

## ATTACHMENT 1

### NATIONAL MUSEUM OF THE UNITED STATES AIR FORCE (NMUSAF) LOAN AND STATIC DISPLAY PROGRAMS

### INSTRUCTIONS FOR PREPARATION AND MAINTENANCE OF AEROSPACE VEHICLES

#### SECTION A - GENERAL

##### **A. Information:**

1. This instruction covers the requirements for the preparation and preservation of aerospace vehicles for static display by an organization borrowing an aerospace vehicle from the National Museum of the United States Air Force (NMUSAF).
2. These requirements are designed to return and/or maintain the aerospace vehicle in as near original configuration as possible and to render them suitable for display.
3. Generally, all reconditioning, repairing, and refinishing will be accomplished in accordance with current Air Force directives and instructions and in a manner that would not modify it in any way, thereby altering the original form, design, or the historical significance of, said property. Deviations from this standard must be requested in writing and approved by NMUSAF.

##### **B. Security Requirements:**

1. Aerospace vehicles on display and undergoing preparation for display shall be kept secure from unsupervised personnel. Aerospace vehicles will be maintained with sufficient security to ensure that it is protected from vandalism and theft or unauthorized removal of components.
2. Any theft or unauthorized removal of components shall be immediately reported to the local law enforcement agency and by the next working day to NMUSAF. This must be followed by a report of the investigation of the incident within 30 days.
3. All canopies, doors, access hatches, and access plates, except for one entrance door, will be permanently sealed shut by any of the following methods to prevent unauthorized entry:
  - a. Bolting through the hatch to internal crossbars placed across the opening. These can be fabricated from sturdy steel strapping or channel iron.
  - b. Riveting the door securely to the jamb section.
  - c. Attaching hasps internally and securing with inside padlock.

d. Whatever method is employed to secure doors and access hatches, the crevices remaining will be filled with caulking compound or elastic putty to prevent internal damage from rain, snow, dust and ice. The access door that is not permanently sealed must be secured by a hasp welded or riveted in place. Multiple locks (two or three) are preferable, each with separate key or combination. This technique will reduce the possibility of unauthorized access but will provide emergency entrance for authorized personnel.

### **C. Maintenance Records:**

1. Whenever items are permanently removed, the removal and disposition of such items shall be annotated on a maintenance log or AF Form 3581 (available from NMUSAF).

2. All work items that are accomplished shall be listed and signed off on a maintenance log (AF Form 3581, available from the NMUSAF).

3. Utilizing the maintenance log, a detailed accounting will be maintained by the borrower of all items removed or installed with the date of installation/removal and the name of the individual accomplishing the work.

4. Copies of all maintenance records must be returned to NMUSAF/MUC with the annual loan renewal process for preservation.

## **SECTION B - REQUIREMENTS**

### **A. Prepare Powerplant for Display:**

1. Disconnect and drain all water and oil lines, tanks, valves, and pumps. Reconnect lines and reinstall plugs after draining (if applicable).

2. Clean excess oil and grease from exterior components of engines (if applicable).

3. Check powerplant cowling for corrosion and damage. Repair and refinish as necessary for display.

4. Install intake and exhaust protective covers. Use standard covers if available or suitable substitutes.

5. Clean and preserve propeller(s). Treat any affected areas and refinish to standard configuration.

### **B. Prepare Landing Gear:**

1. Clean and preserve strut.

2. Clean all wheels and other landing gear components.

3. Check and remove corrosion. Repaint to standard configuration.
4. Check all tires for excessive wear and adjust pressure as required.
5. Secure all retractable landing gear in the down position with positive locking devices.

#### **C. Prepare Hydraulic Systems:**

Clean all exposed finished surfaces of actuating rods, hydraulic cylinders, locks, and valves. Other hydraulic equipment will be cleaned and coated with corrosion preventative compound.

#### **D. Prepare Electronic Systems:**

Leave all electronic equipment that is not reclaimed installed on the aerospace vehicle. Stow all connectors from equipment that has been removed.

