National Aeronautics and
Space Administration
Mission Support Directorate

NASA Management Office
180-801
4800 Oak Grove Drive
Pasadena, CA 91109-8099

Reply to Attn of: LP040

DATE April 20, 2015

SUBJECT: JPL Task Plan No. 87-19641 Letter Revision B, entitled "*ECOsystem Spaceborne Thermal Radiometer Experiment on Space Station (ECOSTRESS): Phases A and B*" – Record of Environmental Consideration

MEMORANDUM FOR RECORD

This is a Record of Environmental Consideration (REC) for JPL Task Plan No. 87-19641 Letter Revision B, entitled "*ECOsystem Spaceborne Thermal Radiometer Experiment on Space Station (ECOSTRESS): Phases A and B,*" an instrument development project, which would be launched on a resupply mission to the International Space Station (ISS) no earlier than August 2017. This proposed action has been reviewed against the National Environmental Policy Act, the implementing regulations of the Council on Environmental Quality, and the implementing regulations of NASA. Following my review of the proposed action, I have determined that the proposed action at JPL described by this task plan is categorically excluded from further environmental impact analysis pursuant to 14 CFR §1216.304(d)(3)(iii) for research, development, and testing in compliance with all Federal, federally recognized Indian tribe, state, and/or local law or requirements, and Executive Orders. This task at JPL does not involve any extraordinary circumstances that would preclude the applicability of a Categorical Exclusion.

Launch preparations and launch of the ECOSTRESS instrument from a U.S. launch site would require preparation of environmental review documentation to satisfy NASA's NEPA requirements. The integration and launch of the ECOSTRESS instrument is the responsibility of the launch site (Kennedy Space Center (KSC) or Wallops Flight Facility (WFF)). As described by correspondence received from KSC's and WFF's Environmental Management Branches, a statement of determination will be delivered from the launch site Environmental Branch office to JPL prior to launch confirming that NASA environmental review requirements have been satisfied.

My signature on this document constitutes a written record of this decision.

Steve Slaten
Environmental and Facilities Manager
NASA Management Office

Attachments

Jet Propulsion Laboratory
California Institute of Technology
MS 301-370
4800 Oak Grove Drive
Pasadena, California 91109-8099

April 20, 2015

Mr. Steven Slaten
NASA Management Office
Jet Propulsion Laboratory MS 180-801
4800 Oak Grove Drive
Pasadena, CA 91109

Environmental Evaluation and Recommendation for a Record of Environmental Consideration for the JPL Task Plan No. 87-19641 Letter Revision B, entitled "*ECOsystem Spaceborne Thermal Radiometer Experiment on Space Station (ECOSTRESS): Phases A and B*"

1. Description and location of proposed action:

1.1. Background

"ECOSTRESS" stands for "ECOsystem Spaceborne Thermal Radiometer Experiment on Space Station." ECOSTRESS would be a JPL Principal Investigator-led investigation that was competitively selected in August 2014 under the NASA Headquarters Science Mission Directorate (SMD) Announcement of Opportunity entitled "Earth Venture Instrument – 2." ECOSTRESS would address critical scientific questions on plant–water dynamics and future ecosystem changes with climate through an optimal combination of thermal infrared measurements with high spatiotemporal resolution from the International Space Station (ISS).

ECOSTRESS would use an existing in-house radiometer named the Prototype Hyperspectral Infrared Imager (HyspIRI) Thermal Infrared Radiometer (PHyTIR), developed under the Instrument Incubator Program (IIP) and would be accommodated on ISS Japanese Experiment Module Exposed Facility (JEM-EF), where it would measure evapotranspiration (ET) and water use efficiency (WUE) over the diurnal cycle for a wide range of biomes. The ECOSTRESS mission would acquire data for one year, measuring Thermal Infrared (TIR), ET and WUE and the Evaporative Stress Index (ESI) drought indicator for selected regions of the globe and the entire contiguous United States to answer several key science questions. The ECOSTRESS instrument would provide thermal infrared data in multi-spectral bands between 8 and 12.5 micrometers with 38 meters (125 feet) x 57 meters (187 feet) spatial resolution.

The purpose of Letter Revision B would be to allow for additional Phase C/D work in the following areas: 1) Perform a Wi-Fi accommodation study; and 2) Identify the project's accommodations needs by task item. The work authorized in this revision falls within the current scope of work.

