Organización de Aviación Civil Internacional
Grupo Regional de Planificación y Ejecución CAR/SAM (GREPECAS)

NOTA DE ESTUDIO

CRPP/5 — NE/16
15/07/19

Quinta Reunión del Comité de Revisión de Programas y Proyectos (CRPP/5)
Ciudad de México, México, 16 al 18 de julio de 2019

Cuestión 5 del Orden del Día: **Revisión de los Programas/Proyectos y Grupos subsidiarios del GREPECAS**

5.7 Proyectos del Programa de Meteorología Aeronáutica (B0-AMET)

PROYECTOS DEL PROGRAMA DE METEOROLOGÍA AERONÁUTICA (B0-AMET) PARA LA REGIÓN SAM

(Presentada por la Secretaría)

RESUMEN EJECUTIVO	
Esta nota de estudio presenta el seguimiento a los programas y proyectos bajo el Programa H del GREPECAS. Adicionalmente, presenta el seguimiento a los requisitos introducidos por la enmienda 78 al Anexo 3 de la OACI.	
Acción:	Lo indicado en el ítem 3.1.
Objetivos Estratégicos:	• Capacidad y eficiencia de la navegación aérea • Protección del medio ambiente
Referencias:	• Anexo 3 – Servicio Meteorológico para la navegación aérea internacional • Informe de la Décimo Octava Reunión del Grupo Regional de Planificación y Ejecución CAR/SAM (GREPECAS/10) • Informe de la Segunda Reunión de Proyectos del Programa MET del GREPECAS (MP/2) • Informe de la Tercera Reunión de Proyectos del Programa MET del GREPECAS para la Región SAM (SAM/MP/3) • Reporte de la Cuarta Reunión del Panel MET de la OACI (METP/4)

1. Introducción

1.1 La Segunda Reunión de Proyectos MET había revisado los Proyectos MET del GREPECAS a la luz de los requisitos introducidos por la Enmienda 78 al Anexo 3 de la OACI.

1.2 El Plan mundial de navegación aérea (GANP, Doc 9750) es el documento de mayor nivel para la estrategia de navegación aérea, y en sus distintas revisiones, reformula el módulo B0-AMET y sus evoluciones en los bloques de los ASBU.

1.3 La enmienda 78 al Anexo 3 de la OACI introdujo nuevos requerimientos para la prestación de los servicios meteorológicos aeronáuticos.

1.4 La Reunión del GRFEPECAS/18 había analizado las actividades del Proyecto H (MET).

1.5 La cuarta reunión del Panel de Meteorología de la OACI (METP/4) ha recomendado acciones para los Grupos regionales de planificación y ejecución (PIRG) y oficinas regionales.

1.6 La tercera reunión de Proyectos MET del GREPECAS para la Región SAM analizó los proyectos del programa H, además de otros temas presentados durante la misma.

2. Análisis

Región SAM

2.1 La segunda reunión de Proyectos MET del GREPECAS había revisado los Proyectos actualmente llevados adelante por la Región SAM en el Programa H (MET) a la luz de los nuevos requisitos introducidos por la Enmienda 78 al Anexo 3 de la OACI. Con relación al mismo, la Reunión MP/2 recomendó solicitar la aprobación del CRPP de los siguientes puntos:

a) modificación del Proyecto H2 – Implantación de la Vigilancia de los Volcanes en Aerovías Internacionales (IAVW) para introducir los puntos referentes a la liberación de material radiactivo, mejoras de la información relativa a fenómenos meteorológicos en ruta que puedan afectar la seguridad de las operaciones de las aeronaves (SIGMET), así como mayor claridad de los informes sobre Ciclones Tropicales, cambiando el nombre del Proyecto H2 con la denominación de "Implantación de la vigilancia meteorológica para el monitoreo de fenómenos severos en ruta, cenizas volcánicas, ciclones tropicales y liberación de material radiactivo", y en los términos que se presenta en el **Apéndice A** a esta Nota de Estudio;

b) modificación del proyecto H3 – Implantación del Sistema de Gestión de la Calidad de la información MET (QMS/MET) para introducir los puntos relacionados a las competencias, calificaciones, formación profesional e instrucción del personal de meteorología aeronáutica. Los términos se encuentran en el **Apéndice B**;

c) modificación del Proyecto H4 – Intercambio de información meteorológica relativa a las operaciones (OPMET) para introducir el punto relacionado con la implantación del IWXXM con finalización al 2020 de esta tarea; y

d) considerar la armonización de los proyectos H2, H3, y H4 de las Regiones CAR con los proyectos de la Región SAM

2.2 Con relación a la prosecución de los Proyectos del Programa H, en la Región SAM, las mismas fueron analizadas por la Tercera Reunión de Proyectos MET para la Región SAM. Los resultados de estas revisiones son descriptos a continuación

Proyecto H2

2.3 La Región SAM llevó adelante el ejercicio de SIGMET sobre Cenizas Volcánicas, el 4 y 5 de junio del presente año. Con relación a la misma, la coordinadora del Proyecto presentó los resultados. Los resultados pueden ser observados en el **Apéndice C** a esta nota. Del informe se puede resaltar que han participado todas las Oficinas de Vigilancia Meteorológica (OVM) involucradas, pero con oportunidades de mejoras en relación con la cancelación de los mensajes SIGMET, la utilización del código "EXER" y la continuidad de la secuencia de los mensajes SIGMET y otros aspectos relacionados con la interpretación de los avisos de ceniza volcánica (VAA).

2.4 En relación con los SIGMET por Material radiactivo, los Estados de Chile y Argentina cuentan con Plan de Contingencias. Adicionalmente, Argentina presentó los resultados del simulacro llevado adelante en el 2018 por su Estado. Así mismo, debido a que este plan involucra a las áreas ATM y CNS, la cuestión fue llevada al seno del Grupo de Implantación SAM, que, al analizar el punto, emitió la Conclusión SAM/IG/23-04.

2.5 Con relación a los SIGMET por Ciclones Tropicales, a iniciativas de la Organización Meteorológica Mundial (OMM), se ha analizado el requisito aeronáutico de provisión de asesoramiento para el Sudoeste del Océano Atlántico por depresiones tropicales profundas que se presentaron en la costa atlántica de Brasil, punto que será tratado in extenso en otra nota de estudio.

2.6 Así mismo, y con el objetivo de mejorar la coherencia, continuidad y calidad del contenido de la información SIGMET en la Región SAM, en apoyo a una navegación aérea segura y eficiente para la Región, cuando un fenómeno adverso a la navegación aérea afecte a más de una Región de Información de Vuelo (FIR) en un mismo momento, está en estudio la presentación de un nuevo proyecto. El mismo es proyectado en vista de que las OVM están asociadas (o limitadas) con una determinada FIR y, por lo tanto, los informes SIGMET se preparan considerando dichos límites, en ocasiones no teniendo en cuenta la extensión propia del fenómeno meteorológico que se presenta en la atmósfera y que puede abarcar varias FIR, lo cual puede generar una significativa diferencia entre los mensajes SIGMET que se preparan (o no) en las OVM que tienen a cargo FIR adyacentes. Los problemas observados, se refieren a inconsistencias en la información de áreas afectadas, diferencias en los niveles de topes e incoherencias en la información relacionada con fenómenos severos entre los límites de la FIR.

2.7 En relación con el punto anterior, el proyecto pretende planificar la implementación de herramientas, plataformas y procedimientos en relación con la Coordinación SIGMET entre OVMs adyacentes. El objetivo será evaluar las diferentes opciones existentes y la factibilidad de delinear acuerdos de implementación entre los Estados de la Región para una coordinación de comunicación entre OVM adyacentes, en la elaboración de SIGMETs coherentes y de calidad.

2.8 Adicionalmente, dentro del contexto del Proyecto H2, se viene trabajando en coordinación con el Grupo Regional sobre Seguridad Operacional de la Aviación-Panamérica (RASG-PA) para proveer medidas de mitigación sobre los efectos adversos a la aeronavegación de los fenómenos meteorológicos severos. Esta tarea se viene llevando adelante debido a los incidentes graves ocurridos a finales del 2018 e inicios del 2019, y cuyas causas fueron los fenómenos meteorológicos.

Proyecto H3- QMS/MET

2.9 Con relación al Proyecto H3, la situación actual de implementación y certificación de los QMS/MET en la Región SAM, puede observarse en la siguiente Tabla:

Implantación QMS/MET – Región SAM			
ESTADO	**Implantado**	**Certificado**	**En proceso de certificación**
Argentina	En proceso para adecuar a la versión 2015 de la Norma ISO 9001.	Se prevén Auditorías de certificación para Junio/2019 para los Aeropuertos de Ezeiza, Aeroparque y Córdoba.	
Bolivia	Implantación culminada	Auditoría para Agosto del 2019 para los Aeropuertos de La Paz, Santa Cruz de la Sierra y Cochabamba.	70%
Brasil	✓	✓	
Chile	✓	✓	
Colombia	IDEAM – Implantado Grupo MET – UAEAC - Implantado	IDEAM- Certificado UAEAC – No	Los procesos asociados con MET deberían estar certificados y por ello se ha extendido en el tiempo la obtención de la certificación del Grupo MET del UAEAC.
Ecuador	En proceso de implantación		No iniciado
Guyana	✓	En proceso	No iniciado
Guyana Francesa	✓	✓	
Panamá	✓	✓	
Paraguay	✓	✓	
Perú	✓	✓	
Surinam	Sin información en relación con la adecuación a la versión 2015 de la Norma ISO 90001.	Sin información en relación con la adecuación a la versión 2015 de la Norma ISO 90001.	
Uruguay	✓	Sin información en relación con la adecuación a la versión 2015 de la Norma ISO 90001.	
Venezuela	La Implantación era con la versión 2008. Actualmente, los procesos han sido actualizados a la versión 2015 de la Norma ISO 9001. Las Auditorías no pueden llevarse a cabo porque el Organismo certificador no cuenta con experto MET en su plantel de auditores.	Será solicitado apoyo a la Oficina Regional para proveer auditor MET.	No iniciado

Proyecto H4 – Intercambio OPMET

2.10 Han sido analizados los resultados del intercambio OPMET realizado por el Banco de Datos OPMET de Brasilia (IODB). Se ha observado que, en los últimos controles realizados en el presente año, hubo una disminución de la eficiencia en algunos Estados del norte de la Región SAM.

2.11 La Secretaría ha solicitado las pruebas de recepción de mensajes OPMET al IODB para verificar si los mismos han llegado al servidor. Adicionalmente, se ha observado que las Tablas de Control OPMET contienen Oficinas Meteorológicas Aeronáuticas y Oficinas de Vigilancia Meteorológica que no ya no son activas en los Estados.

2.12 Adicionalmente, al revisar el Catálogo de Datos del IODB, se han observado inconsistencias entre las listas de Oficina Meteorológica de Aeródromo y Oficinas de Vigilancia Meteorológica que intercambian datos OPMET, los que figuran en las Tablas del Catálogo y los que son utilizados para los controles de intercambios. Chile, Colombia, Ecuador y Panamá han advertido que observaron aeropuertos que ya no son operativos o que cambiaron de designador de la OACI, o que el horario de funcionamiento es solo H-J.

2.13 Considerando estas incongruencias, y con la finalidad de actualizar el Catálogo de Datos del IODB y que los Controles OPMET reflejen la realidad de los datos transmtidos, la SAM/MP/3 emitió la siguiente conclusión:

<table>
<tr><td colspan="2">CONCLUSION SAM/MP/04-01: Controles de Intercambio OPMET</td></tr>
<tr><td>Que, con la finalidad de establecer procedimientos actualizados para el Control de Intercambio OPMET y verificar el estatus de los circuitos de transmisión, se realicen las siguientes acciones:

a) que el Banco Internacional de Datos OPMET de Brasilia (IODB) actualice el Catálogo de Datos del IODB;

b) que el IODB actualice las Tablas de Control de Intercambio OPMET considerando las Tablas AOP I-1, MET II-1 y MET II-2;

c) que los Estados que aún no lo han realizado, procedan a realizar el procedimiento de verificación de la llegada de los datos OPMET al IODB a través de los requerimientos al Banco de datos OPMET;

d) que los Estados que aún no lo han hecho, comuniquen a la Secretaría los resultados de estas pruebas, a más tardar el 15 de julio del 2019; y

e) que la Secretaría convoque una teleconferencia para la segunda quincena de septiembre del 2019 para discutir el resultado de estas pruebas.</td><td>Impacto esperado:

☐ Político / Global

☐ Inter-regional

☒ Económico

☐ Ambiental

☒ Técnico/Operacional</td></tr>
<tr><td colspan="2">Por qué: Para actualizar el Catálogo de Datos OPMET del Banco Internacional de Datos OPMET de Brasilia y reflejar la real eficiencia de los intercambios de mensajes OPMET</td></tr>
<tr><td>Cuándo: De inmediato</td><td>Estatus: Adoptada por SAM/MP/3</td></tr>
<tr><td colspan="2">Quién: ☐ Coordinadores ☒ Estados ☒ Secretaría OACI ☐ OACI HQ ☐ Otros: Usuarios/Industria</td></tr>
</table>

2.14 Con relación al intercambio OPMET en formato IWXXM, es importante destacar que la misma se convierte en un estándar desde el 5 de noviembre de 2020. En este contexto, ha sido emitid la conclusión SAM/IG/23-04, mediante la cual el Grupo de Implantación de la Región SAM insta a los Estados a adecuar las terminales AMHS de los usuarios de meteorología aeronáutica para dotarlo de capacidad de transmitir y recibir mensajes OPMET en formato IWXXM GML y acelerar la interconexión en AMHS entre los Estados para posibilitar el intercambio de mensajes OPMET en formato IWXXM GML.

Proyecto H5

2.15 Con relación al Proyecto H5, algunos Estados informaron que han implementado tareas relacionadas al apoyo MET para un entorno CDM, A-CDM y para el ATFM, como es el caso de Argentina, Brasil y Colombia. Al respecto Colombia realizó una presentación indicando los servicios que prestan como una "transmisión en vivo" o "now casting" para la TMA de Bogotá y otros apoyos para los servicios de navegación aérea de Colombia. Brasil comentó que en el Centro de Gerenciamiento de Navegación Aérea, el servicio de meteorología aeronáutica tiene un puesto de coordinación para apoyar las decisiones de gestión de flujo aéreo.

2.16 El Panel MET viene trabajando este tema, y en la última reunión (METP/4), se emitió la recomendación 3/1 - Nuevo enfoque para la definición de nuevos requisitos de MET, la cual pidió al Relator del Grupo de Trabajo en Integración y Requerimientos Meteorológicos (WG-MRI) tenga la tarea de preparar un documento de trabajo para la próxima reunión del Panel de Desempeño y requisitos de gestión del tránsito aéreo (ATMRPP), en nombre de MET/P, para solicitar la aprobación del nuevo enfoque propuesto, que consiste en la identificación de tres áreas de desarrollo del servicio de información (operaciones de vuelo de larga distancia, operaciones de deshielo en tierra de aeronaves y observaciones de aeródromos).

Actividades del Panel MET

2.17 Con relación a las actividades del Panel MET relacionadas con el GREPECAS, es necesario mencionar dos recomendaciones, las cuales son:

a) Recomendación 5/10 – Guía para la implementación de Intercambio de Datos OPMET en formato IWXXM
b) Recomendaciones 5/5 – Plan y Hoja de Ruta para Meteorología en la Gestión de Información de todo el Sistema (SWIM).

Las recomendaciones piden distribuir estos documentos a los PIRG para los fines correspondientes. Los documentos mencionados se encuentran como **Apéndice D** y **E** (disponible solo en inglés), respectivamente, a esta nota de estudio.

3. Acciones sugeridas

3.1 Se invita a los Estados a:

a) revisar y aprobar las modificaciones a los Proyectos del Programa H, contenidas en el ítem 2.1 y los apéndices correspondientes;
b) proveer comentarios sobre oportunidades de mejoras para los proyectos del Programa H;
c) considerar los documentos proveídos por el Panel MET que se encuentran como Apéndices D y E; y
d) analizar otros puntos que consideren necesario.

— — — — — — — — — — —

PROYECTO IMPLANTACION DE LA VIGILANCIA DE LOS FENÓMENOS SEVEROS EN RUTA, VOLCANES EN LAS AEROVÍAS INTERNACIONALES (IAVW), CICLONES TROPICALES Y PROTOCOLOS EN CASO DE LIBERACIÓN DE MATERIAL RADIACTIVO

Región SAM	**DESCRIPCION DEL PROYECTO (DP)**	**DP N° H2**	
Programa	**Título del Proyecto**	**Fecha Inicio**	**Fecha Término**
Meteorología Aeronáutica *(Coordinador del Programa: Jorge Armoa)*	Implantación de la vigilancia de los volcanes en las aerovías internacionales (IAVW) *Coordinador del proyecto:* *Roxana Vasquez Ferro (Argentina)* *Expertos contribuyentes al proyecto:* *Walter Rios (Bolivia)* *Rodrigo Fajardo Rosell* (*Chile)* *Marco Ortiz (Ecuador)* *Celestino Lamboglia (Panamá)* *Gustavo Rodríguez (Paraguay)* *Martin Polo Puelles (Perú)*	Diciembre 2011	Diciembre 2020
Objetivo	Lograr que los Estados implanten la IAVW, las normas y métodos recomendados del Anexo 3 y del Volumen I, Parte MET del Plan Navegación Aérea electrónico relacionado con CAR/SAM (reemplaza al Doc 8733 Básico), en lo que respecta a la elaboración y distribución de los informes sobre fenómenos meteorológicos en ruta y de liberación de material radioactivo que puedan afectar la seguridad de las operaciones de las aeronaves, y de la evolución de esos fenómenos en el tiempo y en el espacio (SIGMET WV).		
Alcance	El proyecto abarcará todas las oficinas de vigilancia meteorológica (MWO) de la Región SAM de la Tabla MET 1B del FASID CAR/SAM en coordinación con los ACC/FIC/NOF, y los Centros de Aviso de Cenizas Volcánica (VAAC) de Buenos Aires y de Wellington (Nueva Zelandia). Deberán definirse procedimientos para la emisión de los informes, coordinación entre las áreas afectadas, así como las transferencias de responsabilidades entre una oficina MWO y otras. Se definirán procedimientos de transferencia de responsabilidades y de asesoramiento entre el CMRE y las MWO		
Métricas	Las pruebas de SIGMET relacionados con cenizas volcánicas deberán dar resultados de mejora continua, una vez los Estados dispongan de los entregables del proyecto. Cantidad de estados que tengan establecidos procedimientos nacionales de responsabilidad y asesoramiento entre las autoridades de aviación civil, la autoridad nuclear nacional y las MWO		
Estrategia	Todos los trabajos serán ejecutados por expertos nominados por los Estados de la región SAM, miembros del proyecto, bajo la dirección del Coordinador del Proyecto y supervisión del coordinador del Programa MET a través del GoToMeeting. Una vez completadas las tareas, los resultados serán remitidos al Coordinador del Programa MET en forma de documento final para la presentación y, en caso necesario, aprobación del CRPP del GREPECAS a través del Procedimiento Expreso del GREPECAS. Para apoyar la toma de decisiones en colaboración, se harán reuniones con las áreas involucradas.		
Metas	a) 100% de aceptación de las pruebas SIGMET, en cuanto a la transmisión y recepción de SIGMET WV y ASHTAM; b) disponibilidad total de la información para evitar encuentros de aeronaves con nubes de cenizas volcánicas en la Región SAM; y c) 100% de los estados con procedimientos nacionales de responsabilidad y asesoramiento entre la aeronáutica civil, la autoridad nuclear y del proveedor de servicios MET.		
Justificación	La severidad, persistencia y mayor grado de frecuencia de los eventos de actividad volcánica con dispersión de cenizas y de nubes radioactivas suscitados en la Región SAM y su consecuente repercusión en el suministro de los servicios de navegación aérea, conducen a la necesidad de brindar todas las herramientas necesarias para proveer información que colabore con la mejora o incremento en los niveles de la seguridad operacional		
Proyectos relacionados	➢ Optimización de la estructura del espacio aéreo en ruta ➢ Implantación de la ATFM		

Entregables del Proyecto	Relación con el Plan Regional basado en Rendimiento (PFF)	Responsable	Estado de Implantación[i]	Fecha Entrega	Comentarios
Guía SIGMET revisada, actualizada, y alineada a la Plantilla proveída por OACI	PFF SAM MET 03	Coordinador del Programa MET y coordinador del proyecto		Junio 2018	La Guía incluirá los procedimientos de transición de responsabilidades de las MWO. Esta tarea será realizada por un grupo de trabajo que fue conformado en la Reunión de Proyectos MET del GREPECAS, noviembre 2015.
Realización de ejercicios de SIGMETs sobre Cenizas Volcánicas	PFF SAM MET 03	Coordinador del Proyecto y Estados		Diciembre 2017, 2018, 2019.	
Elaboración de Protocolos para casos de presencia de Material Radiactivo en las FIR	PFF SAM MET 03	Coordinador del Programa MET		2018	Realización de teleconferencia para socializar el Protocolo.
Realización de Talleres y cursos sobre Material radiactivo	PFF SAM MET 03	Coordinador del Programa MET		2018	Se realizaran Talleres para la creación de capacidades técnicos en los Estados para dar respuesta para casos de Liberación de Material radiactivo o tóxico en la atmósfera.
Realización de ejercicios por presencia de material radiactivo en las FIR	PFF SAM MET 03	Coordinador del Proyecto y Estados		Febrero 2019 Junio 2020	Elaboración de protocolos y evaluación de los resultados de los ejercicios.
Informe final del Proyecto		Coordinador del Programa MET y coordinador del proyecto		1er semestre 2021	
Recursos necesarios	Fondos para llevar a cabo las reuniones y para la traducción del Plan de contingencia regional para casos de actividad volcánica **y** del Plan de contingencia regional para casos de liberación accidental de material radiactivo. Asimismo se requiere disponibilidad para las reuniones GoTo Meeting.				

– – – – – – – – – – –

[i] ***Gris*** *- Tarea no iniciada*
Verde *- Actividad en progreso de acuerdo con el cronograma*
Amarillo *- Actividad iniciada con cierto retardo, pero estaría llegando a tiempo en su implantación*
Rojo *- No se ha logrado la implantación de la actividad en el lapso de tiempo estimado y se requieren adoptar medidas mitigatorias*

PROYECTO IMPLANTACIÓN DEL SISTEMA DE GESTIÓN DE CALIDAD DE LA INFORMACIÓN MET (QMS/MET)

Región SAM	**DESCRIPCION DEL PROYECTO (DP)**	**DP N° H3**	
Programa	**Título del Proyecto**	**Fecha Inicio**	**Fecha Término**
Meteorología Aeronáutica *(Coordinador del Programa: Jorge Armoa)*	Implantación del QMS/MET *Coordinador del proyecto:* *Baldomero Thomas (Panamá)* *Expertos contribuyentes al proyecto:* *César Acosta (Ecuador)* *Jorge Sánchez (Paraguay)* *Hugo Rosado (Perú)* *Ricardo Reyes (Perú)*	Enero 2016	Diciembre 2020
Objetivo	Apoyar a los Estados en la implantación del QMS/MET y para la certificación, donde corresponda, y establecer directrices para la transición a la norma ISO 9001:2015 alineada al ASBU y proyectado a la interoperabilidad de la información meteorológica, dando cumplimiento a lo establecido en el Anexo 3.		
Alcance	El establecimiento y aplicación de un sistema de gestión de calidad de los datos meteorológicos orientados a la seguridad operacional en cada una de las dependencias de los servicios MET de todos los aeródromos del ANP CAR/SAM de la Región SAM, así como el cumplimiento de las normas y métodos recomendados del Anexo 3 y del e-ANP CAR/SAM Vol. I y Vol. II.		
Métricas	Número de aeródromos AOP certificados con la Norma ISO 9001 vigente.		
Estrategia	Todos los trabajos serán ejecutados por expertos nominados por los Estados de la región SAM miembros del proyecto, bajo la dirección del Coordinador del Proyecto y supervisión del coordinador del Programa MET a través del GoTo Meetings. Una vez completadas las tareas, los resultados serán remitidos al Coordinador del Programa MET en forma de documento final para la presentación y, en caso necesario, aprobación del CRPP del GREPECAS a través del Procedimiento Expreso del GREPECAS. Para apoyar la toma de decisiones en colaboración, se harán reuniones con las áreas involucradas.		
Metas	a) el 100% de los Estados SAM tienen establecido el sistema QMS/MET conforme la norma ISO 9001:2008 al 30 de junio de 2016; b) el 70% de los Estados SAM aplica y certifica el sistema QMS/MET conforme la norma ISO 9001:2015 al 31 de diciembre de 2017; c) el 100% de los Estados SAM tienen certificado por una organización aprobada el sistema QMS/MET conforme la norma ISO 9001:2015 a junio 2020		
Justificación	La información meteorológica más precisa y oportuna permitirá optimizar la planificación y predicción de la trayectoria de vuelo, con lo que mejorará la seguridad operacional y la eficiencia del sistema ATM; la mejora de los informes y pronósticos de aeródromo facilitará la utilización óptima de la capacidad disponible en los aeródromos; y la información meteorológica contribuirá a minimizar el impacto ambiental del tránsito aéreo. La gestión del rendimiento será una parte importante de la garantía de calidad de la información meteorológica.		
Proyectos relacionados	➢ Automatización ➢ Mejora a la Comprensión Situacional ATM		

Entregables del Proyecto	Relación con el Plan Regional basado en Rendimiento (PFF)	Responsable	Estado de[i] Implantación	Fecha Entrega	Comentarios
Directrices para la transición a la Norma ISO 9001:2015.	PFF SAM MET 02, 03 y 04	Coordinador del Programa MET y Director del Proyecto		Diciembre 2017	Las directrices facilitarán la elaboración del esquema documentario de la Norma ISO 9001: 2015 a los Estados proveedores del servicios MET.
Encuesta realizada a los Estados sobre personal MET	PFF SAM MET 02, 03 y 04	Coordinador del Programa MET y Director del Proyecto		Noviembre 2016	Uno de los principales problemas que tienen los Estados proveedores de servicios MET es la falta de personal que cumpla con las cualificaciones y competencias exigidas por la OMM y la OACI. Los requisitos de los Estados serán informados oficialmente al Estados Contratante de la OACI.
Preparar Plan de evaluación de competencia del personal, calificación, formación profesional e instrucción del personal meteorológico aeronáutico.				Diciembre 2019	Se realizará seguimientos sobre las tareas relacionadas a este punto con la finalidad de observar el cumplimiento de la Norma 2.1.5 del Anexo 3 y a los requisitos del Reglamento Técnico N° 49, Parte V y Parte VI de la OMM.
Tablas de cumplimiento al e-ANP CAR/SAM, Parte V – MET, Vol. I.	PFF SAM MET 02, 03 y 04	Coordinador del Programa MET y Director del Proyecto		Junio 2016	Se hará un seguimiento al cumplimiento estricto de la Parte V - MET del Volumen I del e-ANP CAR/SAM.
Informe del Taller de gestión de riesgos en los servicios MET.	PFF SAM MET 02, 03 y 04	Coordinador del Programa MET y Director del Proyecto		Agosto 2016	Se tiene programado como fecha probable junio de 2016 la realización del taller seminario “Análisis de Riesgos”.
Curso de Actualización de Auditores Líder	PFF SAM MET 02, 03 y 04	Director del Proyecto		Octubre 2017	Deberá realizarse un curso de actualización de los auditores formados bajos los estándares de la Norma ISO 9001:2008 para tener la formación necesaria en los nuevos estándares introducidos en la versión 2015.
Revisión de las implementaciones y certificaciones de los QMS/MET actualizada a los requisitos de la Norma ISO 9001:2015	PFF SAM MET 02, 03 y 04	Director del Proyecto		Diciembre 2019 Junio del 2020	Será solicitada el envío de las certificaciones a todos los Estados emitidas bajo la versión 2015 de la Norma ISO 9001
Instalación y entrenamiento in situ en SAETAF para los Estados CAR/SAM que lo requieran.		Estados que lo requieran		Septiembre 2020	Cuba en coordinación con la OMM y OACI proporcionará la instalación y entrenamiento in situ a los Estados CAR sin costo. Los Estados deberán cubrir el costo del pasaje y viáticos de los expertos de acuerdo a la norma de las agencias de las Naciones Unidas.
Informe final del Proyecto		Coordinador del Programa MET y Director del Proyecto		Diciembre de 2020	
Recursos necesarios	Se requiere disponibilidad para las reuniones GoTo Meeting.				

