



**Agenda Item 6:      Assessment of the operational requirements to determine the implementation of improvements in communication, navigation and surveillance (CNS) capabilities for en-route and terminal area operations**

**FOLLOW UP ON THE INTERCONNECTION OF AMHS SYSTEMS**

(Presented by the Secretariat)

<b>Summary</b> This working paper is a follow up on the regional activities carried out for the interconnection of AMHS systems since the SAM/IG/7 meeting.	
<b>References:</b> <ul style="list-style-type: none"><li>• SAM/IG/7 meeting report (Lima, Peru, 23-27 May 2011);</li></ul>	
<b>ICAO strategic objectives:</b>	<i>A – Safety</i> <i>D – Efficiency</i>

**1      Background**

1.1      The SAM Region is completing the installation of AMHS systems in practically all the States of the Region. By the end of the first quarter of 2011, an AMHS system was installed in Guyana and another one in Suriname. Bolivia and Ecuador will have their AMHS system installed by the end of 2011. Panama will have a new AMHS system by November 2012, and Uruguay should have implemented an AMHS system by the end of 2012 since it has already drafted a technical specifications document and the bidding process for the purchase of the AMHS system would be completed before the end of 2011. **Appendix A** to this working paper describes the status of AMHS systems installed in the SAM Region.

1.2      Most of the AMHS systems installed in the SAM Region are interconnected through their gateways. Only Peru and Colombia, and Guyana and Suriname are interconnected directly through their MTAs.

1.3      In order to complete the operational interconnection with other AMHS systems installed in the Region, the following Memorandums of Understanding (MoUs) have been signed, wherein the States involved have undertaken to implement the operational interconnection of their AMHS systems: Argentina–Brazil, Argentina–Chile, Argentina–Paraguay, Argentina–Peru, Brazil–Paraguay, Brazil–Peru.

1.4      In order to facilitate the interconnection of AMHS systems in the Region, Argentina developed an AMHS training system, which is installed at the CIPE (Ezeiza), for the conduction of trials with all States that have installed AMHS systems to date.

1.5 Coordination for the establishment of new MoUs between Chile and Peru, between Venezuela and Peru, and between Venezuela and Brazil began at the SAM/IG/7 meeting, with a view to signing them at this SAM/IG/8 meeting.

## **2 Discussion**

### *AMHS interconnection between Argentina and Brazil*

2.1 In early June 2011, preliminary tests started between the MTA of Brasilia and the MTA of CIPE, with satisfactory results. **Appendix B** shows the AMHS addressing scheme adopted for the test. In order to endorse and certify the tests, the Aeronautical Administrations of Brazil and Argentina continue coordinating and developing a protocol to cover all possibilities and eliminate uncertainties in order to operate the system with the P1 protocol without going through the gateway.

2.2 It should be noted that the connection between the MTA of Argentina and Brazil would support the greatest volume of messages in the Region, and it is in the interest of the whole Region to get good results. It is expected that updated information on this interconnection will be presented at the SAM/IG/8 meeting.

### *Argentina-Paraguay and Brazil-Paraguay AMHS interconnection*

2.3 There has been a delay in the interconnection between the MTAs of Ezeiza and Asunción since Paraguay is yet to install the new Stratus server (MTA), and update the software in the MTA and all its terminals. Once the new MTA server is installed, the interconnection between the Asunción MTA (Paraguay) and the Brasilia and Ezeiza MTA will be done using the P1 protocol. The installation of the new MTA, as well as the software update of the AMHS system of Paraguay have been postponed on several occasions, but the equipment is already in Paraguay since mid 2011.

### *AMHS interconnection between Brazil and Peru*

2.4 The connectivity between the Manaus and Lima routers, between the Manaus router and the Lima MTA, and between the Manaus and Lima MTAs has been established. These tests were conducted on the second week of September 2011, and will continue until operational interconnection is achieved between the two MTAs. The results of the last tests conducted, as well as the plans for the operational interconnection between the MTAs will be presented to the Meeting.

### *AMHS interconnection between Chile and Peru, and between Peru and Venezuela*

2.5 At the SAM/IG/7 meeting, the Aeronautical Administrations of Chile and Peru and of Peru and Venezuela coordinated and drafted the respective MoUs for AMHS interconnection. The Aeronautical Administration of Peru signed the MoUs and sent them to the ICAO South American Regional Office in early August 2011. Subsequently, they were sent to Chile and Venezuela for signing. The Regional Office sent the MoUs on the same week they were received. Since the MoUs signed by the Administrations of Chile and Venezuela have not been sent back to the ICAO South American Office, it is expected that the delegates of Chile and Venezuela will bring their MoUs duly signed to the SAM/IG/8 meeting.

### *AMHS interconnection between Argentina and Chile and between Argentina and Peru*

2.6 As to the AMHS interconnection between Argentina and Chile and between Argentina and Peru, there is no information about the progress made to date. According to the MoU signed between Chile and Argentina, tests should have been completed in April 2011, and the commissioning should have taken place in June 2011.

3      **Suggested action**

3.1    The Meeting is invited to:

- a)      take note of the information contained herein;
- b)      analyse the progress made in the implementation of the interconnection of AMHS systems described in section 2 of this working paper;
- c)      establish new MoUs in view of the implementation of new AMHS systems; and
- d)      update the action plan for the interconnection of AMHS systems shown in **Appendix C** to this working paper.