#### **E. Prepare Airframe:**

1. Check airframe for corrosion and treat affected areas.
2. Clean all debris and foreign material from interior of fuselage.
3. Check airframe for external damage and repair.
4. Cover all openings that will allow the entrance of water or other foreign matter that may have a corrosive or other deteriorating effect. Use standard covers if available, or suitable substitutes. Additional protection may be incorporated for aerospace vehicles displayed outside.
5. Check all fuselage, wing, and empennage drain holes for obstructions. Aerospace vehicles displayed outside may necessitate additional drain holes to ensure proper drainage. Drain holes should be periodically probed to ensure they are not obstructed. Inspect for water trapped in lower portions of fuselage. If water is present, comply with instructions contained in applicable technical order for removal and correction.
6. Clean and treat lavatory and relief facilities (if applicable).
7. Check all astrodomes and plastic panels for crazing and damage. Repair and/or replace as necessary. Clean all plastic panels thoroughly with soap and water.

#### **F. Prepare Control Surfaces:**

1. Check all metal control surfaces for corrosion and treat-affected areas.
2. Check all control surfaces for external damage and repair areas as necessary.
3. Inspect all fabric-covered control surfaces, repair or re-cover as necessary.

4. Check all control surfaces, attaching mechanisms for loose rivets and/or sheared bolts and make necessary repairs.

5. Secure all moveable surfaces in a neutral position with positive locking devices.

#### **G. Radiation Safety:**

**No radioactive components will be reinstalled by the borrowing organization.** If radioactive items are found reinstalled during later inspections, the borrowing organization will pay the cost of removal of the radioactive items and any decontamination required.

#### **H. Final Preparation:**

1. Secure aerospace vehicles by attaching tie down restraints to surface attaching points and to major structural parts of the item. Tie down restraints, including surface attaching points, should be of sufficient strength to withstand the expected wind condition for the locality.

2. Place aerospace vehicles on surface concrete or asphalt of sufficient strength to support its weight. This will not apply if the recipient, with the written permission of the NMUSAF, has mounted the aerospace vehicle on a pylon attached to its structural members.

3. Aerospace vehicles that are normally supported on pneumatic tires must be placed on display stands. Tires should be inflated and or checked to maintain normal tire shape.

4. Remove all antenna wires that could serve as a bird roost.

5. Install bird proofing on all aerospace vehicle openings, including intake and exhaust covers.

6. Flag or cover protruding objects of a hazardous nature.

#### **I. Coordination:**

1. Deviation from the procedures outlined in this attachment must be requested in writing and require written approval prior to deviation.

2. No aerospace vehicles will be renovated, reconfigured, have markings changed, or tail number altered, or any parts added, removed, or replaced as part of a planned restoration effort without prior written approval from the NMUSAF.

## ATTACHMENT 2

### NATIONAL MUSEUM OF THE UNITED STATES AIR FORCE (NMUSAF) LOAN AND STATIC DISPLAY PROGRAMS

#### INSTRUCTIONS FOR THE CARE OF ARTIFACTS

##### **A. Information:**

1. These general guidelines are provided to fulfill the NMUSAF's obligation to ensure the preservation of the collection and to define the responsibilities of organizations that retain historical property for display.

2. Under normal circumstances, artifacts will not be made available from the NMUSAF unless the basic measures for preservation and conservation have already been accomplished. However, regardless of the state of preservation at the time of receipt, an assessment must be made and all appropriate measures taken to ensure continued preservation of historical property. All items must be properly prepared for exhibition, placed in a safe environment and inspected periodically.

##### **B. General Guidelines for Artifacts:**

1. All artifacts must be protected from harmful exposure and maintained in a stable environment. Preservative treatments and mounting techniques will vary with each item depending on its material(s), condition and display method. The following are some general guidelines:

a. When displaying an artifact never modify it in such a way as to alter or compromise its integrity, authenticity or uniqueness. Retain its natural characteristics.

b. Provide appropriate physical security against vandalism or theft through the use of locked or sealed display cases. The artifact's intrinsic value should determine the security measures required.

c. Good housekeeping and environmental control are essential for the long term care of museum artifacts.