— — — — — — — — — — —

[i] *Gris* *Tarea no iniciada*
Verde *Actividad en progreso de acuerdo con el cronograma*
Amarillo *Actividad iniciada con cierto retardo pero estaría llegando a tiempo en su implantación*
Rojo *No se ha logrado la implantación de la actividad en el lapso de tiempo estimado se requiere adoptar medidas mitigatorias*

Servicio Meteorológico Nacional
Argentina

APÉNDICE C
Ejercicio de SIGMET sobre Cenizas Volcánicas

Proyecto H2: Implantación de la Vigilancia de los volcanes en las aerovías internacionales "Ejercicio Fictitus"

Tercera Reunión sobre Proyectos del Programa MET del GREPECAS

Lic. Roxana S. Vasques Ferro

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

VOLCAN: FICTITUS PSN, S5000 – W07400

ALTITUD: 1500 m

INICIO: martes 4 de junio 2019 – 13:00UTC

FINALIZACION: martes 5 de junio 2019 - 13:00UTC

Primer VAA/VAG: Detección erupción por imágenes GOES E.

Involucra todas las FIRs asociadas al VAAC Buenos Aires.

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

Tabla A6-1A. Plantilla para mensajes SIGMET y AIRMET

Clave: M = inclusión obligatoria, parte de cada mensaje;
C = inclusión condicional, incluido de ser aplicable;
= = una línea doble indica que el texto que sigue debe colocarse en la línea subsiguiente.

Nota 1.— En la Tabla A6-4 del presente apéndice se indican los valores y las resoluciones de los elementos numéricos incluidos en los mensajes SIGMET/AIRMET.

Nota 2.— De conformidad con 1.1.5 y 2.1.5, no deberían incluirse el engelamiento fuerte o moderado ni la turbulencia fuerte o moderada (SEV ICE, MOD ICE, SEV TURB, MOD TURB) asociados a tormentas, nubes cumulonimbus o ciclones tropicales.

Elementos	*Contenido detallado*	*Plantilla SIGMET*	*Plantilla AIRMET*	*Mensaje SIGMET Ejemplos*	*Mensaje AIRMET Ejemplos*
Indicador de lugar de FIR/CTA (M)[1]	Indicador de lugar OACI de la dependencia ATS al servicio de la FIR o CTA a la que se refiere el SIGMET/AIRMET	nnnn		YUCC[2] YUDD[2]	
...					
Nombre de la FIR/CTA (M)	Indicador de lugar y nombre de la FIR/CTA[4] para la cual se expide el SIGMET/AIRMET	nnnn nnnnnnnnnn FIR *o* UIR *o* FIR/UIR *o* nnnn nnnnnnnnnn CTA	nnnn nnnnnnnnnn FIR[/n]	YUCC AMSWELL FIR[2] YUDD SHANLON[2] FIR/UIR[2] UIR FIR/UIR YUDD SHANLON CTA[2]	YUCC AMSWELL FIR/2[2] YUDD SHANLON FIR[2]
SI HA DE CANCELARSE EL SIGMET, VÉANSE LOS DETALLES AL FINAL DE LA PLANTILLA					
Indicador de estado (C)[5]	Indicador de prueba o ejercicio	TEST *o* EXER	TEST *o* EXER	TEST EXER	TEST EXER
Fenómeno (M)[6]	Descripción del fenómeno que lleva a expedir el SIGMET/AIRMET	OBSC[7] TS[GR[8]] EMBD[9] TS[GR[8]] FRQ[10] TS[GR[8]] SQL[11] TS[GR[8]] TC nnnnnnnnnn PSN	SFC WIND nnn/nn[n]MPS (*o* SFC WIND nnn/nn[n]KT) SFC VIS nnnM (nn)[16]	OBSC TS OBSC TSGR EMBD TS EMBD TSGR FRQ TS FRQ TSGR	SFC WIND 040/40MPS SFC WIND 310/20KT SFC VIS 1500M (BR) ISOL TS

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

Inicio del Ejercicio

OVM PUNTA ARENAS SCCI (FIR SCCF)

4 JUNIO

12:47:44

WVCH31 SCCI 041209
SCCZ SIGMET 1 ~~EXER~~ VALID 041209/041809 SCCI-
SCCZ PUNTA ARENAS FIR **EXER** VA ERUPTION MT FICTITUS POS S5000 W07400
VA CLD OBS AT 1200Z=

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

VAA

Tabla A2-1. Plantilla para mensaje de aviso de cenizas volcánicas

Clave: M = inclusión obligatoria, parte de cada mensaje;
O = inclusión facultativa;
C = inclusión condicional, se incluye cuando sea pertinente;
= = una doble línea indica que el texto que sigue debería colocarse en la línea siguiente.

Nota 1.— En el Apéndice 6, Tabla A6-4 se presentan los intervalos de valores y las resoluciones de los elementos numéricos incluidos en los mensajes de aviso de cenizas volcánicas.

Nota 2.— En los Procedimientos para los servicios de navegación aérea — Abreviaturas y códigos de la OACI *(PANS-ABC, Doc 8400) figuran las explicaciones de las abreviaturas.*

Nota 3.— Es obligatoria la inclusión de "dos puntos" después de cada título de elemento.

Nota 4.— Se incluyen solamente para fines de claridad los números 1 a 19 y no forman parte del mensaje de aviso, según lo indicado en el ejemplo.

Anexo 3 — Servicio meteorológico para la navegación aérea internacional *Apéndice 2*

	Elementos	Contenido detallado	Plantillas		Ejemplos	
1	Identificación del tipo de mensaje (M)	Tipo de mensaje	VA ADVISORY		VA ADVISORY	
2	Indicador de estado (C)[1]	Indicador de prueba o ejercicio	STATUS:	TEST o EXER	STATUS:	TEST EXER
3	Hora de origen (M)	Año, mes, día y hora en UTC	DTG:	nnnnnnnn/nnnnZ	DTG:	20080923/0130Z
4	Nombre del VAAC (M)	Nombre del VAAC	VAAC:	nnnnnnnnnnn	VAAC:	TOKYO
5	Nombre del volcán (M)	Nombre y número de volcán IAVCEI[2]	VOLCANO:	nnnnnnnnnnnnnnnnnnnnnn [nnnnnn] o UNKNOWN o UNNAMED	VOLCANO:	KARYMSKY 1000-13 UNNAMED
6	Lugar del volcán (M)	Lugar del volcán en grados y minutos	PSN:	Nnnnn o Snnnn Wnnnnn o Ennnnn o UNKNOWN	PSN:	N5403 E15927 UNKNOWN
7	Estado o región (M)	Estado o región si no se notifican cenizas por encima de un Estado	AREA:	nnnnnnnnnnnnnnn	AREA:	RUSSIA
8	Elevación de la cumbre (M)	Elevación de la cumbre en m (o ft)	SUMMIT ELEV:	nnnnM (o nnnnnFT)	SUMMIT ELEV:	1536M
9	Número de aviso (M)	Año completo y número de mensaje (secuencia separada para cada volcán)	ADVISORY NR:	nnnn[n][n][n][n]	ADVISORY NR:	2008/4
10	Fuente de información (M)	Fuente de información en texto libre	INFO SOURCE:	*Texto libre hasta 32 caracteres*	INFO SOURCE:	MTSAT-1R KVERT KEMSD
11	Clave de colores (O)	Clave aeronáutica de colores	AVIATION COLOUR CODE:	RED o ORANGE o YELLOW o GREEN o UNKNOWN o NOT GIVEN o NIL	AVIATION COLOUR CODE:	RED
12	Detalles de la erupción (M)	Detalles de la erupción (incluida fecha/hora de la erupción)	ERUPTION DETAILS:	*Texto libre hasta 64 caracteres* o UNKNOWN	ERUPTION DETAILS:	ERUPTION 20080923/0000Z FL300 REPORTED
13	Hora de observación (o estimación) de cenizas (M)	Día y hora (en UTC) de observación (o estimación) de cenizas volcánicas	OBS (o EST) VA DTG	nnnnnnZ	OBS VA DTG:	23/0100Z

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

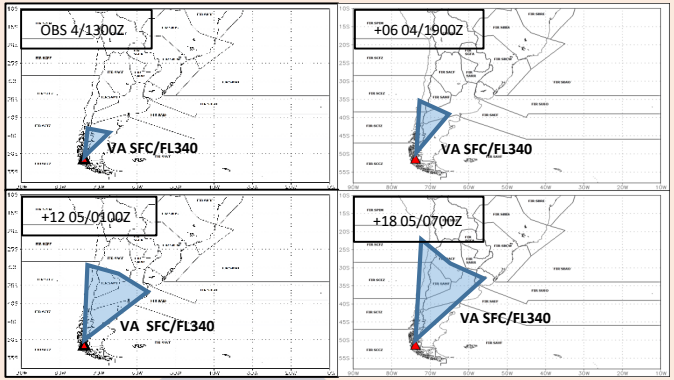
	Elementos	Contenido detallado	Plantillas		Ejemplos	
14	Nube de cenizas observada o prevista (M)	Horizontal (en grados y minutos) y extensión vertical al momento de observación de la nube de cenizas observada o prevista o, si se desconoce la base, el tope de la nube de cenizas observada o prevista; Movimiento de la nube de cenizas observada o prevista	OBS VA CLD o EST VA CLD:	TOP FLnnn o SFC/FLnnn o FLnnn/nnn [nnKM WID LINE[3] BTN (nnNM WID LINE BTN)] Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn] – Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn][– Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn] – Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn] – Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn] MOV N nnKMH (o KT) o MOV NE nnKMH (o KT) o MOV E nnKMH (o KT) o MOV SE nnKMH (o KT) o MOV S nnKMH (o KT) o MOV SW nnKMH (o KT) o MOV W nnKMH (o KT) o MOV NW nnKMH (o KT)[4] o VA NOT IDENTIFIABLE FM SATELLITE DATA WIND FLnnn/nnn nnn/nn[n] MPS (o KT)[5] o WIND FLnnn/nnn VRBnnMPS(o KT) o WIND SFC/FLnnn nnn/nn[n]MPS (o KT) o WIND SFC/FLnnn VRBnnMPS(o KT)	OBS VA CLD:	FL250/300 N5400 E15930 N5400 E16100 N5300 E15945 MOV SE 20KT SFC/FL200 N5130 E16130 – N5130 E16230 – N5230 E16230 – N5230 E16130 MOV SE 15KT TOP FL240 MOV W 40KMH VA NOT IDENTIFIABLE FM SATELLITE DATA WIND FL050/070 180/12MPS
15	Altura y posición de las nubes de ceniza pronosticadas (+ 6 HR) (M)	Día y hora (en UTC) (6 horas desde la *hora de observación (o estimación) de cenizas[2] indicada en el rubro 13); Altura y posición (en grados y minutos) de cada masa de nubes pronosticadas para el tiempo fijo de validez	FCST VA CLD +6 HR:	nn/nnnnZ SFC o FLnnn/[FL]nnn [nnKM WID LINE[3] BTN (nnNM WID LINE BTN)] Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn] – Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn][– Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn] – Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn] – Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn][4] o NO VA EXP o NOT AVBL o NOT PROVIDED	FCST VA CLD +6 HR:	23/0700Z FL250/350 N5130 E16030 – N5130 E16230 – N5330 E16230 – N5330 E16030 SFC/FL180 N4830 E16330 – N4830 E16630 – N5130 E16630 – N5130 E16330 NO VA EXP NOT AVBL NOT PROVIDED

	Elementos	detallado	Plantillas		Ejemplos	
16	Altura y posición de las nubes de ceniza pronosticadas (+12 HR) (M)	Día y hora (en UTC) (12 horas desde la *hora de observación (o estimación) de cenizas[2] indicada en el rubro 13); Altura y posición (en grados y minutos) de cada masa de nubes pronosticada para el tiempo fijo de validez	FCST VA CLD +12 HR:	nn/nnnnZ SFC o FLnnn/[FL]nnn [nnKM WID LINE[3] BTN (nnNM WID LINE BTN)] Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn] – Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn][– Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn] – Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn] – Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn][4] o NO VA EXP o NOT AVBL o NOT PROVIDED	FCST VA CLD +12 HR:	23/1300Z SFC/FL270 N4830 E16130 – N4830 E16600 – N5300 E16600 – N5300 E16130 NO VA EXP NOT AVBL NOT PROVIDED
17	Altura y posición de las nubes de ceniza pronosticadas (+18 HR) (M)	Día y hora (en UTC) (18 horas desde la *Hora de observación (o estimación) de cenizas[2] indicada en el rubro 13); Altura y posición (en grados y minutos) de cada masa de nubes pronosticada para el tiempo fijo de validez	FCST VA CLD +18 HR:	nn/nnnnZ SFC o FLnnn/[FL]nnn [nnKM WID LINE[3] BTN (nnNM WID LINE BTN)] Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn] – Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn][– Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn] – Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn] – Nnn[nn] o Snn[nn] Wnnn[nn] o Ennn[nn][4] o NO VA EXP o NOT AVBL o NOT PROVIDED	FCST VA CLD +18 HR:	23/1900Z NO VA EXP NOT AVBL NOT PROVIDED
18	Observaciones (M)	Observaciones, si corresponde	RMK:	*Texto libre de hasta 256 caracteres* o NIL	RMK:	LATEST REP FM KVERT (0120Z) INDICATES ERUPTION HAS CEASED. TWO DISPERSING VA CLD ARE EVIDENT ON SATELLITE IMAGERY NIL
19	Siguiente aviso (M)	Año, mes, día y hora en UTC	NXT ADVISORY:	nnnnnnnn/nnnnZ o NO LATER THAN nnnnnnnn/nnnnZ o NO FURTHER ADVISORIES o WILL BE ISSUED BY nnnnnnnn/nnnnZ	NXT ADVISORY:	20080923/0730Z NO LATER THAN nnnnnnnn/nnnnZ NO FURTHER ADVISORIES WILL BE ISSUED BY

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

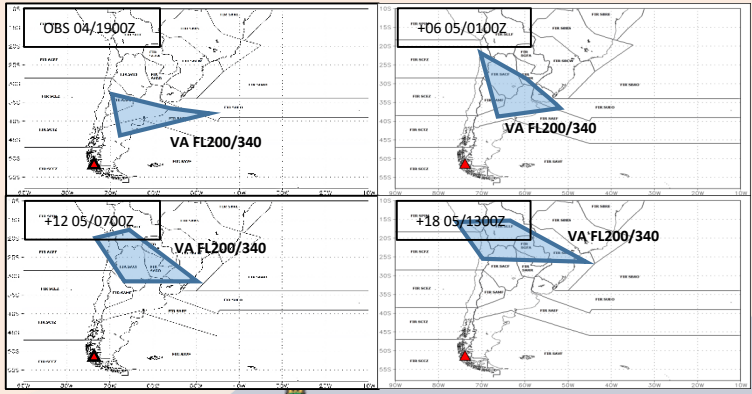
4 JUNIO VAA
12:51:03
FVAG03 SABM 041300
VA ADVISORY EXER
DTG: 20190604/1300Z
VAAC: BUENOS AIRES
VOLCANO: FICTITUS 999999
PSN: S4959 W07359
AREA: CHILE
SUMMIT ELEV: 4921 FT (1500 M)
ADVISORY NR: 2019/001
INFO SOURCE: SIGMET MWO SCCI
AVIATION COLOR CODE: NOT GIVEN
ERUPTION DETAILS: EXER
OBS VA DTG: 04/1230Z
OBS VA CLD: SFC/FL340 S4229 W07312 - S4310 W06612 - S5006 W07407 - S4229 W07312 MOV NE 20KT
FCST VA CLD +6HR: 04/1830Z SFC/FL340 S3557 W07301 - S3913 W06455 - S5002 W07353 - S3557 W07301
FCST VA CLD +12HR: 05/0030Z SFC/FL340 S2926 W07415 - S3126 W06337 - S3700 W05657 - S4954 W07349 - S2926 W07415
FCST VA CLD +18HR: 05/0630Z SFC/FL340 S2128 W07419 - S2941 W06424 - S3217 W05543 - S5000 W07349 - S2128 W07419
RMK: THIS IS ONLY A EXCERCISE. PLEASE DISREGARD... ...SMN
NXT ADVISORY: WILL BE ISSUED BY 20190604/1900Z=

VAG



18:58:35 VAA
FVAG03 SABM 041900
VA ADVISORY EXER
DTG: 20190604/1900Z
VAAC: BUENOS AIRES
VOLCANO: FICTITUS 999999
PSN: S4959 W07359
AREA: CHILE
SUMMIT ELEV: 4921 FT (1500 M)
ADVISORY NR: 2019/002
INFO SOURCE: EXER.
AVIATION COLOR CODE: NOT GIVEN
ERUPTION DETAILS: EXER
OBS VA DTG: 04/1900Z
OBS VA CLD: FL200/340 S3316 W06917 - S3801 W04548 - S4405 W06710 - S3316 W06917 MOV NE 15KT
FCST VA CLD +6HR: 05/0100Z FL200/340 S2228 W07035 - S2847 W05811 - S3732 W05107 - S3837 W06511 - S2228 W07035
FCST VA CLD +12HR: 05/0700Z FL200/340 S1702 W06458 - S3159 W04950 - S3117 W06615 - S2043 W07323 - S1702 W06458
FCST VA CLD +18HR: 05/1300Z FL200/340 S1416 W06453 - S2637 W04444 - S2519 W07356 - S1522 W07829 - S1416 W06453
RMK: THIS IS ONLY A VAA EXERCISE. PLEASE DISREGARD...SMN
NXT ADVISORY: WILL BE ISSUED BY 20190605/0100Z=

VAG



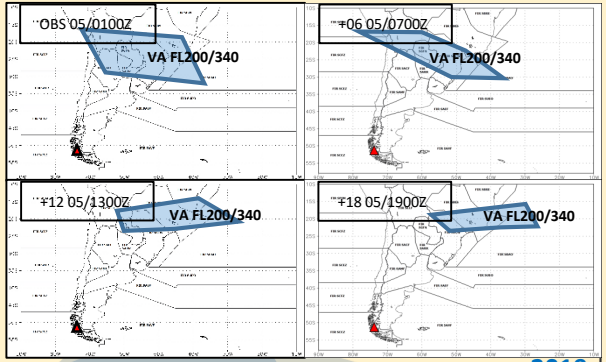
Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

5 Jun 2019

00:59:05

FVAG03 SABM 050100
VA ADVISORY EXER
DTG: 20190605/0100Z
VAAC: BUENOS AIRES
VOLCANO: FICTITUS 999999
PSN: S4959 W07359
AREA: CHILE
SUMMIT ELEV: 4921 FT (1500 M)
ADVISORY NR: 2019/003
INFO SOURCE: EXER.
AVIATION COLOR CODE: NOT GIVEN
ERUPTION DETAILS: EXER
OBS VA DTG: 05/0100Z
OBS VA CLD: FL200/340 S1530 W07328 - S1824 W04244 - S3217 W03814 - S2757 W06658 - S1530 W07328
MOV NE 15KT
FCST VA CLD +6HR: 05/0700Z FL200/340 S1600 W07838 - S1621 W06201 - S2127 W04440 - S2817 W03406 -
S2726 W05832 - S1600 W07838
FCST VA CLD +12HR: 05/1300Z FL200/340 S1317 W03712 - S2123 W02559 - S2342 W05748 - S1816
W06414 - S1317 W03712
FCST VA CLD +18HR: 05/1900Z FL200/340 S1229 W02856 - S1952 W02337 - S2422 W05331 - S1910
W05704 - S1229 W02856
RMK: THIS IS ONLY A VAA EXERCISE. PLEASE DISREGARD...SMN
NXT ADVISORY: WILL BE ISSUED BY 20190605/0700Z=

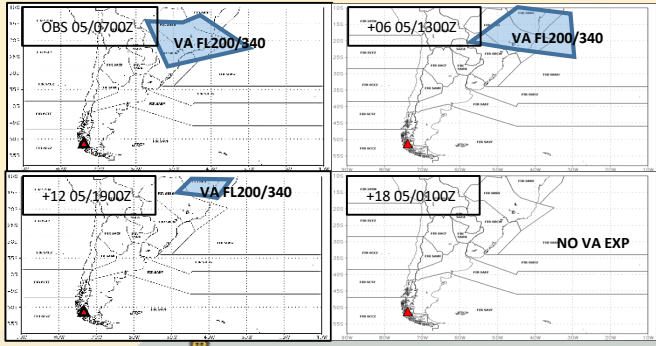
VAG



07:00:04

FVAG03 SABM 050700
VA ADVISORY EXER
DTG: 20190605/0700Z
VAAC: BUENOS AIRES
VOLCANO: FICTITUS 999999
PSN: S4959 W07359
AREA: CHILE
SUMMIT ELEV: 4921 FT (1500 M)
ADVISORY NR: 2019/004
INFO SOURCE: EXER.
AVIATION COLOR CODE: NOT GIVEN
ERUPTION DETAILS: EXER
OBS VA DTG: 05/0700Z
OBS VA CLD: FL200/340 S1133 W04018 - S2000 W02248 - S2734 W05127 - S1426 W05731 - S1452 W04635-
S1133 W04018 MOV NE 15KT
FCST VA CLD +6HR: 05/1300Z FL200/340 S1116 W04524 - S1125 W03007 - S2502 W02931 - S1956 W05637-
S1116 W04524
FCST VA CLD +12HR: 05/1900Z FL200/340 S1032 W03455 - S1604 W03743 - S1530 W05105 - S1041
W04417 - S1032 W03455
FCST VA CLD +18HR: 06/0100Z NO VA EXP
RMK: THIS IS ONLY A VAA EXERCISE. PLEASE DISREGARD...SMN
NXT ADVISORY: WILL BE ISSUED BY 20190605/1300Z=

VAG



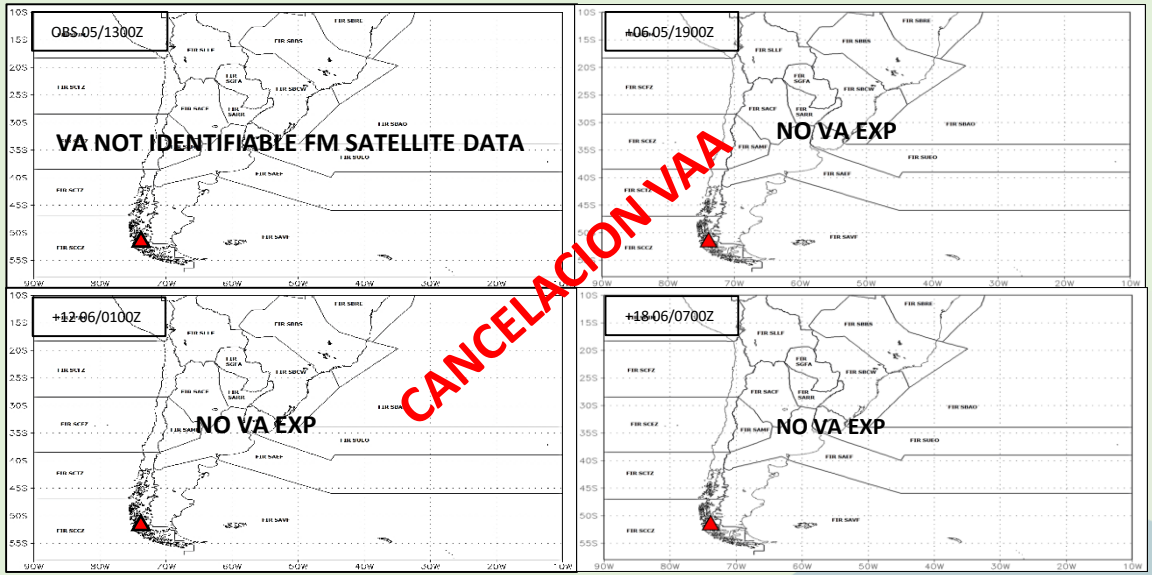
Servicio Meteorológico Nacional

Ministerio de Defensa
Presidencia de la Nación

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

13:00:05
FVAG03 SABM 051300
VA ADVISORY **EXER**
DTG: 20190605/1300Z
VAAC: BUENOS AIRES
VOLCANO: FICTITUS 999999
PSN: S4959 W07359
AREA: CHILE
SUMMIT ELEV: 4921 FT (1500 M)
ADVISORY NR: 2019/005
INFO SOURCE: EXER.
AVIATION COLOR CODE: NOT GIVEN
ERUPTION DETAILS: EXER
OBS VA DTG: 05/1300Z
OBS VA CLD: VA NOT IDENTIFIABLE FROM SATELLITE DATA
FCST VA CLD +6HR: 05/1900Z NO VA EXP
FCST VA CLD +12HR: 06/0100Z NO VA EXP
FCST VA CLD +18HR: 06/0700Z NO VA EXP
RMK: THIS IS ONLY A VAA EXERCISE. PLEASE DISREGARD...SMN
NXT ADVISORY: NO FURTHER ADVISORIES=

VAG



Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

FICTITUS 2019 04/05 junio			CORRIDAS (Mjes VAA)								
			04/JUN 13Z		04/JUN 19Z		05/JUN 01Z		05/JUN 07Z		05/JUN 13Z
		Niveles	SFC/FL340		FL200/FL340		FL200/340		FL200/340		FL200/ 340
Nombre FIR		SIGLA	OBS	FCST 06HS	OBS	FCST 06HS	OBS	FCST 06HS	OBS	FCST 06HS	OBS
A	Punta Arenas	SCCF	X	X	CNL						
B	Puerto Montt	SCTZ	X	X	CNL						
C	Santiago	SCEZ		X	CNL						
D	Antofagasta	SCFZ				X	X	X	CNL		
E	Comodoro Rivadavia	SAVF	X	X	X		CNL				
F	Ezeiza	SAEF		X	X	X	CNL				
G	Córdoba	SACF				X	X	X	CNL		
H	Mendoza	SAMF		X	X	X	CNL				
I	Resistencia	SAAR				X	X	X	CNL		
J	Montevideo	SUEO			X	X	CNL				
K	Curitiba	SBCW					X	X	X	X	CNL
L	Atlántico	SBAO					X	X	X	X	CNL
M	Brasilia	SBBS					X	X	X	X	CNL
N	Recife	SBRE							X	X	CNL
O	Asunción	SGFA					X	X	CNL		
P	La Paz	SLLF					X	X	CNL		
Q	Lima	SPIM					X	X	CNL		

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

ASHTAM RECIBIDOS CRT Buenos Aires

4 JUNIO

16:42:00

NOTA SABM 041641
VASC0002 SCCZ 06041300
ASHTAM 0002
A)SCCZ
B)1906040100
C)VOLCAN FICTITUS 0000-00
D)POS S4959 W07359
F)VA CLD OBS AT 1230Z SCF/FL340 WI S4229 W07312 -
S4310 W06612- S5006
W07407 - S4229 W07312
G)MOV NE
H)SFC/FL340
J)SIGMET 2 SCCI
K)THIS IS ONLY AN ASHTAM TEST EXERCISE. PLEASE DISREGARD

16:42:31

NOTA SABM 041642
VASA0197 SAEZ 06041600
A) SAVF
B) 06041600
C) FICTITUS 999999
D) S4959 W07359 CHILE
E) NIL
F) OBS VA CLD SFC/FL340 S4229 WH7312-S4310 W006612-S5006 W07407- S4229 W07312 MOV NE 200KT
G) FCST VA CLD +6HR: 04/1830Z SFC/FL340 S3557 W07301- S3913 W06455- S5002 W07353- S3557 W07301
FCST VA CLD +12HR: 05/0030Z SFC/FL340 S2926 W07415- S3126OW06337-S3700 W05657- S4954 W07349- S2926 W07415
FCST VA CLD +18HR: 05/0630Z SFC/FL340 S2128 W07419- S2941 W06424- S3217 W05543- S5000 W07349- S2128 W07419
H) OBS VA CLD SFC/FL390 UT658 UW50 UW39 UT110 UT105 UW40-UT658 UT659 UW58 UT110 UW39 UG550 UW50
+6 HS SE AGREGAN UW39 UW50
+12 HS UW33 SE AGREGAN UA570 UW18 UT693 UT700 UT657 UT106 UW41 UW39 UW44 UT658 UT109 UT108
J) VAAC: BUENOS AIRES
RMK: THIS IS ONLY A EXERCISE. PLEASE DISREGARD..... SMN
NXT ADVISORY.. WILL BE ISSUED BY 20190604/1900Z

