

PMC-ND

(1.08.09.13)

**U.S. DEPARTMENT OF ENERGY  
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY  
NEPA DETERMINATION**



**RECIPIENT:** Raytheon Technologies Corporation

**STATE:** CT

**PROJECT TITLE:** MULTI-SOURCE MACHINE LEARNING AND THERMOPLASTICS ENHANCED AEROSTRUCTURE MANUFACTURING (mTEAM)

<b>Funding Opportunity Announcement Number</b>	<b>Procurement Instrument Number</b>	<b>NEPA Control Number</b>	<b>CID Number</b>
DE-FOA-0002252	DE-EE0009398	GFO-0009398-001	GO9398

Based on my review of the information concerning the proposed action, as NEPA Compliance Officer (authorized under DOE Policy 451.1), I have made the following determination:

**CX, EA, EIS APPENDIX AND NUMBER:**

Description:

**A9 Information gathering, analysis, and dissemination** Information gathering (including, but not limited to, literature surveys, inventories, site visits, and audits), data analysis (including, but not limited to, computer modeling), document preparation (including, but not limited to, conceptual design, feasibility studies, and analytical energy supply and demand studies), and information dissemination (including, but not limited to, document publication and distribution, and classroom training and informational programs), but not including site characterization or environmental monitoring. (See also B3.1 of appendix B to this subpart.)

**B3.6 Small-scale research and development, laboratory operations, and pilot projects** Siting, construction, modification, operation, and decommissioning of facilities for smallscale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment.

Rationale for determination:

The U.S. Department of Energy (DOE) is proposing to provide funding to Raytheon Technologies Corporation (Raytheon) to develop a novel welding process for manufacturing applications in the aerospace industry. The process would integrate machine learning and real-time computer modeling of components to reduce production lead time. Software would be integrated into previously developed hardware and tested via welding of representative samples. The project would be completed over two Budget Periods (BPs), with a Go/No-Go Decision Point in between each BP. This NEPA Determination is applicable to both BPs.

Proposed project activities would consist of conceptual design work, computer modeling, algorithm/software development, welding demonstrations, process development, and material characterization. These activities will be discussed further below.

All welding activities and material characterization activities would be performed by Raytheon and its project partner Collins Aerostructures (Collins) utilizing specialized welding hardware (discussed further below). Welding demonstration activities would consist of the welding together of sample coupons and thermoplastic composite panels, utilizing the hardware and processes that would be developed as part of the project. The thermoplastic composite panels would be designed by Raytheon and fabricated by a qualified, third-party manufacturer. After welding, the parts would be sectioned and characterized. This would include both imaging/optical analysis, as well as mechanical testing of the welded parts. Data generated by the welding demonstrations would be used to develop machine learning algorithms, which would model and optimize welding methods. Project partner Oak Ridge National Laboratory ('ORNL' – Oak Ridge, TN) would assist both with the development of machine learning algorithms and with the performance of optical imaging.

For the activities discussed above, Raytheon would use existing hardware that was developed and fabricated as part of a previous work effort. The hardware is located at Raytheon's facility in Hartford, CT and would be deployed/installed to the specifications of the current project. The hardware includes a welding cell, end effector, induction heater, chiller, and welding fixture. All equipment would be operated within a designated, controlled space within the facility. Collins would also use an existing induction welding system installed at its manufacturing facility in Riverside, CA. This hardware would be supplemented by the addition of two induction heaters and multizone heating blankets. These items would be incorporated into Collins' existing manufacturing line. Additionally, optical imaging would be performed at Collins' facility utilizing a camera system developed by ORNL, which would be deployed at

Collins site during the project. At both facilities, modifications would be made to the hardware to adjust the specifications, orientation, and layout to the needs of the project. All modifications would be limited to the hardware itself. No facility modifications or ground disturbance would be required at either location. No additional permits or authorizations would be required.

Project work would involve the use and handling of powered machinery operating at high temperatures. All such handling would be performed at purpose-built manufacturing sites that operate this equipment as part of their regular course of business. At all locations, Potential hazards would be mitigated through adherence to established institutional health and safety policies and procedures. This would include carrying out Environmental, Health, and Safety (EHS) risk assessments prior to performing any work activities. Raytheon and its project partners would observe all applicable Federal, state, and local health, safety, and environmental regulations.

## NEPA PROVISION

DOE has made a final NEPA determination.

Notes:

Advanced Manufacturing Office

This NEPA determination does not require a tailored NEPA Provision.

NEPA review completed by Jonathan Hartman, 06/24/2021

## FOR CATEGORICAL EXCLUSION DETERMINATIONS

The proposed action (or the part of the proposal defined in the Rationale above) fits within a class of actions that is listed in Appendix A or B to 10 CFR Part 1021, Subpart D. To fit within the classes of actions listed in 10 CFR Part 1021, Subpart D, Appendix B, a proposal must be one that would not: (1) threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, or similar requirements of DOE or Executive Orders; (2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities (including incinerators), but the proposal may include categorically excluded waste storage, disposal, recovery, or treatment actions or facilities; (3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that preexist in the environment such that there would be uncontrolled or unpermitted releases; (4) have the potential to cause significant impacts on environmentally sensitive resources, including, but not limited to, those listed in paragraph B(4) of 10 CFR Part 1021, Subpart D, Appendix B; (5) involve genetically engineered organisms, synthetic biology, governmentally designated noxious weeds, or invasive species, unless the proposed activity would be contained or confined in a manner designed and operated to prevent unauthorized release into the environment and conducted in accordance with applicable requirements, such as those listed in paragraph B(5) of 10 CFR Part 1021, Subpart D, Appendix B.

There are no extraordinary circumstances related to the proposed action that may affect the significance of the environmental effects of the proposal.

The proposed action has not been segmented to meet the definition of a categorical exclusion. This proposal is not connected to other actions with potentially significant impacts (40 CFR 1508.25(a)(1)), is not related to other actions with individually insignificant but cumulatively significant impacts (40 CFR 1508.27(b)(7)), and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211 concerning limitations on actions during preparation of an environmental impact statement.

The proposed action is categorically excluded from further NEPA review.

## SIGNATURE OF THIS MEMORANDUM CONSTITUTES A RECORD OF THIS DECISION.

NEPA Compliance Officer Signature:  Casey Strickland Date: 6/25/2021  
NEPA Compliance Officer

## FIELD OFFICE MANAGER DETERMINATION

- Field Office Manager review not required  
 Field Office Manager review required

## BASED ON MY REVIEW I CONCUR WITH THE DETERMINATION OF THE NCO :

Field Office Manager's Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
Field Office Manager