



AEROSPACE RECOMMENDED PRACTICE

ARP4102™/6**REV. A**

Issued 1988-07
Reaffirmed 2007-07
Revised 2022-03

Superseding ARP4102/6

Communications and Navigation Equipment

RATIONALE

This SAE Aerospace Recommended Practice (ARP) has been revised to incorporate the requirements of various new technologies, such as the global navigation satellite system (GNSS), the unique needs of augmented crews in aircraft certificated with two pilots, and the removal of outdated references, such as OMEGA and LORAN.

1. SCOPE

This document recommends criteria for the control and display of communications and navigation equipment on the flight deck. The equipment includes:

- a. Communications: Ultra high frequency (UHF), very high frequency (VHF), and high frequency (HF) radios, cabin/service interphones, public address (PA), select call (SELCAL), call select (CALSEL), satellite communications (SATCOM), and controller pilot data link communications (CPDLC).
- b. Navigation: Very high frequency omnidirectional range (VOR), tactical air navigation (TACAN), automatic direction finder (ADF), distance measuring equipment (DME), instrument landing system (ILS), markers (MKR), very low frequency (VLF), inertial navigation systems (INS), inertial reference systems (IRS), global navigation satellite system (GNSS), global positioning system (GPS), low range radio altimeter (LRRA), and attitude heading reference system (AHRS).
- c. Weather radar.
- d. Data link: Company, Air Traffic Control (ATC), transponders (Mode-S), controller pilot data link communications (CPDLC), and others.

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.

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 © 2022 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

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

SAE WEB ADDRESS:

Full document details: SAE ARP4102_6A

For more information on this standard, visit
<https://www.sae.org/standards/content/ARP4102/6A/>

Documents

Document Sharing Hub

2.1.1 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.

ARP4101	Flight Deck Layout and Facilities
ARP4102/4	Flight Deck Alerting System (FAS)
ARP4102/7	Electronic Displays
ARP4102/9	Flight Management System (FMS)
ARP4102/12	Approach to Landing Guidance System for Transport Aircraft
ARP4105	Abbreviations, Acronyms, and Terms for Use on the Flight Deck

2.2 Definitions

2.2.1 AUTO TUNING

A means of tuning communication and navigation radio equipment automatically to frequencies that satisfy the associated navigation or other task.

2.2.2 FLIGHT CREW

The operational crew occupying the flight deck during flight, to include positions for the captain, first officer, and a position for any jumpseaters, checkairmen, or relief pilots.

2.2.3 JUMPSEATS

Seat positions on the flight deck that may be occupied by a jumpseater, checkairman, or relief pilot. If more than one jumpseat is installed, they will be referred to as the Primary and Secondary Jumpseat in this document.

2.2.4 PRESELECTED FREQUENCY

A frequency that can be readily tuned, either manually or automatically, as the active frequency from a previously programmed or selected list.

2.2.5 REMOTE TUNING

A means of tuning communication and navigation radio equipment other than that normally associated with the radio frequency display panel. Remote tuning includes auto-tuning and keyboard tuning from a flight management system or other systems having radio management capability.

3. OPERATIONAL REQUIREMENTS

3.1 Audio

3.1.1 Mic

Handheld, boom, and oxygen mask mic capabilities shall be provided to all flight crew members..

3.1.2 Audio Selection

The captain and first officer positions shall each have an audio selection capability covering all voice communications and aural radio navigation equipment. This capability is also recommended for the primary jumpseat pilot.

3.1.3 Volume

It shall be possible to decrease each audio level to the point where no signal is audible except that a minimum preset level shall be provided for the receiver associated with the selected transmitter.

3.1.4 Operational Requirements

The audio quality of each radio and/or intercom should be such that there is no perceptible interference from other electronic sources.

3.1.5 Ident Signal

Means should be provided to automatically decode and display audio ident signals. If this capability is not provided, a switch to select between audio ident/voice communication and voice communication-only shall be provided.

3.1.6 Public Address (PA) and Interphone

PA, flight, cabin, and service interphone facilities shall be provided from the boom, oxygen mask, and handheld microphones.

The selected flight deck microphone (handheld, boom, and oxygen mask) shall have direct access to the interphone or the PA system. This requirement does not preclude the provision of dedicated microphones for any or each service.

The capability may be provided for any flight deck station to call directly any or all cabin and service locations.

3.1.7 Oxygen Mask Microphone

Consideration should be given to the automatic selection of the oxygen mask microphone on mask deployment.

3.1.8 Push to Talk Switch (PTT)

An open microphone should deactivate automatically after an appropriate length of time and this condition indicated to the crew. If automatic deactivation is not provided, the open microphone condition shall be clearly annunciated.

3.1.9 Loud Speakers

If individual loud speakers are installed for crew members for the reception of aural communication and navigation signals, an ON-OFF and/or volume control means shall be provided for each.

Side tone and speaker muting shall be provided, i.e., MIC-1 PTT muting SPKR-1 and MIC-2 PTT muting SPKR-2, except for audio warnings which should not be muted or be adjustable.

There shall be no undesirable interference between speakers when more than one is installed. However, all transmissions must be intelligible to both pilots throughout the full range of movement of the respective seats under all normal flight conditions.

3.1.10 Hot Mic Intercom

The captain and first officer shall have the capability to engage and maintain hot mic on their intercom system in order to allow effective use of noise-cancelling headsets. This capability is also preferred for the primary and secondary jumpseat positions.

3.2 Communication Equipment

3.2.1 UHF/VHF

Frequency selection and pre-selection shall be provided. Auto-tuning shall not be provided. If remote tuning is provided, the source controlling for frequency shall be annunciated.