1.2. Task Description:

a. Establish and finalize all project management activities.
b. Develop and baseline project and system-level requirements.
c. Conduct design trades, finalize the system architectural changes, baseline mission and payload architectures including subsystem designs and interfaces.
d. Perform technical risk reduction on Prototype HyspIRI Thermal Infrared Radiometer (PHyTIR) hardware.
e. Initiate long lead procurements with critical suppliers for items such as spectral filters, cryocooler and cryocooler electronics (CCE), science data systems (SDS) hardware, and electronics parts.
f. Initiate contact and define agreements with the ISS program office on instrument accommodation and interfaces.
g. Conduct SRR/MDR and a preliminary design review (PDR), prepare appropriate gate products, and support the required NASA Key Decision Point (KDP) process, while meeting the intent of NPR 7120.5E, tailored for a Class D instrument hosted on the ISS.

h. Conduct Monthly Management Reviews at JPL which include technical progress, risks, and cost and schedule, including variance analysis at each major element level of the project Work Breakdown Structure (WBS).
i. Prepare a revision to this Task Plan for subsequent project phases.
j. Perform a Wi-Fi accommodation study to select a design, which would include holding a pre-PDR peer review, contributing inputs to Project PDR, and providing scope, cost, and schedule for the Phase C/D task plan. (New)
k. Identify the project's accommodations needs by task item for the Phases C/D task plan, including scope, cost, and schedule of the task item(s). (New)

1.3. Deliverables: (No change from LRA)

a. Monthly Status and Financial reports.
b. Preliminary Program Level Requirements Agreement (PLRA).
c. Preliminary Project Plan.
d. Formulation Agreement.
e. Final PLRA.
f. Final Project Plan.
g. Phase C/D Task Plan Revision.

2. Anticipated start date and duration of proposed action (estimated):

Start Date: As indicated by Task Order NNN13D025T
Duration: Through September 30, 2015.

3. Assessment

The above-proposed action qualifies for Categorical Exclusion as described in 14 CFR §1216.304(d)(3)(iii) for research, development, and testing in compliance with all Federal, federally recognized Indian tribe, state, and/or local law or requirements, and Executive Orders, and does not involve any extraordinary circumstances that would preclude the applicability of a Categorical Exclusion. Information supporting this recommendation is provided as an attachment to this letter.

Launch preparations and launch of the ECOSTRESS instrument from a U.S. launch site would require preparation of environmental review documentation to satisfy NASA's NEPA requirements. The integration and launch of the ECOSTRESS instrument is the responsibility of the launch site (Kennedy Space Center (KSC) or Wallops Flight Facility (WFF)). As described by correspondence received from KSC's and WFF's Environmental Management Branches, a statement of determination will be delivered from the launch site Environmental Branch office to JPL prior to launch confirming that NASA environmental review requirements have been satisfied.

Approval:

V.S. Ryan, Supervisor
Launch Approval Engineering Group

4-20-15
Date

Concurrence:

for

J. M. Phillips, Manager
Launch Approval Engineering Office (Acting)

4/24/15
Date

LAE Proposed Action Assessment Checklist

PROJECT NAME:	ECOsystem Spaceborne Thermal Radiometer Experiment on Space Station (ECOSTRESS) Phases A & B			**LAUNCH DATE :**	NET August 2017
PROJECT CONTACT:	Wesley Schmitigal	**PHONE NUMBER:**	(818) 354-2941	**MAILSTOP:**	321-250
PROJECT START:	September 2014	**PROJECT NAME (or TASK PLAN/ORDER NUMBER) and LOCATION:**		87-19641 LRB, JPL	
PROJECT DESCRIPTION:	JPL's roles on this project would be principal investigator, project management, systems engineering, mission assurance and system safety, ECOSTRESS instrument development, integration and test, and verification prior and post-delivery to the ISS, mission operations, and science data product development.				

Note: "YES" responses require explanation in the comment field at the end of each section, and may require the conduct of additional studies or preparation of additional NEPA compliance documentation.

A.	NEPA Determination:	YES	NO
1.	a. Does the proposed project qualify as an action that is normally categorically excluded from NEPA per 14 CFR 1216.304(d)?		X
	b. Is the proposed project free from unique or extraordinary circumstances as described in 14 CFR 1216.304(c)?	X	
	c. Does the proposed project qualify as an action described by 14 CFR 1216.304(d)(4)(ii),(iii),(iv),(v) or 14 CFR 1216.304(d)(5)(ii)		X
2.	Does the proposed project require NASA to institute rapid actions that would result in substantial environmental impact without the benefit of previous NEPA analysis as described by 14 CFR 1216.311, Emergency Responses?		X
3.	a. Does another Federal Agency's NEPA document appear to adequately address and evaluate the environmental impacts of the NASA proposed project?		X
	b. Does the scope of an existing NASA NEPA document (e.g., NASA Routine Payload Environmental Assessment) appear to adequately address and evaluate the environmental impacts of the NASA proposed project?		X
4.	a. Is the proposed project expected to have a significant effect on the human environment and therefore be an action normally requiring an Environmental Impact Statement per 14 CFR 1216.306, Actions normally requiring an EIS?		X
	b. If the proposed project is not expected to have a significant effect on the human environment, is it expected to include sufficient public controversy warranting the initiation of an EIS?		X
	c. Does the timing of the proposed project in combination with the uncertainties in being able to arrive at a FONSI (or mitigated FONSI) warrant proceeding with an EIS rather than an EA?		X
	d. Does the scope (e.g. substantial cost, multiple affected environments, or complicated phasing or implementation) of the proposed project warrant proceeding with an EIS rather than an EA?		X

