and Mobex Network Services, LLC, *Report and Order*, WT Docket No. 04-257, 22 FCC Rcd 8971 (2007) (*Flexibility Order*), *aff'd*, 25 FCC Rcd 533 (2010), *aff'd*, 26 FCC Rcd 2491, *review dismissed*, 26 FCC Rcd 16579 (2011).

⁹ See *supra* note 1.

¹⁰ See Request of PTC-220, LLC for Waivers of Certain 220 MHz Rules, *Memorandum Opinion and Order*, 24 FCC Rcd 8537 (WTB 2009); Application for Consent to the Assignment of a Five-Channel 220 MHz Nationwide License to the Association of American Railroads, *Order*, 18 FCC Rcd 24711 (WTB CWD 2003).

¹¹ See 2014 Waiver Request at 2.

¹² See *id.* at 1.

dispatch facilities. The system provides trains with status of tracks ahead and allows the rail traffic controller to manage the system by providing status of the tracks, switch positions, signal lights and location of work crews.¹³

8. To implement its PTC system, Amtrak seeks a waiver of the following rule sections:

- Section 80.92(a), which requires Part 80 licensees to monitor a frequency prior to transmitting;
- Section 80.105, which requires coast stations to receive calls from vessels and aircraft;
- Section 80.106, which requires mobile stations to receive calls from ships or aircraft;
- Section 80.123(a), which requires AMTS land stations to secure a letter authorizing the land station to communicate with the coast station;
- Section 80.123(b), which affords priority to marine communications;
- Section 80.123(c), which requires AMTS land stations to use the coast station call sign;
- Section 80.123(f), which provides that AMTS land stations may communicate only with public coast stations; and
- Section 80.385(a)(2), which divides AMTS spectrum into coast (base) station frequencies and ship (mobile) station frequencies.¹⁴

9. We note that in 2011, Amtrak filed a request for waiver of certain Part 80 rules to implement its planned PTC system in the AMTS bands.¹⁵ In WT Docket No. 11-27 the Commission sought comment solely on Amtrak's request for waiver and not on the merits of whether a specific prospective AMTS spectrum acquisition or lease would serve the public interest.¹⁶ Because Amtrak's 2014 Waiver Request supersedes its 2011 Waiver Request, we hereby dismiss the 2011 Waiver Request as moot and terminate WT Docket No. 11-27.

¹³ See, e.g., FCC File Nos. 0006590008, 0006591371, 0006591407 and 0006591411, Description of Transaction and Public Interest Statement at 2 (filed Dec. 19, 2014) (Transaction Description).

¹⁴ See 2014 Waiver Request at Attachment A. Amtrak notes that the Southern California Regional Rail Authority has requested similar waivers to implement a PTC system using AMTS spectrum in Southern California. See 2014 Waiver Request at note 10 (citing Request of the Southern California Regional Rail Authority for Waiver of Certain Part 80 Rules, FCC File No. 0004144435). Initially, the 2014 Waiver Request also requested waiver of 47 C.F.R. §§ 80.102(a), 80.123(d), 80.123(g), 80.475(c) and 80.479(c), but Amtrak withdrew the request with respect to those rules on February 25, 2015, after consultation with Commission staff.

¹⁵ See Request for Waiver (filed Jan. 3, 2011) (2011 Waiver Request).

¹⁶ The 2011 Waiver Request was placed on public notice on February 18, 2011. See Wireless Telecommunications Bureau Seeks Comment on National Railroad Passenger Corporation (Amtrak) Request for Waiver of Certain Part 80 Automated Maritime Telecommunications System (AMTS) Rules to Implement Positive Train Control (PTC), *Public Notice*, WT Docket No. 11-27, 26 FCC Rcd 1979 (WTB MD 2011). Commenters Association of American Railroads, Southern California Regional Rail Authority, Federal Railroad Administration, and PTC-220, LLC supported the request; commenters Hammett & Edison, Inc., Cohen Dippell and Everist P.C., and Skybridge Spectrum Foundation, ATLAS Wireless LLC, V2G LLC, Environmental LLC, Verde Systems LLC, Telesaurus Holdings GB LLC and Intelligent Transportation & Monitoring Wireless LLC opposed the request.