5 JUNIO

03:46:19

NOTA SABM 050346
VASA0199 SAEZ 050100
(ASHTAM 0199
A) EXER00
B) 06050100
C) FICTITUS 999999
D) S4959 W07359
E) NIL
F) OBS VA CLD: FL200/340 S1530 W07328 - S1824 W04244- S3217 W03814 - S2757 W06658 - S1530 W07328
G) MOV
H) NIL
I) NIL
J) VAAC:
BUENOS AIRES
K) FCST VA CLD +6HR: 05/0700Z FL200/340 S1600 W07838 - S1621 W06201 - S2127 W04440 - S2817 W03406 -S2726 W05832 -
S1600 W07838
FCST VA CLD +12HR: 05/1300Z FL200/340 S1317 W03712 - S2123 W02559 - S2342 W05748 - S1816
W06414 - S1317 W03712
FCST VA CLD +18HR: 05/1900Z FL200/340 S1229 W02856 - S1952 W02337 - S2422 W05331 - S1910
W05704 - S1229 W02856
RMK:THIS IS ONLY A VAA EXERCISE. PLEASE DISREGARD...SMN
NXT
ADVISORY: WILL BE ISSUED BY 20190605/0700Z=)

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

Elementos	*Contenido detallado*	*Plantilla SIGMET*	*Plantilla AIRMET*	*Mensaje SIGMET Ejemplos*	*Mensaje AIRMET Ejemplos*
Movimiento o movimiento previsto (C)[20, 25]	Movimiento *o* movimiento previsto (dirección y velocidad) con referencia a uno de los dieciséis puntos de la brújula, *o* estacionario	MOV N [nnKMH] *o* MOV NNE [nnKMH] *o* MOV NE [nnKMH] *o* MOV ENE [nnKMH] *o* MOV E [nnKMH] *o* MOV ESE [nnKMH] *o* MOV SE [nnKMH] *o* MOV SSE [nnKMH] *o* MOV S [nnKMH] *o* MOV SSW [nnKMH] *o* MOV SW [nnKMH] *o* MOV WSW [nnKMH] *o* MOV W [nnKMH] *o* MOV WNW [nnKMH] *o* MOV NW [nnKMH] *o* MOV NNW [nnKMH] (*o* MOV N [nnKT] *o* MOV NNE [nnKT] *o* MOV NE [nnKT] *o* MOV ENE [nnKT] *o* MOV E [nnKT] *o* MOV ESE [nnKT] *o* MOV SE [nnKT] *o* MOV SSE [nnKT] *o* MOV S [nnKT] *o* MOV SSW [nnKT] *o* MOV SW [nnKT] *o* MOV WSW [nnKT] *o* MOV W [nnKT] *o* MOV WNW [nnKT] *o* MOV NW [nnKT] *o* MOV NNW [nnKT]) *o* STNR		MOV SE MOV NNW MOV E 40KMH MOV E 20KT MOV WSW 20KT STNR	
Cambios de intensidad (C)[20]	Cambios de intensidad previstos	INTSF *o* WKN *o* NC		INTSF WKN NC	
Hora pronosticada (C)[25]	Indicación de la hora pronosticada del fenómeno	FCST AT nnnnZ	—	FCST AT 2200Z	—
Posición pronosticada TC (C)[23]	Posición pronosticada del centro TC al final del período de validez del mensaje SIGMET	TC CENTRE PSN Nnn[nn] *o* Snn[nn] Wnnn[nn] *o* Ennn[nn]	—	TC CENTRE PSN N1030 TC CENTRE PSN E1600015	—
Posición pronosticada (C)[20, 24, 25]	Posición pronosticada- del fenómeno al final del período de validez del mensaje SIGMET	Nnn[nn] Wnnn[nn] *o* Nnn[nn] Ennn[nn] *o* Snn[nn] Wnnn[nn] *o* Snn[nn] Ennn[nn]	—	N30 W170 N OF N30 S OF S50 AND W OF	—

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

PUNTA ARENAS SCCI (SCCF)
4 JUNIO
12:47:44
WVCH31 SCCI 041209
SCCZ SIGMET 1 ~~EXER~~ VALID 041209/041809 SCCI-
SCCZ PUNTA ARENAS FIR EXER VA ERUPTION MT FICTITUS POS S5000 W07400 VA CLD OBS AT 1200Z=
13:04:08
WVCH31 SCCI 041300
SCCZ SIGMET 2 ~~EXER~~ VALID 041300/041900 SCCI-
SCCZ PUNTA ARENAS FIR EXER VA ERUPTION MT FICTITUS POS S4959 W07359 VA CLD OBS AT 1230Z SFC/FL340 WI S4229 W07312 - S4310 W06612 - S5006 W07407 - S4229 W07312 MOV NE 20KT
FCST AT ~~VA CLD +6HR: 04/~~1830Z SFC/FL340 WI S3557 W07301 - S3913 W06455 - S5002 W07353 - S3557 W07301=
13:23:49
WVCH31 SCCI 041322
SCCZ SIGMET 3 ~~EXER~~ VALID 041322/041900 SCCI -
SCCZ PUNTA ARENAS FIR EXER CNL SIGMET 2 VALID 041300/041900=
WVCH31 SCCI 041324
SCCZ SIGMET 4 ~~EXER~~ VALID 041324/041900 SCCI-
SCCZ PUNTA ARENAS FIR EXER VA ERUPTION MT FICTITUS POS S4959 W07359 VA CLD OBS AT 1230Z SFC/FL340 E OF LINE S4700 W07400 - S5006 W07407 MOV NE 20KT FCST VA CLD AT ~~+6HR: 04/~~1830Z SFC/FL340 E OF LINE S4700 W07301 - S5002 W07353=
19:09:24
WVCH31 SCCI 041908
SCCZ SIGMET 5 ~~EXER~~ VALID ~~041908/041908~~ 041908/041918 SCCI-
SCCZ PUNTA ARENAS FIR EXER **CNL** SIGMET 4 ~~EXER~~ VALID 041324/041900=

PUERTO MONTT SCTZ
4 JUNIO
13:56:52
WVCH31 SCTE 041354
SCTZ SIGMET 01 ~~EXER~~ VALID 041354/~~041754~~ 041900 SCTE- **EL PERIODO DE VALIDEZ DEBERIA SER HASTA LAS 1900**
SCTZ PUERTO MONTT FIR EXER VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD OBS AT ~~04/~~1230Z WI S4229 W07312 - S4310 W06612 - S5006 W07407 - S4229 W07312 SFC/FL340 MOV NE 20KT FCST AT ~~04/~~1830Z VA CLD APRX S3557 W07301 - S3913 W06455 - S5002 W7353 - S3557 W07301=
17:55:02
WVCH31 SCTE 041754
SCTZ SIGMET 02 ~~EXER~~ VALID 041754/042354 SCTE- **EMITE UN SEGUNDO SIGMET CON EL MISMO VAA**
SCTZ PUERTO MONTT FIR EXER VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD **OBS** AT ~~04/~~1230Z WI S4229 W07312 - S4310 W06612 - S5006 W07407 - S4229 W07312 SFC/FL340 MOV NE 20KT **FCST** AT ~~04/~~1830Z VA CLD APRX S3557 W07301 - S3913 W06455 - S5002 W7353 - S3557 W07301=
19:10:54
WVCH31 SCTE 041910
SCTZ SIGMET 03 ~~EXER~~ VALID 041910/042354 SCTE-
SCTZ PUERTO MONTT FIR EXER CNL SIGMET 02 ~~EXER~~ VALID 041754/042354=

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

SANTIAGO SCCZ
4 JUNIO
15:57:12
WVCH31 SCEL 041500
SCCZ SIGMET 1 ~~EXER~~ VALID 041830/050030 SCEL-
SCEZ SANTIAGO FIR EXER VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD FCST AT ~~04/~~1830Z SFC/FL340 E OF LINE S3557 W07301 S3830 W07300=
21:05:49
WVCH31 SCEL 042100
SCCZ SIGMET 2 ~~EXER~~ VALID 042100/050030 SCEL-
SCEZ SANTIAGO FIR EXER CNL SIGMET 01 ~~EXER~~ VALID 041830/050030=

ANTOFAGASTA SCFZ
04 JUNIO
19:30:24
WVCH31 SCFA 041930
SCFZ SIGMET 01 ~~EXER~~ VALID 041930/050130 SCFA- **AFECTA A LA FIR EN EL PRONOSTICO A 6 horas**
SCFZ ANTOFAGASTA FIR EXER VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD ~~FCST WI S3316 W06917 - S3801 W04548 - S4405 W06710 - S3316 W06917 FL200/340 MOV NE 15KT NC~~ **FCST AT** ~~05/~~0100Z VA CLD APRX S2228 W07035- S2847 W05811-S3732 W05107- S3837 W06511-S2228 W07035=
05 JUNIO
01:40:54
WVCH31 SCFA 050140
SCFZ SIGMET 01 ~~EXER~~ VALID 050140/050740 SCFA-
SCFZ ANTOFAGASTA FIR EXER VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD ~~FCST~~ **OBS AT 1900Z** WI S1530 W07328 - S1824 W04244 - S3217 W03814 - S2757 W06658 - S1530 W07328 FL200/340 MOV NE 15KT NC FCST 0700Z VA CLD APRX S1600 W07838 - S1621 W06201 - S2127 W04440 - S2817 W03406 -S2726 W05832 - S1600 W07838=
07:35:34
WVCH31 SCFA 050730 **DEBERIA HABERLO CANCELADO PORQUE NO AFECTA MAS LA FIR (COMO LE FALTA EL = VUELVE A HACER OTRO SIGMET)**
SCFZ SIGMET 02 VALID 050735/051335 SCFA-
SCFZ ANTOFAGASTA FIR EXER VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD OBS AT 0700Z WI S1133 W04018 - S2000 W02248 - S2734 W05127 - S1426 W05731 - S1452 W04635 - S1133 W04018 FL200/340 MOV NE 15KT NC FCST 1300Z VA CLD APRX S1116 W04524 - S1125 W03007 - S2502 W02931 - S1956 W05637 -S1116 W04524
07:38:33
WVCH31 SCFA 050738 **DEBERIA HABERLO CANCELADO-REPITE NUMERO DE SIGMET**
SCFZ SIGMET ~~02~~ 03 ~~EXER~~ VALID 050738/051338 SCFA-
SCFZ ANTOFAGASTA FIR EXER VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD OBS AT 0700Z WI S1133 W04018 - S2000 W02248 - S2734 W05127 - S1426 W05731 - S1452 W04635 - S1133 W04018 FL200/340 MOV NE 15KT NC FCST 1300Z VA CLD APRX S1116 W04524 - S1125 W03007 - S2502 W02931 - S1956 W05637 -S1116 W04524=
12:47:19
WVCH31 SCFA 051247
SCFZ SIGMET 03 VALID 051247/051335 SCFA-
SCFZ ANTOFAGASTA FIR EXER CNL SIGMET 02 050735/051335=

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

COMODORO RIVADAVIA SAVF
4 JUNIO
13:03:03
WVAG31 SAVC 041300
SAVF SIGMET B1 VALID 041300/041900 SAVC-
SAVF COMODORO RIVADAVIA FIR EXER VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD **OBS** AT 1230Z WI S4229 W07312 - S4310 W06612 - S5006 W07407 - S4229 W07312 SFC/FL340 MOV NE~~/~~20KT ~~KT~~ VA CLD **FCST** AT 1830Z WI S3557 W07301 - S3913 W06455 - S5002 W07353 - S3557 W07301 ~~SFC/FL340~~=
13:10:05
WVAG31 SAVC 041309
SAVF SIGMET B1 VALID 041300/041900 SAVC-
SAVF COMODORO RIVADAVIA FIR EXER VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD **OBS** AT 1230Z WI S4229 W07312 - S4310 W06612 - S5006 W07407 - S4229 W07312 SFC/FL340 MOV NE~~/~~20KT KT VA CLD **FCST** AT 1830Z WI S3557 W07301 - S3913 W06455 - S5002 W07353 - S3557 W07301 ~~SFC/FL340~~=
13:36:01
WVAG31 SAVC 041336
SAVF SIGMET B2 VALID 041336/041900 SAVC-
SAVF COMODORO RIVADAVIA EXER CNL SIGMET B1 041300/041900=
13:41:01
WVAG31 SAVC 041343
SAVF SIGMET B3 ~~EXER~~ VALID 041343/041943 SAVC-
SAVF COMODORO RIVADAVIA FIR EXER VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD **OBS** AT 1230Z WI S4229 W07312 - S4310 W06612 - S5006 W07407 - S4229 W07312 SFC/FL340 MOV NE/20KT KT VA CLD **FCST** AT 1830Z WI S3557 W07301 - S3913 W06455 - S5002 W07353 - S3557 W07301 ~~SFC/FL340~~=
14:38:51
WVAG31 SAVC 041437 CCA
SAVF SIGMET B3 ~~EXER~~ VALID 041343/041943 SAVC-
SAVF COMODORO RIVADAVIA FIR **EXER** VA ERUPTION MT FICTITUS PSN S4959 W07359
VA CLD **OBS** AT 1230Z WI S4229 W07312 - S4310 W06612 - S5006 W07407 - S4229 W07312 SFC/FL340 MOV NE20KT VA CLD **FCST** AT 1830Z WI S3557 W07301 - S3913 W06455 - S5002 W07353 - S3557 W07301 ~~SFC/FL340~~=
19:26:02
WVAG31 SAVC 041925
SAVF SIGMET B4 VALID 041925/VALID 04134 ~~SAVF~~ SAVC-
SAVF COMODORO RIVADAVIA FIR **EXER** CNL SIGMET B3 VALID=
19:32:03
WVAG31 SAVC 041931
SAVF SIGMET B5 ~~EXER~~ VALID 041931/042331 SAVC-
SAVF COMODORO RIVADAVIA FIR **EXER** VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD **OBS** AT 1900Z WI S3316 W06917 - S3801 W04548 - S4405 W06710 - S3316 W06917 FL200/340 MOV ~~MOV~~ NE 15KT ~~KT~~
VA CLD **FCST** AT 0100Z~~Z~~ WI S2228 W07035 - S2847 W05811 - S3732 W05107 - S3837 W06511 - S2228 W07035 ~~FL200/340~~=
01:00:00
FALTO SIGMET CNL SIGMET B5 041931/041940 SAVC-

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

EZEIZA SAEF
4 JUNIO
13:09:47
WVAG31 SABE 041300
SAEF SIGMET A1 ~~EXER~~ VALID 041300/041900 SABE-
SAEF EZEIZA FIR **EXER** VA ERUPTION MT FICTITUS PSN S4959 W07359 ~~VA CLD OBS AT 1230Z WI S4229 W07312 - S4310 W06612 - S5006 W07407 - S4229 W07312 SFC/FL340 MOV NE 20KT~~ VA CLD FCST AT 1830Z WI S3557 W07301 - S3913 W06455 - S5002 W07353 - S3557 W07301 SFC/FL340=
19:05:03
WVAG31 SABE 041907
SAEF SIGMET A2 ~~EXER~~ VALID 041907/050107 SABE-
SAEF EZEIZA FIR **EXER** VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD **OBS** AT 1900Z WI S3316 W06917 - S3801 W04548 - S4405 W06710 - S3316 W06917 FL200/340 MOV NE 15 KT VA CLD **FCST** AT 0100Z WI S2228 W07035 - S2847 W05811 - S3732 W05107 - S3837 W06511 - S2228 W07035 ~~FL200/340~~=
5 JUNIO
01:51:02
WVAG31 SABE 050152
SAEF SIGMET 1 ~~EXER~~ VALID 050152/050552 SABE- **SE DEBERIA HABER CANCELADO**
SAEF EZEIZA FIR **EXER** VA ERUPTION MT FICTITUS PSN S4959 W07359
VA CLD OBS AT 0100Z WI S1530 W07328 - S1824 W04244 - S3217 W03814 - S2757 W06658 - S1530 W07328 FL200/340 MOV NE 15KT ~~KT~~ VA CLD FCST AT 0700Z WI S1600 W07838 - S1621 W06201 - S2127 W04440 - S2817 W03406 - S2726 W05832 - S1600 W07838 ~~FL200/340~~=
07:10:01
WVAG31 SABE 050710
SAEF SIGMET 2 VALID 050710/051310 SABE- **SE DEBERIA HABER CANCELADO**
SAEF EZEIZA FIR **EXER** VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD OBS AT 0700Z WI S1133 W04018 - S2000 W02248 - S2734 W05127 - S1426 W05731 - S1452 W04635 - S1133 W04018 FL200/340 MOV NE 15 KT VA CLD FCST AT 1300Z WI S1116 W04524 - S1125 W03007 - S2502 W02931 - S1956 W05637 - S1116 W04524 ~~FL200/340~~ =
10:13:04
WVAG31 SABE 051012
SAEF SIGMET 3 VALID 051012/051310 SABE-
SAEF EZEIZA FIR **EXER** CNL SIGMET 2 050710/051310=

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

MENDOZA SAMF
4 junio
13:16:02
WVAG31 SAME 041300
SAMF SIGMET NUMERO ~~EXER~~ VALID 041300/041900 SAME-
SAMF MENDOZA FIR EXER VA ERUPTION MT FICTITUS PSN S4959 W07359
VA CLD **FCST** AT 1830Z WI S3557 W07301 - S3913 W06455 - S5002 W07353 - S3557 W07301 ~~BTN SUP~~ SFC /FL340=
14:00:01
WVAG31 SAME 041359
SAMF SIGMET E0 VALID 041359/041900 SAME-
SAMF MENDOZA FIR EXER CNL SIGMET EXER 041300/041900=
14:03:33
WVAG31 SAME 041401
SAMF SIGMET 2 ~~EXER~~ VALID 041401/041405 SAME-
SAMF MENDOZA FIR EXER CNL SIGMET EXER VALID 041300/041900=
14:08:17
WVAG31 SAME 041410
SAMF SIGMET 3 ~~EXER~~ VALID 041410/041900 SAME-
SAMF MENDOZA FIR EXER VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD **FCST** AT 1830Z WI S3557 W07301 - S3913 W06455 - S5002 W07353 - S3557 W07301 BTN SFC/FL340=
19:09:01
WVAG31 SAME 041907
SAMF SIGMET 4 VALID 041907/040107 SAME-
SAMF MENDOZA FIR EXER VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD **OBS** AT 04/1900Z WI S3316 W06917 - S3801 W04548 - S4405 W06710 - S3316 W06917 FL200/340 MOV NE 15KT KT~~.~~VA CLD **FCST** AT 05/0100Z WI S2228 W07035 - S2847 W05811 - S3732 W05107 - S3837 W06511 - S2228 W07035 ~~FL200/340~~=
19:34:01
WVAG31 SAME 041933
SAMF SIGMET 2 VALID 041933/040107 SAME-
SAMF MENDOZA FIR EXER CNL SIGMET 4 041907/040107=
19:54:04
WVAG31 SAME 041939
SAMF SIGMET 6 ~~EXER~~ VALID 041939/050139 SAME-
SAMF MENDOZA FIR EXER VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD **OBS** AT 1900Z WI S3316 W06917 - S3801 W04548 - S4405 W06710 - S3316 W06917 FL200/340 MOV NE 15KT
VA CLD **FCST** AT 0100Z WI S2228 W07035 - S2847 W05811 - S3732 W05107 - S3837 W06511 - S2228 W07035 ~~FL200/340~~=
05 JUNIO
01:30:00
WVAG31 SAME 050129
SAMF SIGMET 1 VALID 050129/050139 SAME-
SAMF MENDOZA FIR EXER CNL SIGMET 6 041939/050139=

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

CORDOBA SACF
4 Junio
19:12:56
WVAG31 SACO 041900
SACF SIGMET 1 ~~EXER~~ VALID 041900/050100 SACO-
SACF CORDOBA FIR EXER VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD **FCST** AT 0100Z S2228 W07035- S2847 W05811 - S3732 W05107 - S3837 W06511 - S2228 W07035 FL200/340=
5 JUNIO
01:17:20
WVAG31 SACO 050100
SACF SIGMET 1 ~~EXER~~ VALID 050100/050700 SACO -
SACF CORDOBA FIR EXER VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD **OBS** AT 0100Z WI S1530 W07328 - S1824 W04244 - S3217 W03814 - S2757 W06658 - S1530 W07328 FL200/FL340 MOV NE 15KT
VA CLD **FCST** AT 0700Z WI S1600 W07838 - S1621 W06201 - S2127 W04440 - S2817 W03406 - S2726 W05832 - S1600 W07838 ~~FL200/340~~=
07:12:56
WVAG31 SACO 050700
SACF SIGMET 2 ~~EXER~~ VALID 050700/050700 SACO-
SACF CORDOBA FIR EXER CNL SIGMET 1 050100/050700 ~~VA FICTITUS EXERCISE~~=

RESISTENCIA SARR
4 JUNIO
19:00:00
FALTA SIGMET SOLO FCST +06
5 JUNIO
01:03:05
WVAG31 SARE 050100
SARR SIGMET 1 ~~EXER~~ VALID 050100/050700 SARE -
SARR RESISTENCIA FIR EXER VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD OBS AT 0100Z WI S1530 W07328 - S1824 W04244 - S3217 W03814 - S2757 W06658 - S1530 W07328 FL 200/340 MOV NE 15KT
VA CLD FCST AT 0700Z WI S1600 W07838 - S1621 W06201 - S2127 W04440 - S2817 W03406 - S2726 W05832 - S1600 W07838 ~~FL200/340~~=
07:10:00
WVAG31 SARE 050700
SARR SIGMET 2 ~~EXER~~ VALID 050700/050800 SARE -
SARR RESISTENCIA FIR EXER CNL SIGMET 1 ~~EXER~~ VALID 050100/050700=

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

MONTEVIDEO SUEO
4 Junio
19:58:03
WVUY31 SUMU 041950
SUEO SIGMET 1 VALID 041950/050150 SUMU-
SUEO MONTEVIDEO FIR **EXER** VA ERUPTION MT FICTITUS PSN S4959 W07379- VA CLD **OBS** AT 1900Z WI S3316 W06917 - S3801 W04548 - S4405 W06710- S3316 W06917 FL200/340 MOV NE 15KT VA CLD **FCST** AT WI S2228 W07035 - S2847 W05811- S3732 W05107- S3837 W06511 - S2228 W07035 ~~FL200/340~~=
19:59:32
WVUY31 SUMU 042000
SUEO SIGMET 1 VALID 041950/050150 SUMU-
SUEO MONTEVIDEO FIR EXER VA ERUPTION MT FICTITUS EXER PSN S4959 W07379- VA CLD **OBS** AT 1900Z WI S3316 W06917 - S3801 W04548 - S4405 W06710- S3316 W06917 FL200/340 MOV NE 15KT VA CLD **FCST** AT WI S2228 W07035 - S2847 W05811- S3732 W05107- S3837 W06511 - S2228 W07035 ~~FL200/340~~=
5 JUNIO
01:37:05
WVUY31 SUMU 050135
SUEO SIGMET 1 ~~EXCER~~ VALID 050135/051035 SUMU-
SUEO MONTEVIDEO FIR **EXER** ~~SIGMET 1 VALID 050135/050135~~ CNL SIGMET 1 VALID 041950/050150=
01:41:08
WVUY31 SUMU 050138
SUEO SIGMET 1 ~~EXCER~~ VALID 050138/051038 SUMU-
SUEO MONTEVIDEO FIR **EXER** CNL SIGMET 1 VALID 041950/050150=
01:53:43
WVUY31 SUMU 050150
SUEO SIGMET 1 VALID 050150/051050 SUMU-
SUEO MONTEVIDEO FIR EXER CNL SIGMET 1 VALID 041950/050150=
01:57:12
WVUY31 SUMU 050154
SUEO SIGMET 1 ~~EXER~~ VALID 050154/051054 SUMU-
SUEO MONTEVIDEO FIR **EXER** CNL SIGMET 1 ~~EXER~~ VALID 041950/050150=

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

ASUNCION SGFA
5 JUNIO
03:41:19
WVPY31 SGAS 050100
SGFA SIGMET 01 ~~EXER~~ VALID 050100/050600 SGAS- FALTA LA PARTE FCST
ASUNCION FIR **EXER** VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD **OBS** AT 0100Z WI S1530 W07328 -
S1824 W04244 - S3217 W03814 - S2757 W06658 - S1530 W07328 FL200/340 MOV NE 15KT=
07:10:16
WVPY31 SGAS 050700
SGFA SIGMET 01 ~~EXER~~ VALID 050700/051300 SGAS- SE DEBERIA HABER CANCELADO
~~SGFA ASUNCION FIR **EXER** VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD OBS AT 0700Z WI S1133 W04018 - S2000 W02248 - S2734 W05127 - S1426 W05731 - S1452 W04635 - S1133 W04018 FL200/340 MOV NE 15KT=~~
10:42:14
WVPY31 SGAS 051040
SGFA SIGMET 03 EXER VALID 051040/051640 SGAS-
SGFA ASUNCION FIR **EXER** CNL SIGMET 02 EXER VALID 050700/051300=
FALTA SIGMET 04
13:40:34
WVPY31 SGAS 051340
SGFA SIGMET 05 ~~EXER~~ VALID 051340/051940 SGAS-
SGFA ASUNCION FIR **EXER** CNL SIGMET 04 EXER VALID 050700/051300=
LA PAZ SLLF
5 JUNIO
01:12:18
WVBO31 SLLP 050102
SLLF SIGMET 1 VALID 050102/010702 SLLP-
SLLF LA PAZ FIR **EXER** VA ERUPTION MT FICTITUS ~~POS~~ PSN S4959 W07359 VA CLD OBS AT 0100Z FL200/340 WI S1530 W07328 - S1824 W04244 - S3217 W03814 - S2757 W06658 - S1530 W07328 MOV NE 15KT FCST VA
CLD AT 0700Z FL200/340 WI S1600 W07838 - S1621 W06201 - S2127 W04440 - S2817 W03406 - S2726 W05832 - S1600 W07838=
01:48:25
WVBO31 SLLP 050102 CCA
SLLF SIGMET 1 VALID 050102/050702 SLLP-
SLLF LA PAZ FIR **EXER** VA ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD OBS AT 0100Z FL200/340 WI S1530 W07328 - S1824 W04244 - S3217 W03814 - S2757 W06658 - S1530 W07328 MOV NE 15KT
FCST VA CLD AT 0700Z FL200/340 WI S1600 W07838 - S1621 W06201 - S2127 W04440 - S2817 W03406 - S2726 W05832 - S1600 W07838=
13:51:01
WVBO31 SLLP 050702
SLLF SIGMET 2 ~~EXER~~ VALID 050702/050702 SLLP-
SLLF LA PAZ FIR **EXER** CNL SIGMET 1 EXER VALID 050102/050702 SLLP=

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

LIMA SPIM
5 JUNIO
01:14:17
WVPR31 SPIM 050103
SPIM SIGMET 1 ~~EXER~~ VALID 050114/050714 SPIM-
SPIM LIMA FIR VA **EXER** ERUPTION MT FICTITUS PSN S4959 W07359 VA CLD OBS AT 0100Z WI S1530 W07328 - S1824 W04244 - S3217 W03814 - S2757 W06658 - S1530 W07328 FL200/340 MOV NE 15KT
FCST AT 0700Z VA CLD WI S1600 W07838 - S1621 W06201 - S2127 W04440 - S2817 W03406 - S2726 W05832 - S1600 W07838=
07:05:34
WVPR31 SPIM 050704
SPIM SIGMET 2 ~~EXER~~ VALID 050704/050714 SPIM-
SPIM LIMA FIR EXER CNL SIGMET 1 ~~EXER~~ VALID 050114/050714=

