

IImsg5 WP3.1A3 – Appendix 1 - Identified ASBU elements applicable to AFI region in MET Field

MET Module	Element	Purpose of the element	Maturity level	Enablers	Applicable (Yes or No)	Rational of applicability
AMET-B0 Global, regional, and local meteorological information to support flexible airspace management, improved situational awareness, collaborative decision-making and dynamically optimized flight trajectory planning.	AMET-B0/1 Meteorological observations products	Provides Meteorological observations in support of flexible airspace management, improved situational awareness, collaborative decision-making and dynamically optimized flight trajectory planning	Ready for implementation	<ul style="list-style-type: none"> • National framework amendment for the provision of meteorological observations products • Procedures for the provision of meteorological observations products • Transmission of meteorological observations data from aircraft • Automated systems and infrastructure to support the provision of meteorological observations products • Training requirements for the provision of meteorological observations products 	Yes	<ul style="list-style-type: none"> • The requirements of Annex 3 to Chicago Convention (A3 Chap. 4: §4.1.5 refers) requiring that At aerodromes with runways intended for Category II and III instrument approach and landing operations, automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure shall be installed to support approach and landing and take-off operations. • Annex 3 Appx. 6: §6.2.5 requires that the wind shear alerts shall be disseminated from automated, ground-based, wind shear remote-sensing or detection equipment in accordance with local arrangements to those concerned.

MET Module	Element	Purpose of the element	Maturity level	Enablers	Applicable (Yes or No)	Rational of applicability
	AMET-B0/2 Meteorological forecast and warning products	Provides Meteorological forecasts, advisories and warnings in support of flexible airspace management, improved situational awareness, collaborative decision-making and dynamically optimized flight trajectory planning.	Ready for implementation	<ul style="list-style-type: none"> • National framework amendment for the provision of meteorological forecast products and warnings • Procedures for the provision of Meteorological forecast products and warnings • Training requirements for the provision of meteorological forecast products and warnings Systems and infrastructure to support the provision of meteorological forecast and warning products	Yes	<ul style="list-style-type: none"> • This element is related to the requirements of Annex Chap. 3: §3.2 & Appendix 2: §1.2 requiring for the provision of the new gridded WAFS information (e.g. Wind, Temperature, Icing, Turbulence, CB clouds).
	AMET-B0/3 Climatological and historical meteorological products	Climatological products in support of the design and planning of infrastructure, flight routes and airspace management. Historical meteorological observations, forecasts, advisories and warnings in support of incident	Ready for implementation	<ul style="list-style-type: none"> • National framework amendment for the provision of climatological meteorological information products • Procedures for the provision of climatological 	Yes	<ul style="list-style-type: none"> • Annex 3 Chap 8: §8.1.1 requiring for the provision of Aerodrome climatological information and historical meteorological products in support of the design and planning of infrastructure, flight routes and airspace management.

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		and accident investigations		meteorological information products <ul style="list-style-type: none"> • Training requirements for the provision of climatological meteorological information products Systems and infrastructure to support the provision of climatological meteorological products		
	AMET-B0/4 Dissemination of meteorological products	Dissemination of meteorological products in support of flexible airspace management, improved situational awareness, collaborative decision-making and dynamically optimized flight trajectory planning	Ready for implementation	<ul style="list-style-type: none"> • National framework amendment for meteorological information exchange • Procedures for meteorological information exchange • Communications infrastructure for meteorological information exchange • Training for meteorological information exchange 	Yes	<ul style="list-style-type: none"> • The requirements for the dissemination of OPMET messages in both TAC and digital formats as of November 2020 prescribed by Annex 3 provisions (A3 App. 3: §2.1.3; App. 6: §1.1.6 & §1.2)

