

Exhibit 1



UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899-0001

MAY 09 2018

David Besson
3701 Overland Avenue #246
Los Angeles, CA 90034
dhbesson@gmail.com

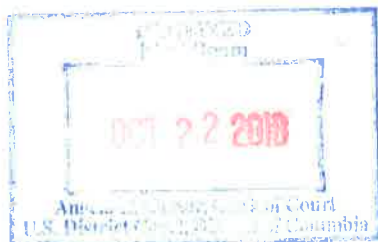
Dear Mr. Besson:

This acknowledges receipt of your May 8, 2018, Freedom of Information Act (FOIA) request to the National Institute of Standards and Technology (NIST) in which you requested:

"I am requesting a copy of the Cooperative Research and Development Agreement between NIST and Ligado Networks. The CRADA is referenced on this page of the NIST website: <https://www.nist.gov/programs-projects/impact-lte-signals-gps-receivers>. The section referencing the CRADA is copied below: "The project was conducted under a Cooperative Research and Development Agreement (CRADA) between NIST and Ligado Networks. A CRADA is the principal mechanism used by Federal laboratories to engage in collaborative efforts with non-Federal entities and allow the exchange of resources with private industry to advance technologies that can then be commercialized for the benefit of the public and the U.S. economy." The CRADA is also referenced in the Federal Register, Vol. 82, No. 76, April 21, 2017: <https://www.gpo.gov/fdsys/pkg/FR-2017-04-21/pdf/2017-08080.pdf>. The section referencing the CRADA is copied below: "The focus of this NASCTN project, proposed by Ligado Networks in 2016 and conducted under a CRADA between NIST and Ligado Networks, was the development of a test methodology to: (1) Investigate the impact of LTE signals on GPS devices that operate in the GPS L1 frequency band; and (2) perform radiated radio-frequency measurements on a representative set of GPS devices to validate the test methodology."

Your request was received at the FOIA Control Desk on May 8, 2018 and was assigned FOIA Log #DOC-NIST- 2018-001337.

FOIA allows agencies twenty working days to make a determination on the request. However, it may not always be possible to provide the documents within this time period. In some cases, we may take an extension and will advise you. Please be advised that your request may be subject to fees for search, review, and reproduction costs. Should this be the case, you will be given an estimate of the costs. Fee estimates are developed in good faith and are based on our reasonable judgment. However, due to the unique

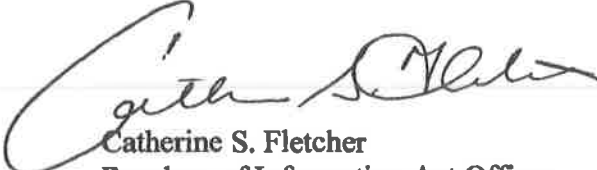


NIST

nature of each request and complexity of documents involved, actual costs to search and review the material may vary from the original estimate.

Elizabeth Reinhart, Management Analyst of my office, is the contact point for processing your request. If you have any questions regarding your pending FOIA request, she may be reached by email at foia@nist.gov or by phone (301) 975-8707.

Sincerely,



Catherine S. Fletcher
Freedom of Information Act Officer

Exhibit 2



UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899-0001

JUN 29 2018

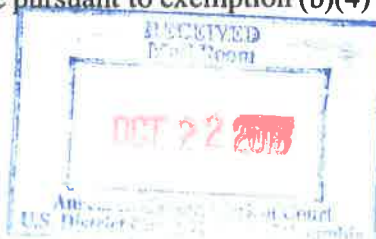
David Besson
3701 Overland Avenue #246
Los Angeles, CA 90034
dhbesson@gmail.com

Dear Mr. Besson:

This letter serves as the final response to your May 8, 2018 Freedom of Information Act (FOIA) request (DOC-NIST-2018-001337) to the National Institute of Standards and Technology (NIST) for:

"I am requesting a copy of the Cooperative Research and Development Agreement between NIST and Ligado Networks. The CRADA is referenced on this page of the NIST website: <https://www.nist.gov/programs-projects/impact-lte-signals-gps-receivers>. The section referencing the CRADA is copied below: "The project was conducted under a Cooperative Research and Development Agreement (CRADA) between NIST and Ligado Networks. A CRADA is the principal mechanism used by Federal laboratories to engage in collaborative efforts with non-Federal entities and allow the exchange of resources with private industry to advance technologies that can then be commercialized for the benefit of the public and the U.S. economy." The CRADA is also referenced in the Federal Register, Vol. 82, No. 76, April 21, 2017: <https://www.gpo.gov/fdsys/pkg/FR-2017-04-21/pdf/2017-08080.pdf>. The section referencing the CRADA is copied below: "The focus of this NASCTN project, proposed by Ligado Networks in 2016 and conducted under a CRADA between NIST and Ligado Networks, was the development of a test methodology to: (1) Investigate the impact of LTE signals on GPS devices that operate in the GPS L1 frequency band; and (2) perform radiated radio-frequency measurements on a representative set of GPS devices to validate the test methodology."

NIST has completed the actual search for responsive records and enclosed is one (1) document consisting of seventeen (17) pages that is being released with redactions pursuant to Exemption (b)(4) of the FOIA (5 U.S.C. Section 552(b)(4)) which exempts from disclosure "trade secrets and commercial or financial information obtained from a person and privileged or confidential." A number of records located either originated from or pertained to outside entities and contained information considered to be privileged or proprietary by the entities. Those records, or portions thereof, are being withheld from disclosure pursuant to exemption (b)(4) of the FOIA.



NIST

It was previously determined that you were in the “all other” requester category for which chargeable services include search and duplication of responsive documents excluding the cost of the first 2 hours of search and the first 100 pages of duplication. The actual search and duplication costs were under the chargeable threshold; thus, the document is being provided at no cost.

If you have questions or concerns or would like to discuss any aspect of your request, you may contact either the analyst who processed your request, Elizabeth Reinhart, Management Analyst at 301-975-8707, or me, the FOIA Public Liaison/Freedom of Information Act Officer, at 301-975-4074. We may also be reached at foia@nist.gov.

Please refer to your FOIA request tracking number, DOC-NIST-2018-001337, when contacting us.

In addition, you may contact the Office of Government Information Services (OGIS) at the National Archives and Records Administration to inquire about the FOIA mediation services they offer. The contact information for OGIS is as follows:

Office of Government Information Services
National Archives and Records Administration
8601 Adelphi Road-OGIS
College Park, MD 20740-6001
e-mail at ogis@nara.gov
telephone at 202-741-5770; toll free at 1-877-684-6448; facsimile at 202-741-5769.

You have the right to appeal this response to your FOIA request. An appeal must be received within 90 calendar days of the date of this response letter. Address your appeal to the following office:

Assistant General Counsel for Employment, Litigation, and Information
U.S. Department of Commerce
Office of the General Counsel, Room 5896
1401 Constitution Avenue N.W.
Washington, D.C. 20230

An appeal may also be sent by e-mail to FOIAAppeals@doc.gov or by FOIAonline, if you have an account in FOIAonline, at <https://foiaonline.regulations.gov/foia/action/public/home#>. The appeal should include a copy of the original request and initial denial, if any. All appeals should include a statement of the reasons why the records requested should be made available and why the adverse determination was in error.