BRASILIA
5 JUNIO
04:10:59
WVBZ31 SBBS 050410
SBBS SIGMET 1 ~~TESTE NO VALID~~ 050100/050700 SBBS -
SBBS BRASILIA FIR **EXER** VA ERUPTION MT FICTITUS ~~EXERCISE~~ PSN S4959 W07359 VA CLD OBS AT 0100Z WI S1757 W05313 - S1823 W04243 - S1909 W04231 - S2028 W04233 - S2011 W04322 - S2022 W04328 - S2029 W04345 - S2030 W04404 - S2247 W04547 - S2314 W04551 - S2324 W04619 - S2328 W04655 - S2313 W04724 - S2301 W04733 - S2239 W04735 - S2204 W04800 - S2131 W04937 S1757 W05313 ~~BTN~~ FL200/340 MOV NE 15KT VA **FCST** AT 0700Z WI S1943 W05125 - S2125 W04445 - S2245 W04546 - S2315 W04552 - S2324 W04621 - S2328 W04657 - S2311 W04725 - S2301 W04734 - S2240 W04735 - S2205 W04759 - S2133 W04937 - S2035 W05031 - S1943 W05125 ~~FL200/340~~=
07:11:23
WVBZ31 SBBS 050710
SBBS SIGMET 2 ~~TESTE NO VALID~~ 050700/051300 SBBS -
SBBS BRASILIA FIR **EXER** VA ERUPTION MT FICTITUS EXERCISE PSN S4959 W07359 VA CLD **OBS** AT 0700Z WI
S1437 W05337 - S1451 W04634 - S1403 W04505 - S1540 W04407 - S1704 W04143 - S1836 W04232 - S2027 W04233 - S2012 W04321 - S2029 W04339 - S2030 W04405 - S2246 W04548 - S2317 W04552 - S2329 W04653 - S2305 W04735 - S2242 W04734 - S2204 W04759 - S2133 W04933 - S1720 W05354 - S1642 W05306 - S1437 W05337 ~~BTN~~ FL200/340 MOV NE 15KT VA FCST AT 1300Z WI S1215 W04641 - S1320 W04535 - S1402 W04505 - S1536 W04407 - S1705 W04142 - S1837 W04231 - S2028 W04231 - S2015 W04321 - S2032 W04342 - S2031 W04404 - S2247 W04546 - S2315 W04547 - S2332 W04655 - S2307 W04735 - S2244 W04738 - S2205 W04802 - S2132 W04937 - S1739 W05334 - S1215 W04641 ~~FL200/340~~=
13:00:00
NO SE RECIBIO CANCELACION SIGMET 2 050700/051300 SBBS
CURITIBA SBCW
5 JUNIO
01:00:00
NO SE RECIBIO SIGMET SBCW OBS Y FCST
07:15:15
WVBZ31 SBCW 050703 REALIZA EL POLIGONO SOBRE SU FIR
SBCW SIGMET 4 ~~TEST NO VALID~~ 050700/051300 SBCW - SBCW CURITIBA FIR **EXER** VA ERUPTION MT FICTITUS ~~EXERCISE~~ PSN S4959 W07359 VA CLD OBS AT 0700Z WI S1741 W05607 - S2733 W05128 - S2553 W04237 - S2226 W03812 - S2044 W03949 - S2054 W04032 - S2025 W04101 - S2037 W04202 - S2014 W04322 - S2026 W04340 - S2028 W04405 - S2240 W04548 - S2313 W04552 - S2327 W04656 - S2300 W04737 - S2241 W04738 - S2153 W04833 - S2134 W04935 - S1934 W05134 - S1715 W05354 - S1733 W05441 - S1741 W05607 ~~BTN~~ FL200/340 MOV NE 15KT VA **FCST** AT 1300Z S1116 W04524 - S1125 W03007 - S2502 W02931 - S1956 W05637 - S1116 W04524 ~~FL200/340~~=
13:00:00
NO SE RECIBIO CANCELACION SIGMET 2 050700/051300 SBCW

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

RECIFE
5 JUNIO
08:08:37
WVBZ31 SBRE 050806
SBRE SIGMET 1 ~~TEST NO VALID~~ 050700/051300 SBRE-
SBRE RECIFE FIR EXER VA ERUPTION MT FICTITUS ~~EXERCISE~~ PSN S4959 W07359 VA CLD **OBS** AT 0700Z WI S1134 W04016 - S1322 W03637 - S1829 W03858 - S1849 W03738 - S2113 W03922 - S2043 W03949 - S2053 W04033 - S2025 W04100 - S2037 W04200 - S2027 W04233 - S1837 W04229 - S1704 W04143 - S1542 W04407 - S1403 W04504 - S1134 W04016 BTN FL200/340 MOV NE 15KT VA FCST AT 1300Z S1217 W04635 - S1117 W04528 - S1118 W03534 - S1506 W03739 - S1635 W03805 - S1819 W03903 - S1854 W03737 - S2107 W03926 - S2040 W03950 - S2055 W04029 - S2027 W04104 - S2037 W04201 - S2024 W04232 - S1833 W04234 - S1659 W04145 - S1531 W04409 - S1313 W04537 - S1217 W04635 ~~FL200/340~~=
13:00:00
NO SE RECIBIO CANCELACION SIGMET 2 050700/051300 SBRE

ATLANTICO
5 JUNIO
FALTA SIGMET DE 01:00Z
08:18:46
WVBZ31 SBRE 050817
SBAO SIGMET 4 ~~TEST NO VALID~~ 050700/051300 SBAO-
SBAO ATLANTICO FIR **EXER** VA ERUPTION MT FICTITUS EXERCISE PSN S4959 W07359 VA CLD OBS AT 0700Z WI
S2458 W04120 - S1959 W02247 - S1320 W03639 - S1506 W03739 - S1635 W03805 - S1819 W03903 - S1854 W03737 - S2107 W03926 - S2225 W03816 - S2458 W04120 ~~BTN~~ FL200/340 MOV NE 15KT VA FCST AT 1300Z WI S2310 W03904 - S2503 W02926 - S1127 W03006 - S1119 W03536 - S1507 W03738 - S1637 W03802 - S1824 W03859 - S1857 W03742 - S2108 W03922 - S2227 W03816 - S2310 W03904 ~~FL200/340~~=
13:00:00
NO SE RECIBIO CANCELACION SIGMET 2 050700/051300 SBRE

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

Referencias de las correcciones:

- En verde: correcciones realizadas
- ~~En rojo~~: texto incorrecto

Conclusiones:

Mensajes SIGMET

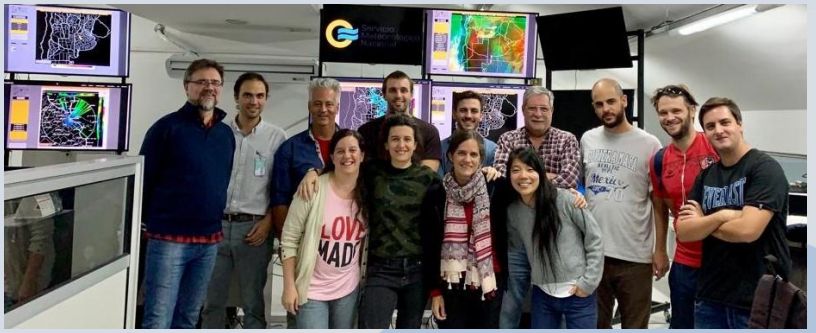
- La palabra **EXER** estaba en la posición incorrecta en el ejemplo para mensaje SIGMET (Anexo 3,AP. 6, Tabla A6-1A).
- FCST **AT** ~~VA CLD +6HR: 04/~~1830Z, (Anexo 3,AP. 6, Tabla A6-1A)
- El período de validez es desde la hora de emisión del mensaje SIGMET hasta la hora de emisión del próximo VAA,
- El período de validez de una CNL SIGMET tiene que ser de aproximadamente 5 a 10 minutos,
- Si existe una parte OBS y FCST, la parte FCST no lleva nivel de vuelo ni movimiento,
- Hubieron varios casos en los cuales sólo estaba afectada la FIR por la nube en el FCST+06 y sin embargo enviaban datos de la nube OBS cuando no afectaba a la FIR.
- En ocasiones sucedió que no enviaron SIGMET cuando les afectaba FCST+06.
- En otros casos enviaron SIGMET cuando sin que la nube afectara la FIR bajo su responsabilidad.
- En el caso que se cometieron errores y fueron identificados en el momento, no utilizaron el CCA.
- No se utiliza el TESTE NO VALID

ASHTAM

- Solo se recibieron ASHTAM de Chile (1) y de Argentina (2) en el CRT Buenos Aires.

Ejercicio FICTITUS 2019 – VAAC BUENOS AIRES

FVAG03 SABM 041300
VA ADVISORY EXER
DTG: 20190604/1300Z
VAAC: BUENOS AIRES
VOLCANO: FICTITUS 999999
PSN: S4959 W07359
AREA: CHILE
SUMMIT ELEV: 4921 FT (1500 M)
ADVISORY NR: 2019/001
INFO SOURCE: SIGMET MWO SCCI
AVIATION COLOR CODE: NOT GIVEN
ERUPTION DETAILS: EXER
OBS VA DTG: 04/1230Z
OBS VA CLD: SFC/FL340 S4229 W07312 - S4310 W06612 - S5006 W07407 - S4229 W07312 MOV NE 20KT
FCST VA CLD +6HR: 04/1830Z SFC/FL340 S3557 W07301 - S3913 W06455 - S5002 W07353 - S3557 W07301
FCST VA CLD +12HR: 05/0030Z SFC/FL340 S2926 W07415 - S3126 W06337 - S3700 W05657 - S4954 W07349 - S2926 W07415
FCST VA CLD +18HR: 05/0630Z SFC/FL340 S2128 W07419 - S2941 W06424 - S3217 W05543 - S5000 W07349 - S2128 W07419
RMK: THIS IS ONLY A EXCERCISE. PLEASE DISREGARD... ...SMN
NXT ADVISORY: WILL BE ISSUED BY 20190604/1900Z=



Servicio Meteorológico Nacional

Ministerio de Defensa
Presidencia de la Nación

Servicio Meteorológico Nacional

Dorrego 4019 (C1425GBE) Buenos Aires . Argentina
Tel: (+54 11) 5167-6712
smn@smn.gob.ar . www.smn.gob.ar

Ministerio de Defensa
Presidencia de la Nación

APÉNDICE D

Guía para la implementación de Intercambio de Datos OPMET en formato IWXXM

INTERNATIONAL CIVIL AVIATION ORGANIZATION

GUIDELINES FOR THE IMPLEMENTATION OF OPMET DATA EXCHANGE USING IWXXM

DRAFT THIRD EDITION – MAY 2019

TABLE of CONTENTS

TABLE of FIGURES

1 Introduction

1.1 Purpose

The main intention of this document is to describe the activities relating to the transition of intra- and interregional operational meteorological (OPMET) data exchange until 2020 and operational exchange beyond. During this period, the amendments to ICAO Annex 3, *Meteorological Service for International Air Navigation*, requiring this transition towards digital data exchange will become applicable for the international exchange of OPMET data.

1.2 Background

The bilateral exchange of IWXXM (ICAO Meteorological Information Exchange Model) based information was introduced in November 2013 through Amendment 76 to ICAO Annex 3, enabling States to exchange their OPMET data not only in TAC (Traditional Alphanumeric Code form) but also in extensible mark-up language (XML) and more precisely geography mark-up language (GML).

This represented the start of a significant change from the provision and exchange of textual OPMET data towards a digital environment supporting the ICAO Global Air Navigation Plan (GANP) and transition towards a SWIM (System Wide Information Management) environment.

Since their inception, OPMET data has been promulgated systems with the data products initially designed to be human readable. Due to bandwidth limitations, these products are highly compact to facilitate a regular and efficient flow of data.

The exchange of IWXXM information became a recommendation through Amendment 77 to ICAO Annex 3 from November 2016, with some States exchanging digital products (IWXXM) from early 2017. The exchange of IWXXM will be a standard from November 2020, as indicated in Amendment 78 to ICAO Annex 3.

The use of OPMET in a TAC format presents an obstacle to the digital use of the data as it often contains typographical errors, is poorly structured and lacks validation. This makes the handling of global data difficult to use correctly and expensive to maintain. These significant difficulties have been highlighted during past code changes. The coding practices in text form also presents an obstacle to efficient automation as State coding exceptions are commonly used.

IWXXM represents the first step to move to an environment where the systems handling this data can make more use of standard applications and techniques. The development of new systems which provide and support digital OPMET requires initial investment but the use of enabling data exchange standards for other domains such as AIXM (Aeronautical Information Exchange Model) and FIXM (Flight Information eXchange Model) along with IWXXM will lead to a cost reduction due to the implementation of widely used data modelling techniques including OGC (Open Geospatial Consortium) segments. Consequently, users are presented with opportunities to create new products at a lower cost by fusing this data.

It is essential that the transition towards the use of IWXXM is adequately planned and equipped to make reliable data sets available to users for exploitation as soon as possible at both a Regional and a Global scale. This guidance document provides elements and steps for consideration in achieving that aim by defining common definitions and concepts, as well as structured phases to be implemented in relation to the International exchange of OPMET data.

1.3 Intended Audience

This document is intended to be used by Centres considering being involved in the exchange of IWXXM data, both within a region and inter-regionally.

2 Current Operations and Capabilities

2.1 Current Capabilities

The current capabilities are dedicated to Traditional Alphanumeric Code (TAC) data exchange, via the Aeronautical Fixed Service (AFS), primarily the aeronautical fixed telecommunications network through AFTN and AMHS protocols, SADIS and WIFS.

AMHS provides a mechanism for the exchange of IWXXM information as attachments by utilising the AMHS File Transfer Body Part (FTBP) feature over the AFS.

2.2 Data Producer/Originating Unit

The TAC Data Producer provides TAC data only.

2.3 Data Aggregator

The function of the Data Aggregator is to take individual TAC reports, perform limited data validation and aggregate them into bulletins. Bulletins shall consist of one or more reports of the same type (e.g. METAR).

2.4 Data Switch

A Data Switch will route the data according to the WMO abbreviated header structure, TTAAiiCCCC, of the bulletin. The bulletin header fulfils the regulations described in WMO doc No 386, *Manual on the Global Telecommunication System*.

2.5 National OPMET Centre (NOC)

The role of the NOC is to gather and validate all - international required OPMET messages – required AOP and agreed exchanged non-AOP - (refer to the Regional (electronic) Air Navigation Plans for AOP) generated by all originating units within a State, to compile national data into bulletins and to distribute them internationally according to the regional distribution schema.

A NOC should perform the following functions:

- Data Aggregator;
- Data Validator; and
- Data Switch.

2.6 Regional OPMET Centre (ROC)

A ROC is responsible for the collection from NOCs and validation of all required AOP and agreed exchanged non-AOP OPMET data in its area of responsibility (AoR) according to the regional distribution schema.

Each ROC is responsible for the collection of all required OPMET data and agreed exchanged non-AOP OPMET data from the other ROCs in the region and the dissemination to the other ROCs of these data from its AoR.

A ROC should perform the following functions:

- Data Aggregator; and
- Data Switch.

2.7 Interregional OPMET Gateway (IROG)

An IROG is responsible for the collection of all required OPMET data and agreed exchanged non-AOP OPMET data from its interregional area(s) of responsibility (IAoR) and its dissemination to the ROCs in its region.

Furthermore, the IROGs are responsible for collection and dissemination of their region's required AOP and agreed non-AOP exchanged OPMET data to their partner IROGs.

The IROG is responsible for the validation of the bulletins sent to the IROGs of its IAoR and received from their IAoR.

For TAC data exchange, an IROG should perform the following functions:

- Data Aggregator; and
- Data Switch.

2.8 International OPMET Databank

An International OPMET Databank provides the capability for users to interrogate TAC data through the AFTN or AMHS. In some regions the databank is known as a Regional OPMET Databank (RODB).

Operational principles:

- OPMET Databank Requests
    - Requests for TAC data can be sent via the AFS using AFTN or AMHS. These requests work as described in current Regional OPMET Data Bank (RODB) Interface Control Documents (ICD).
    - The above example describes the syntax of TAC requests:
        - "RQM/" is used as the start of the query
        - only the new T_1T_2 message types defined by the World Meteorological Organization (WMO) are allowed

          For example: RQM/SALOWW/WSEBBR/WSLFFF=
        - the request is sent to the AFTN address of the International Databank

- OPMET Databank Replies
    - Replies to TAC requests are described in the current RODB Interface Control Documents.
    - Reply reports of a request will be aggregated into one or more messages, according to the same rules used by the Data Aggregators, e.g. no mixing of message types in one file.
    - The RODB Interface Control Documents should specify a set of standardized information & error replies, specifically when the required data are not defined (example: request for a SIGMET with a wrong location indicator)

3 Inclusion of IWXXM within ICAO Annex 3

ICAO Annex 3 defines what IWXXM capability is required at different time frames. These capabilities can also be considered in context of the ICAO SWIM-concept (Doc 10039, *Manual on System Wide Information Management (SWIM) Concept*).

The Amendment 78 to Annex 3 introduced the requirement for the international exchange of the METAR/SPECI, TAF, AIRMET, SIGMET, VAA and TCA XML-formatted messages as a standard with effect from November 2020. In addition, Space Weather Advisories in XML format are a recommended practice and a standard from 2019 and 2020, respectively.

Note: The intention of this Guidelines document is not to define Net Centric services but to provide guidance as a stepping stone for a swift transition to IWXXM implementation as a first step towards SWIM.

4 Proposed service concept

4.1 Operating principles

This section outlines the general principles for transitioning the international exchange of OPMET data. These principles are still based on continued use of the WMO abbreviated header structure and all participating States using the ICAO Extended AMHS. The intention is to support the different identified phases that will lead to a managed IWXXM-based international exchange of METAR/SPECI, TAF, TCA, VAA, AIRMET and SIGMET, Space Weather data by the Amendment 78 to Annex 3 applicability date.

4.1.1 Managing the transition

A group responsible for managing the transition should be identified in each region, for the necessary intraregional and interregional coordination and should be guided by METP WG-MIE with the support of WMO.

It is assumed that different regions will progress at different rates. It is necessary to create a plan that facilitates this different implementation pace.

The Meteorological Panel (METP) Working Group on Meteorological Information Exchange (WG-MIE) has developed this Guidelines document to assist all ICAO regions with the transition to IWXXM exchange. Each ICAO region may also establish a regional version of the document to provide regional information and references but it is important that this should maintain alignment to the global guidelines to ensure the inter-regional exchange is not affected. To simplify management of both the global and regional documentation, regions are encouraged to only modify or add appendices.

One example of regional information would be tests for National OPMET Centres for exchanging IWXXM via the Aeronautical Fixed Service using AMHS with FTBP and AMHS profile for IWXXM data, as indicated as guidance in the Appendix A and Appendix B of this document.

It would be recommended that this regional information be contained in an appendix to the main document, whereby it could be reviewed and agreed, in particular in those regions who have not yet established such regional information.

Note: Groups such as Data Management Group for EUR, the Bulletin Management Group for MID and the Meteorological Information Exchange working group (MET/IE) for APAC could be the right groups to manage this transition (or equivalent groups in other regions). Where AMHS is being used, close cooperation with the State COM Centre is advised to assure an efficient management of AMHS links and interconnections between adjacent regions.

4.1.2 Variances to the IWXXM Model

National extensions (such as remark sections) could only be supported when accompanied by necessary XML tags and in a globally agreed standard way. The international exchange of these extensions will only be supported for data fully compliant to the IWXXM model and abuse of extensions must be prevented.

Note: The term *"IWXXM model*" should be understood as the XML schema including all necessary GML components (including metadata) necessary for the exchange of IWXXM data. The use of extensions within the IWXXM is discouraged and should only be utilised where absolutely necessary.

4.1.3 Translation

A State will be required to produce IWXXM data **in addition** to TAC data for international exchange from November 2020. Generating both formats will help minimize, as much as possible, the translation between formats. It will also avoid operational translation/conversion from IWXXM to TAC and onward forwarding, as the bi-directional conversion will not necessarily result in the same TAC.

Where a translation from TAC to IWXXM is necessary and conducted, the translation centre and date/time of when the translation occurred will be identified within the XML message (refer to section 6.3).

4.1.4 Data collection

When creating a feature collection of the same type of IWXXM data (e.g. METAR), further named as "bulletin", the aggregating centre identifier and date/time group of when the collection was created will be indicated within the XML message. The aggregating centre metadata will be defined as part of a globally accepted GML/XML model.

Only regular reports (e.g. METAR and TAF) will be aggregated. Non-regular reports (e.g. SIGMET, SPECI, AIRMET and VAA) will NOT be aggregated.

A single bulletin will only contain TAC or XML, never both.

A single file will contain only one bulletin.

4.1.5 Transmission & Routing

Given the size and character set of IWXXM messages, it will not be possible for these messages to be transmitted via AFTN. The file containing the bulletin will be compressed and FTBP (**File Transfer Body Part**) under Extended AMHS (**ATS Message Handling System)** will be used to exchange IWXXM data internationally through the AFS.

The principles of exchanging IWXXM data on AMHS are further described in section 5.1.4 but, in general, rules close to the ones governing the TAC transmission are applied.

The WMO abbreviated header structure (TTAAiiCCCC) is part of the filename of the FTBP and used as data identifier. The routing of IWXXM messages should associate this data identifier with AMHS address(es) that the message should be sent to.

As a file name extension, the gzip (.gz) suffix will be used to identify a compressed file containing meteorological data.

Note: The number of FTBPs and the maximum message size are subject to the AMHS specifications and recipients User Capabilities. It would be highly desirable to have a common agreed maximum limit size for AMHS messages between all ICAO regions. A total size of AMHS message (including FTBP) up to 4MB should be considered, as already defined in some regions. The available network path between the Originator and Recipient must be completely AMHS with FTBP support for successful message delivery. It does not necessarily require each COM Centre in the path to operate AMHS in Extended Services to relay an AMHS message with FTBP. To ensure that delivery is within the capabilities of the recipient, it is advised that the User Capabilities are coordinated before the establishment of regular communications. In some regions, this information may be available through Directory Services (X.500/EDS). The available bandwidth for each 'hop' in the network should be considered by COM Centres when switching to AMHS FTBP operations.

4.1.6 Compliance Testing

IWXXM compliance testing platforms or software will be made available in order to allow States to test the compliance of their XML data to the IWXXM model before operational international exchange. This is to assure that the future internationally disseminated data are operationally usable.

4.1.7 International OPMET Databank

In order to allow IWXXM data retrieval from International OPMET Databanks, a standard set of queries for IWXXM data will also need to be developed, agreed and documented. An Interface Control Document will be provided to describe the query structure, structure of the answer(s) and bulletin header(s) to be used by the International Databank, as well as all other information necessary for the automatic use of the query answers. The initial interface for ad hoc requests for IWXXM data will follow similar rules as the TAC-requests (refer to section 5.1.5). It is expected that the range of queries and the method of access will become more extensive as we migrate into a SWIM environment.

4.1.8 Aeronautical Information Metadata

The aeronautical information metadata are part of the XML model and should be transported by the IWXXM data by means of an external reference to AIXM.

The metadata is additional information relevant to the type of the aeronautical information object i.e. an airport, a flight information region (FIR). A challenge resides in getting the correct state of this aeronautical information, especially for centres that will perform translation from TAC to XML that will require this. Therefore, obtaining this from an authorized source (details to be determined) is implied, in order to provide the right piece of information that characterizes the data.

The access to aeronautical metadata should be provided by a link to the AIXM model, therefore avoiding possible inconsistencies between the transported metadata inside the IWXXM data and the current status of this aeronautical information as part of the AIXM model.

5 Functional requirements - Framework

This section is intended to describe the generalized elements which can be used to establish a framework for the exchange of IWXXM data, both intraregional and inter-regionally. One key aspect is that the framework needs to be flexible to permit development of an intra-regional structure suitable to the requirements, but at the same time allowing establishment of controlled and coordinated exchange between Regions.

The framework is organized into a basic set of functions/type of operations as described in section 5.1. A list of requirements that should be met to carry out each respective function as well as illustrations on how these functions may be performed/combined are provided in the same section.

In section 5.2, more complex regional entities which comprise some of the above functions are described.

5.1 Functional definitions

5.1.1 Data Producer/Originating Unit

TAC Producer
This producer provides TAC data only.

IWXXM Producer

This producer provides IWXXM. The IWXXM Producer may provide information in both TAC (until no longer required in Annex 3) and IWXXM forms.

The Data Producer-function may be performed by an aeronautical meteorological station (e.g. producing a METAR), a MWO producing AIRMET or SIGMETS or by an Aerodrome Meteorological Office (AMO) providing TAFs.

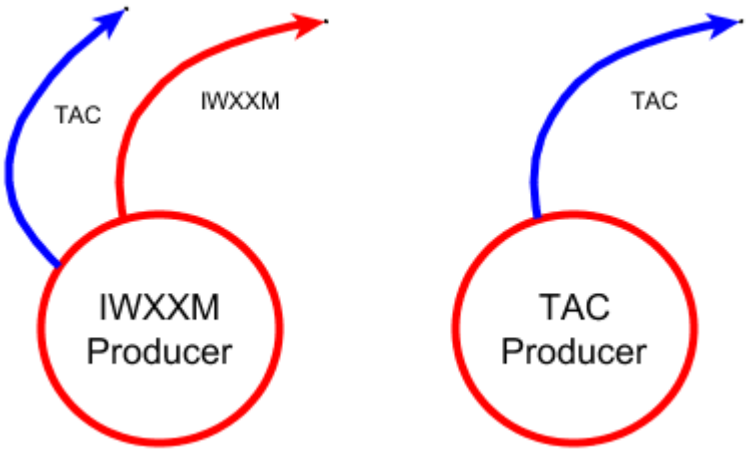


Figure 1: Comparison of IWXXM and TAC Producers

For an IWXXM Producer, the following functions could be the subject to compliance testing:

- The Producer output will conform to the IWXXM Schema;
- The Producer output will pass IWXXM Schematron/business rules; and
- The Producer will apply appropriate (defined) metadata following agreed ICAO rules and regulations.

5.1.2 Data Aggregator

This function takes individual IWXXM reports - decompresses them if already compressed – aggregates them (when multiple METAR or TAF reports), applies the Feature Collection Model and then compresses the file containing the resulting information. The aggregation shall consist of one or more reports of the same type (e.g. METAR, SIGMET).

The 'Feature Collection Model' (COLLECT) is currently used to represent a collection of one or more GML feature instances of the same type of meteorological information. The intent is to allow XML encoded meteorological information to be packaged in a way that emulates the existing data distribution practices used within Aeronautical Fixed System (AFS).

Note: The collection of meteorological information is often referred to as a bulletin.

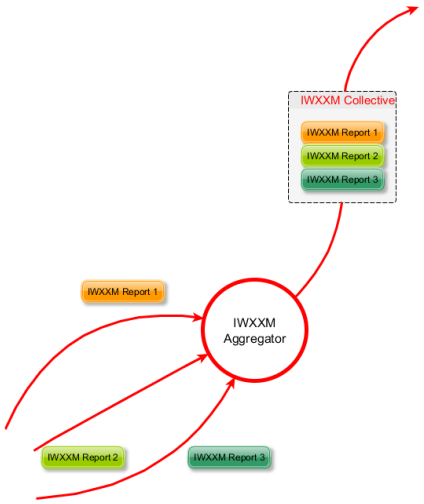


Figure 2: Data aggregation

For an IWXXM Aggregator, the following functions could be the subject of compliance testing.

- The Aggregator output will conform to the IWXXM Schema;
- The Aggregator output will pass IWXXM Schematron/business rules;
- The Aggregator will apply a correct filename to its output;
- The Aggregator correctly compresses data applying an appropriate suffix; and
- The Aggregator will apply appropriate (defined) metadata following agreed ICAO rules e.g. for monitoring and validation issues.

5.1.3 Data Translation Centre

A data translator converts TAC data into IWXXM on behalf of their State and/or another State (i.e. when the data producer is unable to do so). A bi-lateral or regional agreement should be defined for such circumstances. To do so, it shall be able to parse incoming TACs and apply the data to IWXXM schema. It is expected that this will be carried out on a bulletin basis so that the translator will always be associated with a Data Aggregator function.

It is highly likely that not all incoming TACs will be translatable due to of non-conformance with TAC standards. There will be a need to have procedures in place to deal with any non-compliant data, which may involve further translation where predefined arrangements have been made. Refer to section 6.3 for more details.