MET Module	Element	Purpose of the element	Maturity level	Enablers	Applicable (Yes or No)	Rational of applicability
				ICAO Meteorological Information Exchange Model (IWXXM) V1-V2		
AMET-B1 Meteorological information supporting automated decision process or aids, involving meteorological information, meteorological information translation, ATM impact conversion and ATM decision support	AMET-B1/1 Meteorological observations information	Provides Meteorological observations information in support of automated decision processes or aids and performance based requirements, involving meteorological information, meteorological information translation, ATM impact conversion and ATM decision support.	Standardization	<ul style="list-style-type: none"> • National framework amendment for the provision of meteorological observations information • Procedures for the provision of meteorological observations information • Transmission of meteorological observations information from aircraft • Automated systems and infrastructure to support the provision of meteorological observations information • Training requirements for meteorological 	Yes	<ul style="list-style-type: none"> • IWXXM format became a Standard for dissemination on 5 November 2020 with the applicability of Amendment 79 to Annex 3 for the following TAC products: SIGMET, AIRMET, METAR, SPECI, TREND, TAF, VAA, TCA and SWXA. • Significant weather (SIGWX) forecasts, is recommended for dissemination in IWXXM as of 4 November 2021 • Furthermore, the Conclusion 23/29 of APRG/23 Established a Regional Space Weather Project to assist States with the implementation of Space Weather requirements as per the provisions of Annex 3 to Chicago Convention.

MET Module	Element	Purpose of the element	Maturity level	Enablers	Applicable (Yes or No)	Rational of applicability
				observations information		
	AMET-B1/2 Meteorological forecast and warning information	Meteorological forecast and warning information for automated support for decision processes or aids and performance based requirements, involving meteorological information, meteorological information translation, ATM impact conversion and ATM decision processes	Standardization	<ul style="list-style-type: none"> • National framework amendment for the provision of meteorological forecast and warnings information • Procedures for the provision of meteorological forecast and warnings information • Training requirements for Meteorological forecast and warning information Systems and infrastructure to support the provision of meteorological forecast and warning information	Yes	<ul style="list-style-type: none"> • The above is applied

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	AMET-B1/3 Climatological and historical meteorological information	Climatological information in support of the design and planning of infrastructure, flight routes and airspace management. Historical meteorological observations, forecasts, advisories and warnings in support of incident and accident investigations.	Standardization	<ul style="list-style-type: none"> • National framework amendment for the provision of climatological meteorological information • Procedures for the provision of climatological meteorological information • Training requirements for climatological meteorological information Systems and infrastructure to support the provision of climatological meteorological information	Yes	<ul style="list-style-type: none"> • Enhanced climatological data/Information with their associated characteristics such as metadata; required to support the design and planning of infrastructure, flight routes and airspace management.
	AMET-B1/4 Dissemination of meteorological information	Dissemination of meteorological information in support of automated decision process or aids, involving meteorological information, meteorological information translation,	Standardization	<ul style="list-style-type: none"> • National framework amendment for the dissemination of meteorological information • Procedures for the dissemination of 	Yes	<ul style="list-style-type: none"> • As of 5 November 2020, States were required by Annex 3 to the Convention to implement IWXXM format for the international exchange of MET information. • States, ROCs and RODBs in a position to do so will begin to disseminate gridded and

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		ATM impact conversion and ATM decision support.		meteorological information <ul style="list-style-type: none"> • Communication infrastructure for meteorological information exchange • Training for the dissemination of meteorological information • ICAO Meteorological Information Exchange Model (IWXXM) V3 		imagery products throughout Block 1. <ul style="list-style-type: none"> • RODBs to implement TAC Request/Reply and IWXXM Request/Reply Procedures. •

AFI REGION ASBU Threads & Elements for AMET-B0 Module Monitoring Table

(*) = Priority 1: Elements that have the highest contribution to the improvement of air navigation safety, capacity and/or efficiency in the AFI Region. These elements should be implemented where applicable and will be used for the purpose of regional air navigation monitoring and reporting.

() Priority 2:** Elements recommended for implementation based on identified operational needs and benefits.

