

MEMORANDUM OF UNDERSTANDING
BETWEEN
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN F. KENNEDY SPACE CENTER
AND THE UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
FOR PLANT PROPAGATION RESEARCH

ARTICLE 1. AUTHORITY AND PARTIES

The National Aeronautics and Space Administration John F. Kennedy Space Center, located at Kennedy Space Center, FL 32899 (hereinafter referred to as "NASA" or "NASA KSC") enters into this Agreement in accordance with 51 U.S.C. § 20113(e). The United States Department of Agriculture, Agricultural Research Service, located at 10300 Baltimore Ave., Bldg. 003, Beltsville, MD 20705-2325 (hereinafter referred to as "USDA-ARS"), enters into this Agreement in accordance with 7 U.S.C. § 3318(b). NASA and USDA-ARS may be individually referred to as a "Party" and collectively referred to as the "Parties."

ARTICLE 2. PURPOSE

NASA KSC and USDA-ARS wish to conduct research and develop technologies for fruit production, plant growth, and plant propagation that are compatible with spaceflight conditions. The work will build on previously USDA-ARS developed early flowering plums (FT1 genetically transformed lines) that have no dormancy and can continually produce fruit. Plums and related fruits could provide high value, fresh foods to supplement the pre-packaged space foods, and provide compounds that could counter the loss of bone mass.

The goals of the proposed research are to optimize plum material and growing conditions that minimize space and resource requirements, while reducing harvest time and optimizing yields. A second line of research will focus on a USDA-ARS identified TC09 fungus for promoting plant growth in atmospherically closed environments. The TC09 testing could enable dramatic improvements in crop yields in controlled environments and further our understanding of the plant microbial interactions. As part of this effort, the Parties will develop plans for future space flight testing. The Parties will conduct research in a working biotechnology laboratory located in the Land Pavilion at the Experimental Prototype Community of Tomorrow (EPCOT), a theme park at Walt Disney World Resort in Lake Buena Vista, Florida. USDA-ARS in coordination with Disney Worldwide Services, Inc. through a cooperative agreement conduct research at the biotechnology laboratory with tissue culture, plant propagation and genetic transformation of crops. The Land Pavilion sits on the western side of "Future World" at EPCOT. In addition to being an entertainment venue, the biotechnology laboratory is also a demonstration, production, and research facility for areas such as experimental horticulture techniques in hydroponics, irrigation methods, and integrated pest

management and is on view to the public through the EPCOT "Living with the Land" boat ride/show.

ARTICLE 3. RESPONSIBILITIES

A. NASA KSC will use reasonable efforts to:

1. Collaborate with USDA-ARS to define research to be conducted in the Biotechnology Laboratory at EPCOT.
2. Review and finalize research plans with USDA-ARS.
3. Provide expertise to conduct research at the biotechnology laboratory at EPCOT.
4. Provide general lab supplies required for research.
5. Provide support for any mutually agreed upon tours.
6. Collaborate with USDA-ARS on analysis of test data and research results.
7. Collaborate with USDA-ARS on identifying additional research study opportunities utilizing available ground analog facilities and flight research platforms such as the International Space Station (ISS).
8. Collaborate and review performance reports that will be submitted to the USDA-ARS Principal Investigator.

B. USDA-ARS will use reasonable efforts to:

1. Collaborate with NASA KSC to define research to be conducted in the biotechnology laboratory at EPCOT.
2. Review and finalize research plans with NASA KSC.
3. Provide expertise to conduct research at the biotechnology laboratory at EPCOT.
4. Provide general lab supplies required for research.
5. Provide support for any mutually agreed upon tours, and coordinate concurrence with Disney Worldwide Services, Inc.
6. Provide assistance with badging required to gain access to the EPCOT biotechnology laboratory.
7. Collaborate with NASA KSC on analysis of test data and research results.
8. Collaborate with NASA KSC on identifying additional research study opportunities utilizing available ground analog facilities and flight research platforms such as the ISS.
9. Collaborate and review performance reports that will be submitted to the NASA KSC Principal Investigator.

ARTICLE 4. SCHEDULE AND MILESTONES

The planned major milestones for the activities defined in the "Responsibilities" Article are as follows:

Strategic planning meeting to review/assess joint plant research studies and plan for upcoming cooperation	Within two (2) weeks from last signature on this Agreement; annually thereafter
Prepare and/or review test plan for research to be conducted in the EPCOT biotechnology laboratory	Within one (1) month from last signature on this Agreement; annually thereafter
Bi-monthly status telecons	Bi-monthly from strategic planning meeting
Midyear Technical Exchange meetings to discuss research and report progress	Six (6) months from strategic planning meeting; annually thereafter
Submit joint results and review of partnership activities	One (1) year from strategic planning meeting; annually thereafter

ARTICLE 5. FINANCIAL OBLIGATIONS

There will be no transfer of funds between the Parties under this Agreement and each Party will fund its own participation. All activities under or pursuant to this Agreement are subject to the availability of funds, and no provision of this Agreement shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act (31 U.S.C. § 1341).

ARTICLE 6. PRIORITY OF USE

Any schedule or milestone in this Agreement is estimated based upon the Parties' current understanding of the projected availability of its respective goods, services, facilities, or equipment. In the event that either Party's projected availability changes, NASA or USDA-ARS, respectively, shall be given reasonable notice of that change, so that the schedule and milestones may be adjusted accordingly. The Parties agree that each Party's use of its own goods, services, facilities, or equipment shall have priority over the use planned in this Agreement.

