



AEROSPACE INFORMATION REPORT

AIR7063™

Issued

2024-10

Environmental Control Systems (ECS) for Unmanned Aircraft (UA)

RATIONALE

A document was needed to provide a guide for design of Environmental Control Systems (ECS) for Unmanned Aircraft (UA) and discuss the importance of environmental control of equipment, cargo, and occupants for successful operation of UA.

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1. SCOPE

This document provides guidance for ECS design for UA primarily by reference to existing applicable SAE AC-9 documents with indication of how they would apply and how they may need to be adapted for UA. This document provides guidance related to environmental control for onboard equipment, cargo, animals, and passengers. This document cannot provide detail design guidance for all potential types of UA. Limited information is available for ECS requirements for UA that may carry passengers, but it should be expected that the same comfort and safety standards would be applied to UA as prescribed in current civil aviation authority rules and military specifications. Additional requirements unique to UA can be expected for totally autonomous UA operation with no provision for flight or ground crew monitoring and intervention in the event of ECS failures or malfunctions. This document does not pertain to the related ground stations that may be controlling the UA.

1.1 Purpose

The purpose of this document is to indicate to UA designers which AC-9 ECS documents are applicable to UA with some information on how they may be adapted to UA.

2. APPLICABLE DOCUMENTS

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AIR64	Electrical and Electronic Equipment Cooling in Commercial Transports
AIR806	Air Conditioning of Aircraft Cargo
AIR860	Aircraft Electrical Heating Systems
AIR1168/3	SAE Aerospace Applied Thermodynamics Manual Aerothermodynamic Systems Engineering and Design
AIR1168/6	Characteristics of Equipment Components, Equipment Cooling System Design, and Temperature Control System Design
AIR1168/7	Aerospace Pressurization System Design
AIR1168/8	Aircraft Fuel Weight Penalty Due to Air Conditioning
AIR1277	Cooling of Military Avionic Equipment
AIR1600	Animal Environment in Cargo Compartments
AIR1609	Aircraft Humidification
AIR1811	Liquid Cooling Systems
AIR1812	Environmental Control Systems Life Cycle Cost
AIR1957	Heat Sinks for Airborne Vehicles
AIR4766	Air Quality for Commercial Aircraft Cabins