The appeal letter, the envelope, and the e-mail subject line should be clearly marked “Freedom of Information Act Appeal.” The e-mail, FOIAonline and office mail are monitored only on

working days during normal business hours (8:30 a.m. to 5:00 p.m., Eastern Time, Monday through Friday). FOIA appeals posted to the e-mail box, FOIAonline, or office after normal business hours will be deemed received on the next normal business day. If the 90th calendar day for submitting an appeal falls on a Saturday, Sunday or legal public holiday, an appeal received by 5:00 p.m., Eastern Standard Time, the next business day will be deemed timely.

Sincerely,

A handwritten signature in black ink, appearing to read "Catherine S. Fletcher". The signature is fluid and cursive, with the first name being the most prominent.

Catherine S. Fletcher
Freedom of Information Act Officer

Attached:

One (1) electronic document / Seventeen (17) pages

Exhibit 3

CRADA Identification Number: CN-16-0054
Collaborator: Ligado Networks, LLC

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENT

Article 1. INTRODUCTION

- 1.1 This Cooperative Research and Development Agreement (CRADA or Agreement) is by and between the National Institute of Standards and Technology (NIST) and Ligado Networks, LLC (Collaborator), entered into by NIST pursuant to its authority under Title 15, United States Code, section 3710a. NIST and Collaborator are also hereinafter referred to individually as "Party" and collectively as "Parties."
- 1.2 The research and development project(s) which will be undertaken by the Parties in the course of this CRADA is detailed in the Statement of Work (SoW) in Appendix A. This CRADA shall be effective upon the date of the last signature of the Parties ("Effective Date") until the date identified in Appendix A.
- 1.3 Any exceptions or changes to the CRADA are set forth in Appendix B.

Article 2. DEFINITIONS

- 2.1 As used in this CRADA, the following terms shall have the indicated meanings:
- 2.2 "Background Invention" means any Invention of either Party conceived outside of this CRADA.
- 2.3 "CRADA Data" means all recorded information, including computer software, first produced in the performance of this Agreement.
- 2.4 "CRADA Invention" means any invention conceived under this CRADA. Inventions created from research continuing after the expiration date of the CRADA are not CRADA Inventions and are not covered by provisions of this Agreement. The License options of Article 7 do not apply to inventions conceived solely or jointly by NIST after the expiration date of the CRADA or in any period during which this CRADA or any subsequent extensions are not effective.
- 2.5 "Invention" means any invention or discovery which is or may be patentable or otherwise protected under Title 35 (35 U.S.C.) or any novel variety of plant which is or may be protectable under the Plant Variety Protection Act (7 U.S.C. 2321 *et seq.*).

Article 3. COOPERATIVE RESEARCH

- 3.1 **SoW and Project Details.** The SoW of this CRADA, its duration, and its objectives are detailed in Appendix A. The research under this CRADA shall be performed on a reasonable efforts basis. Collaborator certifies the correctness of the information it has provided in Appendix A.
- 3.2 **Principal Investigators and Project Team.** NIST shall be the supervising Federal agency, both administratively and scientifically, for this CRADA. The NIST Project Manager, identified in Appendix A, is responsible for the scientific and technical conduct of this project on behalf of NIST. Collaborator's Principal Investigator, identified in Appendix A, is responsible for the scientific and technical conduct of this project on behalf of Collaborator. In Appendix A, Collaborator shall identify its employees or associates working on its behalf and under its direction (collectively, Collaborator's "Project Team").
- 3.3 **Conduct.** Collaborator agrees that each member of its Project Team will abide by all applicable regulations, policies and procedures applicable to NIST personnel relating to safety, security, and conduct while on NIST property, and will adhere to applicable building and restricted area access controls.

Article 4. EQUIPMENT

- 4.1 Any devices, instruments, equipment or software (referred to herein collectively as "Equipment") purchased by NIST with funds provided by Collaborator shall be the property of NIST. All Equipment loaned by one Party to the other shall remain the property of the lending Party unless the Parties agree in

NIST CRADA NASCTN Template v2016.1
DC 6058111-1



CRADA Identification Number: CN-16-0054
Collaborator: Ligado Networks, LLC

writing on another disposition. Each Party's Equipment will be returned to the lending Party at the lending Party's expense and risk as soon as practical after termination of the Agreement.

Article 5. PROPRIETARY INFORMATION AND PUBLICATION

- 5.1 **Proprietary Information.** Each Party agrees to not disclose to the other Party any proprietary information under this CRADA.
- 5.2 **Mandatory Disclosures.** NIST's obligations are consistent with and do not supersede, conflict with, or otherwise alter the employee obligations, rights, or liabilities created by existing statute or Executive order relating to (1) classified information, (2) communications to Congress, (3) the reporting to an Inspector General of a violation of any law, rule, or regulation, or mismanagement, a gross waste of funds, an abuse of authority, or a substantial and specific danger to public health or safety, or (4) any other whistleblower protection. The definitions, requirements, obligations, rights, sanctions, and liabilities created by controlling Executive orders and statutory provisions are incorporated into this CRADA and are controlling.
- 5.3 **Publication.** Before either Party submits a paper or abstract for publication or otherwise intends to publicly disclose information about a CRADA Invention, or CRADA Data, the other Party shall be provided thirty (30) days to review the proposed publication or disclosure to ensure that no proprietary information or Protected Results are included therein.

Article 6. INTELLECTUAL PROPERTY

- 6.1 **Rights to Background Inventions.** No rights to Background Inventions are conveyed by this Agreement, other than the rights to NIST under Background Inventions as necessary for NIST to use any Equipment contributed to NIST under this Agreement.
- 6.2 **Reporting Inventions and Other Responsibilities.** Each Party shall promptly supply written disclosure to the other Party of any invention conceived or reduced to practice under the SoW. Such disclosures shall not be further disclosed to others by the receiving Party until such time as a patent or other intellectual property application claiming that CRADA Invention has been filed or the parties inform each other through Written Notice that they do not wish to pursue patent protection. Collaborator shall ensure that all Project Team members (a) promptly report any CRADA Inventions they make to Collaborator, and (b) sign any documents necessary or desirable for the filing and prosecution of patent applications. If any Project Team member is not Collaborator's employee, Collaborator shall require the member to agree in writing to assist Collaborator in fulfilling all of its patent responsibilities under this CRADA.
- 6.3 **CRADA Data.** NIST and Collaborator agree to exchange all CRADA Data in a timely manner during the conduct of the Project. NIST and Collaborator shall each have the right to use all CRADA Data for their own purposes, consistent with their obligations under this Agreement.
- 6.4 **Copyrights of CRADA Data.** Collaborator may elect to copyright scientific and technical publications, or those identifiable portions of a joint publication, developed solely by a Collaborator Project Team member. When Collaborator obtains a copyright, Collaborator shall affix the applicable copyright notice of 17 U.S.C. §§ 401, 402, and 403, and an acknowledgment of the scientific and technical contributions of the National Institute of Standards and Technology. Collaborator grants to the U.S. Government a paid-up, non-exclusive, irrevocable world-wide license to reproduce or have reproduced, prepare or have prepared in derivative form, and distribute or have distributed copies of publications and solely created CRADA Data for Government purposes. CRADA Data prepared by NIST employees, and CRADA Data prepared jointly by NIST employees and the Project Team, are not subject to copyright in the United States pursuant to section 105 of title 17 of the United States Code. NIST may, however, own copyright in jointly created, or solely created, publications and CRADA Data outside of the United States.
- 6.5 **Joint CRADA Inventions.** CRADA Inventions jointly conceived by the Parties shall be jointly owned by the Parties. If Collaborator does not file a U.S. Patent Application on a joint CRADA Invention within six (6) months after disclosure, NIST may file a U.S. Patent Application on such joint CRADA Invention. The non-filing Party shall reasonably cooperate and assist the filing Party in perfecting the patent application,