III. DISCUSSION

10. Section 1.925(b)(3) of the Commission's Rules provides that we may grant a waiver if it is shown that (a) the underlying purpose of the rule(s) would not be served or would be frustrated by application to the instant case, and grant of the requested waiver would be in the public interest; or (b) in light of unique or unusual circumstances, application of the rule(s) would be inequitable, unduly burdensome, or contrary to the public interest, or the applicant has no reasonable alternative.¹⁷ The Commission also may waive a rule, in whole or in part, on its own motion or on petition if good cause therefor is shown.¹⁸

11. Amtrak requests a waiver of the requirements to monitor before transmitting,¹⁹ to afford priority to marine communications,²⁰ and to use the coast station call sign²¹ because its PTC system is configured to transmit data, does not support voice communications, and cannot provide service to maritime communications.²² Amtrak notes that there are other public coast licensees in the area available to meet marine communications needs.²³ Amtrak also states that it has an agreement with the Assignors to ensure that the impact of its PTC operations to adjacent channel and co-channel operations is minimized.²⁴ We agree that waiver of these provisions is warranted.²⁵ Amtrak's proposed use of the AMTS frequencies will not jeopardize the maritime community's ability to meet its operational, safety, and security communications needs. Further, permitting the use of the subject frequencies for PTC operations will promote the efficient use of AMTS spectrum and serve the public interest by promoting railroad safety. We therefore waive these requirements.²⁶

¹⁷ 47 C.F.R. § 1.925(b)(3); *see also WAIT Radio v FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969). In addition, when the Commission amended its rules to permit AMTS stations to provide private correspondence service to units on land, it stated that the following factors would be considered in evaluating waiver requests: (a) whether the applicant will provide priority to maritime communications, (b) the distance of a proposed land mobile radio operation from the nearest navigable waterways, (c) the magnitude of divergence sought from specific Part 80 technical requirements, (d) whether alternative spectrum that could accommodate the proposed private land mobile radio (PLMR) or other land mobile radio service is unavailable or unsuitable for that purpose, and (e) whether grant of the waiver would benefit public safety or homeland security (including support of critical infrastructure). *See Flexibility Order*, 22 FCC Rcd at 8986-87 ¶ 26.

¹⁸ 47 C.F.R. § 1.3.

¹⁹ 47 C.F.R. § 80.92(a).

²⁰ 47 C.F.R. § 80.123(b).

²¹ 47 C.F.R. § 80.123(c).

²² *See* Transaction Description at 2.

²³ 2014 Waiver Request at 3.

²⁴ *Id.* at 4.

²⁵ Amtrak argues that the factors identified by the Commission support its request. *See* 2014 Waiver Request at 2-4. With respect to priority of marine-originating communications, it notes that marine traffic will still have access to other public coast stations in the area. *See also PacifiCorp, Order*, 27 FCC Rcd 5796, 5799 ¶ 3 (WTB MD 2009) (waiving priority requirement when sufficient other maritime spectrum was available). Amtrak also states that congestion on alternative land mobile spectrum, and the need to find spectrum in close spectral proximity to the 220 MHz Radio Service make AMTS spectrum the most effective spectrum for Amtrak's needs. Further, Amtrak's system is designed to protect both PTC operations and licensees adjacent to Amtrak from interference. Finally, Amtrak notes that the safe and efficient operation of passenger trains within the Northeast corridor is an important component of public safety.

²⁶ *See* PHI Service Company, *Order*, 29 FCC Rcd 8176, 8178 ¶ 7 (WTB MD 2014) (*PHI*) (waiving Sections 80.92(a) and 80.123(b) and (c) to permit use of AMTS spectrum in an electric utility's fixed system because the

(continued....)

12. Amtrak seeks waiver of the requirement that AMTS land stations secure a letter authorizing the land station to communicate with the coast station,²⁷ which enables authorities to verify that a unit on land is authorized to operate on AMTS spectrum. We previously granted such a request with respect to an electric utility's fixed data system.²⁸ We conclude that precedent is applicable here, for Amtrak's system is configured to transmit only data, and railroad operations take place in limited locations where the responsible party is easily identifiable. We therefore waive this requirement.

