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Training Manual

Part F-1 Meteorology for Air Traffic Controllers and Pilots

Approved by the Secretary General
and published under his authority

First Edition — 2002

International Civil Aviation Organization

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AMENDMENTS

The issue of amendments is announced regularly in the *ICAO Journal* and in the monthly *Supplement to the Catalogue of ICAO Publications and Audio-visual Training Aids*, which holders of this publication should consult. The space below is provided to keep a record of such amendments.

RECORD OF AMENDMENTS AND CORRIGENDA

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FOREWORD

The importance of meteorology for the safety of civil aviation has been acknowledged since the early days of aviation. The ICAO *Training Manual* has provided guidance on meteorological training for aviation operations personnel since its inception. However, this new part of the *Training Manual* is the first that is exclusively dedicated to aeronautical meteorology. This approach has been chosen to outline, in a more efficient way, the important developments which have taken place in the dissemination of meteorological information.

This manual has been prepared by the Meteorology and the Personnel Licensing and Training Sections of ICAO. It updates the meteorological part of the syllabus that is included in Doc 7192 — *Training Manual*, Part B-5

— *Integrated Commercial Pilot Course*, and provides guidance for the training of air traffic controllers.

Comments on this manual, particularly with respect to its application, usefulness and scope of coverage, would be appreciated from States, ICAO Technical Co-operation field missions and training organizations. They will be taken into consideration in the preparation of subsequent editions. Comments concerning this manual should be addressed to:

The Secretary General
International Civil Aviation Organization
999 University Street
Montreal, Quebec H3C 5H7
Canada

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GLOSSARY

ACC	Area control centre	D-ATIS	Data link automatic terminal information service
ACARS	Aircraft communications addressing and reporting system	D-VOLMET	VOLMET data link service
ADS	Automatic dependent surveillance	ETD	Estimated time of departure
AFI	Africa-Indian Ocean	ETOPS	Extended range operations by twin-engined aeroplanes
AFTN	Aeronautical fixed telecommunication network	EUR	European
AIP	Aeronautical information publication	FIC	Flight information centre
AIRMET	Information concerning en-route weather phenomenon which may affect the safety of low-level aircraft operations	FIR	Flight information region
AIREP	A report from an aircraft in flight prepared in conformity with requirements for position and operational and/or meteorological reporting	GAMET	Area forecast for low-level flights
AIS/MET	Aeronautical information service/ meteorology	GRIB	Processed meteorological data in the form of grid point values expressed in binary form
AMBEX	AFI MET bulletin exchange	GTS	Global telecommunication system
AMDAR	Aircraft meteorological data acquisition and relay	IAVW	International airways volcano watch
ANP	Air navigation plan	ISA	International standard atmosphere
APP	Approach control office	ISCS	International satellite communications system
ASDAR	Aircraft-to-satellite data relay	ITCZ	Intertropical convergence zone
ASHTAM	A special series NOTAM notifying, by means of a specific format, change in activity of a volcano, a volcanic eruption and/or volcanic ash cloud that is of significance to aircraft operations	MET	Meteorological
ATCO	Air traffic controller	MET REPORT	Local routine meteorological report
ATIS	Automatic terminal information service	METAR	Aviation routine weather report
ATP	Airline transport pilot	MOTNE	Meteorological Operational Telecommunications Network Europe
ATPL	Airline transport pilot licence	MWO	Meteorological watch office
ATS	Air traffic service	NAT	North Atlantic
ATS/MET	Air traffic service/meteorology	NOTAM	Notice to airmen
AWOS	Automated weather observation system	OPMET	Operational meteorological information
CAT	Clear air turbulence	PP	Private pilot
CAVOK	Visibility, cloud and present weather better than prescribed values or conditions	PPL	Private pilot licence
CP	Commercial pilot	QFE	Atmospheric pressure at aerodrome elevation
CPDLC	Controller-pilot data link communications	QNH	Altimeter subscale setting to obtain elevation when on the ground
CPL	Commercial pilot licence	ROBEX	Regional OPMET bulletin exchange
		RVR	Runway visual range
		SADIS	Satellite distribution system for information relating to air navigation
		SIGMET	Information concerning en-route weather phenomena which may affect the safety of aircraft operations
		SIGWX	Significant weather
		SNOWTAM	A special series NOTAM notifying the presence or removal of hazardous conditions due to snow, ice, slush or

	standing water associated with snow, slush and ice on the movement area, by means of a specific format	TEMPS	Upper-level pressure, temperature, humidity and wind report from a fixed land station
SPECI	Aviation selected special weather report	TWR	Aerodrome control tower
SPECIAL	Local special meteorological report	VAAC	Volcanic ash advisory centre
SVR	Slant visual range	VOLMET	Meteorological information for aircraft in flight
SYNOPS	Report of surface observation from a fixed land station	WAFC	World area forecast centre
TAF	Aerodrome forecast	WAFS	World area forecast system
TCAC	Tropical cyclone advisory centre	WMO	World Meteorological Organization

Chapter 1

INTRODUCTION

1.1 While all transport is subject to weather conditions which can vary from benign to vicious, it can be argued that aviation is the most sensitive to weather conditions. Moreover, an international or small local airport can be equally affected by weather conditions. Even relatively low-speed cross-winds combined with wet runway conditions can effectively close an airport, and conditions of poor visibility can cause major disruptions to aviation schedules. Meteorological (MET) conditions may also compromise safety, efficiency and regularity of flight operations en route.

1.2 It is most important, therefore, that the air traffic controllers (ATCOs), private pilots (PPs), commercial pilots (CPs) and airline transport pilots (ATPs) have sufficient skill and knowledge to interpret MET information, reports, forecasts and warnings correctly and efficiently. They must be able to use this information when exercising their duties.

1.3 In order to ensure that the trainee fully understands the role that the local MET office and aeronautical MET station play in the preparation, coding and dissemination of weather data, it is strongly

recommended that the trainee be taken on a guided tour of the nearest MET office and/or aeronautical MET station, where questions and discussion should be encouraged. It should be emphasized to the ATCO trainees that the maintenance of good coordination between the designated MET office and the respective air traffic service (ATS) units and search and rescue services centres has a major positive impact on the quality of the work of both units.

1.4 The following syllabus outlines the minimum knowledge and skill that are necessary if the ATCOs, PPs, CPs and ATPs are to perform their jobs efficiently and productively. While it may be necessary for authorities to enhance some parts of the outlined syllabus, it must not be at the expense of other parts. For the private pilot licence (PPL) instrument rating, the minimum knowledge required for commercial pilot licences (CPLs) applies.

1.5 The minimum required knowledge may be presented to ATCO trainees in two separate courses: the initial course and the ATCO licence course. The composition of the suggested course content given in Table 2-1 reflects such an arrangement.