NEPA Assessment:	
If answers to 1a and 1b are both YES, the proposed action may (pending NASA review) qualify as a Categorical Exclusion. Refer to LAE Procedure "NASA NEPA Compliance – Categorical Exclusions"	X
If answer to 1c is YES, the proposed action may (pending NASA review) qualify as a Categorical Exclusion and require development of a Record of Environmental Consideration. Refer to LAE Procedure "NASA NEPA Compliance – Categorical Exclusions"	
If the answer to 2 is YES, then the proposed action may (pending NASA review) qualify for special compliance procedures as an Emergency Circumstance. Refer to LAE Procedure "NASA NEPA Compliance – Emergency Circumstances"	
If the answer to 3 a or b is YES then the proposed action may (pending NASA review) be covered by an existing NEPA document. Refer to LAE Procedure "NASA NEPA Compliance – Coverage by Existing NEPA Document"	
If any answer to 4 above is YES, then the proposed action may (pending NASA review) require development of an Environmental Impact Statement. Refer to LAE Procedure "NASA NEPA Compliance – Environmental Impact Statement (EIS)"	
If answers to 1 through 4 above are all NO, then the proposed action is expected (pending NASA review) to require an Environmental Assessment. Refer to LAE Procedure "NASA NEPA Compliance – Environmental Assessment (EA)"	

LAE Proposed Action Assessment Checklist

PROJECT NAME:	ECOsystem Spaceborne Thermal Radiometer Experiment on Space Station (ECOSTRESS) Phases A & B			**LAUNCH DATE :**	NET August 2017
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Note: "YES" responses require explanation in the comment field at the end of each section, and may require the conduct of additional studies or preparation of additional NEPA compliance documentation.

B.	EO 12114 Determination:	YES	NO
1.	Is the proposed project expected to include actions significantly affecting the environment of the global commons outside the jurisdiction of any nation (e.g., the oceans and the atmosphere)?		X
2.	Is the proposed project expected to include actions significantly affecting the environment of a foreign nation not participating with the United States and not otherwise involved in the action (e.g., the reentry of a spacecraft and impact on such nation's environment)?		X
3.	Is the proposed project expected to provide to a foreign nation a product or physical project producing a principal product or an emission or effluent, which is prohibited or strictly regulated by U.S. Federal law because its toxic effects on the environment create a serious public health risk (e.g., DDT, asbestos, polychlorinated biphenyl (PCB); but not, for example, sulfur dioxide, chlorine, or ammonia)?		X
4.	Is the proposed project expected to provide to a foreign nation a physical project which in the U.S. is prohibited or strictly regulated by U.S. Federal law to protect the environment against radioactive substances (e.g., a nuclear reactor; but not for example export of a nuclear fuel for commercial power generation)?		X
5.	Is the proposed project expected to include actions significantly affecting natural or ecological resources of global importance, either designated for protection by the President or protected by a binding international agreement (e.g., protection of whales or migratory species; or binational transboundary agreements such as those between the United States and Canada)?		X

EO 12114 Assessment:

If answers to any questions in section B are YES, then the proposed action will likely (pending NASA review) need to comply with Executive Order 12114.
Refer to LAE Procedure "NASA Compliance with Executive Order 12114 (EO 12114)"

C.	Proposed Action Assessment:	YES
1.	The proposed action qualifies for Categorical Exclusion as described in14 CFR §1216.304(d)(3)(iii) for research, development, and testing in compliance with all Federal, federally recognized Indian tribe, state, and/or local law or requirements, and Executive Orders, and does not involve any extraordinary circumstances that would preclude the applicability of a Categorical Exclusion, and does not involve any extraordinary circumstances that would preclude the applicability of a Categorical Exclusion.	X
2.	The proposed action qualifies for special compliance procedures as an Emergency Response.	
3.	The proposed action is adequately addressed in an existing Environmental Assessment (EA) entitled dated .	
4.	The proposed action is adequately addressed in an existing Environmental Impact Statement (EIS) entitled , dated .	
5.	The proposed action will require preparation of environmental review documentation to satisfy NASA NEPA requirements. The level of documentation required is , pending confirmation by NASA HQ Environmental Management Division.	
6.	The proposed action is exempt from NEPA compliance under the provisions of Executive Order (EO) 12114, *Environmental Effects Abroad of Major Federal Actions*, and will require the preparation of EO 12114 documentation.	

Evaluation Checklist for Applicability of the NASA Routine Payload Environmental Assessment

PROJECT NAME:	ECOsystem Spaceborne Thermal Radiometer Experiment on Space Station (ECOSTRESS) Phases A & B			**LAUNCH DATE :**	NET August 2017
PROJECT CONTACT:	Wesley Schmitigal	**PHONE NUMBER:**	(818) 354-2941	**MAILSTOP:**	321-250
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Note: "YES" responses require explanation in the comment field at the end of each section, and may require the conduct of additional studies or preparation of additional NEPA compliance documentation.