2. Contact the NMUSAF Conservator for guidance if needed.

**C. Damage Threats to Artifacts:** The threats of damage or deterioration to artifacts generally come from four sources:

1. People – The greatest threat to the continued survival of an artifact comes from people. This is a result of mishandling the artifact resulting in mechanical breakage, soiling from unprotected hands (fingerprints), improper cleaning methods and incorrect attempts at preservation or repairs (making it 'look' better). Unfortunately, theft must also be included in this category.

2. Light – Light, a form of radiation, damages many materials, especially fabrics. This damage is first observed as the fading of colors followed by the gradual breakdown of the material. The most harmful portion of the light spectrum is ultra-violet (UV). Protecting from UV is accomplished by avoidance of natural sunlight or artificial light such as florescent and halogen. The use of Light Emitting Diodes (LED) is the preferred standard in museum exhibits. Normal incandescent lighting is low in UV radiation.

a. All historical property on loan from the NMUSAF that is on interior exhibit will not be exposed to light level which exceeds 200 lux or 20 foot-candles from any source. The acceptable level for most artifacts falls between 50 and 200 lux or 5 and 20 foot-candles. Sensitive artifacts, such as artwork, photographs and textiles should have their intensity levels adjusted toward lower limits and/or limited exposure time. There is a reciprocity law between intensity (lux) and time of exposure: Ten hours of exposure at 50 lux has the same damaging effect as 1 hour at 500 lux.

b. Protection for UV is accomplished by avoidance or shielding. Shielding of UV producing light sources, such as direct or diffused sunlight and all fluorescent lighting, requires UV Plexiglas, solar screen, blackout curtains or UV filtering sleeves. All UV filtering media have a life span of about 10 years, after which they must be changed to maintain their effectiveness.

3. Environment – The most common environmental threats are heat and humidity. Ideally, an artifact is displayed at a constant temperature of 68 degrees and 50% relative humidity. Of the two, humidity is the most destructive. Excessive heat and humidity may create a favorable environment for the growth of molds and fungus as well as rust/corrosion. Rapid changes in temperature and humidity should be avoided.

4. Insect/Pest – Insects and pests can be highly destructive. The first line of defense is the cleanliness of the facility. Careful monitoring and frequent inspection will provide early detection of infestation. If and when an infestation is detected many methods of pest removal are destructive to artifacts. If an artifact is exposed to infestation, contact the NMUSAF Conservator.

**D. Conservation:** Adherence to the guidelines for preservation of artifacts will go a long way to ensure their longevity. In rare instances, some conservation measures may be needed. Contact the NMUSAF Conservator for guidance. Do not attempt to treat an artifact on your own.

**E. Storage:** All attempts should be made to place artifacts on exhibit as soon as possible. Environmental control, good housekeeping and periodic inspections are essential to the proper storage of artifacts. Textiles shall be stored flat when possible and laid out on acid free tissue

paper. Well padded hangers should be used if textiles are hung for display. Storage on shelves shall be loose with no piling or stacking of artifacts and all shelving covered with acid free tissue. If shelving is wood, it shall be sealed to deter transfer of acid from wood to artifacts. Cabinets are preferable to open storage as they discourage theft, dust and insect problems.

**F. Handling:** Wear cotton, nitrile or latex gloves while handling artifacts. Two hands should be used to handle or carry artifacts to reduce risk of dropping. Carry only one artifact at a time. Do not carry or lift artifacts by handles or weakest point.

**G. Display:** Displaying an artifact can be very detrimental if not done properly. Cases should be designed to incorporate UF-3 or UF-5 Plexiglas to shield artifacts from UV light. Cases should be ventilated to allow air exchange and openings filtered to prevent entry of insects. All interior surfaces of wooden cases should be properly sealed. All artifacts should be buffered from acidic display materials. Never alter an artifact to fit a case or to facilitate mounting. Use mannequins that do not place undue stress on uniforms. Do not force garments on to mannequins. Keep cases clean and place them in areas away from direct sun and extremes in temperature and humidity.

**H. Shipping:** Damage to artifacts can occur during shipping. Use appropriate packing materials to protect the artifact during transit. Consult the NMUSAF to arrange shipping.