CRADA Identification Number: CN-16-0054
Collaborator: Ligado Networks, LLC

and the filing Party shall have the right to control the prosecution of the U.S. Patent Application. The Parties will consult with each other as to the advisability of filing for patent protection outside the U.S.

- 6.6 **CRADA Inventions Solely Developed.** Except for joint CRADA Inventions, each Party shall retain title to any CRADA Invention conceived by its employees or Project Team members. The Party retaining title to a CRADA Invention may file a U.S. Patent Application after consultation with the other Party. The owner of a CRADA Invention has no duty to file a U.S. or foreign patent application.
- 6.7 **Patent Expenses and Prosecution.** Prior to the filing of patent applications, the Parties shall agree as to which Party shall bear the expenses attendant to filing the applications. Each Party shall promptly provide the other Party with copies of Provisional Applications filed, Patent Applications filed and Office Actions bearing upon any CRADA Invention. Any post-filing and post-issue fees shall also be borne by the same Party.

Article 7. LICENSING

7.1 **Reservation of Government's Minimum Rights.**

- a. **NIST Sole Inventions and Joint Inventions.** Pursuant to the Federal Technology Transfer Act of 1986 as amended (15 U.S.C. 3710a (b)), NIST, on behalf of the United States Government, shall retain a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced CRADA Inventions solely conceived by NIST and CRADA Inventions jointly conceived by NIST and Collaborator, throughout the world by or on behalf of the Government.
- b. **Collaborator Sole Inventions.** Pursuant to the Federal Technology Transfer Act of 1986 as amended (15 U.S.C. 3710a (b)), Collaborator hereby grants to NIST, on behalf of the United States Government, a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced all CRADA Inventions solely conceived by Collaborator, throughout the world, by or on behalf of the Government for research or other Government purposes.

- 7.2 **Option for a Commercialization License.** NIST, on behalf of the Government, hereby grants to Collaborator an option to choose an exclusive or nonexclusive commercialization license to patents or patent applications claiming CRADA Inventions solely conceived by NIST or to NIST's interest in patents or patent applications on joint CRADA Inventions. The exclusive or nonexclusive license shall be limited to fields of use defined by the subject matter of the SoW found in Appendix A. The license will specify the licensed fields of use, geographic territory, markets, term and royalties. Additional terms and conditions shall be added to all licenses consistent with applicable statutes and regulations. The license will be based on mutually agreeable terms consistent with those conventionally granted in the field identified in the SoW for inventions with reasonably similar commercial potential. The royalty rates will reflect the relative contributions of the Parties to the CRADA Invention. All licenses granted under this Section are subject to the reservation of licenses in favor of the United States Government as set forth in Section 7.1.

- 7.3 **Exercise of License Option to NIST Sole CRADA Inventions.** The option of Section 7.2 for CRADA Inventions solely conceived by NIST must be exercised by written notice within three (3) months from the date on which NIST notifies Collaborator that it intends to file a non-provisional patent application. Exercise of the license option by Collaborator initiates a negotiation period that expires six (6) months after the written notice to exercise the license option has been received by NIST. This period may be extended for three (3) months, by mutual agreement of the Parties. If no agreement is concluded in this period, NIST shall be free to license its interest in such CRADA Inventions to others.

- 7.4 **Exercise of License Option to Joint CRADA Inventions.** The option of Section 7.2 for NIST's interest in CRADA Inventions jointly-conceived by the Parties must be exercised by written notice within three (3) months from the date on which NIST or Collaborator notifies the other Party that it intends to file a non-provisional patent application. Exercise of the license option by Collaborator initiates a negotiation period that expires six (6) months after the written notice to exercise the license option has been received by NIST. This period may be extended for three (3) months, by mutual agreement of the Parties. If no agreement is concluded in this period, NIST shall be free to license its interest in such CRADA Inventions to others.

Article 8. TERMINATION

- 8.1 **Termination Notices.** Collaborator and NIST each has the right to terminate this Agreement upon thirty (30) days written notice to the other Party.
- 8.2 **Termination After Change of Control.** NIST may terminate this Agreement immediately if direct or indirect control of Collaborator is transferred to a foreign company or government; or, if upon the Effective Date, Collaborator is controlled by a foreign company or government, that control is thereafter transferred to another foreign company or government.
- 8.3 **Interim Extension.** Upon written notice from Collaborator to NIST that it is the intent that the CRADA be amended, as provided in Section 11.5, to extend the term of the CRADA, the term of this Agreement shall be extended for ninety (90) days. The written notice shall be directed to the Director of NIST's Technology Partnerships Office. Such interim extension shall be available only once prior to the effective date of a written amendment extending the CRADA pursuant to Section 11.5.

Article 9. DISPUTES

- 9.1 **Settlement.** Any dispute arising under this Agreement, which is not disposed of by agreement of the Parties shall be submitted jointly to the signatories of this Agreement. A joint decision of the signatories or their designees shall be the disposition of such dispute. If the Parties cannot reach a joint decision, either Party may terminate this Agreement immediately.
- 9.2 **Continuation of Work.** Pending the resolution of any dispute or claim pursuant to this Article, the Parties agree that performance of all obligations shall be pursued diligently in accordance with the direction of the NIST Communications Technology Laboratory Director.