	A. Sample Return:	**YES**	**NO**
1.	Would the candidate mission return a sample from an extraterrestrial body?		**X**
Comment			
	B. Radioactive Materials:	**YES**	**NO**
1.	Would the candidate instrument carry radioactive materials in quantities that produce an A2 mission multiple value of 10 or more?		**X**
Comment			
	C. Launch and Launch Vehicles:	**YES**	**NO**
1.	Would the candidate instrument be launched on a vehicle and launch site combination other than those listed in Table 1 below?		**X**
2.	Would launch of the proposed mission exceed the approved or permitted annual launch rate for the particular launch vehicle or launch site?		**X**
Comment			
	D. Facilities:	**YES**	**NO**
1.	Would the candidate instrument require the construction of any new facilities or substantial modification of existing facilities? (If YES, provide a brief description below of the construction or modification required, including whether ground disturbance and/or excavation would occur)		**X**
Comment			
	E. Health and Safety:	**YES**	**NO**
1.	Would the candidate instrument utilize batteries, ordnance, hazardous propellant, radiofrequency transmitter power, or other subsystem components in quantities or levels exceeding the Envelope Payload Characteristics (EPCs) in Table 2 below?		**X**
2.	Would the expected risk of human casualty from spacecraft planned orbital reentry exceed the criteria specified by NASA Standard 8719.14?		**X**
3.	Would the candidate instrument utilize any potentially hazardous material as part of a flight system whose type or amount precludes acquisition of the necessary permits prior to its use or is not included within the definition of the Envelope Payload Characteristics (EPCs)?		**X**
4.	Would the candidate instrument, under nominal conditions, release material other than propulsion system exhaust or inert gases into the Earth's atmosphere or space?		**X**
5.	Are there changes in the preparation, launch or operation of the candidate instrument from the standard practices described in Chapter 3 of the *Final Environmental Assessment for Launch of NASA Routine Payloads on Expendable Launch Vehicles* dated November 2011?		**X**
6.	Would the candidate instrument utilize an Earth-pointing laser system that does not meet the requirements for safe operation (ANSI Z136.1-2007 and ANSI Z136.6-2005)?		**X**

Evaluation Checklist for Applicability of the NASA Routine Payload Environmental Assessment

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Note: "YES" responses require explanation in the comment field at the end of each section, and may require the conduct of additional studies or preparation of additional NEPA compliance documentation.

7.	Would the candidate instrument contain, by design (e.g., a scientific payload) pathogenic microorganisms (including bacteria, protozoa, and viruses) which can produce disease or toxins hazardous to human health or the environment beyond Biosafety Level 1 (BSL 1)[1]?		**X**
Comment			

F.	**Other Environmental Issues:**	**YES**	**NO**
1.	Would the candidate instrument have the potential for substantial effects on the environment outside the United States?		**X**
2.	Would launch and operation of the candidate instrument have the potential to create substantial public controversy related to environmental issues?		**X**
3.	Would any aspect of the candidate instrument that is not addressed by the Envelope Payload Characteristics (EPCs) have the potential for substantial effects on the environment (i.e., previously unused materials, configurations or material not included in the checklist)?		**X**
Comment			

[1] The use of biological agents on payloads is limited to materials with a safety rating of "Biosafety Level 1." This classification includes defined and characterized strains of viable microorganisms not known to consistently cause disease in healthy human adults. Personnel working with Biosafety Level 1 agents follow standard microbiological practices including the use of mechanical pipetting devices, no eating drinking, or smoking in the laboratory, and required hand-washing after working with agents or leaving a lab where agents are stored. Personal protective equipment such as gloves and eye protection is also recommended when working with biological agents.

Evaluation Checklist for Applicability of the NASA Routine Payload Environmental Assessment

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Note: "YES" responses require explanation in the comment field at the end of each section, and may require the conduct of additional studies or preparation of additional NEPA compliance documentation.

Table 1. Launch Vehicles and Launch Sites

Launch Vehicle and Launch Vehicle Family	Space Launch Complexes and Pads				
	Eastern Range	Western Range (VAFB)	USAKA/RTS	WFF	KLC
Athena I, IIc, III[a]	LC-46	CA Spaceport (SLC-8)	N/A	Pad 0	LP-1
Atlas V Family	LC-41	SLC-3	N/A	N/A	N/A
Delta II Family	LC-17	SLC-2	N/A	N/A	N/A
Delta IV Family	LC-37	SLC-6	N/A	N/A	N/A
Falcon 1/1e	LC-36	SLC-4W	Omelek Island	Pad 0	LP-3[a]
Falcon 9	LC-40	SLC-4E	Omelek	Pad 0	LP-3[a]
Minotaur I	LC-20 and/or LC-46	SLC-8	N/A	Pad 0	LP-1
Minotaur II-III	LC-20 and/or LC-46	SLC-8	N/A	Pad 0	LP-1
Minotaur IV[b]	LC-20 and/or LC-46	SLC-8	N/A	Pad 0	LP-1
Minotaur V	LC-20 and/or LC-46	SLC-8	N/A	Pad 0	LP-1
Pegasus XL	CCAFS skidstrip KSC SLF	VAFB Airfield	Kwajalein Island	WFF Airfield	N/A
Taurus	LC-46 and/or LC-20	SLC-576E	N/A	Pad 0	LP-1
Taurus II/Antares[c]	NA	NA	N/A	Pad 0	LP-3[a]
Any other launch vehicle/launch site combination for which NASA has completed or cooperated on the NEPA Compliance					

[a] Athena III and LP-3 are currently under design

[b] While not explicitly listed in this table, the Minotaur IV includes all configurations of this launch vehicle, including the Minotaur IV+, which is a Minotaur IV with a Star 48V 4th stage.

