



AEROSPACE RECOMMENDED PRACTICE

ARP4148™**REV. C**

Issued 1993-03
Revised 2015-03
Reaffirmed 2025-10

Superseding ARP4148B

Gas Turbine Engine Real Time Performance Model Presentation

RATIONALE

Sections related to computer hardware and resources have been reviewed and references to other SAE standard documents have been updated.

ARP4148C has been reaffirmed to comply with the SAE Five-Year Review policy.

TABLE OF CONTENTS

1.	SCOPE.....	3
1.1	Mathematical Model Presentation.....	3
1.2	Applications.....	3
2.	REFERENCES.....	3
2.1	Applicable Documents	3
2.2	Definitions	4
3.	MODEL REQUIREMENTS	4
3.1	General Requirement.....	4
3.2	Structure.....	4
3.3	Dynamic Response	4
3.4	Numerical Stability	4
3.5	Numerical Accuracy	5
3.6	Validity.....	5
3.7	Consistency.....	5
3.8	Engine Limits.....	5
3.9	Power Definition	5
3.10	Station Identification.....	5
3.11	Nomenclature	5
3.12	Initialization	5
4.	MODEL OPTIONS	6
4.1	Coordination.....	6
4.2	Environmental and Flight Conditions	6
4.3	Customer Services.....	6
4.4	Engine Anti-Icing System.....	6
4.5	Subidle Operation	6
4.6	Thrust Generation	6
4.7	Variable Geometry	6
4.8	External Loads	6

SAE Executive Standards Committee Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2025 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, or used for text and data mining, AI training, or similar technologies, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 1-877-606-7323 (U.S. and Canada only)
Tel: 1-724-776-4970 (outside U.S. and Canada)
Fax: 724-776-0790
Email: CustomerService@sae.org
http://www.sae.org

SAE WEB ADDRESS:

Full document details: SAE ARP4148C

For more information on this standard, visit <https://www.sae.org/standards/content/ARP4148C/>

Documents

Standard, visit Sharing Hub

4.9	Engine Instability	6
4.10	Alternate Control Modes	6
4.11	Malfunctions	7
5.	COORDINATION REQUIREMENTS	7
5.1	Computer Capabilities	7
5.2	Precision	7
5.3	Interface with Other Models	7
5.4	Consistency	7
5.5	Identification	7
5.6	Checkout	7
5.7	Revisions	8
6.	DOCUMENTATION REQUIREMENTS	8
6.1	Deliverable Documents	8
6.2	Model Implementation Guide	8
7.	NOTES	9

1. SCOPE

This SAE Aerospace Recommended Practice (ARP) provides guidance for the presentation of gas turbine engine transient performance models with the capacity to be implemented as computer programs operating in real time and is intended to complement AS681.

Such models will be used in those applications where a transient program must interface with physical systems. These applications are characterized by the requirement for real time transient response.

These models require attention to unique characteristics that are beyond the scope of AS681. This document is intended to facilitate the development of mathematical models and the coordination of their requirements with the user. It will not unduly restrict the modeling methodology used by the supplier.

The objective of this document is to define a recommended practice for the delivery of mathematical models intended for real time use. Models used in this application may also be contained in deliverable computer programs covered by AS681.

1.1 Mathematical Model Presentation

The presentation of mathematical models can include, but is not limited to, the following:

- a. Executable computer programs
- b. Program listings
- c. Block diagrams
- d. Tabular data
- e. Plotted data

A description of the model will be included in the Model Implementation Guide (6.2, Items 4 and 10).

1.2 Applications

The applications of real time engine models include, but are not limited to, the following:

- a. Flight simulators
- b. Avionic and control system development
- c. Control system embedded software

2. REFERENCES

2.1 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.

AS681	Gas Turbine Engine Performance Presentation for Computer Programs
AS755	Aircraft Propulsion System Performance Station Designation
AS6502	Aircraft Propulsion System Performance Nomenclature