Article 10. LIABILITY

- 10.1 **Property.** The U.S. Government shall not be responsible for damage to any Equipment or other property of Collaborator that is loaned to NIST or is acquired by NIST pursuant to this Agreement.
- 10.2 **Indemnification.**
- 10.2.1 **Conduct of Employees.** Collaborator's Project Team assigned to this SoW are not employees of NIST. Collaborator shall indemnify and hold harmless the U.S. Government for any loss, claim, damage, or liability of any kind to Collaborator's Project Team arising in connection with this Agreement except to the extent that such loss, claim damage or liability arises from the gross negligence or wrongful acts of NIST or its employees. NIST's responsibility for payment of tort claims in connection with the performance of work under this Agreement is governed by the Federal Tort Claims Act.
- 10.2.2 **Collaborator's Use of NIST Research.** Collaborator shall indemnify and hold harmless the U.S. Government for any loss, claim, damage, or liability of any kind arising out of the use by Collaborator, or any Party acting on its behalf or under its authorization, of NIST's research and technical developments or out of any use, sale or other disposition by Collaborator or others acting on its behalf or with its authorization, of products made by the use of NIST's technical developments.
- 10.3 **Force Majeure.** Neither Party shall be liable for any unforeseeable event beyond its reasonable control not caused by the fault or negligence of such Party, which causes such Party to be unable to perform its obligations under this Agreement (and which it has been unable to overcome by the exercise of due diligence), including, but not limited to, flood, drought, earthquake, storm, fire, pestilence, lightning and other natural catastrophes, epidemic, war, riot, civic disturbance or disobedience, strikes, labor dispute, or failure, threat of failure, or sabotage of facility, or any order or injunction made by a court or public agency. In the event of the occurrence of such a force majeure event, the Party unable to perform shall promptly notify the other Party. It shall further use its best efforts to resume performance as quickly as possible

and shall suspend performance only for such period of time as is necessary as a result of the force majeure event.

- 10.4 **NO WARRANTY.** THE PARTIES MAKE NO EXPRESS OR IMPLIED WARRANTY AS TO ANY MATTER WHATSOEVER, INCLUDING THE CONDITIONS OF THE RESEARCH OR ANY INVENTION OR PRODUCT, WHETHER TANGIBLE OR INTANGIBLE, MADE OR DEVELOPED UNDER THIS AGREEMENT, OR THE OWNERSHIP, MERCHANTABILITY, NON-INFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE OF THE RESEARCH OR ANY INVENTION OR PRODUCT.

Article 11. MISCELLANEOUS

- 11.1 **No Benefits.** No member of, or delegate to, the United States Congress, or resident commissioner, shall be admitted to any share or part of this Agreement, nor to any benefit that may arise therefrom; but this provision shall not be construed to extend to this Agreement if made with a corporation for its general benefit.
- 11.2 **Governing Law.** The construction, validity, performance and effect of this Agreement for all purposes shall be governed by the laws of the United States.
- 11.3 **Entire Agreement.** This Agreement constitutes the entire agreement between the Parties concerning the subject matter hereof and supersedes any prior understanding or written or oral agreement relative to said matter.
- 11.4 **Headings.** Titles and headings of the Sections and Subsections of this Agreement are for the convenience of references only and do not form a part of this Agreement and shall in no way affect the interpretation thereof.
- 11.5 **Amendments.** If either Party desires a modification in this Agreement, the Parties shall, upon reasonable notice of the proposed modification by the Party desiring the change, confer in good faith to determine the desirability of such modification. Such modification shall not be effective until a written amendment is signed by all the Parties hereto by their representatives duly authorized to execute such amendment.
- 11.6 **Assignment.** Neither this Agreement nor any rights or obligations of any Party hereunder shall be assigned or otherwise transferred by either Party without the prior written consent of the other Party except that, subject to Section 8.2, Collaborator may assign this Agreement to the successors or assignees of a substantial portion of Collaborator's business interest to which this Agreement directly pertains.
- 11.7 **Notices.** All notices pertaining to or required by this Agreement shall be written notices, as defined in Section 2.9, and shall be directed by each Party to the contact for written notices identified by the other Party on the signature page of this document.
- 11.8 **Independent Parties.** The relationship of the Parties to this Agreement is that of independent entities and not as agents of each other or as joint venturers or partners. Each Party shall maintain sole and exclusive control over its personnel and operations.
- 11.9 **The Use of Name or Endorsements.** Neither Party shall use the name of the other Party on any advertisement, product or service which is directly or indirectly related to either this Agreement or any patent license or assignment agreement which implements this Agreement. By entering into this Agreement NIST and collaborator do not directly or indirectly endorse any product or service provided, or to be provided, by the other Party, its successors, assignees, or licensees. NIST and Collaborator shall not in any way imply that this Agreement is an endorsement of any such product or service.
- 11.10 **Duration of the Agreement.** It is mutually recognized that the duration of this project cannot be rigidly defined in advance and that the contemplated time periods for various phases of the SoW are only good faith guidelines subject to adjustment by mutual agreement to fit circumstances as the SoW proceeds. In no case will the term of this Agreement extend beyond the term specified in Appendix A unless the term is revised in accordance with Section 11.5, or Section 8.3.

CRADA Identification Number: CN-16-0054
Collaborator: Ligado Networks, LLC

no case will the term of this Agreement extend beyond the term specified in Appendix A unless the term is revised in accordance with Section 11.5, or Section 8.3.

- 11.11 **Full Execution.** Collaborator acknowledges that this CRADA is not an offer to enter into a contract and cannot unilaterally be made binding. No contract exists until this CRADA is fully executed and signed by all signatories of both Parties.
- 11.12 **Survivability.** The provisions of Articles 5, 6, 7, and 10, and Sections 11.2, 11.9 and 11.12 shall survive the expiration or termination of this CRADA.
- 11.13 **Export of Technical Data.** Collaborator agrees to comply with United States export laws and regulations, including, but not limited to, the International Traffic in Arms Regulations and the Department of Commerce Export Administration Regulations.

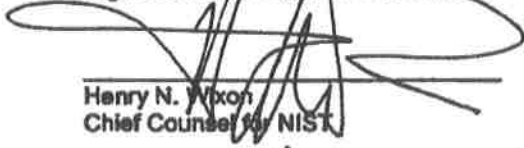
IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their duly authorized representatives as follows:

Signatory for Collaborator:

(b)(4)
[Redacted signature and name area]

(b)(4)
[Redacted signature and name area]

Signatories for National Institute of Standards and Technology:


Henry N. Nixon
Chief Counsel for NIST

8 JUL 2016
Date


Derek Orr
Acting Director, Communications Technology Laboratory

7/8/2016
Date


Paul Zielinski
Director, Technology Partnerships Office

7/5/16
Date

NIST's contact for written notices:

NIST Technology Partnerships Office
Attn: Director
100 Bureau Drive, Gaithersburg, MD 20899-2200
E-mail: ipp@nist.gov

Appendix A

I. PROJECT INFORMATION:

1. **Project Title:** **Measuring Impacts of Adjacent Band LTE Signals on GPS Performance**
(Either Party may publicly disclose this Project Title)

2. **Duration of the CRADA:** Effective Date to June 1, 2019.