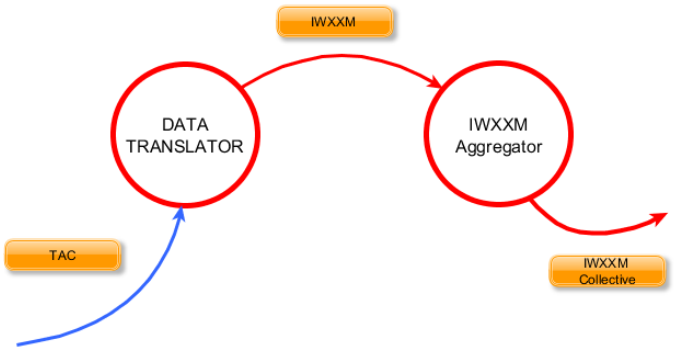


Figure 3: Data Translator generating IWXXM from TAC

Note: A Translation centre should also perform Data Aggregator functions. Whilst the IWXXM Schema may be extended for national translation purposes, an emphasis on maintaining the purity of the schema should be maintained. Where extensions to the schema are proposed to be disseminated internationally, these should follow the WMO extension mechanism for extending the schema and the extensions should be standardised where possible with other States, so that the benefits of the extensions use can be realised by all ICAO members.

5.1.4 Data Switch

A Data Switch will route IWXXM data according to the TTAAiiCCCC part of the filename of the File Transfer Body Part. The filename including the current WMO bulletin header will be structured as follows (WMO naming convention A):

A_TTAAiiCCCCYYGGgg*BBB*_**C**_CCCC_YYYYMMddhhmmss**.xml.gz**

Where the elements in black and bold are fixed elements and:

TTAAiiCCCCYYGGgg is the current WMO header with the date time group

BBB is ***optional*** (as usual),

CCCC is the repeated CCCC part from TTAAiiCCCC,

YYYYMMddhhmmss is the date/time group

Note: gzip is used in the MET domain. The ideal situation is to define the same compression technique for all types of ICAO data. If different compression techniques were to be required, this will need to be coordinated and agreed globally.

The routing table will associate this TTAAiiCCCC data identifier with the AMHS addresses where the data should be sent to. The compressed file will be named with the suffix appropriate to the compression and sent onto AMHS.

FTBP name examples with METAR from LFPW:

A_LAFR31LFPW171500_C_LFPW_20151117150010.xml.gz

1st retarded bulletin: A_LAFR31LFPW171500RRA_C_LFPW_20151117150105.xml.gz

1st corrected bulletin: A_LAFR31LFPW171500CCA_C_LFPW_20151117150425.xml.gz

WMO defined T_1T_2 (from TTAAii) for the following IWXXM data types:

- Aviation Routine Report (*METAR*) *LA*
- Aerodrome Forecast (*"short" TAF*) (VT < 12 hours) *LC*
- Tropical Cyclone Advisory *LK*
- Special Aviation Weather Reports (*SPECI*) *LP*
- Aviation General Warning (*SIGMET*) *LS*
- Aerodrome Forecast (*"long" TAF*) (VT >= 12 hours) *LT*
- Volcanic Ash Advisory *LU*
- Aviation Volcanic Ash Warning (*VA SIGMET*) *LV*
- AIRMET *LW*
- Aviation Tropical Cyclone Warning (*TC SIGMET*) *LY*
- *Space Weather Advisory (SWXA)* *LN*

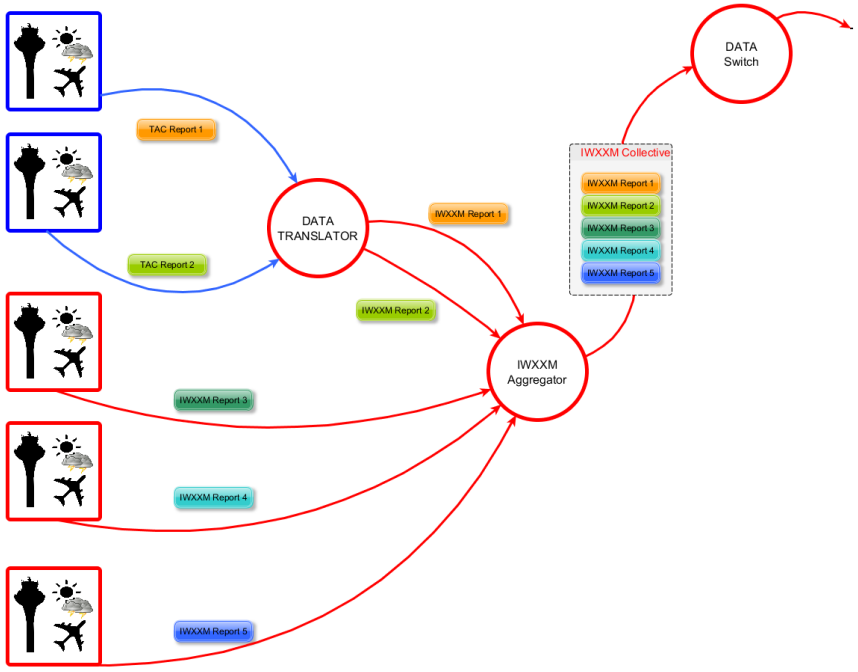


Figure 4: Aggregation of TAC and IWXXM data

5.1.5 International OPMET Databank

An International OPMET Databank (called Regional OPMET databank (RODB) in some regional documentation) will provide the capability for users to interrogate IWXXM data through the AFS in much the same way as the RODBs currently provide global TAC data.

There will be no TAC to IWXXM translation taking place by the Databank in case the requested OPMET is only available in TAC, as this translation should be done upstream by a Translation Centre, unless the databank has formal arrangements to convert TAC to IWXXM on behalf of a State.

Although the implementation of Net Centric Services is beyond the scope of this document, the Databank element could provide Net Centric services in addition to the AFS based IWXXM interrogation capabilities. As

soon as agreed descriptions of the interface to request data via web-services are available, this additional feature may be added for the databank.

For an IWXXM OPMET Databank, the following functions could be the subject of compliance testing.

- The Databank output shall conform to the IWXXM Schema;
- The Databank output shall pass IWXXM Schematron/business rules;
- The Databank has an AMHS interface supporting FTBP;
- Databank shall only send the response back to the originator;
- The Databank shall aggregate the reply reports according to the same rules used by the Data Aggregators;
- The Databank shall apply a correct filename to its output;
- The Databank base correctly compresses data applying an appropriate suffix; and
- The Databank shall respond correctly to the standard interrogations.

The picture below illustrates a possible implementation of an OPMET Databank with combined TAC and IWXXM functionalities.

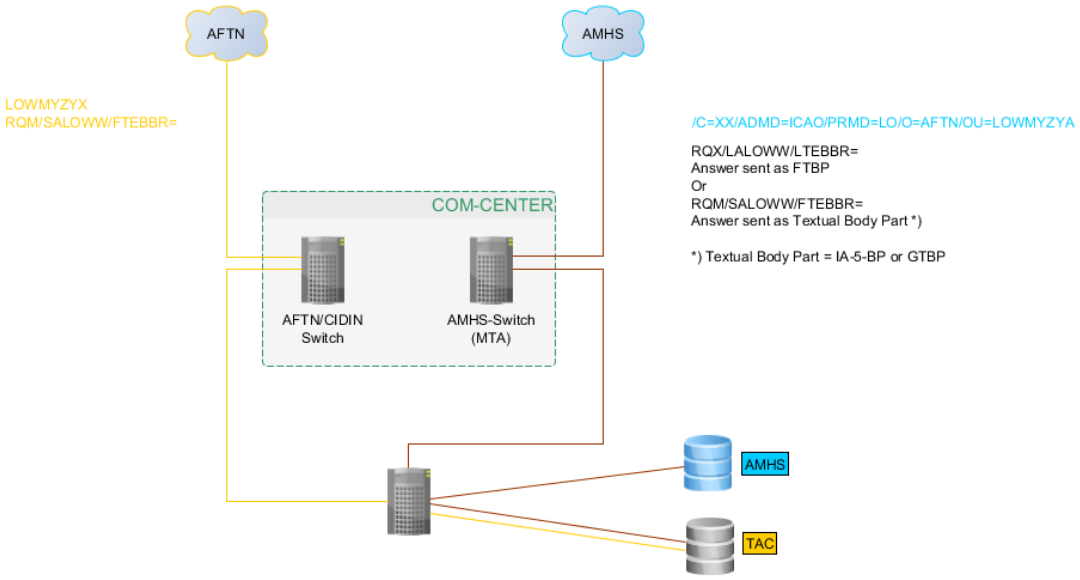


Figure 5: The implementation of a combined TAC & IWXXM Databank

Technical principles:

- Interfaces:
  - the Databank has an AMHS P3 connection to the AMHS Message Transfer Agent (MTA) of a COM centre; and
  - in case the COM Centre still serves AFTN users, the Databank may have a separate AFTN connection to the COM Centres AFTN switch or alternatively, the COM Centre will take care of the AFTN-AMHS conversion.

- Databank tables: data in IWXXM and data in TAC are stored in separate sets of tables.

Operational principles:

- DB Requests

  - Requests for TAC data can be sent via AFTN or via AMHS as international reference alphabet number 5 (IA5) text). These requests will continue to work as described in the current RODB Interface Control Documents;

  - Requests for IWXXM data shall be sent via AMHS as Textual Body Part;

  - Requesting data in IWXXM will work in a similar way as requesting TAC data. The above example uses a syntax similar to the TAC requests, but:

    - "RQX/" is used as the start of the query

    - only the IWXXM T_1T_2 message types defined by WMO (see 5.1.4) are allowed

    For example: RQX/LALOWW/LTEBBR/LSLFFF=

  - Requests for TAC data and requests for IWXXM data shall not be mixed

  - Any violation of the above principles (e.g. the request "RQX/LSLOWW=" received via AFTN), will result in an automatic reply sent by the databank, informing the user that this is not allowed.

- DB Replies

  - Replies to TAC requests will continue to work as described in the current RODB Interface Control Documents.

  - Reply reports of an IWXXM request will be aggregated into one or more files, according to the same rules used by the Data Aggregators, e.g. no mixing of message types in one file.

  - These files will be compressed and a correct file name with appropriate suffix supplied.

  - These files will be sent as FTBP through AMHS and directory services should be used to ensure the recipient is capable to receive this

  - The RODB Interface Control Documents will specify an extended set of standardized information & error replies.

5.2 Regional Centres Definitions

5.2.1 National OPMET Centre (NOC)

The role of the NOC is to gather and validate all required AOP and agreed exchanged non AOP OPMET messages generated by all originating units within a State, to compile national data into bulletins and to distribute them internationally according to the regional distribution schema.

Note: It is assumed that the data provided by NOCs is in accordance with the similar specifications as applicable for an International Data Aggregator

5.2.2 Regional OPMET Centre (ROC)

In its Area of Responsibility (AoR) according to the regional distribution schema, a ROC is responsible for the collection from NOCs of all required AOP and agreed exchanged non AOP OPMET data and for the validation of these OPMET data.

Each ROC is responsible for the collection of these OPMET data from the other ROCs in the region and the dissemination to the other ROCs of these OPMET data from its AoR.

For IWXXM exchange, a ROC should perform the following functions:

- Data Aggregator;
- Data Translation centre; and

- Data Switch.

5.2.3 Interregional OPMET Gateway (IROG)

An IROG is responsible for the collection of all required AOP and agreed exchanged non AOP OPMET data from its Interregional Area(s) of Responsibility (IAoR) and its dissemination to the ROCs in its region. Furthermore, the IROGs are responsible for collection and dissemination of their Region's required OPMET data to their partner IROGs.

The IROG is responsible for the validation of the bulletins sent to the IROGs of its IAoR and received from their IAoR.

For IWXXM exchange, an IROG should perform the following functions:

- Data Aggregator
- Data Translation Centre
- Data Switch

5.2.4 International OPMET Databank

The International OPMET Databank(s) (called Regional OPMET databank (RODB) in some regional documentation and further labelled RODB in this document) are supplied with required OPMET data by the ROCs. These databases can be queried via the AFS by using a specified query language. Details on the query language as well as the supported data types can be found in Regional Interface Control Documents for OPMET Database Access Procedures. Those documents should be updated to integrate the new functions.

A RODB shall be able to fulfil the requirements to handle IWXXM-code as described in paragraph 5.1.5.

6 Generation and use of IWXXM

The IWXXM format is not intended to be read in its raw form by humans. It is intended as a structured, 'machine to machine' message that is then subsequently processed for human interpretation/interaction.

6.1 Operational Status Indicator (PermissableUsage)

Under certain circumstances it has been and will continue to be necessary to distribute meteorological information for test and exercise purposes. To support this need, the IWXXM schema may incorporate non-operational flags.

6.1.1 Definition of Operational and Non-Operational messages

An operational message is one that is intended to be used as the basis for operational decision making. As such, the content of the message may result in decisions that may affect any or all phases of flight by any authorised and competent stakeholder (i.e. air navigation service providers, airport authorities, pilots, flight dispatchers etc). Recipients of such messages (either automatic or human) would therefore expect that the information is sourced from a competent entity and that originating equipment (sensors etc) are serviceable and that any human involvement is carried out by qualified, competent personnel.

A non-operational message is one that is not intended to be used for operational decision making, even though it may contain realistic data (particularly during an exercise). Recipients of such messages shall ignore the content of the message with regard to decision making. Non-operational messages may be further classified as either being related to TEST or EXERCISE.

Definition of Test and Exercise.

There is no known official definition of TEST or EXERCISE within the ICAO lexicon. In some instances, the two words are used interchangeably. Since the use of TEST or EXERCISE would only be used in messages identified as NON-OPERATIONAL, there are circumstances where one may be more appropriate than the other.

TEST messages may be issued for the following reasons:

- As an ad-hoc message to test distribution of a particular message, such as SIGMET when, for example, a new system is installed at an originating centre.
- As part of a more organised test of message routing for non-scheduled messages such as SIGMET.
- As part of the process to introduce IWXXM messages by a particular entity. In this instance, IWXXM messages may be issued on a regular basis over a period of weeks or months in advance of OPERATIONAL status.

In the above cases the messages may contain either realistic data or no data.

EXERCISE messages may be issued for the following reasons:

- As a national or regional (or more rarely 'global') organised event intended to permit stakeholders to become familiar with the data content of messages. An example would be for Regional Volcanic Ash Exercises where stakeholders wish to provide training and 'desk top' scenarios for rare events.
- Under exercise scenarios, the messages will contain realistic data (though not necessarily valid data). For instance, volcanic ash exercises sometimes use volcanic ash data based on historical wind patterns to ensure that the requisite training is provided (i.e. to ensure the volcanic ash data impacts particular FIRs).

6.1.2 Technical Detail on the Operational Status Indicator

Operational Messages:

- Every IWXXM message that is issued for operational purposes shall set the IWXXM element name 'permissibleUsage' to OPERATIONAL.
- Under such circumstances no other information relating to OPERATIONAL status shall be included.

Non-Operational Messages:

- Every IWXXM message that is issued for non-operational purposes shall set the IWXXM element name 'permissibleUsage' to NON-OPERATIONAL.
- Under such circumstances, it will be necessary to provide additional information relating to the reason for the non-operational status.
- The 'permissibleUsageReason' field shall be set to either TEST or EXERCISE.
- The 'permissibleUsageReason' field should contain a short description to provide further information. This is a free text field and is intended to contain the reason for the TEST or EXERCISE. For example;
    - A Volcanic Ash Exercise message may include the name of the exercise in this field 'EUR VOLCEX16'.
    - An organised regional SIGMET test may likewise include 'APAC SIGMET TEST 02 Nov 2016'.
    - For an entity initially issuing IWXXM data as it enters the final phase of transition to IWXXM, production may include 'TEST IWXXM DATA PRE-OPERATIONAL' or similar.
    - Whilst the 'permissibleUsageReason' field may be left empty, this is not considered to be good practice. Where possible, the field should contain some description of the reason for the TEST or EXERCISE.

The examples below are provided for reference:

Example 1: Operational IWXXM data

```
<IWXXM:CLASSNAME ... permissibleUsage ="OPERATIONAL">...</IWXXM:CLASSNAME>
```

Example 2: 'Test' IWXXM data

```
<IWXXM:CLASSNAME ... permissibleUsage ="NON-OPERATIONAL" permissibleUsageReason
="TEST" permissibleUsageSupplementary ="EUR SIGMET TEST 17/09/2018">...</IWXXM:CLASSNAME>
```

Example 3: 'Exercise' IWXXM data

```
<IWXXM:CLASSNAME ... permissibleUsage ="NON-OPERATIONAL" permissibleUsageReason
="EXERCISE" permissibleUsageSupplementary ="EUR VOLCEX 12/03/2018">...</IWXXM:CLASSNAME>
```

Notwithstanding the explicit inclusion of TEST and EXERCISE indicators in all IWXXM messages, it is considered to be best practice to always forewarn stakeholders of TEST events, and in particular EXERCISE events, whenever possible. The message originator, and/or the EXERCISE coordinator where applicable, should consider the most appropriate method to notify stakeholders. A non-exhaustive list of methods would include, State Letter, Exercise Directives, administrative messages, and emails.

It should be noted that, independently of the status of the data, the distribution of data should remain the same (whether the permissibleUsage is OPERATIONAL or NON-OPERATIONAL).

6.2 Unique GML.ID

The gml.id attribute is required to be unique within a XML/GML document. it is not difficult for an IWXXM message creator to make all gml:id unique with the use of, say, natural keys, however when similar types of IWXXM messages like METAR/SPECI or TAF are aggregated (with the use of the COLLECT schema for example), there may be cases of overlap if natural keys are used.

Therefore it is recommended Version 4 of Universal Unique Identifier (UUID - a 128-bit number) is used for gml:id to uniquely identify the object or entity. A fragment of IWXXM METAR message aggregated with COLLECT schema showing the use of UUIDv4 in gml:ids is as follow:

<collect:MeteorologicalBulletin … gml:id= "uuid.6f353602-12a1-40a7-b6b5-3edb14c6241e">

<collect:meteorologicalInformation>

<iwxxm:METAR … gml:id="uuid.15ff064a-6dc4-41e0-bafa-8ee78ed4dc25">

…

A schematron rule should be added from IWXXM v3 to mandate the use of UUIDs in gml:id for IWXXM messages.

6.3 Translating TAC to IWXXM

A Translation Centre will typically be placed after the National OPMET Centre (NOC) or Regional OPMET Centre (ROC) or Regional OPMET Data Bank (RODB) and its correction facilities, if any. Correction will not typically be applied by the Translation Centre but the ROC, NOC or RODB.

When generating the IWXXM, the translator shall include IWXXM fields which define where and when the translation has been carried out in order to provide traceability. This shall be achieved by introducing agreed metadata elements (centre identifier and time stamp) that is part of IWXXM.

Amendment 78 to ICAO Annex 3 includes TEST and EXERCISE fields in the TAC templates for SIGMET, AIRMET, VAA and TCA (with applicability of November 2019) since these non-scheduled messages are from time to time issued during tests and exercises. Until the changes in Annex 3 are implemented following its templates, it will be difficult for the translator to identify test messages. When uncertain, such as when translation fails, the IWXXM should always be presumed to be operational (refer to section 6.1) so that the original TAC message is available for reviewing by a human.

6.3.1 Pre-requisites for Translation Centres

The following items are considered pre-requisite for data translation centres:

- Operate on a permanent 24/7 basis with 24-hour support;
- Robust network between MET node and national AFS node (example, redundant or dual connectivity for the telecommunication links);
- Access to the incoming TAC data and outgoing IWXXM (an AMHS enabled AFS Centre supporting FTBP that is able to send IWXXM data to the AFS;
- Provide IWXXM bulletin compilation (collection) capability; and
- Archive of at least the last 28 days data and logs of at least on the last 2 months translation details (at minimum, full WMO header received, time of reception, rejection or not).

6.3.2 Data Validation

The data validation should be based upon the following:

- Annex 3 provisions / WMO regulations should be used as the basis of validating received TAC information.
- The most recent official version of the IWXXM schema/Schematron should be applied, unless an explicit agreement between the requiring centre and the Translation Centre is agreed.
- The format should be based upon WMO – No. 306, Manual on Codes, Volume I.1, Part A – Alphanumeric Codes FM where applicable; and the WMO FM201 (collect) and FM 205 (Met Information Exchange Model) should be followed.
- The aeronautical metadata descriptions follow AIXM schema. The process for updating metadata should be documented.

6.3.3 Incomplete (Partial) Translation

When TAC to IWXXM translation is necessary but fails, an IWXXM message of the corresponding type (METAR, TAF, …) without any translated MET parameters but containing the original TAC message should be disseminated to users for their manual interpretation. It is also recommended that, if possible and where agreed, an error message be sent to the TAC originator encouraging the TAC originator to re-issue a valid TAC message for subsequent translation and distribution. Another possible policy would consist in having regular monitoring for a past period and communicate back pertinent elements on errors in coding policy to data originators, regional data exchange working groups and/or some users, where agreed.

Transmitting an IWXXM message with minimum data will allow users to monitor only a single meteorological data stream, reducing the dependency on the TAC stream.

The following minimum set of data should be considered:

METAR:

METAR (COR) CCCC YYGGggZ

TAF :

TAF (COR/AMD) CCCC YYGGggZ

SIGMET/AIRMET:

CCCC SIGMET | AIRMET ... VALID YYGGgg/YYGGgg

VAA :

DTG, VAAC

TCA:

DTG, TCAC

SWXA :

DTG, SWXC

where " | " indicates a logical "OR", "(group)" indicates an optional group

6.3.4 Monitoring Functions

The Translation Centre should monitor incoming TAC messages and keep statistics on the data received and IWXXM generated. The statistics collected should be based upon the detail of IWXXM Validation Statistics to be Gathered by ROCs an RODBs (section 8.1).

6.3.5 Validation of the Translator

A TAC to IWXXM Translator could be the subject of compliance testing of the following:

- The Translator output will conform to the agreed IWXXM Schema;
- The Translator output will pass IWXXM Schematron/business rules;
- The Translator will successfully translate a standard set of TAC test data;
- The Translator provides metadata related to when and where data have been translated (see section 4.1.3) - such metadata conforms to the agreed metadata structure; and
- The Translator will apply appropriate (defined) metadata following agreed ICAO rules e.g. for monitoring and validation issues.

The test cases and operated tests to demonstrate the capability of the translator should be made available on request.

The expected data quality on incoming TAC data should be clearly stated and the limitation on the translator (what will be done/what will not or cannot be done) should be stated.

6.3.6 Commencement of Translation Services

It is recommended that initially the Translator should generate data and set the Operational Status Indicator field as “non-operational” and disseminate the IWXXM to a reduced number of recipients wishing to receive the IWWXM to ensure that all the relevant procedures and operations are in place and are clearly understood.

If felt necessary, a learning strategy could be applied such as the reception for an agreed defined period, prior to the operational emission of the IWXXM data. During that period, there could also be another defined contact point on the TAC-producer side to be reached during business hours. In case of an incorrect/rejected TAC message, a procedure should be in place to contact the appropriate State and to request corrections to the incoming TAC.

The date to start the exchange of data operationally should be agreed.

6.3.7 Translation Agreement

The following elements should be contained in the service agreement between the Translation Centre and applicant State:

- Hours of Translation Centre operations (24 hours, 365 days a year);
- Business contact details (e.g. name, phone, email) for both the Translation Centre and the applicant State;
- Operational (24Hr) contact details for both the Translation Centre and the applicant State;
- Details of which data is to be translated (e.g. WMO Header(s) of TAC data, locations indicators, frequency);
- Details of whether and when the originator should be notified when translation of individual messages fails;
- IWXXM distribution details (AMHS addresses);
- Details of which metadata should be used to derive the limits of airspace (boundaries, base, top).
- The aeronautical metadata descriptions follow AIXM schema. The process for updating metadata should be documented.
- Archiving requirements; and
- Procedure on what will be done in case of a failure of all or part of the Translation Centre functionality.

7 Requirements to Transition

The first necessary step is to define the prerequisites in order to be able to exchange IWXXM OPMET data. This will impact not only the network itself, but also the Message Switching Systems and most of the end-user systems.

7.1 Phase 1: Pre–Requisites to Transition

Phase 1 was enabled by Amendment 76 to Annex 3 in November 2013.

To achieve an efficient transition towards IWXXM, Phase 1 activities focused in the following areas and the particular elements identified per area.

7.1.1 Managing the Transition

Regional group(s) should be designated to deal with the transition in order to further define and monitor:

- Intra-regional plan on AMHS infrastructure/links planning and IWXXM data exchange between the ROCs, and between the ROCs and RODBs.
- Intra-regional implementation plan on IWXXM data exchange planning by the States to their ROC.
- Agreement to define how the testing platform and software should be made available and accessible to each State.

It is desirable that responsible group(s) for managing the transition in each ICAO regions be identified and established, that could be responsible for defining the Regions structure and capabilities in the context of the framework.

Furthermore, a full liaison should be established and maintained between the ICAO groups in charge of meteorology & data exchange and groups in charge of the AFS network.

For data translation purposes, if there is a systematic need for the translation of data on behalf of a State, this may be performed by the dedicated ROC for the part of the region under its Area of Responsibility and the IROGs for the interregional distribution.

7.1.2 Documentation

The region should define and have a plan in place to provide IWXXM data. This plan shall be published and maintained by the designated responsible groups (FAQ's etc. should be available).

ICAO and WMO documentation and provisions should be published/available describing the IWXXM code itself as well as documentation referencing the appropriate schemas and rules made available in order to handle this new format.

Cyber Security

Appropriate AFS security elements should be defined by the ICAO groups in charge of information management / networks in order to introduce the operational exchange of IWXXM data via extended AMHS.

It is recommended that appropriate malware and anti-virus precautions are exercised as a bare minimum when dealing with FTBP messages.

7.1.3 Processes

An agreed process should be defined to ensure that data generated by Data Producers are compliant. In order to promote the use of IWXXM, the process should be widely known and shared and some tools to check the compliance state of the data easily accessible and usable.

An identical process should be agreed to initiate and enable the IWXXM exchange between regions.

An AMHS network will be available to support exchange IWXXM data by the use of FTBP between those States wishing to do so. Corresponding AMHS connections should be made available between those Regions exchanging IWXXM data.

Source of Metadata

Updated processes, or notification on modifications about Aeronautical information metadata by the States, should be in place at the end of the period, or metadata sources should be defined and agreed.

Action Plan to Reduce Formatting Errors

Actions plans based on monitoring results about OPMET data not following the agreed coding rules should be undertaken in order to assist States in detecting and correcting incorrect coding policies.

A task should be started to define a procedure that the ROC may use on how to deal with errors in IWXXM-messages, in particular taking into account errors detected in converting TAC-reports. This procedure would ideally provide a clear description on how to report errors to a State that provides these data and clearly define the service and its limitation.

Interregional Cooperation/Coordination

The following tasks should be started:

- The updated processes and notification on modifications on IWXXM bulletins headers between adjacent regions.
- Identification of the interregional exchanges solely based on required AOP and agreed exchanged non-AOP data: actions plans to define clearly the interregional data/bulletins to be exchanged.
- Interregional plan to follow the AMHS infrastructure/links planning between AFS nodes supporting interregional data exchange of neighbouring IROGs.
- Implementation plan for interregional exchange between IROGs.
- An update process to introduce IWXXM in the contingency plans for the IROGs.

7.2 Phase 2: From Nov 2016 until IWXXM Exchange is a Standard

The following elements should be ready prior to the exchange of OPMET data in IWXXM format becoming an ICAO Annex 3 standard, which is defined in Amendment 78, with effect in November 2020.

7.2.1 Operations

- The ROCs & IROGs should have the capability to aggregate and switch IWXXM data.
- The ROCs & IROGs may have the capability to act as translation centres.
- Each NOC should to be ready to exchange IWXXM data at the end of the period.
- The RODBs should have all the capabilities to deal with IWXXM data as well as TAC data.
- Update process or notification on modifications about metadata should be in place not later than the end of the period.
- The standard set of queries for IWXXM data for a RODB should be implemented and documented.
- Updated processes and notification on modifications on IWXXM bulletins headers between adjacent Regions should be in place and tested.

7.2.2 Processes

Institutional and Technical Issues

- A communication plan should be established and enacted to inform States and users - both from ICAO and WMO - about the IWXXM code, the metadata use, and the new procedures to access the RODBs.
- The IWXXM model should integrate the metadata related to Data Aggregator and Data Translator functions.
- A procedure used by the ROC should be in place on how to deal with errors in IWXXM-messages, in particular taking into account errors detected when converting TAC-reports. This procedure includes items on how to report errors to a State that provides these data.