[c] The Taurus II LV was renamed Antares after publication of the Final Environmental Assessment for Launch of NASA Routine Payloads on Expendable Launch Vehicles in November 2011.

Key: CA=California; CCAFS=Cape Canaveral Air Force Station; KSC=Kennedy Space Center; LC=Launch Complex; LP=Launch Pad; MARS=Mid-Atlantic Regional Spaceport; SLC=Space Launch Complex; SLF=Shuttle Landing Facility; USAKA/RTS=United States Army Kwajalein Atoll/Reagan Test Site; VAFB=Vandenberg Air Force Base; WFF=Wallops Flight Facility.

Evaluation Checklist for Applicability of the NASA Routine Payload Environmental Assessment

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Note: "YES" responses require explanation in the comment field at the end of each section, and may require the conduct of additional studies or preparation of additional NEPA compliance documentation.

Table 2. Summary of Envelope Payload Characteristics (EPCs) by Spacecraft Subsystems

Structure	• Unlimited: aluminum, beryllium, carbon resin composites, magnesium, titanium, and other materials unless specified as limited.
Propulsion[a]	• Liquid propellant(s); 3,200 kg (7,055 lb) combined hydrazine, monomethylhydrazine and/or nitrogen tetroxide. • Solid Rocket Motor (SRM) propellant; 3,000 kg (6,614 lb) Ammonium Perchlorate (AP)- based solid propellant (examples of SRM propellant that might be on a spacecraft are a Star-48 kick stage, descent engines, an extra-terrestrial ascent vehicle, etc.)
Communications	• Various 10-100 Watt (RF) transmitters
Power	• Unlimited Solar cells; 5 kilowatt-Hour (kW-hr) Nickel-Hydrogen (NiH_2) or Lithium ion • (Li-ion) battery, 300 Ampere-hour (A-hr) Lithium-Thionyl Chloride (LiSOCl), or 150 A-hr Hydrogen, Nickel-Cadmium (NiCd), or Nickel-hydrogen (Ni-H_2) battery.
Science Instruments	• 10 kilowatt radar • American National Standards Institute safe use of lasers (see Section 4.1.2.1, Final Environmental Assessment for Launch of NASA Routine Payloads on Expendable Launch Vehicles, November 2011)
Other	• U. S. Department of Transportation (DoT) Class 1.4 Electro-Explosive Devices (EEDs) for mechanical systems deployment • Radioactive materials in quantities that produce an A2 mission multiple value of less than 10 • Propulsion system exhaust and inert gas venting • Sample returns are considered outside of the scope of this environmental assessment

[a] Propellant limits are subject to range safety requirements.

Key: kg=kilograms; lb=pounds.

EAPO Checklist

A.	Geologic	YES	MAYBE	NO
1.	Greater than a 10% change in topography or ground surface relief features?			✔
2.	Any increase in wind or water erosion of soils, either on or off site?			✔
3.	Changes in deposition, siltation, or erosion that may modify wetlands?			✔

B.	Air	YES	MAYBE	NO
1.	Classified as either a New Emission Source or a major modification to an existing source (SCAQMD Regulation XIII)?			✔
2.	Creation of objectionable odors?			✔
3.	Alteration of air movement, moisture, temperature, or any changes in climate, either locally or regionally?			✔

C.	Water	YES	MAYBE	NO
1.	Disturbance of groundwater?			✔
2.	Alteration of the direction or rate of ground waters?			✔
3.	Change in the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations?			✔
4.	Greater than 10% changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?			✔
5.	Alter the course or flow of flood waters?			✔
6.	Activities resulting in changes of greater than 10% of Laboratory total potable water use?			✔
7.	Any construction or other activity in a floodplain or wetland?			✔
8.	Generate industrial waste water or storm water discharge?			✔

D.	Cultural Resources	YES	MAYBE	NO

D.	Cultural Resources	YES	MAYBE	NO
1.	Project located in a historic district, in or near a historic property, or affects an existing national historic landmark?			✔
2.	Will Project alter all or part of an eligible structure?			✔
3.	Project located in an area of suspected archeological resources?			✔