3. **NIST's Project Manager:**

Sheryl M. Genco, Ph.D.
Communications Technology Laboratory
National Institute of Standards and Technology
325 Broadway, Mail Code 670.02
Boulder, Colorado 80305
Telephone: (303) 497-3591
Facsimile: (303) 497-6665
E-mail: sheryl.genco@nist.gov

4. **NIST Personnel:**

NIST Employees:

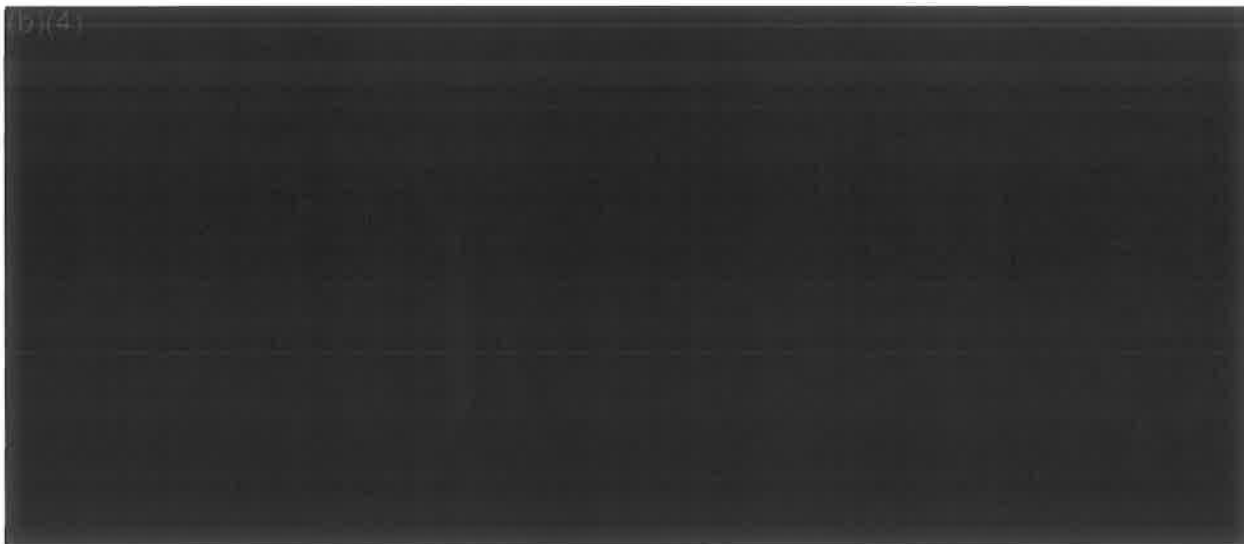
Sheryl M. Genco	sheryl.genco@nist.gov
William F. Young	william.young@nist.gov
Dan Kuester	daniel.kuester@nist.gov
John Ladbury	john.ladbury@nist.gov
Adam Wunderlich	adam.wunderlich@nist.gov
Michael Janzeic	michael.janzeic@nist.gov
Azizollah Kord	azizollah.kord@nist.gov

NIST Associates:

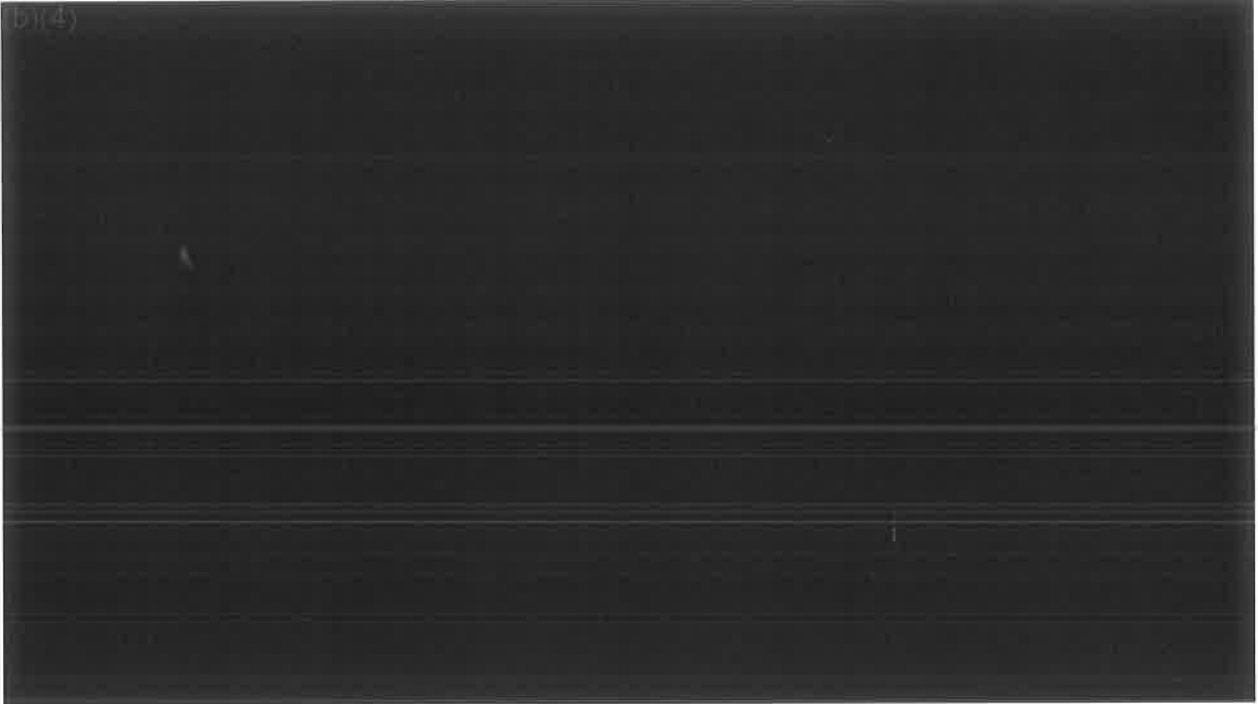
Duncan McGillivray	duncan.a.mcgillivray@nist.gov
Andre Rosete	andre.rosete@nist.gov
Audrey Puls	audrey.puls@nist.gov
Ryan Jacobs	ryan.jacobs@nist.gov

5. **Statement of Work (SoW):**

(NIST treats the non-public information in this SoW as Proprietary Information.)



CRADA Identification Number: CN-16-0054
Collaborator: Ligado Networks, LLC



6. The research to be conducted under this CRADA does not involve human subjects within the meaning of 15 CFR Part 27, or animal subjects within the meaning under 7 USC 2131et seq. and 9 CFR Parts 1, 2, and 3.

II. COLLABORATOR INFORMATION:

1. Collaborator's Principal Investigator:



2. Collaborator Eligibility: PLEASE CHECK THE ALL THE APPROPRIATE BOX(ES)

Collaborator certifies that it is incorporated or organized under the laws of one of the states or territories of the United States.

Collaborator certifies that it is not directly or indirectly controlled by a foreign government or foreign company.

Collaborator certifies that it is partially or wholly owned by the following foreign government:

Collaborator certifies that it is not owned by any government, but organized under the laws the following foreign country: _____

Collaborator certifies that it is directly or indirectly controlled by a foreign company (please also specify country): _____

CRADA Identification Number: CN-16-0054
Collaborator: Ligado Networks, LLC

Collaborator certifies that it has a manufacturing presence in the United States.

3. **Receipt of Federal Funds:** Collaborator receives Federal funds related to the SoW from the following Federal source(s):

Source(s) of federal funds: _____
Contract(s) or Grant Number(s): _____

Not Applicable. Collaborator does not receive any federal funds.