Action Plan about data validation

- 'Validation' (validation against the XML schema) is the specific monitoring and gathering of statistics on schema conformance rather than meteorological data quality.
- Action plans based on monitoring results about TAC data not following the agreed coding rules should be in place in order to assist States in detecting and correcting incorrect coding policies.
- A procedure that the ROC can use on how to deal with errors in IWXXM-messages, in particular taking into account errors detected in converting TAC-reports, should be agreed on and made available. This procedure would ideally provide information on how to report errors to a State that provides these data and clearly define this service and its limitation.
- Messages that do not pass validation against the XML schema will continue to be passed and not rejected by ROCs/RODBs.
- States shall arrange the validation of their IWXXM messages against the corresponding XML schema, and make corrections to the process of generating their IWXXM messages as necessary, as per quality management processes.
- The ROC/RODB should conduct validation of IWXXM messages within their region/area of responsibility, excluding validation of 'State extensions'.
- ROC/RODBs should gather statistics on long-term validation results, broken down by State and Region, and provide this information to the relevant ICAO Regional Office and the METP (in particular WG-MIE and WG-MOG) to identify common or troublesome data quality issues.
- Users should be encouraged to continue to validate messages and they will remain responsible for making sure that the received IWXXM messages are suitable for their purposes.
- Users should review the IWXXM PermissableUsage field to determine whether the message is suitable for operational, test or exercise purposes.

Regional Coordination/Planning

The regional group(s) designated to deal with the transition should define and monitor:

- Intra-regional plans regarding AMHS infrastructure/links and IWXXM data exchange between the ROCs, and between the ROCs and RODBs.
- Intra-regional plans regarding the IWXXM data exchange by the States to their ROC.
- The Contingency plans for the ROCs should integrate the IWXXM data and be ready before the end of the period.
- Testing platform and software are made available and accessible for every State.

Interregional Cooperation/Coordination

- The interregional mechanism to follow the AMHS infrastructure/links planning between AFS nodes supporting interregional data exchange between IROGs should be in place, as should the interregional procedure to notify the changes and new IWXXM bulletins introduction.
- The Contingency plans for the IROGs should include the IWXXM data exchange and be ready at the end of the period.
- It is proposed that bilateral agreements between neighbouring IROGs are set up for the translation of TAC data. This agreement should include notification processes on IWXXM data newly produced by the specific Region.

Figure 6 below provides an example of the ICAO Region 1 interfacing with two other ICAO Regions. In this example, it is assumed that:

- There is no operational exchange of IWXXM data between Region 1 and Region 3.
- There is operational exchange of IWXXM data between Region 2 and Region 1.

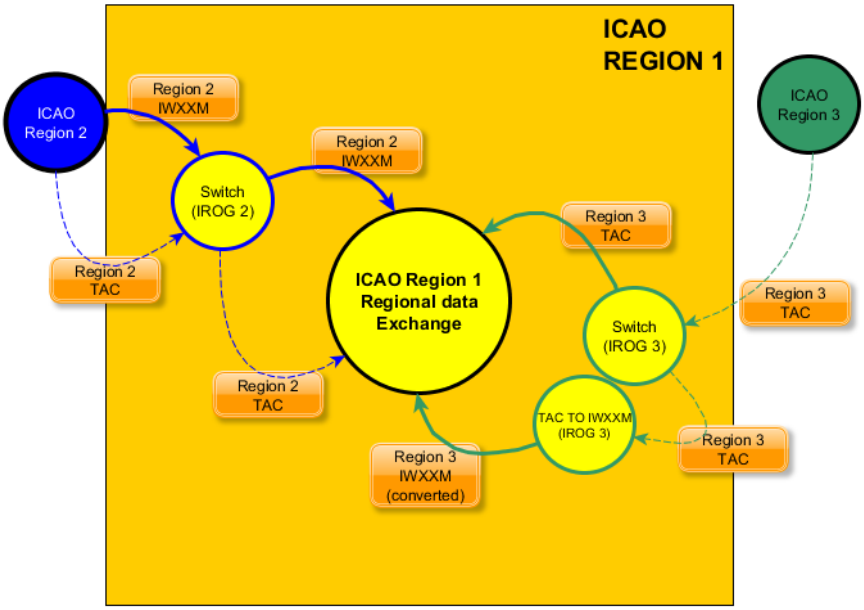


Figure 6: Phase 2, interregional exchange of OPMET with Region 2 (IWXXM & TAC capable) and Region 3 (TAC capable)

7.3 Phase 3: After IWXXM Exchange becomes a Standard

This section is reserved for capability that should be ready from ICAO Annex 3 Amendment 79 applicability date and is yet to be populated.

8 Data Validation and Statistics

8.1 IWXXM Validation Statistics to be Gathered by ROCs an RODBs

Regions should invite their ROCs, IROGs, and/or RODBs to provide statistics about IWXXM data reception, state of compliance of the received data, IWXXM version used, data volume etc. as a measure of the state of IWXXM implementation.

This section defines the general rules about gathering statistics with the aim of providing and proposing a globally consistent way of defining such statistics, assisting the inter-regional comparison and providing a solid bases for the regions to use those statistics as a way to measure IWXXM implementation progression.

8.1.1 Data and Type of Data

Regular Data

The location indicators for regular data should be ICAO compliant indicators (as available on integrated Safety Trend Analysis and Reporting System (iSTARS)) and in conformance with the MET tables defined in the eANPs. For METAR and TAF, it should be noted that the eANP is only required to reference the AOP aerodromes and therefore the minimum set of statistics should be the regular data (i.e. METAR, TAF) related to AOP aerodromes. In addition, if desired, statistics on the agreed exchanged non-AOP aerodromes data can be provided. A clear distinction should appear while presenting statistics to easily discriminate data related to AOP aerodromes from non-AOP aerodromes, where those last ones are presented.

The statistics for IWXXM data should be identical to those provided for TAC data, so as to provide a clear comparison between TAC and IWXXM data produced for the same location and to provide the number of received messages per day (not NIL, not corrected or amended).

Whilst the validation of all messages is encouraged, NIL data, TAF amendments and corrections should not be taken into consideration while producing statistics. The type of TAF (short or long) is defined in eANP Volume II and may be considered to measure the ad-equation to the requirements, if some indices are used in addition to basic statistics.

Non-regular data

The location indicators for non-regular data should also be ICAO compliant indicators (as available on iSTARS) and in conformance with the MET tables defined in the eANPs. For SIGMET, and where applicable AIRMET, they refer to FIR, FIR/UIR, CTA.

The statistics should also be available for VAA and TCA, and for space weather when implemented.

8.1.2 Proposed Statistics

Availability

Availability statistics for IWXXM data should be identical to those provided for TAC data, so as to provide a clear comparison between TAC and IWXXM data produced for the same location and provide the number of received messages per day, not NIL, not corrected, not amended (including not cancelled for TAF). For AIRMET and SIGMET, the cancelled data should not be considered. For VAA and TCA, the number of VAA and TCA per VAAC and TCAC respectively should be provided.

The statistics for VAA/TCA is by nature more complex as the VAA/TCA may refer to VA/TC in other regions, cover multiple FIRs and does not directly refer to location indicators. The distinction between a VAA/TCA that concerns specific region can only be derived by analysing the MET content. Therefore, basic statistics about VAA/TCA reception by the ROC/RODB from the VAAC/TCAC may be considered as a starting point, without any consideration of the content.

Timeliness

Timeliness statistics for IWXXM data should be identical to those provided for TAC data, as to provide a clear comparison between TAC and IWXXM data produced for the same location. The statistics should take into consideration the same source of information as for availability.

Specific statistics about IWXXM model or version

IWXXM validation

The validation against schema/Schematron (i.e. success rate) should be provided. Statistics about the validation should be provided per IWXXM version and will provide a good indication on what data are produced for which IWXXM version.

Acceptance of different versions of IWXXM model

It should be determined whether IWXXM data which is in conformance with a previous version of IWXXM could be considered as “valid” or only the last published official version of IWXXM by the World Meteorological Organization (WMO). A clear policy is yet to be developed by ICAO.

It should be understood that, for statistical purposes, the production of statistics for all received versions is the only correct way to have a good measure of the disseminated products. Therefore, a statistic per station and per version (with the limits previously explained) should be provided, even if it should be unlikely to have different versions of IWXXM schema disseminated for the same location and same type of data. The statistics should provide which version is used for the dissemination of which data per location indicator (and VAAC/TCAC for VAA/TCA).

Operational/non-operational data

The statistics of non-operational versus the total number of data (i.e. percentage of non-operational reports delivered).

Incomplete/Partial Translations

The statistics of incomplete/partially translated versus the total number of reports.

Data volume

Statistics of total data volume for the same location indicator (VAAC/TCAC for VAA/TCA) and daily average/daily total volume.

Additional groups (extensions)

Some statistics could be presented about the number of data with extensions versus the total number of data (with and without extension) per location indicator (VAAC/TCAC for VAA/TCA).

Another statistic about the daily average/ daily total volume of extensions compared to the total volume of data per location indicator (VAAC/TCAC for VAA/TCA) could also be provided.

Optional statistics

ROCs/RODBs could also choose to provide additional statistics about validation failure, to identify deviations from the models, which could be used to derive systematic errors such as the inclusion of additional data elements via methods other than the global agreed way, non-conformance on cardinality or NIL reason for missing mandatory Annex 3 elements.

8.1.3 Statistics Presentation

Statistics should be made available and presented per ICAO region, then per State, then per location indicator (CCCC) with each time an aggregation of the provided statistics from the sub-levels to the upper level (CCCC → State → Region). For VAA/TCA, it should be presented per Region and then per VAAC/TCAC.

The statistics should be gathered on a daily basis, then by monthly basis. The statistics could be provided offline, the day after or some days after.

8.2 IWXXM Validation Statistics to be Gathered by SADIS & WIFS

The SADIS and WIFS Provider States are investigating the value and effort to produce global sets of statistics based upon the data received at their gateway. The details are likely to be the same or similar to those produced by ROCs or RODBs but this is yet to be confirmed.

9 Acronyms and Terminology

AFS	Aeronautical Fixed Service
AFTN	Aeronautical Fixed Telecommunication Network
AIXM	Aeronautical Information Exchange Model
AMHS	ATS Message Handling System
AMO	Aerodrome Meteorological Office
AoR	Area of Responsibility
APAC	ICAO Asia/Pacific Region
AvXML	Aviation XML
COM	Communication
DB	Databank
EUR	ICAO European Region
FAQ	Frequently Asked Questions
FASID	Facilities and Services Implementation Document
FIR	Flight information Region
FIXM	Flight Information Exchange Model
FTBP	File Transfer Body Part
GML	Geography Markup Language
IAoR	Interregional Area of Responsibility
ICAO	International Civil Aviation Organization
ICD	Interface Control Document
IHE	IPM Heading Extension(s)
IPM	Interpersonal Messaging (AMHS)
IROG	Interregional OPMET Gateway
IUT	Implementation Under Test
IWXXM	ICAO Meteorological Information Exchange Model
METAR	Meteorological Aerodrome Report
METP	ICAO Meteorology Panel
MTA	Message Transfer Agent
MWO	Meteorological Watch Office
NDR	Non-Delivery Report
NOC	National OPMET Centre
OGC	Open Geospatial Consortium
OID	Object Identifier
OPMET	Operational Meteorological information

P3	Message Submission and Delivery Protocol
ROC	Regional OPMET Centre
RODB	Regional OPMET Databank (International OPMET Databank)
RQM	Meteorological Databank Request in TAC-format
RQX	Meteorological Databank Request in IWXXM-format
SIGMET	Significant Meteorological Information
SPECI	Special Meteorological Report
SWIM	System Wide Information Management
TAC	Traditional Alphanumeric Code Form
TAF	Aerodrome Forecast
TCA	Tropical Cyclone Advisory
UA	User Agent
VAA	Volcanic Ash Advisory
WMO	World Meteorological Organization
XML	Extensible Markup Language

Appendix A: AMHS Profile Information to Support IWXXM Exchange

1. Introduction

A number of standards have been established by ISO for Message Handling Systems.

In order to describe which standards or group of standards, together with options and parameters, are needed to accomplish a function, it is necessary to specify a profile. Such profiles have been standardized by ISO and are known as International Standardized Profiles (ISPs). Profiles standardize the use of options and other variations in the base standards and deal primarily with the use of implemented capabilities in order to meet requirements for interoperability and efficient interworking.

ICAO Doc 9880, Part II contains the detailed technical specifications for ATSMHS based on a number of international standards and ISPs, complemented by additional requirements. The basic and the extended ATSMHS services meet the basic requirements of the respective ISPs but additional features and supplementary functions are incorporated as necessary in ICAO Doc 9880, Part II. In order to express conformance requirements, i.e. static capability, ICAO Doc 9880, Part II uses the classification defined in the ISPs to include different levels of support (mandatory, optional, etc.). These requirements, applying to the related parameters or elements are specified in the form of Profile requirement lists (PRLs). In a limited number of cases, the PRLs may also include dynamic behaviour requirements, using another classification also defined in the ISPs.

It is noted that the classification of a feature as mandatory in the ISPs corresponds to a requirement regarding static capability, i.e. the ability to generate and/or receive, encode and/or decode a specific parameter, but not to use this parameter in every message sent or received. The same logic is applicable to ICAO Doc 9880, Part II and, as an example, the EUR AMHS Manual.

Furthermore, it is recalled that in ICAO Doc 9880, Part II, for the Basic ATS Message Handling Service, the interface between the ATS Message User Agent and the ATS Message Server has been left open, since this is often an implementation matter local to each AMHS Management Domain. Conversely, for the Extended ATS Message Handling Service, implementation of a P2/P3 or P2/P7 profile compliant with the relevant MHS ISP (among ISP AMH23 to AMH26) is mandated.

The question of compliance with a P2/P3 or P2/P7 ISP for AMHS conformance should be addressed in the context of an implementation making use of some functionalities part of the Extended Service, but not of the whole of it. In particular, it is not specified whether a partial Extended Service implementation which does not include AMHS Security requires conformance with one of the AMH23 to AMH26 profiles or not.

User agents may be implemented exclusively for the support of a specific application/service. Such dedicated user agents may not need to implement all the features defined by ICAO Doc 9880, Part II, and parts of regional AMHS Manuals, where defined. For example, dedicated user agents implemented for the exchange of OPMET data formatted based on the IWXXM model are not supposed to generate messages with SS priority. Similarly, these user agents are not expected to receive messages with SS priority, although this could happen at the reception direction, at least by mistake.

Mandating implementation of features which are not required by the application/service served by certain user agents may generate additional complexity and impose implementation delay, effort and cost, without any operational benefit. In order to eliminate such impediments and facilitate the adoption of the ATS Message Handling Service by end users, the need of defining application/service oriented AMHS profiles, which clarify requirements and may relax some of them by mandating less features than the current AMHS specification, should be recognized. The definition of an IWXXM profile which is applicable to explicit, limited environments, i.e. submission of OPMET data, taking into consideration which features are useless for the specific application/service. The relaxed requirements concern message submission only.

Implementations complying with an application/service oriented AMHS profile are accepted for connection to the AMHS, although possibly not fully compliant from a formal standpoint, provided that conformance to the AMHS IWXXM profile is verified.

2. AMHS Profile for OPMET IWXXM data exchange

AMHS is the intended communication means for MET IWXXM data exchanges using FTBP.

AMHS UAs complying with ICAO Doc 9880, Part II, Second Edition and where applicable, with the additional provisions of regional AMHS Manual, are capable to originate and receive AMHS messages containing such data. The support by UAs of IPM Heading Extensions (IHE), defined in ICAO Doc 9880, Part II as part of the Extended ATS Message Handling Service, is additionally required but represents a minor upgrade already available in several UA implementations.

However, to ensure unambiguous interpretation of messages upon reception, and to facilitate their origination, it is necessary to establish a detailed specification of X.400 and AMHS parameters to be adopted for conveyance of such messages, including those associated with the AMHS file-transfer-body-parts (FTBP).

2.1. Scope of the profile

This profile specification is established for application by AMHS UAs submitting and/or receiving OPMET data in IWXXM format through a P2/P3 or a P2/P7 interface, implemented as part of the following centres or systems:

- National OPMET Centre (NOC)
- Regional OPMET Centre (ROC)
- Interregional OPMET Gateway (IROG)
- Regional OPMET Databank (RODB)
- Any terminal or system receiving or requesting OPMET data in IWXXM format from one of the above centres/systems

This specification is based on the following assumptions, which identify topics out of scope of the AMHS profile, which are addressed in the MET domain:

- The MET domain may add further data types to the IWXXM without affecting the AMHS profile. It is assumed that irrespective of the data format (bulletin or report), the MET domain will always pass an unstructured binary file with a defined filename to the AMHS.
- Data compression will always be performed in the MET domain. The AMHS will not perform compression.
- The MET Domain will define procedures for the submission of RQX messages to RODBs.

2.2. Definition of the profile

A profile based on the exclusive use of the Extended Service shall be used. As a result the IPM-Heading-extensions (IHE) need to be used to carry the ATS priority, Filing time and Optional Heading Information. However, only some of the functional groups which are part of the Extended Service are needed for the profile, namely FTBP and IHE. More specifically, the profile does not require support of AMHS security.

2.2.1. Number of body parts

The IPM body shall contain exactly one body-part which is an FTBP.

The body part selection shall be as represented using the following tabular description.

Table 1: Body part selection for the IWXXM profile

(derived from ICAO Doc 9880 Part II Tables 3-1 and 3-2)

Ref	*Element*	*Doc 9880 static support (Extended Service) Orig/Rec*	*Doc 9880 reference*	*Dynamic action upon generation of IWXXM message*	*Value and/or comments*
Part 2: AMH21/A.1.3 IPM body					
1	ia5-text	O/M		X	
1.2	data	M/M	3.3.3	X	
10	bilaterally-defined	O/M	3.3.5	X	
Part 3: AMH21/A.1.3.1 Extended body part support					
1	ia5-text-body-part	O/M		X	
9	bilaterally-defined-body-part	O/M	3.3.5.1	X	
11	general-text-body-part	M/M	3.3.3 and Part 4, Table 3-1	X	
12	file-transfer-body-part	M/M	3.3.5.1 and 3.3.5.2	G	AMH21/ A.1.3.3
M = mandatory support (static support) O = optional support (static support) or optionally generated (dynamic behaviour) G = generated X = not used					

2.2.2. Selection of IPM heading parameters and parameter values

2.2.2.1. The IPM Heading parameter selection and values are listed in Table 2 below

Table 2: IPM Heading parameters for the IWXXM profile

(derived from ICAO Doc 9880 Part II Table 3-2)

Ref	*Element*	*Doc 9880 static support (Extended Service) Orig/Rec*	*Doc 9880 reference*	*Dynamic action upon generation of IWXXM message*	*Value and/or comments*
Part 1: AMH21/A.1.2 IPM heading fields					
1	this-IPM	M/M	3.1.2.2.1, 3.1.4.2.1 (AMH21 support)	G	
2	originator	M/M		G	Address of the originating OPMET system (MET switch)
3	authorizing-users	O/M		X	
4	primary-recipients	M/M		G	Recipient addresses are populated by the MET switch based on its routing table (EUR Doc 033 section 5 .1.4)
5	copy-recipients	M/M		X	
6	blind-copy-recipients	O/M		X	
7	replied-to-IPM	M/M		X	
8	obsoleted-IPMs	O/M		X	
9	related-IPMs	O/M		X	
10	subject	M/M		G	This field shall carry the TTAAiiCCCCYYGGggBBB part of the filename of FTBP. It is assumed that the subject field is easier to access for human operators in case of retrieval or analysis of transferred messages
11	expiry-time	O/M		X	
12	reply-time	O/M		X	
13	reply-recipients	O/M		X	
14	importance	O/M		X	The receiving UA shall assume that this field takes its default value (“normal”)
15	sensitivity	O/M		X	
16	auto-forwarded	O/M		X	
17	extensions	M/M	3.3.4.1	G	

Ref	*Element*	*Doc 9880 static support (Extended Service) Orig/Rec*	*Doc 9880 reference*	*Dynamic action upon generation of IWXXM message*	*Value and/or comments*
17.6	authorization-time	M/M	3.3.4.2	G	Equivalent to filing time
17.12	originators-reference	M/M	3.3.4.3	X	To avoid confusion with the use of this field in the IHE context (where it is carrying data converted to/from AFTN OHI)
17.13	precedence-policy-identifier	M/M	3.3.4.5, 3.3.4.6 and 3.3.4.7	G	OID value {iso (1) identified-organisation (3) icao (27) atn-amhs (8) parameters (0) amhs-precedence-policy (0)} (see Doc 9880, 3.3.4.7)
Part 4: AMH21/A.1.5 common data types					
1	RecipientSpecifier				
1.2	notification-requests	M/M	3.3.6	X	
1.2.1	rn	M/M	3.3.6	X	IWXXM never use priority SS
1.2.2	nrn	M/M		X	Doc 9880 does not foresee the presence of nrn-request
1.4	recipient-extensions	M/M	3.3.4.1	G	
1.4.3	precedence	M/M	3.3.4.8	G	Equivalent to priority GG: precedence value = 28 (TAF, METAR/SPECI, and also in case of AMD, COR or RTD reports/bulletins) Equivalent to priority FF: precedence value = 57 (AIRMET, SIGMET, VAA, TCA)
2	ORDescriptor				
2.1	formal-name	M1/M1		G	used for originator-address and recipient-addresses

M = mandatory support (static support)

M1 = mandatory O/R name minimal support (static support)

O = optional support (static support) or optionally generated (dynamic behaviour)

G = generated

X = not used

2.2.2.2. Content of body parts

The parameters composing the FTBP shall be in line with the details provided in Table 3 below.

Note: The references to EUR DOC 020 have been indicated to provide more details, if needed.

Table 2: File Transfer parameters for the IWXXM profile

Ref	*Element*	*ATS Messaging Service Profile - static support Orig/Rec*	*European ATS Messaging Service Profile - Reference*	*Dynamic action upon generation of IWXXM message*	*Value and/or comments*
1	related-stored-file	-			
2	contents-type				
2.1	document-type				
2.1.1	document-type-name	M/M	A.2.4.2.1	G	default OID value: 1.0.8571.5.3 {iso(1) standard(0) 8571(8571) document-type(5) unstructured-binary(3)}
3	environment				
3.1	application-reference				
3.1.1	registered-identifier	O/M	A.2.4.2.2 and A.2.4.2.6	G	OID value: 1.3.27.8.1.2 {iso (1) identified-organisation (3) icao (27) atn-amhs (8) application (1) digital-met (2)}
3.4	user-visible-string	O/M	A.2.4.2.6	G	“Digital MET”
4	compression	-			See para below
5	file-attributes				
5.1	pathname				
5.1.1	incomplete-pathname	O/M	A.2.4.2.3	G	bulletin file name as specified in section 5.1.4
5.5	date-and-time-of-last-modification	O/M	A.2.4.2.4	O	

Ref	*Element*	*ATS Messaging Service Profile - static support Orig/Rec*	*European ATS Messaging Service Profile - Reference*	*Dynamic action upon generation of IWXXM message*	*Value and/or comments*
5.13	object-size				
5.13.2	actual-values	O/M	A.2.4.2.5	O	
6	extensions	-			

M = mandatory support (static support)

O = optional support (static support) or optionally generated (dynamic behaviour)

G = generated

X = not used

Compression of the data to be transferred, if needed, shall be performed in the MET domain before creating the FTBP. This avoids using the “compression” field of FTBP, reduces the UA complexity and limits the FTBP functionality to message exchange mechanisms.

The IWXXM data itself shall be included in the FileTransferData element of the file-transfer-body-part. It should be noted that ISO/IEC 10021-7 / ITU-T X.420 (section 7.4.12) specifies the ASN.1 encoding to be used, and that ISO/IEC ISP 12062-2 (section A.1.3.1) expresses additional recommendations regarding this encoding, which should be “octet-aligned EXTERNAL”. Only one EXTERNAL component should be used.

2.2.2.3. Selection of used P3/P1 envelope parameter values

The mapping of P2 parameters onto P3 envelope parameters shall be as specified in ICAO Doc 9880 and X.420.

IPMs with a precedence value of 28 shall use the priority abstract-value “non-urgent”. IPMs with a precedence value of 57 shall use the priority abstract-value “normal”.

The encoded-information-types in the P3 submission-envelope shall be limited to the OID value specified for FTBP (see ITU-T X.420:1999 7.4.12.8, 20.4.c and Annex C), i.e. OID {joint-iso-itu-t(2) mhs(6) ipms(1) eit(12) file-transfer(0)}.

2.2.2.4. Relaxed requirements from complete AMHS specification

Implementers must be aware that due to the “relaxed” status of the requirements above, any of these requirements may be reverted back to a “mandatory” status in a future profile version, as soon as the need for the corresponding missing feature(s) appears operationally. Conformance with the profile implies a commitment to support such evolutions in the profile, which may be considered as “return-to-normal” in terms of AMHS conformance.

Appendix B: Sample Tests for NOCs to Conduct when Introducing IWXXM

Proposed Conformance Tests

1. General description

This section proposes a list of functional tests that allows verification of conformance of User Agent (UA) implementations dedicated for OPMET IWXXM data exchange.

The proposed conformance tests are divided to three categories:

- profile specific submission tests;
- profile specific delivery tests; and
- submission and delivery tests.

1.1 The scope of the profile specific submission and delivery tests is to ensure conformance of UA implementations specifically deployed for the conveyance of OPMET IWXXM data to the respective profile. A test identification scheme of the form WXMxnn has been used, where x=1 is used for submission tests and x=2 for delivery tests. Wherever applicable and to provide more details, reference to the respective EUR AMHS Manual Appendix D-UA test is made.

1.2 Specific UA conformance testing is to ensure that UA implementations dedicated for OPMET IWXXM data exchange will not malfunction upon reception of a field or element not defined by the specific profile, but classified as mandatory in the ISPs and thus also mandatory in AMHS.

