



**DEPARTMENT OF PARKS AND RECREATION
OFFICE OF HISTORIC PRESERVATION**

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December 11, 2020

VIA Email

In reply, refer to: NASA_2020_1112_001

Mr. Jonathan Ikan
Center Cultural Resources Manager
NASA Ames Research Center
Mail Stop 213-8
Moffett Field, CA 94035

Subject: Vertical Motion Simulator Out-the-Window Cockpit Visual Infrastructure Project,
NASA Ames Research Center, Santa Clara County, CA

Dear Mr. Ikan:

The California State Historic Preservation Officer (SHPO) has received the November 12, 2020, letter initiating consultation regarding an undertaking at NASA Ames Research Center (ARC). NASA is consulting with the State Historic Preservation Officer (SHPO) to comply with Section 106 of the National Historic Preservation Act of 1966 (54 U.S.C. §306108), as amended, and its implementing regulations at 36 CFR Part 800. Along with the letter, NASA submitted a technical Section 106 report prepared by AECOM dated October 30, 2020, that provides the Section 106 analysis, project maps, and photographs.

The proposed undertaking, as described, involves updating the Vertical Motion Simulator (VMS) in Building N243. The VMS is an apparatus in which operators sit in an interchangeable cab (ICAB) with visual projectors that simulate the cockpits of aircraft or spacecraft for pilot/astronaut training purposes. The project would include:

- Replacement of projectors for existing display systems;
- Consolidation and relocation of the existing analog video infrastructure to optimize performance and sustainability during migration to digital video infrastructure;
- Replacement of legacy analog video switch routing, distribution, and post processing equipment with digital technology; and
- Replacement of the visual display systems with state-of-the-art digital visual technologies to support current and evolving high-definition display capabilities.

NASA identified the Area of Potential Effects (APE) for the undertaking encompassing

the footprint of Building N243. The project involves interior alterations that would not cause any type of ground disturbance.

The APE includes the Flight and Guidance Simulation Laboratory (Building N243), which was listed in the National Register of Historic Places on January 11, 2017. The property is eligible under Criterion A for its association with training pilots and testing component features of the Space Shuttle Program (SSP), and under Criterion C for the design and engineering of the VMS, which is the world's largest motion-based simulator and widely regarded as the best simulator during its time for its engineering design and role in Space Shuttle pilot training. The property meets Criteria Consideration G for properties that have achieved significance within the past 50 years because of its exceptional significance within the context of the SSP for its contribution to the advancement of the SSP and the development and operation of the Space Shuttle orbiter by providing research and essential astronaut training in an accurately simulated orbiter. The period of significance is 1967 to 2011.

The project would directly alter the VMS, a significant characteristic of the Flight and Guidance Simulation Laboratory (Building N243) for which it qualifies for the NRHP under Criterion C. The project proposes to relocate the Image Generator, replace analog equipment with digital equipment, and replace the video displays for VMS operations. These alterations would allow the property to continue to be used for its historic purpose, retain the historic character of the property, and maintain reference to historic significance of the property's change over time. The alterations would not introduce conjectural historic features, apply chemical or physical treatments, or affect significant archaeological resources, and the alterations would be differentiated from original features and be compatible with the property. However, the project activities would replace deteriorated equipment with modern equipment, and the changes would not be reversible for practical purposes.

Despite these changes, NASA determined that VMS and Building N243 would retain integrity of location, design, setting, materials, workmanship, feeling, and association after implementation of the project. The continued function of the VMS as a large amplitude simulator for pilot and astronaut training align with the VMS's historical associations, and its improvement will reflect the changing nature of a highly technical facility as addressed in the Advisory Council for Historic Preservation's 1991 *Program Comment Balancing Historic Preservation Needs with the Operation of Highly Technical or Scientific Facilities* (ACHP 1991). Therefore, NASA proposes a Finding of No Adverse Effect for this undertaking.

After reviewing the information submitted, the SHPO offers the following comments.

- This project qualifies as an undertaking with the potential to affect historic properties.

- The APE is sufficient to take direct and indirect effects of the undertaking into account and identification and evaluation efforts are sufficient.
- Because the undertaking would cause loss of historic fabric from components of the VMS that contribute to its significance, the SHPO finds that this undertaking has the potential to cause adverse effects.
- NASA has correctly applied the Advisory Council's *Program Comment Balancing Historic Preservation Needs with the Operation of Highly Technical or Scientific Facilities*, noting that the undertaking would enable the property to continue serving its highly technical function.
- Because of the changes to significant components of the VMS, the SHPO recommends that NASA update the National Register nomination for the facility to account for the modifications.
- The SHPO also recommends that NASA contact parties who have shown interest in undertakings at ARC for the potential use of removed components such as ICABs and/or control equipment for interpretation of the facility's national significance.
- Based upon the information submitted, the SHPO has no objection to the proposed Finding of No Adverse Effect for this undertaking.
- Please be advised that under certain circumstances, such as unanticipated discovery or a change in project description, NASA may have additional future responsibilities for this undertaking under 36 CFR Part 800.

If there are any questions or concerns, please contact State Historian Mark Beason, at (916) 445-7047 or mark.beason@parks.ca.gov.

Sincerely,



Julianne Polanco
State Historic Preservation Officer