ARTICLE 7. LIABILITY AND RISK OF LOSS

Each Party agrees to assume liability for its own risks arising from or related to activities conducted under this Agreement.

ARTICLE 8. INTELLECTUAL PROPERTY RIGHTS - DATA RIGHTS AND HANDLING OF DATA

Both Parties will abide by the markings on any data exchanged under this Agreement.

ARTICLE 9. INTELLECTUAL PROPERTY RIGHTS - INVENTION AND PATENT RIGHTS

Unless otherwise agreed upon by NASA and USDA-ARS, custody and administration of inventions made (conceived or first actually reduced to practice) under this Agreement will remain with the respective inventing Party. In the event an invention is made jointly by employees of the Parties (including by employees of a Party's contractors or subcontractors for which the U.S. Government has ownership), the Parties will consult and agree as to future actions toward establishment of patent protection for the invention.

ARTICLE 10. RELEASE OF GENERAL INFORMATION TO THE PUBLIC AND MEDIA

NASA or USDA-ARS may, consistent with Federal law and this Agreement, release general information regarding its own participation in this Agreement as desired. Insofar as participation of the other Party in this Agreement is included in a public release, NASA and USDA-ARS will seek to consult with each other prior to any such release, consistent with the Parties' respective policies.

Pursuant to Section 841(d) of the NASA Transition Authorization Act of 2017, Public Law 115-10 (the "NTAA"), NASA is obligated to publicly disclose copies of all agreements conducted pursuant to 51 U.S.C. §20113(e) in a searchable format on the NASA website within sixty (60) days after the agreement is signed by the Parties. The Parties acknowledge that, if this Agreement is entered into pursuant to 51 U.S.C. §20113(e), this Agreement will be disclosed, without redaction, in accordance with the NTAA.

ARTICLE 11. TERM OF AGREEMENT

This Agreement becomes effective upon the date of the last signature below ("Effective Date") and shall remain in effect until the completion of all obligations of both Parties hereto, or five (5) years from the effective date, whichever comes first.

ARTICLE 12. RIGHT TO TERMINATE

Either Party may unilaterally terminate this Agreement by providing thirty (30) calendar days written notice to the other Party.

ARTICLE 13. CONTINUING OBLIGATIONS

The rights and obligations of the Parties that, by their nature, would continue beyond the expiration or termination of this Agreement, e.g., "Liability and Risk of Loss" and "Intellectual Property Rights" and related clauses shall survive such expiration or termination of this Agreement.

ARTICLE 14. POINTS OF CONTACT

The following personnel are designated as the Points of Contact between the Parties in the performance of this Agreement.

Management Points of Contact

NASA John F. Kennedy Space Center
Matthew Jimenez
Partnership Development Manager
Mail Stop: AD-C
Kennedy Space Center, FL 32899
Phone: 321-867-4509
matthew.j.jimenez@nasa.gov

United States Department of Agriculture
Agricultural Research Service
Ms. Rebekah Huson
Grants Management Specialist
Mail Suite: USDA-ARS NEA 950
College Station Road
Athens, GA 30605
Phone: 706-546-3171
rebekah.huson@usda.gov

Technical Points of Contact

NASA John F. Kennedy Space Center
Dr. Raymond Wheeler
Senior Scientist
Exploration Research and Technology
Mail Suite: UB-A
Kennedy Space Center, FL 32899
Phone: 321-861-2950
raymond.m.wheeler@nasa.gov

United States Department of Agriculture
Agricultural Research Service
Dr. Chris Dardick
Senior Scientist
Mail Suite: Appalachian Fruit Research
Station 2217 Wiltshire Road
Kearneysville, WV 25430-2771
Phone: 304-725-3451 ext 387
chris.dardick@usda.gov

ARTICLE 15. DISPUTE RESOLUTION

All disputes concerning questions of fact or law arising under this Agreement shall be referred by the claimant in writing to the appropriate person identified in this Agreement as the "Points of Contact." The persons identified as the "Points of Contact" for NASA and USDA-ARS will consult and attempt to resolve all issues arising from the implementation of this Agreement. If they are unable to come to agreement on any issue, the dispute will be referred to the signatories to this Agreement, or their designees, for joint resolution after the Parties have separately documented in writing clear reasons for the dispute. As applicable, disputes will be resolved pursuant to The Department of the Treasury's Intragovernmental Transaction Guide (Treasury Financial Manual, Vol. 1, Chapter 2, Part 4700, Appendix 10 (hereinafter, the "Intragovernmental Transaction Guide")).

ARTICLE 16. MODIFICATIONS

Any modification to this Agreement shall be executed, in writing, and signed by an authorized representative of NASA and the USDA-ARS.

ARTICLE 17. APPLICABLE LAW

U.S. Federal law governs this Agreement for all purposes, including, but not limited to, determining the validity of the Agreement, the meaning of its provisions, and the rights, obligations and remedies of the Parties.

ARTICLE 18. LOAN OF GOVERNMENT PROPERTY

The parties shall enter into a NASA Form 893, Loan of NASA Equipment, for NASA equipment loaned to USDA-ARS.

ARTICLE 19. SIGNATORY AUTHORITY

Approved and authorized on behalf of each Party by:

NATIONAL AERONAUTICS AND
SPACE ADMINISTRATION
JOHN F. KENNEDY SPACE
CENTER

UNITED STATES DEPARTMENT
OF AGRICULTURE
AGRICULTURAL RESEARCH
SERVICE

BY: _____
Josephine B. Burnett
Director, Exploration Research and
Technology Programs

BY: _____
Rebekah Huson
Authorized Departmental Officer

DATE: _____

DATE: __10/15/2020_____