2. tests

2.1. Profile specific submission tests

WXM101	**Submission of an IPM including a bulletin consisting of METAR**
Test criteria	The test is successful if the UA submits an IPM including a bulletin consisting of METAR according to the profile defined in Appendix A of this document
Scenario description	Submit from the UA under test an IPM including a bulletin consisting of METAR. Check that: - the P3 submission-envelope includes the following parameters with the correct values: o *originator-name*: OR-name of the originator o *recipient-name*: OR-name of each recipient of the message o *content-type*: 22 o *encoded-information-types*: OID 2.6.1.12.0 o *priority*: non urgent - the following IPM heading fields are present with the correct values: o *originator*: address of the originating OPMET system (MET switch) o *primary-recipients*: recipient addresses as populated by the MET switch

	○ *subject*: TTAAiiCCCCYYGGggBBB part of the filename of FTBP ○ *importance*: normal, if present ○ *authorization-time* of the IPM heading extensions field: equivalent to filing time ○ *precedence-policy-identifier* of the IPM heading extensions field: OID 1.3.27.8.0.0 ○ *originators-reference* of the IPM heading extensions field: absent - the following elements in the common data types are present with the corresponding values: ○ *precedence*: 28 ○ *formal-name*: originator address and recipient addresses - the elements *rn* and *nrn* in the common data types are absent - the message has exactly one file-transfer-body-part - the parameters composing FTBP are according to ISO/IEC ISP 12062-2 (see section A.2.4.2 of the EUR AMHS Manual Appendix B) and the following elements are present with the correct values: ○ *document-type-name*: OID 1.0.8571.5.3 ○ *registered-identifier*: OID 1.3.27.8.1.2 ○ *user-visible-string*: 'Digital MET' ○ *incomplete-pathname*: bulletin file name as specified in section 5.1.4 for example: A_LAFR31LFPW171500_C_LFPW_20151117150010.xml.[compression_suffix] ○ If generated, check the element *date-and-time-of-last-modification* ○ If generated, check the element *actual-values*, the value of which represents the size of the Attachment data in bytes - the elements *related-stored-file*, *compression* and *extensions* of the FTBP parameters are absent - The IWXXM data itself are included in the FileTransferData element of the file-transfer-body-part; the octet-aligned encoding should be used.
EUR AMHS Manual, Appendix D-UA ref:	CTUA1501, FTBP Capability

WXM102	**Submission of IPMs including bulletins of different file size consisting of METAR**
Test criteria	The test is successful if the UA submits several IPMs including bulletins of different file size consisting of METAR according to the profile defined in Appendix A of this document.
Scenario description	Submit from the UA under test a sequence of several IPMs including each time a bulletin of different file size consisting of METAR. The size of the message should not exceed the limit defined in r the regional AMHS Manual. Check all parameters listed in test case WXM101, with the corresponding values. If the element *actual-values* is generated check each time the respective value, which represents the size of the Attachment data in bytes.
EUR AMHS Manual Appendix D-UA ref:	CTUA1501, FTBP Capability with different body-part size

WXM103	Submission of an IPM including a bulletin consisting of SPECI or TAF
Test criteria	The test is successful if the UA submits an IPM including a bulletin consisting of SPECI or TAF according to the profile defined in Appendix A of this document
Scenario description	Submit from the UA under test an IPM including a bulletin consisting of SPECI. Check that all parameters and their respective values are in accordance to test case WXM101, except that the value of the element *incomplete-pathname* is according to the bulletin file name as specified in section 5.1.4 . The test is repeated with the submission of an IPM including bulletin consisting of TAF.
EUR AMHS Manual Appendix D-UA ref:	CTUA1501, FTBP Capability

WXM104	Submission of an IPM including a bulletin consisting of AIRMET
Test criteria	The test is successful if the UA submits an IPM including a bulletin consisting of AIRMET according to the profile defined in Appendix A of this document.
Scenario description	Submit from the UA under test an IPM including a bulletin consisting of AIRMET. Check that all parameters and their respective values are in accordance to test case WXM101, except that: - the *priority* abstract value of the P3 submission-envelope is normal - the value of the element *precedence* is 57 - the value of the element *incomplete-pathname* is according to the bulletin file name as specified in section 5.1.4.
EUR AMHS Manual Appendix D-UA ref:	CTUA1501, FTBP Capability

WXM105	Submission of an IPM including a bulletin consisting of SIGMET or VAA or TCA
Test criteria	The test is successful if the UA submits an IPM including bulletin consisting of SIGMET or VAA or TCA according to the profile defined in Appendix A of this document.
Scenario description	Submit from the UA under test an IPM including a bulletin consisting of SIGMET. Check that all parameters and their respective values are in accordance to test case WXM101, except that: - the *priority* abstract value of the P3 submission-envelope is normal - the value of the element *precedence* is 57 - the value of the element *incomplete-pathname* is according to the bulletin file name as specified in section 5.1.4. The test is repeated with the submission of an IPM including bulletin consisting of VAA. The test is repeated with the submission of an IPM including bulletin consisting of TCA.
EUR AMHS Manual Appendix D-UA ref:	CTUA1501, FTBP Capability

3.2.4.3 Profile specific delivery tests

WXM201	**Delivery of an IPM including a bulletin consisting of METAR**
Test criteria	The test is successful if an IPM, including a collection consisting of METAR, sent by an MTA is received by the UA under test and the parameters specified by the profile defined in Appendix A of this document are properly received.

Scenario description	The MTA sends an IPM including a bulletin consisting of METAR.
	
	Check that the UA under test receives the IPM with the following parameters:
	
	- the message delivery envelope includes the following parameters with the correct values:
	  o *originator-name*: OR-name of the originator
	  o *this-recipient-name*: OR-name of the recipient to whom the message is delivered
	  o *content-type*: 22
	  o *encoded-information-types*: OID 2.6.1.12.0
	  o *priority*: non urgent
	  o *message-delivery-identifier*: it shall have the same value as the message-submission-identifier supplied to the originator of the message when the message was submitted (X.411, section 8.3.1.1.1.1)
	  o *message-delivery-time*: it contains the time at which delivery occurs and at which the MTS is relinquishing responsibility for the message (X.411, section 8.3.1.1.1.2)
	- the following IPM heading fields are present with the correct values:
	  o *originator*
	  o *primary-recipients*
	  o *subject*: TTAAiiCCCCYYGGggBBB part of the filename of FTBP
	  o *importance*: normal, if present
	  o *authorization-time* of the IPM heading extensions field: equivalent to filing time
	  o *precedence-policy-identifier* of the IPM heading extensions field: OID 1.3.27.8.0.0
	  o *originators-reference* of the IPM heading extensions field: absent
	- the following parameters in the common data types are present with the corresponding values:
	  o *precedence*: 28
	- the elements *rn* and *nrn* in the common data types are absent
	- the message has exactly one file-transfer-body-part
	- the parameters composing the FTBP are according to section A.2.4.2 of the EUR AMHS Manual Appendix B and the following elements are present with the correct values:
	  o *document-type-name*: OID 1.0.8571.5.3
	  o *registered-identifier*: OID 1.3.27.8.1.2
	  o *user-visible-string*: ‘Digital MET’
	  o *incomplete-pathname*: bulletin file name as specified in section 5.1.4 IWXXM CONOPS, for example: A_LAFR31LFPW171500_C_LFPW_ 20151117150010.xml.[compression_suffix]
	  o If generated, check the element *date-and-time-of-last-modification*
	  o If generated, check the element *actual-values*, the value of which represents the size of the Attachment data in bytes

	- the elements *related-stored-file*, *compression* and *extensions* of the FTBP parameters are absent - The IWXXM data itself are included in the FileTransferData element of the file-transfer-body-part; the octet-aligned encoding should be used.
EUR AMHS Manual Appendix D-UA ref:	CTUA1601, FTBP Capability

WXM202	**Delivery of IPMs including bulletins of different file size consisting of METAR**
Test criteria	The test is successful if several IPMs, including bulletins of different file size consisting of METAR, sent by an MTA are received by the UA under test and the parameters specified by the profile defined in Appendix A of this document are properly received.
Scenario description	The MTA sends a sequence of several IPMs including each time a bulletin of different file size consisting of METAR. Check that the UA under test receives all IPMs and that the parameters described in test case WXM201 are received with the corresponding values. If the element *actual-values* is present check each time the respective value, which represents the size of the Attachment data in bytes.
EUR AMHS Manual Appendix D-UA ref:	CTUA1601, FTBP Capability with different body-part size

WXM203	**Delivery of an IPM including a bulletin consisting of SPECI or TAF**
Test criteria	The test is successful if an IPM, including a bulletin consisting of SPECI or TAF, sent by an MTA is received by the UA under test and the parameters specified by the profile defined in Appendix A of this document are properly received.
Scenario description	The MTA sends an IPM including a bulletin consisting of SPECI. Check that the UA under test receives the IPM and the parameters described in test case WXM201 are received with the corresponding values, except the element *incomplete-pathname* which value is according to the bulletin file name as specified in section 5.1.4. The test is repeated with the delivery of an IPM including a bulletin consisting of TAF.
EUR AMHS Manual Appendix D-UA ref:	CTUA1601, FTBP Capability

WXM204	**Delivery of an IPM including a bulletin consisting of AIRMET**
Test criteria	The test is successful if an IPM, including a bulletin consisting of AIRMET, sent by an MTA is received by the UA under test and the parameters specified by the profile defined in Appendix A of this document are properly received.
Scenario description	The MTA sends an IPM including a bulletin consisting of AIRMET. Check that the UA under test receives the IPM and the parameters described in test case WXM201 are received with the corresponding values, except that: - the *priority* abstract value of the P3 submission-envelope is normal - the value of the element *precedence* is 57

	- the value of the element incomplete-pathname is according to the bulletin file name as specified in section 5.1.4 .
EUR AMHS Manual Appendix D-UA ref:	CTUA1601, FTBP Capability

WXM205	**Delivery of an IPM including a bulletin consisting of SIGMET or VAA or TCA**
Test criteria	The test is successful if an IPM, including a bulletin consisting of SIGMET or VAA or TAF, sent by an MTA is received by the UA under test and the parameters specified by the profile defined in Appendix A of this document are properly received.
Scenario description	The MTA sends an IPM including a bulletin consisting of SIGMET. Check that the UA under test receives the IPM and the parameters described in test case WXM201 are received with the corresponding values, except that: - the *priority* abstract value of the P3 submission-envelope is normal - the value of the element *precedence* is 57 - the value of the element incomplete-pathname is according to the bulletin file name as specified in section 5.1.4. The test is repeated with the delivery of an IPM including a bulletin consisting of VAA. The test is repeated with the delivery of an IPM including a bulletin consisting of TCA.
EUR AMHS Manual Appendix D-UA ref:	CTUA1601, FTBP Capability

The execution of the delivery tests defined in EUR DOC 020 (EUR AMHS Manual) Appendix D-UA is encouraged.

However if this is not possible, the following test list from EUR DOC 020 (EUR AMHS Manual) Appendix D-UA is suggested.

Basic Delivery Operations (A2)	
CTUA201	**Deliver an IPM to the IUT – basic capability (A2)**
CTUA203	**Deliver an IPM containing optional-heading-information in the ATS-message-header**
CTUA204	**Deliver an IPM containing different kinds of recipient addresses**
CTUA206	**Deliver an IPM with invalid originator address similar to CAAS**
CTUA207	**Deliver an IPM with invalid originator address similar to XF**

Specific Delivery Operations	
CTUA401	**Deliver a non-delivery report (NDR) to an AMHS user**

Enhanced Delivery UA Capability	
CTUA601	**Deliver an IPM with the implemented capability of one body-part**

CTUA602	**Deliver an IPM with the implemented capability of two body-parts**

Delivery Operations (A2-IHE)	
CTUA1201	**Deliver an IPM with IHE to the IUT – basic capability (A2-IHE)**
CTUA1203	**Deliver an IPM with IHE, containing optional heading information**
CTUA1204	**Deliver an IPM with IHE, containing different kinds of recipient address**

Specific Submission Operations with IHE	
CTUA1303	**Checking of default envelope elements (flag setting) in submitted IPMs with IHE**

Specific Delivery Operations with IHE	
CTUA1401	**Deliver a non-delivery report (NDR) to an AMHS user**

Enhanced Delivery UA Capability with IHE	
CTUA1602	**Deliver an IPM with IHE with the implemented capability of two body-parts**

END

APÉNDICE E

Plan y Hoja de Ruta para Meteorología en la Gestión de Información de todo el Sistema (SWIM)

Plan for Meteorology in System Wide Information Management (SWIM)

_____

First Edition — October 2018

International Civil Aviation Organization

RECORD OF REVISIONS

REVISIONS		
No.	Date	Description

FOREWORD

This first edition of the *Plan for Meteorology in System Wide Information Management (SWIM)* is published to complement the introduction of the *Manual on System Wide Information Management* (Doc 10039). This plan describes the role of meteorological information in a SWIM environment, and the relationship of MET SWIM to other components of the overall system.

As of November 2016, many aeronautical meteorology products from ICAO Annex 3 – *Meteorological Service for International Air Navigation* are recommended for exchange in ICAO Meteorological Information Exchange Model (IWXXM) form by States. This exchange will initially take place outside of a SWIM environment of Service Oriented Architecture (SOA) and web services, but as SWIM implementation takes place these exchanges will be transitioned to a SWIM environment.

_____

TABLE OF CONTENTS

_____

LIST OF ABBREVIATIONS AND ACRONYMS

AIM	Aeronautical information management
AIXM	Aeronautical information exchange model
AMQP	Advanced message queuing protocol
Annex 3	Annex 3 – *Meteorological Service for International Air Navigation*
ASBU	Aviation system block upgrade
ASP	ATM service provider
ATM	Air traffic management
CRS	Coordinate reference system
FIXM	Flight information exchange model
FL	Flight Level
GANP	ICAO Doc 9750 – *Global Air Navigation Plan*
GML	Geography markup language
GRIB	Gridded binary format
HTTP	Hypertext transfer protocol
ICAO	International Civil Aviation Organization
ISO	International Organization for Standardization
IWXXM	ICAO meteorological information exchange model
MET	Meteorology or Meteorological
METAR	Aerodrome routine meteorological report (in meteorological code)
NetCDF	Network common data form
OGC	Open Geospatial Consortium
OPMET	Operational meteorology, usually operationally-used aeronautical meteorology data products
SOA	Service-oriented architecture
SOAP	Simple object access protocol
SWIM	System-wide information management
TAC	Traditional alphanumeric codes
TCP/IP	Transmission control protocol / internet protocol
WCS	Web coverage service
WFS	Web feature service
WMS	Web map service
XML	Extensible markup language

_____

GLOSSARY OF TERMS

When the subsequent terms are used in this manual, they have the following meanings:

Authorization. Permission to engage in a specific activity. A SWIM-enabled application is authorized if it has permission to engage in a specific activity, such as subscribing to a publication service.
Consumer. See *Information consumer*.
Core Services. Functional capabilities of the SWIM Infrastructure such as interface management, request-reply and publish-subscribe messaging, service security, and enterprise service management.
Discoverable. An information service that may be discovered by a potential user is discoverable.
Discovery. See *Service Discovery.*
Information Dissemination. The act of distributing information to one or more recipients.
Domain. A set of business activities that: (a) have a common mission or purpose; (b) share common operational and functional requirements and capabilities; and (c) needs to be considered separately from other activities, while maintaining the relevant relationships with them. For example, the MET and AIM information domains
Enterprise. See *SWIM Enterprise.*
Enterprise Service Management (ESM). The SWIM core service addressing the management of SWIM-enabled services, including performance and availability. ESM provides the ability to monitor, manage, and scale services within the enterprise to ensure the capability offerings are available, responsive and scalable to the operational environment supported.
Expose. To make a service interface discoverable. In SWIM, information services are exposed via one or more SWIM Service Registries.
Information Consumer. The person, application or system consuming an information service. Also called *consumer*.
Information Domain. Focused on identifying, defining, and satisfying the information needs of the set of business activities associated with a specific domain.
Information Exchange Model. An Information Exchange Model is designed to enable the management and distribution of information services data in digital format. Normally this is defined for a specific domain such as aeronautical information.
Information Model. An information model is a representation of concepts and the relationships, constraints, rules, and operations to specify data semantics for a chosen domain.
Information Producer. The person, application or system producing an information service. Also called producer.
Information Provider. Information service provider. Also called provider.
Information Service. An information service is a web service which provides information consumers access to one or more applications or systems by means of the SWIM core services. It encapsulates a distinct set of operations logic within a well-defined functional boundary.
Infrastructure. The logical and physical (i.e., hardware and software) elements that together provide (SWIM) functionality.
Message. A structured information exchange package consisting of a header and payload.
Messaging. The SWIM core service that provides delivery of data and notifications between applications and systems.
Notification. An indication presented to a user regarding the status of a system or an element in a system. In a publish-subscribe system, a publication may consist of notifications about data rather than the data itself.
Operational Pattern. An operational pattern describes the essential flow of a SWIM-enabled service. It is based on the term pattern, which describes the essential features of a common solution to a common problem in software development.
Publication. An information service based on the publish-subscribe operational pattern.

Publisher. An information service provider utilizing the publish-subscribe operational pattern.
Publish-subscribe. A one-to-many operational pattern in which an information provider called a *publisher* makes its services available (i.e. publishes) on a subscription basis. An information consumer in this paradigm called a *subscriber* requests access to the publication service via a subscription request. Based on the nature of their subscriptions, subscribers will continue to receive updates from the publisher until they request the termination of their subscription.
Reliable Delivery. A characteristic of information transfer in which the transfer is either successful or the sender of the information is notified of the failure of the transfer.
Request/Reply. The operational pattern distinguished by a two-way interaction between a requesting entity and a responding entity. This pattern is also called request/response.
REST. A REpresentational State Transfer (REST) architecture is an alternative to SOAP for implementing web services over HTTP.
Security. The SWIM core service responsible for the protection of information, operation, assets and participants from unauthorized access or attack.
Service. Attention is drawn to the dual meaning of "service" in an ICAO context. In the context of SWIM and this document, "service" refers to a web service (also see *Information Service*) rather than an ICAO service which is provided by States or other ICAO organizations.
Service Discovery. The act of locating and accessing the metadata (such as a web address) for a specific information service. Also referred to as *discovery*.
Service-Oriented Architecture (SOA). An approach to integrate applications running on heterogeneous platforms using industry-wide acceptable standards. Each application is exposed as one or more web services where each information service provides a particular function. Information services (applications) communicate with each other in a coordinated sequence that is defined by a business process.
Service Provider. An organization or entity providing a service. Refers (in this document) to ASPs or vendors that provide network or other value-added services; distinct from an information provider.
Service Registration. The act of creating an entry in the SWIM Service Registry.
Service Registry. SWIM web service registry.
SOAP. A SOAP architecture is an alternative to REST for implementing web services over HTTP.
State. An ICAO Member State.
Subscriber. A consumer of a publication service.
Subscription. The process of becoming a subscriber to a publication service. Subscription consists of subscription administration and subscription activation.
Subscription Administration. The act of administering a subscription, including authorization, access list and other database updates, etc.
System-Wide Information Management (SWIM). SWIM consists of standards, infrastructure and governance enabling the management of ATM related information and its exchange between qualified parties via interoperable services.
SWIM Access Point. A SWIM access point is a logical entity which bundles a number of technical capabilities (e.g. messaging, security, logging, interface management, etc.).
SWIM core services. The fundamental SWIM mechanisms that enable information sharing: Interface Management, Messaging, Enterprise Service Management (ESM) and Security. These services are solution-agnostic (not limited to a single process or solution environment) and have a high degree of autonomy so that they support reuse. Also referred to as "core services".
SWIM core services infrastructure. Hardware and software elements that provide the SWIM core services. Also referred to as "core services infrastructure".
SWIM-enabled application. A SWIM enabled application consumes or provides SWIM information services using SWIM standards. Also referred to as "application".
SWIM-enabled service. An information service that may be accessed via SWIM.

SWIM Enterprise. A SWIM enterprise can be an ATM service provider (ASP), a group of ASPs, or an Airspace User, or an ATM support industry that has full control of the implementation planning and execution within the enterprise.

SWIM Region. A collection of SWIM enterprises that have agreed upon common regional governance and internal standards. A region will be delineated by the area of influence of a given governance structure that defines the standards, policies, etc. that are applicable to all the participants within the region.

SWIM Registry. A registry or directory containing entries with the information necessary to discover and access services. The Registry utilizes a formal registration process to store, catalog and manage metadata relevant to the services, thereby enabling the search, identification and understanding of resources. Also referred to as "Service Registry" or "Registry".

SWIM User. Depending on context, a person, organization or application authorized to provide and/or consume services via SWIM.

Web Service. A software system which provides request/reply support to consumers for querying data or generating results. Web services commonly communicate using HTTP and often work with and return XML, JSON, and binary data.

Chapter 1

INTRODUCTION

1.1 BACKGROUND

1.1.1 ICAO Doc 10039 - *Manual on System Wide Information Management (SWIM) Concept*, describes general SWIM concepts and characteristics. This document provides further detail on the role of aeronautical meteorology in SWIM, such as the relationship between meteorology and other SWIM domains (such as aeronautical information management (AIM)) in the system.

1.2 SCOPE

1.2.1 The scope of the plan is limited to the following:

a) identifying required infrastructure (IP network, security capabilities, etc.);
b) identifying interfaces and relationships with the other SWIM Air Traffic Management (ATM) information domains, such as AIM;
c) identifying technologies and required high-level capabilities (web services, XML, and messaging) required for MET SWIM information exchange;
d) describing information flows and high-level data types; and
e) describing the roles and responsibilities of aeronautical meteorological system stakeholders, such as regional centers and member states.

1.2.2 The scope of the plan excludes the detailed description of specific products. It is anticipated that data products will be able to be modified over time without substantial changes to the concepts and infrastructure described in this plan.

1.3 PURPOSE/OBJECTIVE

1.3.1 This document, the *Plan for Meteorology in System Wide Information Management (SWIM)*, describes the role of aeronautical meteorology (MET) in SWIM. In particular, approaches and concepts for the exchange of meteorological information (such as web services), high-level concepts regarding aeronautical meteorological information exchange models and XML/GML are discussed. This document supplements the broader SWIM concept described in the *Manual on System Wide Information Management (SWIM) Concept* (Doc 10039) with approaches and technologies specifically relevant to the exchange of meteorological information in SWIM.

1.4 TARGET AUDIENCE

1.4.1 This plan has been developed for ICAO States seeking information on integrating their MET SWIM information management within a global SWIM construct. The plan does not specifically address any individual member of the ATM community with interested parties to be found in all of the following communities:

a) ICAO;
b) regulatory authorities; and
c) States.

1.5 ORGANIZATION OF THE PLAN

1.5.1 The plan is organized as follows:

a) Chapter 1 gives the background and the purpose and scope of the document;
b) Chapter 2 considers the MET SWIM global interoperability framework and its details, including interoperability and governance at the information exchange services, the information exchange models and at the SWIM infrastructure level. The functions and representative standards are provided;
c) Chapter 3 considers the transition to MET SWIM and operations in a mixed environment; and
d) The appendices provide supporting material.

1.6 RELATIONSHIP TO OTHER DOCUMENTS

1.6.1 The *Global Air Traffic Management (ATM) Operational Concept* (Doc 9854) describes a future concept in which information is managed system-wide. Based upon this concept, the *Manual on Air Traffic Management System Requirements* (Doc 9882) explicitly identifies the implementation of SWIM as a requirement for the future ATM System.

1.6.2 The *Manual on Flight and Flow Information for a Collaborative Environment* (FF-ICE) (Doc 9965) provides a vision specifically for flight information that relies on SWIM as a mechanism for exchange of flight information while managing the consistency and timeliness of the information. The *Manual on Collaborative Air Traffic Flow Management* (Doc 9971) describes the importance of information exchange in establishing a collaborative environment.

1.6.3 There are two aviation system block upgrade (ASBU) modules within the *Global Air Navigation Plan* (GANP) (Doc 9750) that focus on SWIM development: B1-SWIM and B2-SWIM. The ASBU module B1-SWIM is termed ‘Performance Improvement through the application of SWIM’ and applies to the “implementation of SWIM services (applications and infrastructure) creating the aviation intranet based on standard data models, and internet-based protocols to maximize interoperability”. The ASBU module B2-SWIM is termed ‘Enabling Airborne Participation in collaborative ATM through SWIM’ and applies to the “connection of the aircraft as an information node in SWIM enabling participation in collaborative ATM processes with access to rich voluminous dynamic data including meteorology”.

1.6.4 The *Manual on System Wide Information Management (SWIM) Concept* (Doc 10039) describes the overall SWIM concept, along with key goals and characteristics of the system. This plan provides further detail on this general concept, and how aeronautical meteorological information is exchanged and used within the broader system.

1.6.5 The *Manual on the Digital Exchange of Aeronautical Meteorological Information* (Doc 10003) provides implementation guidance on aeronautical meteorological information exchange models and XML/GML. This plan addresses the long-term concept of the MET SWIM system beyond implementation of the information exchange models and beyond initial implementation of XML/GML and digital exchange.

Chapter 2

THE MET SWIM CONCEPT

2.1 MET SWIM CONCEPTS

2.1.1 Meteorological information exchange takes place in SWIM utilizing the core concepts described in Doc 10039. MET SWIM exchanges are enabled by the following more specialized concepts:

Information: The aeronautical meteorology contents being utilized and exchanged in SWIM. In the MET SWIM system there are three types of information: gridded data, non-gridded data, and imagery data. Information is exchanged using a data exchange format, of which one type is an Information Exchange Model. Further detail on the full range of MET information is provided in Section 2.3. Data exchange formats are typically returned from information exchange services (request/reply) or sent as a portion of publish/subscribe messages. The primary information exchange model in MET SWIM is the IWXXM.

Information Exchange Services: An information service which is used to exchange MET information. An information exchange service enables interoperability by following well-defined standards and governance specifications agreed upon by stakeholders and implemented via commonly agreed means. In the MET SWIM system, information exchange services are used to distribute, filter, and transform MET information for use in SWIM.

2.2 SWIM INTERFACES

2.2.1 MET SWIM is a portion of the larger SWIM system and will interface with other SWIM components. There are two primary relationships: a MET SWIM utilization and reliance upon SWIM infrastructure (such as reliable messaging); and MET SWIM use of AIM SWIM information services and data. MET SWIM utilizes the common SWIM infrastructure for TCP/IP network communications, publish/subscribe messaging, request/reply communications, security, registry and metadata, and other facilities.

2.2.2 MET SWIM may interface with AIM SWIM for the following:

a) meteorological observing station metadata at aerodromes (such as location);
b) aerodrome reference points;
c) aerodrome runways;
d) flight information region (FIR) data and locations; and
e) links to further metadata regarding aeronautical service providers such as: meteorological watch offices, air traffic service units, world area forecast centres volcanic ash advisory centres and tropical cyclone advisory centres.

2.3 INFORMATION AND DATA EXCHANGES

2.3.1 Traditional OPMET exchanges have relied on textual data formats, also known as Traditional Alphanumeric Codes (TAC). TAC data exchanges are being replaced by IWXXM XML exchanges in MET SWIM, and new data forms will be exchanged.

2.3.2 INFORMATION EXCHANGE MODELS (NON-GRIDDED DATA)

2.3.2.1 MET SWIM will utilize IWXXM for information exchanges, one of several existing XML/GML exchange models intended for use in the aeronautical domain. As MET SWIM implementation proceeds, current data products in IWXXM will migrate away from the restrictions of traditional alphanumeric code (TAC) towards the exchange of observations, forecasts and warnings with broader utility. One example of such a change is the reporting of the raw observed meteorological values coming from the sensor instead of "binned" data values, such as is reported today with METAR ceiling values. These types of improvements allow for multiple uses of MET SWIM data products, including different visualizations, ready ingest into weather forecast models and direct utilization by both information exchange web services and potentially higher-level decision support web services.

2.3.3 GRIDDED DATA

2.3.3.1 While many data products are adequately specified with non-gridded exchange models, MET SWIM stakeholders will also need to exchange gridded data. Gridded data (also known as raster data) is often, but not always, a regularly spaced set of values such as a satellite image or a set of temperature values over a large geographic area. While gridded data values may also be represented in exchange models in XML format, gridded data is generally too voluminous to be transported efficiently in XML.

2.3.3.2 A graphic showing gridded data with nearby map location information (such as highways) is shown in Figure 1. The individual grid cells are visible, as is the regular spacing of each data value. Gridded data is geo-located on a CRS, such as the world geodetic system (WGS-84) geographic CRS (latitude/longitude) or a Mercator projection CRS.

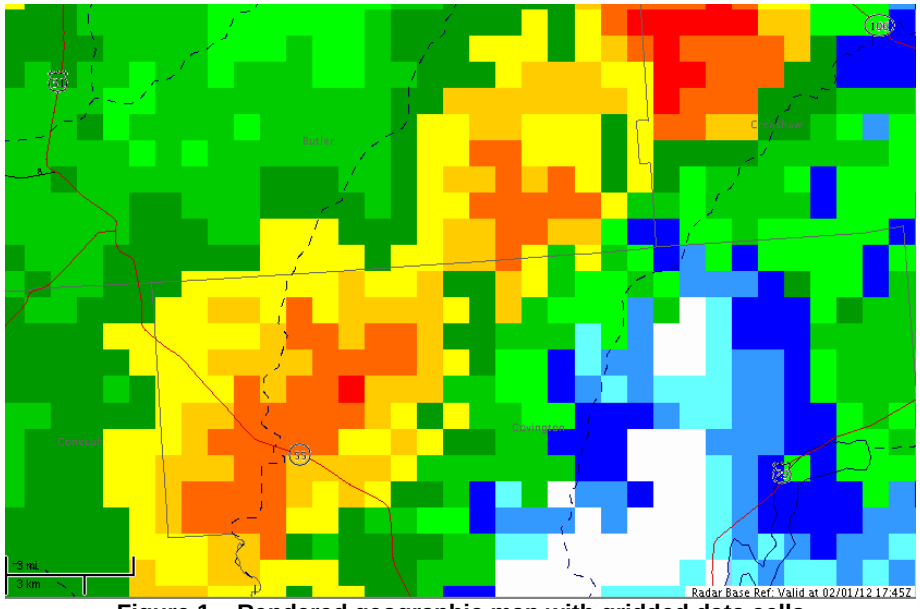


Figure 1 – Rendered geographic map with gridded data cells

2.3.3.3 Gridded data is an efficient representation of raw data values (i.e., not rendered values such as the colored pixels seen in imagery) representing data values from data types such as satellite, radar and numerical weather models, including fields such as wind speed and air temperature.