Element	Title	Applicability	Performance Indicators - Meteorological products /information to be provided	Performance Indicators	Target dates
AMET B0/1*	Meteorological observations products	All states	<p>Indicator: Regional average implementation status of AMET-B0/1 Meteorological observations products</p> <p>Supporting Metrics: Number of States that provide the following Meteorological observations products, as required:</p> <ol style="list-style-type: none"> 1. Automatic Weather Observation System (AWOS) information (including real-time exchange of wind and RVR data) 2. Local reports (MET REPORT/SPECIAL) 3. Aerodrome reports (METAR/SPECI) 4. Lightning Information 5. Ground-based weather radar information 6. Meteorological satellite imagery 7. Aircraft meteorological report (ie. ADS-B, AIREP, etc.) 8. Volcano Observatory Notice for Aviation (VONA) 9. Vertical wind and temperature profiles 10. Wind shear alerts 	80%	Dec 2024
AMET B0/2*	Meteorological forecast and warning products	All states	<p>Indicator: Regional average implementation status of AMET-B0/2 Meteorological forecasts and warning products</p> <p>Supporting Metrics: Number of States that provides the following Meteorological forecast and warning products, as required:</p>	80%	Dec 2024

Element	Title	Applicability	Performance Indicators - Meteorological products /information to be provided	Performance Indicators	Target dates
			<ol style="list-style-type: none"> 1. World Area Forecast System (WAFS) gridded products 2. Significant Weather (SIGWX) 3. Aerodrome Forecast (TAF) 4. Trend Forecast (TREND) 5. Take-off Forecast 6. Tropical Cyclone Advisory (TCA) 7. Volcanic Ash Advisory (VAA) 8. AIRMET (if applicable) 9. SIGMET 10. Aerodrome Warning 11. Wind Shear Warning 		
AMET B0/3**	Climatological and historical meteorological products	All states	<p>Indicator: Regional average implementation status of AMET-B0/3 Climatological and historical meteorological products</p> <p>Supporting Metric: Number of States that provide Climatological and historical meteorological products, as required</p> <ol style="list-style-type: none"> 1. Aerodrome climatological tables 2. Aerodrome climatological summaries 3. Historical meteorological products, as required. 	80%	Dec 2024
AMET B0/4*			<p>Indicator: Regional average implementation status of AMET-B0/4 Dissemination of meteorological products</p> <p>Supporting Metric: Number of States that developed capability to start exchanging meteorological information using the formats and means as required</p>	80%	Dec 2024

Element	Title	Applicability	Performance Indicators - Meteorological products /information to be provided	Performance Indicators	Target dates
			<ol style="list-style-type: none"> 1. TAC 2. Gridded 3. Graphic 4. BUFR Code 5. IWXXM(XML/GML) 6. AMHS 7. WIFS/SADIS 		

AFI REGION ASBU Threads & Elements for AMET-B1 Module Monitoring Table

(*) = Priority 1: Elements that have the highest contribution to the improvement of air navigation safety, capacity and/or efficiency in the AFI Region. These elements should be implemented where applicable and will be used for the purpose of regional air navigation monitoring and reporting.

(**) Priority 2: Elements recommended for implementation based on identified operational needs and benefits.

Element	Title	Applicability	Performance Indicators - Meteorological products /information to be provided	Performance Indicators	Target dates
AMET B1/1*	Meteorological observations information	All states	<p>Indicator: Regional average implementation status of AMET-B1/1 Meteorological observations information</p> <p>Supporting Metrics: Number of States that provide the following SWIM-compliant observational parameters and phenomena, as required:</p> <ol style="list-style-type: none"> 1. Wind speed and direction (aerodrome) including gusts 2. Wind speed and direction from departure to Top of Climb (TOC) and then Top of Descent (TOD) to landing 3. Wind speed and direction en-route 4. Air temperature and dew point temperature (aerodrome) 5. Air temperature and dew point temperature (or equivalent, i.e. humidity) from departure to TOC and then TOD to landing (including the following derived outputs: freezing level, lower tropospheric temperature inversions) 6. Air temperature and dew point temperature (or equivalent) en-route 7. Pressure (aerodrome) (i.e. QNH/QFE) 8. Visibility (aerodrome) (horizontal, slant, vertical), Runway visual range (RVR) 9. Cloud type (of operational significance) 10. Cloud coverage, bases, tops and layers 	80%	Dec 2024