E.	Biological Resources	YES	MAYBE	NO
1.	Construction/grading/filling within or adjacent to designated wetlands?			✔
2.	Reduction of the numbers of any rare or endangered species?			✔
3.	Construction/grading/filling within open space or grasslands areas?			✔
4.	Introduction of new species or plants into an area, or impact the normal replenishment of existing species?			✔
5.	Proposed construction activities in designated critical habitat?			✔
6.	Propose new landscaping or modify existing landscaping?			✔

F.	Noise	YES	MAYBE	NO
1.	Noise increase greater than 10% from an existing operation?			✔
2.	Exposure of people to severe noise levels (> 80 dBA)?			✔
3.	Increase existing Community Noise Equivalent Level (CNEL) noise contours?			✔

G.	Land Use	YES	MAYBE	NO
1.	Substantial alteration of present or planned land use?			✔
2.	Increase in rate of use of any natural resource?			✔
3.	Activities resulting in changes of greater than 10% of facility energy consumption?			✔
4.	Activities resulting in a change in total employment levels greater than 10% ?			✔

H.	Health and Safety	YES	MAYBE	NO
1.	Generation of ionizing or non-ionizing radiation?			✔
2.	Use of pesticides, including insecticides, herbicides, fungicides or rodenticides?			✔
3.	Confined space entry?			✔
4.	Risk of exposure to asbestos or lead-containing materials?			✔
5.	Result in exposure or disturbance of contaminated soil or ground water?			✔
6.	Use of Class 1 ozone depleting substances (CFCs, TCA, halons)?			✔
7.	Acquisition, use, or storage of any toxic or hazardous substance?			✔
8.	Generation of medical (biohazard), hazardous, toxic, or radiological wastes?			✔
9.	Use, disturbance, or disposal of PCBs?			✔
10.	Use of toxic gas?			✔

I.	Transportation/Circulation	YES	MAYBE	NO
1.	Generation of substantial additional vehicle trips?			✔
2.	Affect existing parking facilities or demand for new parking?			✔
3.	Substantial impact upon existing transportation systems?			✔
4.	Increase in traffic hazards to motor vehicles, bicyclists, or pedestrians?			✔

J.	Services	YES	MAYBE	NO
1.	Affect or result in need for new or altered government-provided fire protection services?			✔
2.	Affect or result in need for new or altered government-provided security services?			✔

K.	Environmental Justice	YES	MAYBE	NO
1.	Potential to disproportionately affect low income populations or minority populations?			✔

INSTRUMENT FORM (click here to return)

Last changed by Lum, Karen T. **on** 01/28/2015 14:55:47 PST

A. CONTACT INFORMATION

A1. Input Date	A2. Closed Date	A3. Point of Contact (POC)	A4. Reviewer
Sep 12, 2014		Lum, Karen T. [Delegation in writing from PM/Capture-Lead]	Graham, Janis U.

B. INSTRUMENT INFORMATION

If an exact date is not known, please use the first day of the month you anticipate the milestone would occur, e.g., if project launch is planned for no earlier than February 2013, please input February 1, 2013.

B1. Instrument Name (Mandatory)
ECOSTRESS

B2. Instrument Description (Mandatory : 4,000 Characters Maximum)
"ECOSTRESS" stands for "ECOsystem Spaceborne Thermal Radiometer Experiment on Space Station". ECOSTRESS will be implemented as a Class D payload using 1) an existing in-house radiometer named the Prototype HyspIRI Thermal Infrared Radiometer (PHyTIR), developed under the Instrument Incubator Program (IIP), 2) significant reuse of electrical, mechanical, thermal and ground systems designs from previous and

☑ **Atypical Project Implementation (e.g. no PMSR/MDR or PDR or CDR, etc.)**
Mandatory comment (concise) if checked:
Some reviews may be merged

B8. Phase A Start Date
Oct 1, 2014

B9. Phase A End Date
Mar 31, 2015

B10. Phase B Start Date
Apr 1, 2015

B11. Phase B End Date
Aug 31, 2015

B12. Phase C/D Start Date

B13. Phase C/D End Date

ongoing JPL projects, and 3) accommodation on the International Space Station (ISS) Japanese Experiment Module Exposed Facility (JEM-EF)., where it will measure evapotranspiration (ET) and water use efficiency (WUE) over the diurnal cycle for a wide range of biomes. The ECOSTRESS mission will acquire data for 1 year, measuring Thermal Infrared (TIR), ET and WUE and the Evaporative Stress Index (ESI) drought indicator for selected regions of the globe and the entire contiguous United States to answer several key science questions. The ECOSTRESS instrument will provide thermal infrared data in multi-spectral bands between 8 and 12.5 micrometers with 38 m x 57 m spatial resolution.

Sep 1, 2015 Sep 1, 2017

B14. Launch Date
Aug 8, 2017

B15. PMSR/MDR Date **(AO-Driven)**
Feb 10, 2015

B16. PDR Date
Jul 30, 2015

B17. CDR Date
Feb 2, 2016

B18. PNAR Date

B19. NAR Date

B20. 10% Expend. Date

B21. Other Milestone Date(s) (4,000 Characters Maximum)
The Delivery to KSC is expected to be no earlier than 31 months from start of contract, which roughly comes out to 5/2/2017. The Pre-Ship Review is therefore estimated to be no-earlier-than 4/4/2017.