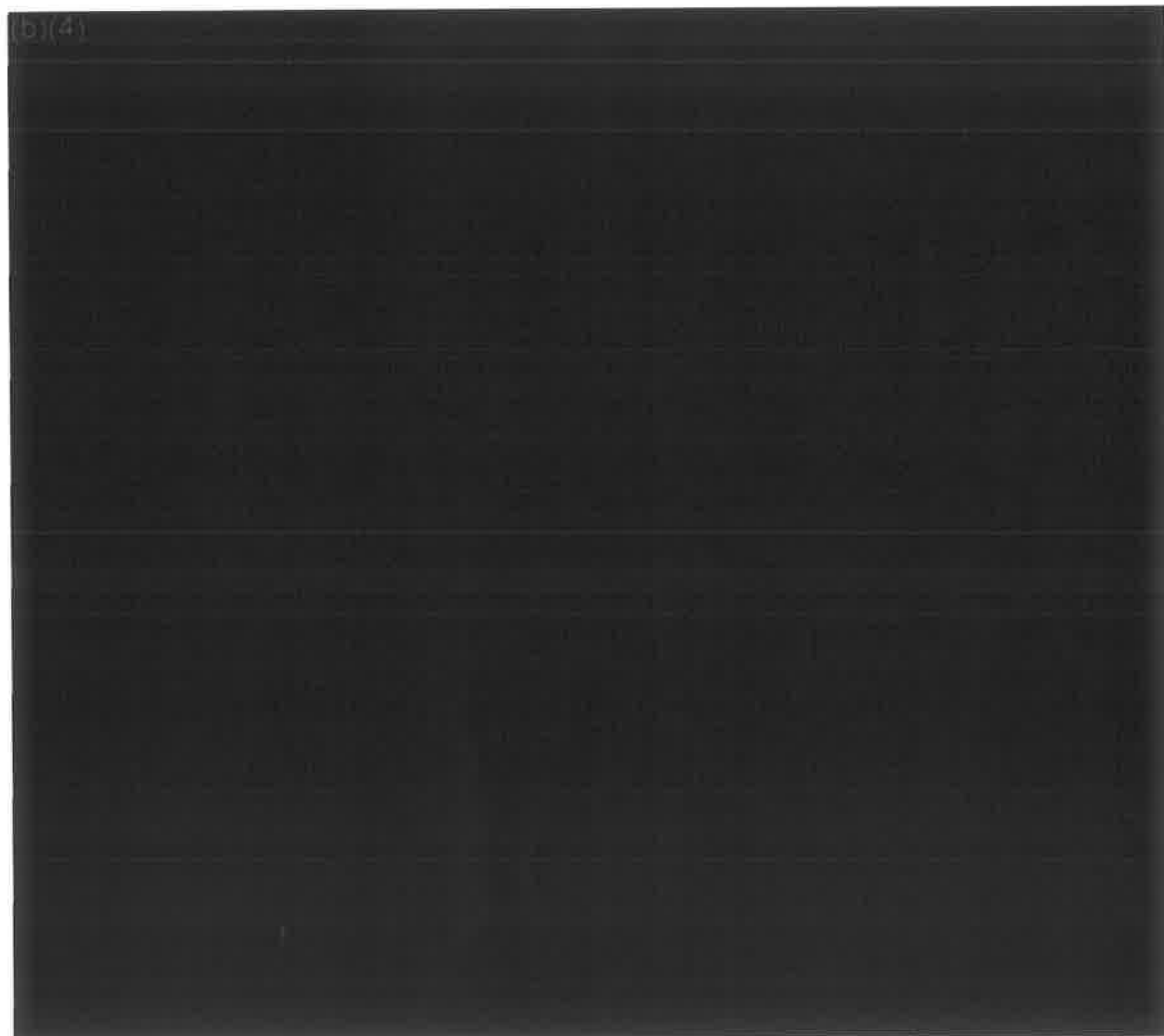
4. **Collaborator's Project Team:**

(b)(4)



5. **Collaborator's Contributions:**

(b)(4)



CRADA Identification Number: CN-16-0054
Collaborator: Ligado Networks, LLC

6. Collaborator's Funding Contribution:

(b)(4)



**Appendix B
Exceptions or Changes to CRADA Terms**

Section 2.6 (Protected Results) is added to Article 2 (Definitions):

- 2.6 "Protected Results" means the portion of the CRADA Data that results from the Test Plan, including the information identifying which CRADA Data is attributable to a specific manufacturer, Equipment or part number, and that would be a trade secret or commercial or financial information that is privileged or confidential if the information had been obtained from Collaborator.

Section 2.7 (Test Plan) is added to Article 2 (Definitions):

- 2.7 "Test Plan" means the written document developed under this CRADA by the Parties that outlines the methods and systems that the Parties will employ to test the Equipment.

Section 2.8 (Anonymized Results) is added to Article 2 (Definitions):

- 2.8 "Anonymized" means that the CRADA Data does not identify which specific manufacturer, Equipment name or part number resulted in such CRADA Data.

Section 3.4 (NIST Associate) is added to Article 3 (Cooperative Research):

- 3.4 Collaborator acknowledges and agrees that certain NIST Associates, including post-doctoral researchers and students ("NIST Associates") will work with NIST's team on the research activities described in the SoW. The NIST Associates are non-federal researchers, and are not employees of the U.S. Government. NIST shall only be responsible for NIST employees to the extent allowable under the Federal Torts Claim Act.

Section 5.3 (Protected Results) is added to Article 5 (Proprietary Information and Publication) and the remaining sections are renumbered accordingly:

5.3 Protected Results.

- (a) Under the authority granted in 15 U.S.C. § 3710a(c)(7)(B), NIST agrees not to disclose any Protected Results until three (3) months after NIST provides a final report of the CRADA Data ("Final Report") to Collaborator, until mutually agreed upon by the Parties in advance, or until Collaborator first publishes any Protected Results, or until five (5) years from the creation of such Protected Results, whichever is earlier. NIST further agrees not to disclose the portion of the Protected Results that identify which CRADA Data is attributable to a specific manufacturer, Equipment name or part number for a period of five (5) years after development of the Protected Results. For the periods of time designated in this Section, NIST will treat the Protected Results as exempt from disclosure under the provisions of Subchapter II of Chapter 5 of Title 5, United States Code (FOIA).
- (b) Notwithstanding the periods stated in Section 5.4(a), the Parties agree that NIST may disclose any CRADA Data, including Protected Results, to the NIST Associates. Collaborators agree that NIST is not responsible for any misuse of Protected Results by any NIST Associate.
- (c) The Parties agree that NIST may disclose Anonymized CRADA Data, including Anonymized Protected Results, to other Federal employees in accordance with Section 5.4(b) with notice that the Anonymized CRADA Data is for official use only and is not for public disclosure until the Parties first publish the Final Report or until five (5) years after the creation of such Anonymized CRADA Data, whichever is first.
- (d) The Parties agree that certain CRADA Data is not to be treated as Protected Results and that NIST may publicly disclose the following:
- I. General information regarding lessons learned during the performance of the research in the SoW;

CRADA Identification Number: CN-16-0054
Collaborator: Ligado Networks, LLC

- ii. Information regarding testing methods employed by NIST under the SoW;
- iii. The list of all Equipment used in the Test Plan; and
- iv. The Test Plan.