13. Amtrak also requests waiver of the requirements that base and mobile stations accept communications from ships and aircraft²⁹ and that AMTS land stations communicate only with public coast stations,³⁰ because the requirements are incompatible with its proposed operations. Amtrak's PTC system is a private, internal-use only system operating PTC mobile units, base stations and wayside stations to facilitate passenger rail services and cannot provide marine communications services.³¹ We conclude that permitting Amtrak's stations to communicate with stations other than public coast and ship stations will promote the efficient use of AMTS spectrum and serve the public interest by improving safety in railroad operations. We therefore waive these requirements.³²

14. Amtrak requests a waiver of the rule requiring coast (base) stations to transmit in the lower half of the AMTS band and ship (mobile) stations in the upper half.³³ Amtrak is acquiring and leasing spectrum in the lower half of the AMTS band only, and proposes to operate base, mobile, and wayside transmitters using that spectrum to provide information wirelessly to locomotives and rail traffic controllers.³⁴ Amtrak will operate in accordance with the antenna height and power levels permitted for AMTS stations,³⁵ thereby providing protection against interference to maritime operations. Additionally, the proposed limited geographical area of operation³⁶ and agreements ensuring Amtrak's PTC operations do not interfere with operations of co-channel or adjacent licensees will protect the parties from

(...continued from previous page)

system was configured to transmit only data and could not support voice communications, and the proposed operations did not jeopardize the maritime community's ability to meet its communications needs); *see also* Chesapeake Operating Inc., *Order*, 29 FCC Rcd 9272, 9276 ¶ 13 (WTB MD 2014) (*Chesapeake*) (similarly waiving Section 80.92(a) to permit use of AMTS spectrum in a PLMR system); Vermont Transco LLC, *Order*, 26 FCC Rcd 8820, 8821-22 ¶ 6 (WTB MD 2011) (*Transco*) (same).

²⁷ 47 C.F.R. § 80.123(a).

²⁸ *See PHI*, 29 FCC Rcd at 8179 ¶ 9. *But cf. Transco*, 26 FCC Rcd at 8822 ¶ 8 (denying such a request with respect to the mobile units in an electric utility's private land mobile radio system, because the applicant had not demonstrated that the requirement was burdensome).

²⁹ *See* 47 C.F.R. §§ 80.105, 80.106.

³⁰ *See* 47 C.F.R. § 80.123(f).

³¹ *See* Transaction Description at 2.

³² *See, e.g.,* County of Silverbow, Montana, *Order*, 24 FCC Rcd 12547, 12565 ¶ 41 (PSHSB PD 2009) (waiving Sections 80.105 and 80.106 to permit use of VHF Public Coast station frequencies in a Public Safety PLMR system); *Transco*, 26 FCC Rcd at 8822 ¶ 7 (waiving Section 80.123(f) to permit use of AMTS frequencies in an electric utility PLMR system, because the mobile units needed to communicate with stations other than public coast stations to support power utility operations).

³³ *See* 47 C.F.R. § 80.385(a)(2).

³⁴ *See* 2014 Waiver Request at 3.

³⁵ *See* 47 C.F.R. §§ 80.123(e), 80.215(e)(2), (h)(5)(i), (i).

³⁶ *See* 2014 Waiver Request at 2.

interference.³⁷ Because the proposed configuration will not affect other licensees any more than compliant base and mobile stations, we conclude that a waiver of this requirement is warranted.³⁸

15. Finally, Amtrak states that because it will observe the interference protection criteria for Channels 10 and 13 specified in the Commission's rules (including preparation of a plan to limit any interference to viewers near its rail lines), approval of the spectrum transactions and grant of the rule waivers will not harm operations on Channels 10 and 13.³⁹ We remind Amtrak that AMTS operations are authorized on the condition that no harmful interference will be caused to reception of existing television stations, and that particular requirements apply to base stations within 169 kilometers (105 miles) of a Channel 13 television station, or within 129 kilometers (80 miles) of a Channel 10 television station.⁴⁰

IV. CONCLUSION AND ORDERING CLAUSES

16. For the reasons stated above we find good cause to grant the rule waivers requested by Amtrak. Our finding of good cause to grant the requested rule waivers is inseparably tied to Congress' directive that Amtrak, as well as certain freight and commuter railroads, implement PTC safety systems and the substantial public interest benefits that will accrue from a nationwide interoperable rail safety network.⁴¹

17. Further, we find that the underlying purpose of the rule sections we waive above would not be served by application to the instant case, and that grant of the requested rule waivers would serve the public interest of all Americans in rail safety, including the safety of life and property.⁴² We also find that Congress' national rail safety mandate constitutes a unique and unusual circumstance, such that strict application of the rule sections we waive above would be contrary to the public interest.⁴³