B22a. Lead Federal Agency
NASA

** If the answer to B22a is NASA, skip to B23; otherwise, continue.
If the answer to B22a is Other, please list the agency in the comments field by clicking on the pad and pen icon, then continue.

B22b. Agency POC

B22c. Agency Phone

B33. Launch Vehicle(s)
Antares
Falcon 9/Dragon

B34. Launch Site(s)
US - KSC/CCAFS
US - Wallops Flight Facility

B35. Mission Trajectory Option(s)
Negative C3 (LEO, MEO, GEO, HEO)

B36. Country with Primary Authority
United States

B22d. Agency Email	**B37. Other Countries Involved**
B23. Project Managing NASA Center Jet Propulsion Laboratory	
B24. Managing NASA Center Program Manager	
B25. Proposal Manager	
B26. Capture Lead	
B27. Project Manager Wesley Schmitigal	
B29. HQ Directorate Responsible Science Mission Directorate	
B30. NASA HQ Program Executive David Jarrett	
B31. NASA HQ Program Executive Mail Code	
B32. Related Instruments	

C. KEY PLANNING CONSIDERATIONS

C2a. Would the instrument be integrated onto a spacecraft
Yes

** If the answer to C2a is No, skip to C3a; otherwise, continue.

C2b. Which spacecraft
International Space Station (ISS)

C3a. Potential for Returning a Sample to Earth or its vicinity
No

** If the answer to C3a is No, skip to C4a; otherwise, continue.

C3b. What would return to Earth or its vicinity

C3c. Where would it return to Earth or its vicinity

C3d. Has the NASA Planetary Protection Officer been contacted regarding this issue

C4a. Potential for carrying as a payload disease producing pathogenic microorganisms or materials extremely hazardous to human health
No

** If the answer to C4a is No, skip to C5a; otherwise, continue.

C4b. Has the NASA Planetary Protection Officer been contacted regarding this issue

C5a. Potential for Radioisotope Power System (RPS)
No

** If the answer to C5a is No, skip to C6a; otherwise, continue.

C5b. Explain why Radioisotope Power System maybe a potential power source (MMRTG or SRG)

C5c. Are Radioisotope Power System trade studies available

C5d. If yes, who is the trade studies contact

C6a. Potential for Radioisotope Heater Units (RHU)
No

** If the answer to C6a is No, skip to C7a; otherwise, continue.

C6b. Explain why RHU maybe a potential heater source

C6c. Are RHU trade studies available

C6d. If yes, who is the studies contact

C7a. Potential for other radioactive material (instrument or calibration sources)
No

** If the answer to C7a is No, skip to C8a; otherwise, continue.

C7b. Which isotopes might be used and what are the maximum estimated quantities of the radioactive material

C8a. Potential for a nuclear fission reactor system
No

** If the answer to C8a is No, skip to C9a; otherwise, continue.

C8b. Explain why a nuclear fission reactor system maybe a potential

C8c. Are nuclear fission reactor system trade studies available

C8d. If yes, who is the studies contact

C9a. Potential for carrying hydrazine, MMH, UDMH, A-50, and/or NTO
No

** If the answer to C9a is No, skip to C10; otherwise, continue.

C9b. Maximum quantity of propellant(s) or oxidizer per tank (in kg or lb)

C9c. Specify maximum number of tanks carrying each type of fuel (e.g., 5 tanks of MMH, 3 tanks of NTO, and 1

tank of Hydrazine)

C9d. Describe the tank construction, including the tank material and whether it has baffles or a composite overwrap. If the tank manufacturer and tank part number are known, please include it

C9e. Would the propellant/oxidizer tank(s) be contained within a heat shield or other substantial protective structure

C10. Potential for Earth-pointing medium or high-power laser (ANSI class 3B or 4)
No

C12a. Would this mission require construction of new facilities or major modifications to existing ones
No

** If the answer to C12a is No, skip to C13a; otherwise, continue.

C12b. What needs to be done to the facilities

C12c. Where are the facilities

C13a. Are any new international agreements required
No

** If the answer to C13a is No, skip to C14; otherwise, continue.

C13b. Any international agreements in Draft or Final form

C13c. Who is the POC for such agreements (if POC is at HQ, please designate (HQ) next to the name of the POC)

C14. Person(s) consulted when filling out this form
Janis Graham, Victoria Ryan

D. LAE PLAN MILESTONES

D1. Draft LAE Plan
Received LAPG GS Concurrence:

D2. Approved LAE Plan
Received CPLAEM Concurrence:

D3. Revised Approved LAE Plans

E. NEPA MILESTONES

E1a. Is adequately covered in an existing

- **Environmental Assessment (EA)**
  entitled
- **Environmental Impact Statement (EIS)**

  entitled

E1b. Qualifies for Categorical Exclusion as described by paragraph 4.2, NPG 8580.1, and NASA NEPA regulations at 14 CFR ?1216.305(d), and has no special circumstances which would suggest a need for an Environmental Assessment