Section 5.3 (Publication) is replaced in its entirety with the following Section 5.4 (Publication and Reports):

5.4 Publication and Reports. Before either Party submits a paper or abstract for publication or otherwise intends to publicly disclose information about a CRADA Invention, or CRADA Data, the other Party shall be provided a reasonable opportunity to review the proposed publication or disclosure. The Parties intend to publicly disclose the Anonymized CRADA Data as a Final Report after approval by NIST in accordance with NIST's publication policies.

- (a) **CRADA Data to Collaborator.** NIST will provide an oral briefing to Collaborator on the Anonymized CRADA Data and on the status of a preliminary report before providing such report to any other Party. Interim updates on the status of the CRADA Data will be presented to Collaborator during weekly project status meetings to be held between the NIST Project Manager and Collaborator.
- (b) **CRADA Data to Federal Employees.** NIST will provide an oral briefing of the Anonymized CRADA Data, including Anonymized Protected Results, to certain Federal employees and to Collaborator no later than three (3) months from the Effective Date. The contents of this oral briefing will be at the discretion of NIST. The Parties agree that no documentation will be provided during this oral briefing. If at any time during the project, NIST believes the schedule for delivery of the briefing on the preliminary report could extend beyond three (3) months from the Effective Date, the NIST Project Manager will immediately notify Collaborator in writing of the potential delay. The notification shall include a detailed description of all of the causes of the potential delay and the term of the delay. In the event a delay cannot be prevented, NIST will provide an interim briefing on the preliminary report that will provide the then-current status of the project and the CRADA Data obtained to date.
- (c) **Final Report.** NIST will submit the Final Report for NIST's publication review. After NIST's publication review process is complete, NIST will provide the Final Report to Collaborator. The Final Report will then be released to the public either three (3) months after NIST provides it to Collaborator or after Collaborator first discloses the Final Report, whichever occurs first.

Section 6.8 (NIST Associate Inventions) is added to Article 6 (Intellectual Property):

6.8 NIST Associate Inventions. Pursuant to Title 35, United States Code, Chapter 18, Sections 200 *et seq.* (Bayh Dole Act) or other provision of law, the employer of a NIST Associate may be entitled to elect to retain ownership of its interest in any invention conceived by the NIST Associate in the performance of research activities under this Agreement. Any ownership right devolving from a NIST Associate's inventorship is not subject to the provisions of this Agreement.

CRADA Identification Number: CN-16-0034, AMD1
Collaborator: Ligado Networks, LLC

AMENDMENT 1

In accordance with Section 11.5 (Amendments) of the Cooperative Research and Development Agreement (CRADA) executed on July 8, 2016, between Ligado Networks, LLC (Collaborator) and the National Institute of Standards and Technology ("NIST"), Collaborator and NIST agree that the CRADA is modified as follows:

- In Appendix A, Section 4 (NIST Personnel), the following changes are made: Marc Weiss is added as a NIST Associate; Ari Feldman, Wen-Bin Yang, Michael Souryal and Michael Kelley are added as a NIST Employees, and Duncan McGillivray is listed as a NIST Employee instead of a NIST Associate, so that the lists read as follows:

NIST Employees:

Sheryl M. Genco	sberyl.genco@nist.gov
William F. Young	william.young@nist.gov
Dan Kuester	daniel.kuester@nist.gov
John Ladbury	john.ladbury@nist.gov
Adam Wunderlich	adam.wunderlich@nist.gov
Michael Janzolic	michael.janzolic@nist.gov
Azizollah Kord	azizollah.kord@nist.gov
Ari Feldman	ari.feldman@nist.gov
Duncan McGillivray	duncan.a.mcgillivray@nist.gov
Wen-Bin Yang	wen-bin.yang@nist.gov
Michael Souryal	michael.souryal@nist.gov
Michael Kelley	michael.kelley@nist.gov

NIST Associates:

Andre Rosete	andre.rosete@nist.gov
Audrey Puls	audrey.puls@nist.gov
Ryan Jacobs	ryan.jacobs@nist.gov
Marc Weiss	marc.weiss@nist.gov

- In Appendix A, Section 5 (Collaborator's Contributions), the first sentence is replaced with the following sentence to make a correction to a typographical error in the funding amount.

(b)(4)

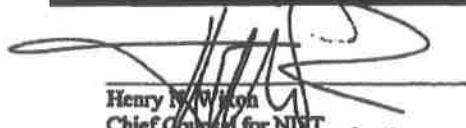
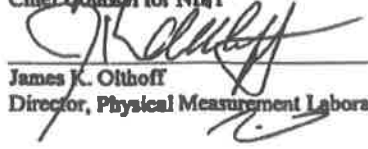


All other terms and conditions contained in the Agreement remain in full force and effect.

IN WITNESS WHEREOF, the Parties have caused this Amendment to be executed by their duly authorized representatives as follows:

Signed for the Collaborator:

(b)(4)

Signed for NIST:

	30 SEP 2016
Henry M. Wilson Chief Counsel for NIST	Date
	10/5/16
James K. Othoff Director, Physical Measurement Laboratory	Date
	10/6/16
Paul R. Zielinski Director, Technology Partnerships Office	Date
	10/6/16
Dereck Orr Acting Director, Communications Technology Laboratory	Date

CRADA Identification Number: CN-14-0054, AMD2
Collaborator: Ligado Networks, LLC

AMENDMENT 2

In accordance with Section 11.5 (Amendments) of the Cooperative Research and Development Agreement (CRADA) executed on July 8, 2016, between Ligado Networks, LLC (Collaborator) and the National Institute of Standards and Technology ("NIST"), Collaborator and NIST agree that the CRADA is modified as follows:

- 1. In Appendix B, Section 5.4(c) (Final Report) is replaced with the following:

Final Report. NIST will submit the Final Report for NIST's publication review. After NIST's publication review process is complete, NIST will provide the Final Report to Collaborator and release it to the public.

All other terms and conditions contained in the Agreement remain in full force and effect.

IN WITNESS WHEREOF, the Parties have caused this Amendment to be executed by their duly authorized representatives as follows:

Signed for the Collaborator:

(b) (4)


Signed for NIST:

Melissa L. F. HNW 11/10/2016
Henry N. Wisoh
Chief Counsel for NIST Date

Derek Orr 11/10/2016
Derek Orr
Acting Director, Communications Technology Laboratory Date

Paul R. Zielinski 11/10/17
Paul R. Zielinski
Director, Technology Partnerships Office Date

CRADA Identification Number: **CR-16-0854, AMDS**
Collaborator: **Ligado Networks, LLC**

AMENDMENT 3

In accordance with Section 11.5, Amendments, of the Cooperative Research and Development Agreement executed on July 8, 2016 (CR-16-0854, hereinafter referred to as "Agreement") between Ligado Networks, LLC ("Collaborator") and the National Institute of Standards and Technology ("NIST"), Collaborator and NIST agree that the Agreement is amended as follows:

1. Section 1.1 is changed to add National Telecommunications and Information Administration and ProTivo, Inc. as signatories to the Agreement, and now reads as follows:

1.1 This Cooperative Research and Development Agreement (CRADA or Agreement) is by and between the National Institute of Standards and Technology (NIST), Ligado Networks, LLC (Collaborator), the National Telecommunications and Information Administration (NTIA), and ProTivo, Inc. (ProTivo), entered into by NIST pursuant to its authority under Title 15, United States Code, section 3710a. NIST and Collaborator are also hereinafter referred to individually as "Party" and collectively as "Parties."