2.3.3.4 In aeronautical meteorology, gridded data is often exchanged in either the GRIB or netCDF file formats. While other formats are used, few of these are as broadly utilized. Gridded data in the meteorological domain is usually updated over time and is comprised of either two or three spatial dimensions (2-D or 3-D) depending upon whether there is a vertical component.

2.3.4 IMAGE DATA

2.3.4.1 While most of the MET SWIM requirements are met with the raw data values exchanged within gridded and non-gridded data, some MET SWIM products may be disseminated as rendered, geo-located images. Examples of image data formats include JPEG, PNG, and SVG files, such as those seen embedded in web mapping tools and other web sites. Image data may be useful in cases where data consumers need an authoritative and/or globally consistent visualization of raw data.

2.3.4.2 Image data can be used to visualize both gridded and non-gridded data. An example of both types of data can be seen in Figure 1, which shows the rendered gridded radar values overlain with non-gridded road and political boundaries. Due to the simple representation of images it can easily be combined with other images (layered) with little effort or much knowledge of the details of the data being represented.

2.4 REGISTRIES AND METADATA

2.4.1 Doc 10039 describes the need for a registry for use in SWIM. The fundamental purpose of the SWIM registry (also known as a catalog) is to provide a repository of information about who are the available data service providers, what data services they each provide and what data sets they each provide. MET SWIM will utilize many of the resources identified for the SWIM registry, including:

a) web service instances (list of services available in SWIM from the various SWIM information service providers);
b) web service description documents;
c) reference models (common models for the implementation of services and information structures, i.e., the Aeronautical information reference model - AIRM);
d) information exchange standards (e.g., AIXM, IWXXM, FIXM);
e) policies (constraints to be respected in SWIM for security or other purposes);
f) compliance (describe levels of conformity e.g., SWIM compliance); and
g) participants (e.g., information service providers).

2.4.2 In addition, MET SWIM will store and access aeronautical meteorology-specific metadata in the SWIM registry for the following:

a) meteorological data products (e.g., update rate, data quality characteristics, data lineage, detailed data structure descriptions, list of included data fields);
b) static publish/subscribe messaging topics and/or queues available from providers;
c) sensor metadata (e.g., location, quality characteristics); and
d) semantic metadata relating to web services and data products available in the MET SWIM system.

2.5 INFORMATION EXCHANGE SERVICES (WEB SERVICES)

2.5.1 There are two main mechanisms by which data will flow from producers to consumers: data which may be requested through web services as needed, and on-going real-time feeds of messages (notifications or actual data). The former describes the request/reply message exchange pattern described in this section, and the latter the publish/subscribe or messaging exchange pattern discussed in the next section. Both mechanisms will be utilized in MET SWIM.

2.5.2 MET SWIM information exchange services will be utilized to exchange and filter data. MET SWIM information exchanges can be quite voluminous and information exchange services can be utilized to trim down exchanged data to the exact needs of consumers. Due to the different nature of data being exchanged (gridded, imagery, and non-gridded) a specialized information exchange service is required for each. MET SWIM will utilize the OGC Web Feature Service (WFS) for non-gridded data, the OGC Web Coverage Service (WCS) for gridded data, and the OGC Web Map Service (WMS) for image data.

2.5.3 For all information exchange web services (gridded, non-gridded, and imagery web services) the following capabilities are supported:

- Requesting the set of data product(s) offered by the web service;
- Requesting the high-level capabilities of the web service;
- Requesting the detailed structure and content of the offered data products, such as geographic region of the data and the structure of offered data (such as the XML schema that describes offered non-gridded data);
- Requesting metadata regarding the data provider, such as contact information and organization name; and
- Requesting metadata regarding the operational status of the web service and/or data product, such as metadata indicating experimental products.

2.5.4 For non-gridded information exchange using the Web Feature Service, the following capabilities are supported in addition to the common capabilities identified above:

- Requesting data filtered by a geographic bounding box;
- Requesting data within a time range or at a time instant;
- Requesting data within a fixed distance from a route of flight; and
- Requesting data that matches free-form queries, such as all aircraft observations where altitude is greater than FL400 and where the aircraft type is ‘Boeing 747’.

2.5.5 For gridded information exchange using the Web Coverage Service, the following capabilities are supported in addition to the common capabilities identified above:

- Requesting data filtered by a geographic bounding box;
- Requesting data within a time range or at a time instant;
- Requesting data which was generated at a specific forecast run time (for forecast model run data);
- Requesting data within a fixed distance from a route of flight (i.e., returning a vertical cross section, 4-D corridor, or horizontal slice); and
- Requesting data that is re-sampled to a new grid spacing.

2.5.6 For imagery information exchange using the Web Map Service, the following capabilities are supported in addition to the common capabilities identified above:

- Requesting data filtered by a geographic bounding box;

- Requesting data within a time range or at a time instant;
- Requesting data which was generated at a specific forecast run time (for gridded forecast model run data);
- Requesting imagery that is at a different image resolution than the original data;
- Requesting data with custom rendering options such as color ranges, transparency, and symbology; and
- Requesting data in different image formats, such as SVG, JPEG, and PNG.

2.5.7 While the information exchange services as described above address the basic needs for the data exchange requirements of MET SWIM, other more specialized web services are also possible in a MET SWIM environment. These web services can be built to utilize data from the information exchange web services to address more specialized requirements. Because these web services are built atop of the data made available from the information exchange services, information exchange web services may be considered the first tier (Tier 1) and a necessary building block for a second tier (Tier 2) of specialized web services.

2.5.8 An example of one such "Tier 2" web service is a warning service which would enable customized warnings to be pushed (over publish/subscribe communications) to consumers. The warning web service would allow consumers to receive crucial information for decision-making without needing access to large amounts of raw aeronautical meteorology information. As MET SWIM information is updated, thresholds and geographic areas would be checked and warnings pushed to consumers as appropriate. Consumers could submit the following to the warning web service:

- any number of data variable names (such as composite reflectivity or observed wind speed);
- geographic area(s) of interest (bounding box, flight path and distance, or polygon area);
- time period(s) of interest; and
- rules describing when warnings are issued, such as the relationships between data variables, upper and lower data variable thresholds, geographic areas, and time periods.

2.5.9 Another example of a "Tier 2" web service would enable authoritative conversion from XML to TAC for transition purposes and human display. This would remove potential ambiguities in the conversion process, and assist with a smooth transition away from TAC having the role of an data exchange format towards TAC having the role of a display format (potentially among many).

2.5.10 Tier 2 web services can be used to address global needs for complex decision-making, authoritative and consistent decisions, and/or a synthesis of multiple sources of SWIM data including data from outside the MET domain, such as AIM. Due to their dependence upon Tier 1 information exchange services for basic data access, implementation of Tier 2 web services in the MET SWIM system will follow the deployment of Tier 1 web services. Given the unique and aviation-specific nature of these web services, they may not fit well into existing standardized web service protocols such as WCS, WFS, and WMS, but will be implemented using web services and fit into the general SWIM architecture.

2.6 MESSAGING AND PUBLISH/SUBSCRIBE

2.6.1 While information exchange services provide advanced capabilities for accessing MET data, they are insufficient to address all MET SWIM scenarios of real-time information exchange. The *Manual on System Wide Information Management* (Doc 10039) describes common messaging capabilities (the publish/subscribe messaging pattern) to be used throughout SWIM and MET SWIM will utilize this capability to reliably distribute data, notifications, and status updates. Messaging is particularly useful with

data that is issued at an unpredictable rate, data that must be delivered as quickly as possible, or data that represents a series of frequent and small updates. Publish/subscribe messaging technology is generally not well suited to distributing large data files/messages directly, and as such will be utilized in MET SWIM for:

- notifying data consumers that data is available for access through a web service such as when a new gridded forecast is available for retrieval;
- pushing relatively small data files directly to consumers as they become available on the provider, such as non-gridded data like aerodrome observations; and
- mission-critical service updates to data consumers, such as notifications of a web service outage, data outage, service/maintenance windows, or degraded provider capabilities.

2.6.2 There are many messaging broker implementations, such as ActiveMQ and RabbitMQ, but relatively few open and standard messaging protocols. As a programming application program interface (API), the Java Message Service (JMS) does not provide network level interoperability between implementations, merely a convenient way for software written in the Java programming language to be written to operate against different messaging broker implementations.

2.6.3 While messaging capabilities are considered a cross-cutting SWIM capability, States and other SWIM participants will communicate directly with other participants. No central messaging brokers will be utilized, and similarly to other SWIM components will be built upon standards that support heterogeneous information exchanges between multiple broker and/or client implementations. Of the messaging protocol standards, the Advanced Message Queueing Protocol (AMQP) is the most general-purpose and well suited to support MET SWIM requirements, and is supported by many existing messaging broker implementations. MET SWIM publish/subscribe messaging will utilize AMQP directly between SWIM participants, which allows stakeholders to choose their message broker and client software as appropriate for their requirements but allow for broad system-wide interoperability.

2.6.4 Publish/subscribe messaging can be utilized to publish information in either a static or dynamic fashion. Static publish/subscribe configurations may be considered a design-time configuration regarding what information is published to predefined topics and/or queues. In the case of static configurations, SWIM providers publish to a fixed set of topics and/or queues which do not change while the system is running. With a dynamic publish/subscribe configuration, the set of published data and the destination topics and/or queues can be modified as the SWIM system is running. For example, a filtered meteorological observation within a specific geographic area could be delivered to a small group of interested Consumers as needed. Dynamic configuration requires an additional request/reply web service on each SWIM Provider to allow modifications to published information at runtime such as described in the OASIS WS-Notification and OGC Publish/Subscribe Interface standards. There are currently no identified requirements for dynamic subscription capabilities, and as such all publish/subscribe messaging will be published in a static, pre-defined manner.

2.7 TESTING AND VALIDATION

2.7.1 As advanced capabilities (and particularly web services) are implemented in SWIM, they introduce the possibility of new types of interoperability problems when implemented incompletely or incorrectly. Therefore, as States and Regional OPMET Centres (ROCs) implement MET SWIM capabilities testing software will be available for evaluating the correct functioning of both web services and data products.

2.7.2 Testing and validation will occur on all components of the system, including web services, messaging capabilities, real-time data flow, and data products. The specific techniques to evaluate the

correct functioning of MET SWIM services are beyond the scope of this document, but will be developed and described in a subsequent document.

Appendix A

MET SWIM Standards

This appendix describes the MET SWIM standards which should be implemented by MET States and Regions.

A.1 Standards

Capability	Standard
Request/reply network connectivity	Transmission Control Protocol version 4 (IETF RFC 793) Internet Protocol version 6 (IETF RFC 2460) and Internet Protocol version 4 (IETF RFC 791) Hypertext Transfer Protocol -- HTTP/1.1 (IETF RFC 2616)
Publish/subscribe network connectivity	Advanced Message Queuing Protocol (AMQP) 1.0
Gridded information exchange	OGC Web Coverage Service Interface Standard – Core v2.0.1 OGC Web Coverage Service Interface Standard – Range Subsetting Extension v1.0.0 OGC Web Coverage Service Interface Standard – Scaling Extension v1.0.0 OGC Web Coverage Service Interface Standard – CRS Extension v1.0.0 OGC Web Coverage Service Interface Standard – Interpoation Extension v1.0.0 OGC Web Coverage Service Interface Standard – XML/SOAP Protocol Binding Extension v1.0.0 OGC Web Coverage Service Interface Standard – Key Value Pair (KVP) Protocol Binding Extension v1.0.1
Non-gridded information exchange	OGC Web Feature Service Interface Standard v2.0.0 (also ISO 19142)
Imagery information exchange	OGC Web Map Service Implementation Specification v1.3.0 OGC Styled Layer Descriptor (SLD) Profile of the Web Map Service Specification v1.1.0 OGC Symbology Encoding Implementation Specification v1.1.0

— END —

Roadmap for Meteorology in System Wide Information Management (SWIM)

2 October 2018

Version 1.3

International Civil Aviation Organization

RECORD OF REVISIONS

Revisions		
No.	Date	Description
1.0	6 September 2016	Initial version developed by the ICAO Meteorological Information Exchange (MIE) Working Group
1.1	6 April 2018	WG-MIE updated based on GANP changes and discussions with the Communications and Information Management Panels
1.2	19 June 2018	Updated based on the outcomes of WG-MIE/4. Additional detail added on timelines and implementation plans
1.3	2 October	Updated based on METP/4 feedback

TABLE OF CONTENTS

_____

LIST OF ABBREVIATIONS AND ACRONYMS

AFTN	Aeronautical Fixed Telecommunication Network
AMHS	Aeronautical Message Handling System
AMQP	Advanced message queuing protocol
ASBU	Aviation system block upgrade
FTBP	File Transfer Body Part
GANP	Global Air Navigation Plan (Doc 9750)
HTTP	Hypertext transfer protocol
IP	Internet protocol
IROG	International Regional OPMET Gateway
IWXXM	ICAO meteorological information exchange model
MET	Meteorology or Meteorological
MWO	Meteorological Watch Office
NOC	National OPMET Centre
RHWAC	Regional Hazardous Weather Advisory Centre
ROC	Regional OPMET Centre
RODB	Regional OPMET Data Bank
RQM	Request/reply query for meteorological databank data in TAC format
SWXC	Space Weather Centre
SWIM	System-wide Information Management
TAC	Traditional Alphanumeric Code
TCAC	Tropical Cyclone Advisory Centre
VAAC	Volcanic Ash Advisory Centre
WAFC	World Area Forecast Centre
WCS	Web Coverage Service
WFS	Web Feature Service
WMS	Web Map Service

_____

Chapter 1 – MET SWIM Roadmap

1.1 INTRODUCTION

1.1.1 The System Wide Information Management (SWIM) will complement human-to-human communications with machine-to-machine communications and improve data distribution and accessibility. However, the flexibility inherent in human communication is not intrinsically included in Information Technology (IT) systems and must be specified and included in the system design. To enable the desired flexibility, IT systems will increasingly need to "ask for / discover" operationally relevant facts, depending on the circumstances, rather than remain "being informed" by pre- agreed messages. Increased machine-to-machine capabilities will enable many new software applications while continuing to support existing human usages.

1.1.2 ICAO Doc 10039 - *Manual on System Wide Information Management (SWIM),* describes general SWIM concepts and characteristics. The MET SWIM Plan – *Plan for Meteorology in System Wide Information Management (SWIM)* - provides further detail on the role of aeronautical meteorology in SWIM, such as the relationship between meteorology and other SWIM domains (such as aeronautical information management (AIM)) in the system, along with design concepts.

1.1.3 This document, the MET SWIM Roadmap, describes the transition plan and associated timelines for implementing MET in SWIM, including the necessary timelines and strategies for implementing necessary non-MET components such as IP networking and HTTP support.

1.1.4 Transition to MET SWIM can be summarized as the following phases:

a) Provision of meteorological products in ICAO Meteorological Exchange Model (IWXXM) format;
b) Provision of meteorological via MET SWIM information exchange services, including Web Feature Service (WFS), Web Coverage Service (WCS), and Web Map Service (WMS), over HTTP;
c) Additional data types beyond IWXXM (non-gridded), including gridded data and imagery;
d) Replacement of AFTN and AMHS "message push" communications with AMQP; and
e) Additional data products beyond those currently distributed in IWXXM.

1.2 TRANSITION PLAN

1.2.1 MET SWIM implementation and transition will proceed based upon the Global Air Navigation Plan (GANP) Block upgrade schedule. IWXXM messages will also become a standard practice in 2020.

1.2.2 There are several components of the MET SWIM transition: physical network connectivity, communications protocols (AFTN, AMHS, AMQP, HTTP), information exchange services (WCS, WFS, WMS), and data types exchanged (gridded, non-gridded, and imagery). The following table summarizes the MET SWIM implementation timeline, this is expanded upon in sections below.

Table 1 - MET SWIM Timeline

	Block 0	Block 1	Block 2	Block 3
Communication protocols (AFTN, AMHS, AMQP)	AFTN (legacy) AMHS FTBP (transitional) AMQP/HTTP (optional)	AFTN (legacy) AMHS FTBP (transitional) AMQP/HTTP (optional)	AFTN (legacy) AMHS (legacy) AMQP/HTTP	AMQP/HTTP
Request/Reply at Regional OPMET Data Banks (RODBs)	AFTN/AMHS request/reply	AFTN request/reply (legacy) WFS, WCS, WMS (optional) AMHS request/reply	AMHS request/reply (legacy) WFS, WCS, WMS	WFS, WCS, WMS
Data Types	Non-gridded	Non-gridded Gridded (optional) Imagery (optional)	Non-gridded Gridded Imagery	Non-gridded Gridded Imagery
Data Addressing	NOC, ROC, RODB, IROG	NOC, ROC, RODB, IROG	IP and SWIM Registry	IP and SWIM Registry

1.2.3 In addition to the technology changes, a transition to MET SWIM will also result in modifications to the organizational roles involved in aeronautical meteorological exchanges. The most significant changes are:

a) IP communications and the SWIM Registry will greatly reduce the need for data aggregation; and
b) More organizations (especially States) will offer web services and data directly to data consumers.

Table 2 - MET SWIM Roles

Function/Role	Block 0	Block 1	Block 2
Data Producer	MWO, VAAC, TCAC, WAFC	MWO, VAAC, TCAC, WAFC, SWXC, RHWAC	MWO, VAAC, TCAC, WAFC, SWXC, RHWAC
Data Aggregator and Validator	NOC, ROC, RODB, IROG	NOC, ROC, RODB, IROG	NOC, ROC, RODB
Data Repository	WAFC, RODB	WAFC, RODB	WAFC, RODB, and State/NOC

Block 0: Current System

1.2.4 The current, mixed system of AFTN and AMHS communications will continue through the end of Block 0. States, ROCs, RODBs, and IROGs in a position to implement AMQP communications in addition to AMHS File Transfer Body Part (FTBP) may do so for IWXXM dissemination. AMHS is considered a transitional communications technique and AMQP implementation plans should be prioritized.

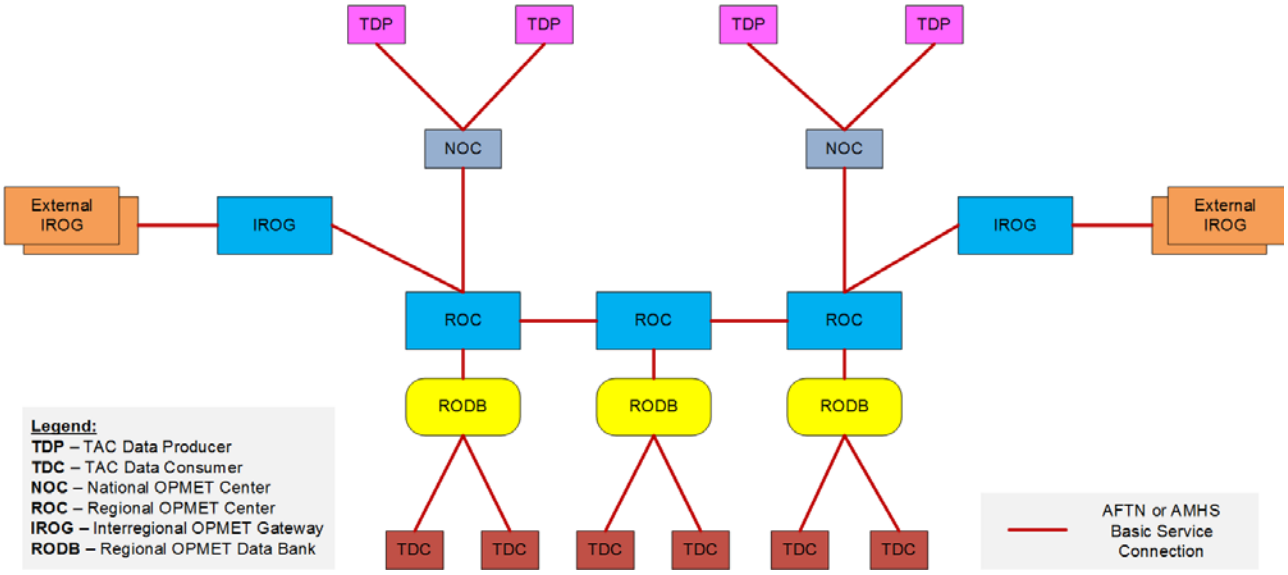


Figure 1 - MET SWIM Block 0

1.2.5 RODBs will utilize the existing RQM method for providing request/reply access to data, and States/RODBs may also offer information exchange services. Most States should be exchanging non-gridded IWXXM and TAC messages and some States may have commenced gridded and imagery information services.

Block 1 and 2: Transition to MET SWIM

1.2.6 States, ROCs, RODBs, and others may commence SWIM technology adoption in Block 1. As a transition Block, both legacy and SWIM communications technologies, data formats, and technology will co-exist for the duration. States, ROCs, RODBs, and others should commence and complete SWIM technology adoption in Block 2. Due to the transition being undertaken in both of these Blocks, the technology will be a mixture of traditional and SWIM-based approaches throughout both Blocks.

1.2.7 States shall implement IWXXM message production as of 2020, but TAC message production will continue throughout Block 1. States, ROCs, and RODBs in a position to do so will introduce gridded and imagery product dissemination on a regional basis.

1.2.8 For those RODBs and States in a position to do so, adoption of AMQP and HTTP (SWIM) communications should be adopted with a preference over AMHS-related communications for publish/subscribe messages and request/reply communications in Block 1. Specifically, ROCs and IROGs should prioritize the adoption of AMQP communications to facilitate State SWIM progress, RODBs should utilize Web Feature Services for request/reply access as an alternative to the AFTN and AMHS FTBP request response interface, and IWWXM data consumers should use the Web Feature Service to consume messages from RODBs and implement AMQP message consumption.

1.2.9 By the end of Block 2, adoption of AMQP and HTTP (SWIM) communications will be complete. ROC and IROG adoption of AMQP communications will be complete, RODBs will utilize Web Feature Services for request/reply access, and IWWXM data consumers will use the Web Feature Service to consume messages from RODBs and implement AMQP message consumption.

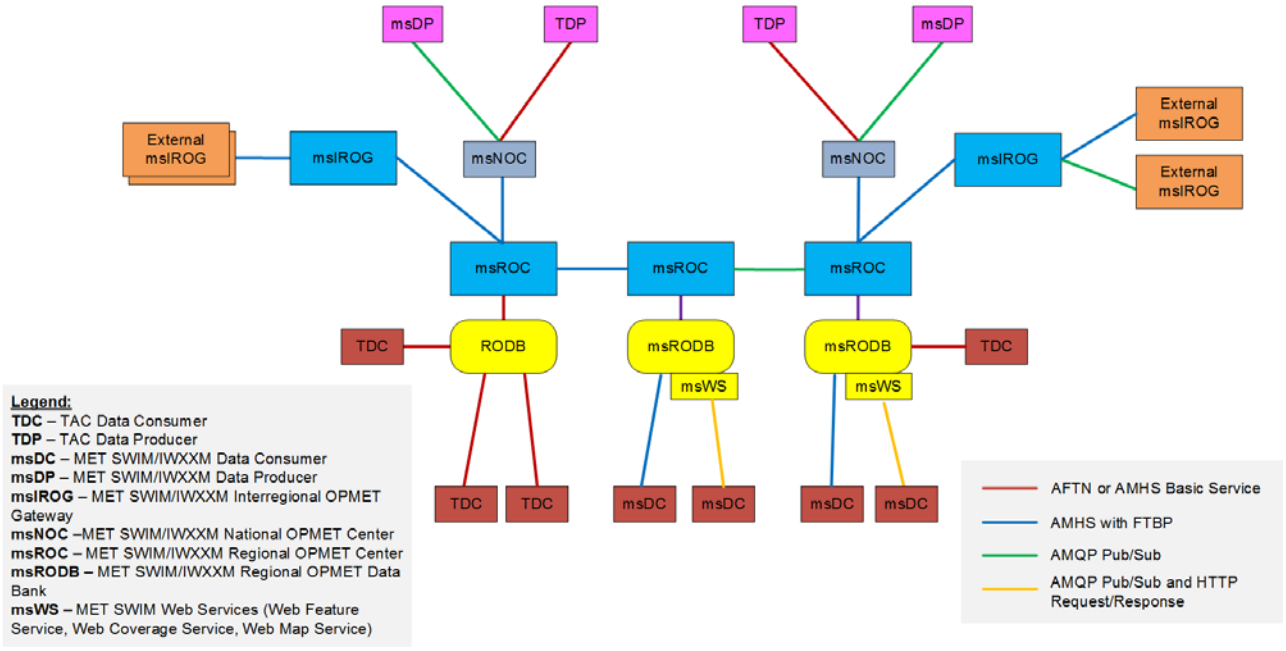


Figure 2 - MET SWIM Block 1 and 2

Block 3: MET SWIM Implementation

1.2.10 In Block 2 the protocol and data exchange transitions are completed and both IWXXM messages and gridded/image data notifications are distributed with AMQP. Gridded and image data consumers retrieve data using HTTP request/response to MET SWIM information exchange services.

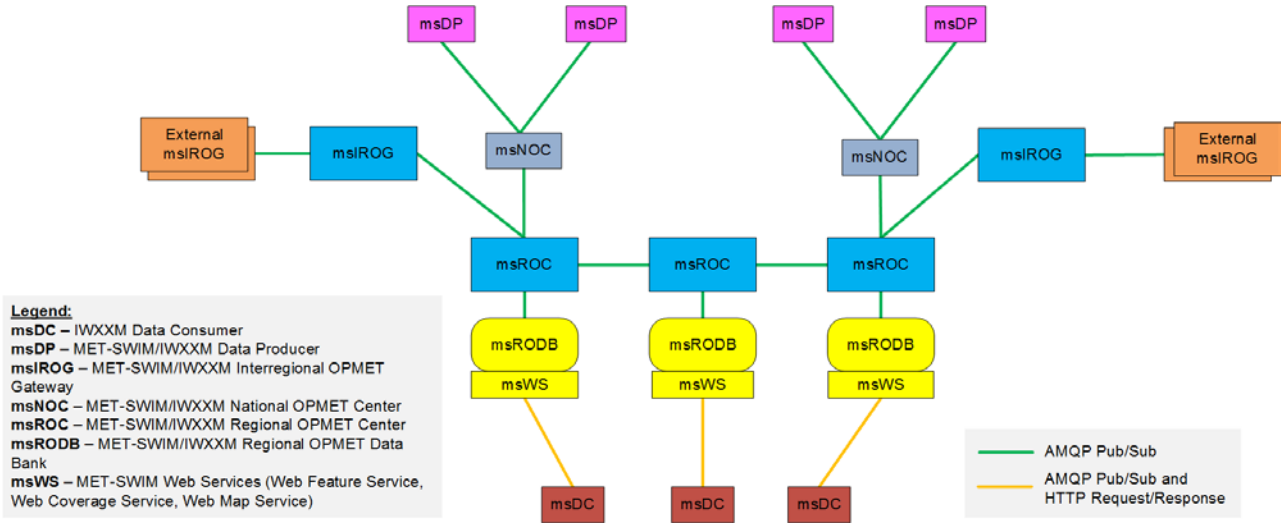


Figure 3 - MET SWIM Block 3

1.3 TIMELINES

1.3.1 As part of the SWIM activity and as part of the Global Air Navigation Plan, MET SWIM implementation will proceed in accordance with the GANP and ASBU schedule. The current ASBU timelines are as follows:

ASBU Block 0 – 2013 to 2018
ASBU Block 1 – 2019 to 2024: B1-SWIM and B1-AMET
ASBU Block 2 – 2025 to 2030: B2-SWIM and B2-AMET
ASBU Block 3 – 2031 and beyond

1.3.2 All MET SWIM pre-requisite interfaces are included in ASBU Module B1-SWIM and therefore MET SWIM Phase 1 can proceed concurrently with ASBU Module B1-SWIM.

Table 3 - MET SWIM Implementation Timelines

	ASBU Module	Implementation Start	Implementation End
SWIM Registry	**B1-SWIM**	2019	2024
Service security	**B1-SWIM**	2019	2024
MET SWIM Block 1 (Early Adoption/Transition)	**B1-AMET**	2019	2024
MET SWIM Block 2 (Transition)	**B2-AMET**	2025	2030
MET SWIM Phase 3 (Operation)	**B3-AMET**	2031	-

— — — — — — — —