Graham, Jan (312J)

From: DANKERT, DONALD J. (KSC-TAA4C) <donald.j.dankert@nasa.gov>
Sent: Wednesday, January 21, 2015 12:04 PM
To: Graham, Jan (312J)
Subject: RE: NEPA for ECOSTRESS Launch to ISS

Jan,
To answer your question, yes KSC is/will be preparing the RECs for commercial resupply missions that launce from CCAFS via the SpaceX Falcon 9. I typically prepare a REC that states that the contents of the Dragon capsule are consistent with the documentation in the Routine Payloads EA. Please keep me informed of the progress or give me a point of contact so I know what mission it will be launching on and I can provide you with a copy of the REC.

The guacamole is just ripe avocados minced garlic, fresh jalapeno, lime juice and cilantro. Salt and pepper to taste. I don't really measure anything I put into it…..just keep adding until it tastes good ☺

Don't hesitate to let me know if there is anything else.
Don

From: Graham, Jan (312J) [mailto:janis.u.graham@jpl.nasa.gov]
Sent: Tuesday, January 20, 2015 11:24 PM
To: DANKERT, DONALD J. (KSC-TAA4C)
Subject: NEPA for ECOSTRESS Launch to ISS

Greetings, Don!

I hope this finds you and your family well, and fully recovered from the holidaze.

We have an instrument that is to launch on a resupply mission (most likely via Falcon 9/Dragon). As per our understanding of the discussion we had at the N3 conference last July, NEPA for the complete launch is the responsibility of the launching center, which would be KSC in the case of Falcon 9/Dragon launches to ISS. This is what Josh and Shari did for the recent ill-fated Antares resupply launch. In order to complete the REC here for ECOSTRESS and so that I don't hold up their NEPA compliance, I need a short paragraph from you via e-mail to the effect that KSC, as the Center with overall responsibility for the ISS resupply launch, will cover the NEPA for the ECOSTRESS instrument in your launch NEPA documentation.

If this is not your understanding, please let me know ASAP.

BTW, what is your recipe for guacamole again? Been seeing avocados in the market and remembering how what you made was the best I can remember eating (and I don't think that's John's margaritas talking either). Vicky also has fond memories of that guacamole.

Thanks!

Jan

Graham, Jan (312J)

From: Bundick, Joshua A. (WFF-2500) <joshua.a.bundick@nasa.gov>
Sent: Thursday, February 12, 2015 5:56 AM
To: Graham, Jan (312J)
Subject: Re: ECOSTRESS Instrument Launch to ISS

Jan,

We will address this instrument, should it fly on Antares, when we prepare the NEPA document for the subject launch from WFF.

Thanks

Josh
--
Joshua Bundick
Lead, Environmental Planning
NASA Wallops Flight Facility
(757) 824-2319 | Joshua.A.Bundick@nasa.gov

From: <Graham>, "Jan (312J)" <janis.u.graham@jpl.nasa.gov>
Date: Thursday, February 5, 2015 4:55 PM
To: "Bundick, Joshua A. (WFF-2500)" <joshua.a.bundick@nasa.gov>
Subject: ECOSTRESS Instrument Launch to ISS

Greetings, Josh!

Hope this finds you all well! NASA selected a JPL instrument to go to ISS on a resupply launch no earlier than August 2017. JSC has provided info stating only that it will be on a USTV, (which we think means US Transfer Vehicle – if you know something different or more definitive, please let me know). We believe this to be a generic term for the Dragon/Cygnus/Orion. Since the new and improved Antares/Cygnus should have a number of flights under its belt by then, we deem it to be a candidate LV. What I need from you is an e-mail stating that you will include ECOSTRESS in your NEPA document for the launch, should ECOSTRESS be manifested on the Antares launching from WFF.

Here's a short description of the ECOSTRESS instrument:

"ECOSTRESS" stands for "ECOsystem Spaceborne Thermal Radiometer Experiment on Space Station". ECOSTRESS will be implemented as a Class D payload using 1) an existing in-house radiometer named the Prototype HyspIRI Thermal Infrared Radiometer (PHyTIR), developed under the Instrument Incubator Program (IIP), 2) significant reuse of electrical, mechanical, thermal and ground systems designs from previous and ongoing JPL projects, and 3) accommodation on the International Space Station (ISS) Japanese Experiment Module Exposed Facility (JEM-EF)., where it will measure evapotranspiration (ET) and water use efficiency (WUE) over the diurnal cycle for a wide range of biomes. The ECOSTRESS mission will acquire data for 1 year, measuring Thermal Infrared (TIR), ET and WUE and the Evaporative Stress Index (ESI) drought indicator for selected regions of the globe and the entire contiguous United States to answer several key science questions. The ECOSTRESS instrument will provide thermal infrared data in multi-spectral bands between 8 and 12.5 micrometers with 38 m x 57 m spatial resolution.