2. Section 3.5 (NIST Contractors) is added to Article 3:

Collaborator acknowledges and agrees that non-federal researchers ("NIST Contractors"), who are not employees of NIST, may work with NIST to perform research activities described in the SoW. The NIST Contractors are identified in Appendix A. NIST shall only be responsible for NIST employees to the extent permitted by the Federal Tort Claims Act.

3. In Appendix B, Section 5.3(a) is replaced with the following:

(a) Under the authority granted in 15 U.S.C. § 3710a(c)(7)(B), NIST and NTIA agree not to disclose any Protected Results until three (3) months after NIST provides a final report of the CRADA Data ("Final Report") to Collaborator, until mutually agreed upon by the Parties in advance, or until Collaborator first publishes any Protected Results, or until five (5) years from the creation of such Protected Results, whichever is earlier. NIST and NTIA further agree not to disclose the portion of the Protected Results that identify which CRADA Data is attributable to a specific manufacturer, Equipment name or part number for a period of five (5) years after development of the Protected Results. For the periods of time designated in this Section, NIST and NTIA will treat the Protected Results as exempt from disclosure under the provisions of Subchapter II of Chapter 5 of Title 5, United States Code (FOIA).

4. In Appendix B, Section 5.3(b) is replaced with the following:

5.3 (b) Notwithstanding the periods stated in Section 5.3(a), the Parties agree that NIST may disclose any CRADA Data, including Protected Results, to the NIST Associates, NTIA Personnel, and ProTivo Personnel. Collaborator agrees that NIST is not responsible for any misuse of Protected Results by any NIST Associates, NTIA Personnel, or ProTivo Personnel.

5. Section 5.3(c) is added to Appendix B as follows:

5.3 (c) ProTivo Personnel shall treat the Protected Results as confidential by using the same degree of care, but no less than a reasonable degree of care, to prevent the unauthorized use, dissemination or publication of the Protected Results as ProTivo uses to protect their own confidential information of a like nature. ProTivo shall not disclose the Protected Results to any other employees, contractors, students, and affiliates other than those who are listed on the Agreement, and who are legally obligated to honor the confidentiality provisions herein.

CRADA Identification Number: CN-16-0054, AMDS
Collaborator: Ligado Networks, LLC

6. The following Section 6.9 (NIST Contractor Invention) is added:

- 6.9 Pursuant to Chapter 18 of Title 35, United States Code (commonly referred to as the Bayh-Dole Act), a NIST Contractor may elect to retain title to any subject invention conceived by the NIST Contractor under the NIST Contractor's funding agreement. An ownership right devolving from a NIST Contractor's election is not subject to the provisions of this Agreement.

7. In Appendix A, I. Project Information, the following is added as 4.1 (NTIA Personnel):

4.1 NTIA Personnel:

Ed Drozda	EDrozda@ntia.doe.gov
Paige Athien	PAAthien@ntia.doe.gov
Peter Tashina	PTashina@ntia.doe.gov
William Doonan	WDoonan@ntia.doe.gov
Cou-Way Wang	CWang@ntia.doe.gov
Jeffrey Devesaux	JDevesaux@ntia.doe.gov
Nicholas LaSorte	NLaSorte@ntia.doe.gov

8. In Appendix A, I. Project Information, the following is added as 4.2 (NIST Contractors):

4.2 NIST Contractors:

Project Personnel: Galen Koopke Galen.koopke@nist.gov

[Signatures follow on next page]

CRADA Identification Number: CN-16-0034, AMED
Collaborator: Ligata Networks, LLC

All other terms and conditions contained in the Agreement shall remain in full force and effect.

IN WITNESS WHEREOF, the Parties have caused this Amendment to be executed by their duly authorized representatives as follows:

Signed for the Collaborator:




Signed for NIST:

 1-30-17
Date

Henry N. Wilson
Chief Counsel for NIST

 1/31/17
Date

Derek Cox
Acting Director, Communications Technology Laboratory

 1-30-17
Date

Paul R. Zelinicki
Director, Technology Partnerships Office

Signed for the NTIA:

 1/31/17
Date

Felipe Atkins
Associate Administrator
Office of Spectrum Management

Read and Acknowledged by:

 1/31/2017
Date

Galen Koepke, Prothro, Inc.

Exhibit 4



David Besson <dhbesson@gmail.com>

FOIA Appeal DOC-OS-2018-001700 Submitted

mbogomolny@doc.gov <mbogomolny@doc.gov>
To: "dhbesson@gmail.com" <dhbesson@gmail.com>

Sat, Jun 30, 2018 at 9:46 AM

This message is to notify you of a new appeal submission to the FOIAonline application. Appeal information is as follows:

- Appeal Tracking Number: DOC-OS-2018-001700
- Request Tracking Number: DOC-NIST-2018-001337
- Requester Name: David Besson
- Date Submitted: 06/30/2018
- Appeal Status: Submitted
- Description: I am appealing the redaction that NIST applied to FOIA DOC-NIST-2018-001337 under the authority of 5 USC 552(b)(4) which states "This [FOIA] section does not apply to... trade secrets and commercial or financial information obtained from a person and privileged or confidential." My appeal is based on three justifications.

(1) Section 5.1 of the CRADA (CN-16-0054) states that "Each party agrees to not disclose to the other Party any proprietary information under this CRADA." Therefore none of the redacted sections in the response to FOIA DOC-NIST-2018-001337 contain proprietary information.

(2) The public NIST website (link copied below) contains copies of the following documents related to the work accomplished under the CRADA (CN-16-0054): NASCTN GPS Project Final Briefing, June 2017 Briefing to PNT Advisory Board, NASCTN Report 1 - Impact of LTE on GPS, Measurement Data Request Form, Revised Test Plan, Draft Test Plan, and Adjudicated Comments. The fact that this information is public should invoke 15 CFR 4.9(h)(2) which states "The notice requirements of paragraphs (d) and (g) of this section shall not apply if: The information has been lawfully published or has been officially made available to the public."

<https://www.nist.gov/programs-projects/impact-lte-signals-gps-receivers>

(3) The extent of the redaction by NIST and/or the submitter should have been deemed frivolous by NIST under 15 CFR 4.9(h)(4) which states "The designation made by the submitter under paragraph (c) of this section appears obviously frivolous." The redacted blocks on pages 6, 7, 8, 9, 10, 13, 14, and 17 are a frivolous attempt by NIST and/or the submitter to mask all of the submitter's specific involvement in CRADA (CN-16-0054) .

For those reasons - and/or any others that the appeal authority deems applicable - NIST should release a completely unredacted copy of the CRADA (CN-16-0054) in response to FOIA DOC-NIST-2018-001337.