Element	Title	Applicability	Performance Indicators - Meteorological products /information to be provided	Performance Indicators	Target dates
			<ol style="list-style-type: none"> 11. Thunderstorms, Lightning, Convection (TCU & CB) 12. Precipitation (ie. drizzle, rain, freezing rain, snow, hail) 13. Weather (ie. dust storm, sand storm, funnel cloud, squall, smoke, haze, mist, fog) 14. Icing, including airframe and engine 15. Liquid Water Content, Iced Water Content 16. Turbulence, Mountain waves, Wind shear 17. Fronts 18. Radioactive clouds, Toxic chemicals 19. Tropical cyclones 20. Volcanic ash 21. Sulphur dioxide (SO₂) and other hazardous gases 22. Aerodrome surface (runway) temperature, state 23. Sea temperature, state and wave height (seaports) 24. Space weather events 25. Tsunami, Flood 		
AMET B1/2*	Meteorological forecast and warning information	All states	<p>Indicator: Regional average implementation status of AMET-B1/2 Meteorological forecast and warning information</p> <p>Supporting Metrics: Number of States that provide the following SWIM-compliant observational parameters and phenomena, as required</p> <ol style="list-style-type: none"> 1. Wind speed and direction (aerodrome) including gusts and operationally significant wind shifts 	80%	Dec 2024

Element	Title	Applicability	Performance Indicators - Meteorological products /information to be provided	Performance Indicators	Target dates
			<ol style="list-style-type: none"> 2. Air temperature and dew point temperature (aerodrome) 3. Upper-level Wind (speed and direction), including departure to Top of Climb (TOC) and then Top of Descent (TOD) to landing 4. Upper-level Air temperature and dew point temperature or equivalent (i.e. humidity), including height of freezing level and lower tropospheric temperature inversions 5. Flight level and temperature of tropopause 6. Geopotential altitude for flight levels 7. Pressure (aerodrome) (i.e. QNH, QFE) 8. Visibility (aerodrome), Runway visual range (RVR) 9. Cloud type (of operational significance) 10. Cloud coverage, bases, tops and layers 11. Thunderstorms, Lightning, Convection (TCU & CB) 12. Precipitation (ie. drizzle, rain, freezing rain, snow, hail) 13. Weather (ie. dust storm, sand storm, funnel cloud, squall, smoke, haze, mist, fog) 14. Icing (airframe and engine), 15. Liquid Water Content, Iced Water Content 16. Turbulence, Mountain waves, Wind shear 17. Fronts 18. Radioactive clouds, Toxic chemicals 19. Tropical cyclones 		

Element	Title	Applicability	Performance Indicators - Meteorological products /information to be provided	Performance Indicators	Target dates
			20. Volcanic ash 21. Sulphur dioxide (SO ₂) and other hazardous gases 22. Aerodrome surface (runway) temperature, state 23. Sea temperature, state and wave height (seaports) 24. Space weather events 25. Tsunami, Flood		
AMET B1/3**	Climatological and historical meteorological information	All states	Indicator: Regional average implementation status of AMET-B1/3 Climatological and historical meteorological information Supporting Metric: Number of States that provide Climatological information services ¹ , including the following climatology parameters and phenomena to users as required: <ol style="list-style-type: none"> 1. En-route winds 2. Airport parameters (i.e., air and surface temperature, wind, precipitation, etc.) 3. Metadata 	80%	Dec 2024
AMET B1/4*	Dissemination of meteorological information	All States	Indicator: Regional average implementation status of AMET-B1/4 Dissemination of meteorological information Supporting Metric: Number of States that Disseminate the meteorological information, using the following formats and means, as required: <ol style="list-style-type: none"> 1. Tailored products (human-readable) 2. Impact-translated products 	80%	Dec 2024

¹ Characteristics of the climatological information will include:

- Averages (daily/monthly/yearly) over 10, 20, 30, 50 years
- Extremes over 1, 5, 10, 20, 30 years, since start of measurement

Element	Title	Applicability	Performance Indicators - Meteorological products /information to be provided	Performance Indicators	Target dates
			3. Gridded 4. Graphical (PNG and BUFR to be phased out) 5. ICAO Meteorological Information Exchange Model (IWXXM) format 6. AMHS 7. WIFS/SADIS		