18. Accordingly, IT IS ORDERED, pursuant to Sections 1, 4(i) and 309(a) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 154(i), 309(a), and Sections 1.3 and 1.925 of the Commission's Rules, 47 C.F.R. §§ 1.3, 1.925, that FCC File Nos. 0006590008, 0006591371, 0006591407, 0006591411, filed December 19, 2014, 0006591789, 0006591792, 0006591797, 0006591802, filed December 22, 2014, 0006595882, 0006595960, 0006596057, 0006596073, 0006596254, 0006596258, 0006596264, 0006596268, filed December 26, 2014, and the related Request for Waiver filed with each application and amended on February 25, 2015 by the National Railroad Passenger Corporation ARE GRANTED consistent with this *Order* and the Commission's Rules.

19. IT IS FURTHER ORDERED that the Request for Waiver filed by the National Railroad Passenger Corporation on January 3, 2011, WT Docket 11-27, IS DISMISSED AS MOOT, and WT Docket No. 11-27 IS TERMINATED.

³⁷ *Id.* at 4.

³⁸ See *Chesapeake*, 29 FCC Rcd at 9276 ¶ 12; *PHI*, 29 FCC Rcd at 8177 ¶ 8.

³⁹ 2014 Waiver Request at 4.

⁴⁰ See 47 C.F.R. §§ 80.215(h)-(h)(4), 80.475(a); see also, e.g., *Avista Corporation, Order on Reconsideration*, 27 FCC Rcd 5258, 5259-60 ¶ 5 (WTB MD 2013), review pending.

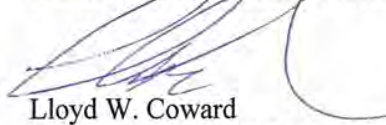
⁴¹ The Commission was formed "for the purpose of promoting safety of life and property through the use of wire and radio communication" 47 U.S.C. § 151.

⁴² 47 C.F.R. § 1.925(b)(3)(i).

⁴³ 47 C.F.R. § 1.925(b)(3)(ii).

20. This action is taken under delegated authority pursuant to Sections 0.131 and 0.331 of the Commission's Rules, 47 C.F.R. §§ 0.131, 0.331.

FEDERAL COMMUNICATIONS COMMISSION

A handwritten signature in blue ink, appearing to read 'Lloyd W. Coward', is written over the printed name.

Lloyd W. Coward
Deputy Chief, Mobility Division
Wireless Telecommunications Bureau

The following pages are not part of the preceding FCC Order but:

- list the FCC assignment and lease applications granted in the Order, and
 - depict the geographic aspects of these granted applications to provide for the Amtrak Positive Train Control system in the corridors shown.
-
- Warren Havens,
For the assignors/ lessors under the Order

ENL-SSF Assignment and Lease Apps to Amtrak *

App. File No.	Call Sign	Licensee*	License Area	Nature of Application	App Filed	PN
0006590008	WQCP810	ENL	North Atlantic	Assignment	12/19/14	12/24/14
0006591371	WQID629	SSF	North Atlantic	+	"	"
0006591407	WQCP811	ENL	Mid Atlantic	"	"	"
0006591411	WQJW652	SSF	Mid Atlantic	"	"	"
0006591789	WQCP810	ENL	North Atlantic	Short Term Spectrum Manager Lease	12/21/14	12/24/14
0006591797	WQID629	SSF	North Atlantic	"	"	"
0006591792	WQCP811	ENL	Mid Atlantic	"	"	"
0006591802	WQJW652	SSF	Mid Atlantic	"	"	"
0006595960	WQCP810	ENL	North Atlantic	Long Term De Facto Transfer Lease - Guardband	12/26/14	1/7/15
0006596254	WQID629	SSF	North Atlantic	"	"	"
0006596057	WQCP811	ENL	Mid Atlantic	"	"	"
0006596264	WQJW652	SSF	Mid Atlantic	"	"	"

0006595882	WQCP810	ENL	North Atlantic	Long Term De Facto Transfer Lease - Corridor	"	"
0006596258	WQID629	SSF	North Atlantic	"	"	"
0006596073	WQCP811	ENL	Mid Atlantic	"	"	"
0006596268	WQJW652	SSF	Mid Atlantic	"	"	"

* "ENL" means Environmental LLC (majority owned by Telesaurus VPC LLC, currently known as Verde Systems LLC).
 "SSF" means Skybridge Spectrum Foundation.