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**APPENDIX A/ APENDICE A**

**STATUS OF IMPLEMENTATION OF AMHS IN THE SAM REGION**  
**ESTADO DE IMPLANTACION DE LOS SISTEMAS AMHS EN LA REGION SAM**

STATE/ ESTADO	MANUFACTURER/ FABRICANTE	YEAR OF INSTALLATION/ AÑO DE INSTALACION	REMARKS/ OBSERVACIONES
ARGENTINA	RADIOCOM	2005	Three MTAs installed: Ezeiza, Cordoba and Comodoro Rivadavia Se tienen instalados tres MTA: Ezeiza; Córdoba; y Comodoro Rivadavia
BOLIVIA	THALES	2011	Equipment in the country and national installation scheduled for the end of 2011 Todo el equipamiento ya se encuentra en el país y su instalación a nivel nacional está previsto para finales del 2011
BRASIL	RADIOCOM	2009	Two MTAs installed: Brasilia; and Manaus Se tienen instalados dos MTA: Brasilia; y Manaus
CHILE	THALES	2010	The AMHS system was completed by the end of 2010 El sistema AMHS se completó a finales del 2010
COLOMBIA	COMSOFT	2009	AMHS interconnectad with Perú. First AMHS interconnection in the CAR SAM Region Está interconectado con el AMHS con Perú. Primera interconexión AMHS en las Regiones CAR/SAM
ECUADOR	RADIOCOM	2007	AMHS installed only in Guayaquil and operates only there, consists of an MTA and some local terminals, this system will be substituted by the new THALES AMHS system. El sistema AMHS está instalado y opera solamente en Guayaquil consiste de un MTA y algunos terminales locales, el sistema será sustituido por el nuevo AMHS THALES.  Ecuador has purchased a new AMHS from Thales to become operational at the beginning of 2012 .Ecuador ha adquirido un nuevo sistema AMHS de Thales que estará en operación a principio del 2012
	THALES	2012	
GUYANA	SKYCOM	2011	Operational since May 2011 . It is AMHS interconnected with Surinam. En operación desde finales de mayo 2011. Está interconectado en AMHS con Surinam
FRENCH GUIANA (FRANCE)			No information available regarding AMHS implementation plans No se tiene información de planes para la implantación de un sistema AMHS
PANAMA	COCESNA	2009	Panama approved the acquisition of a new AMHS system from THALES
	THALES	2012	Panamá aprobó la adquisición de un Nuevo sistema AMHS de la Marca Thales.

STATE/ ESTADO	MANUFACTURER/ FABRICANTE	YEAR OF INSTALLATION/ AÑO DE INSTALACION	REMARKS/ OBSERVACIONES
PARAGUAY	RADIOCOM	2007	Is waiting the installation of a new MTA ad the updating of its AMHS system. Esta esperando la instalacion de un Nuevo MTA y la actualización de su sistema AMHS
PERU	COMSOFT	2009	AMHS interconectad with Colombia in November 2010 First AMHS interconnection in the CAR SAM Region Esta interconectado con el AMHS con Colombia en noviembre de 2010 . Primera interconexión AMHS en las Regiones CAR/SAM
SURINAME	SKYCOM	2011	Operational since the start of 2011. Interconnected with Guyana En operación desde inicios de 2011Interconectado con Guyana
URUGUAY			Currently in the purchasing process Se encuentra en el proceso de adquisición
VENEZUELA	RADIOCOM	2010	AMHS installed since the end of 2010 Sistema AMHS instalado desde finales del 2010

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## APPENDIX B / APENDICE B

State/Estado	MTA	MTA Name / Nombre MTA	MTA Password	Server Name / Nombre Servidor	IP	PRMD	O	OU	CN	CIPE Terminals /
Argentina	CIPE	MTA-CIPE-1	radiocom	nodo-CIPE	10.0.0.1	SA	SAEZ	SAEZ	SAEZMHSA	10 AMHS
									SAEZMHSE	
									SAEZMHSC	
									SAEZMHSD	
									SAEZMHSE	
									SAEZMHSE	
									SAEZMHSE	
									SAEZMHSE	
						Gateway		SAEZFTNA	4 AFTN	
SL	Gateway	SL*****								
SU	Gateway	SU*****								
FA	Gateway	FA*****								
Paraguay	Asunción					SG				
Brasil	Brasilia	isode-br.amhs.mil.br	1S0d3	isode-br.amhs.mil.br	10.0.64.2	SB	SBBR SBBR SBBRAMHS			
USA						K*	Gateway		K*****	
BRASIL	Manaos	ppmn	1S0d3	isode-br.amhs.mil.br	10.0.77.1	SB	SBEG SBEG SBEG ZXAM			
Perú	Lima	MTA-SPIM-1	ICAO- SPIM-1	aida-mta	10.0.192. 0 /19	PERU	SPIM	SPIM	SPIMZYX	
Ecuador										
Chile	Santiago	CHILI	CHILI	AMHS	10.0.32.1	SC	SCSC	SCSC	SCSCYFYX	
España	Madrid					LM				

## APPENDIX C

## ACTION PLAN FOR THE INTERCONNECTION OF AMHS SYSTEMS IN THE SAM REGION

ITEM	ACTIVITY	RESPONSIBLE	EXPECTED RESULT	STATUS	FINALIZATION DATE
1	2	3	4	5	6
1	Review of the ATN Regional Plan as regards AMHS implementation	Secretariat	Revised ATN ground applications plan (Table CNS 1Bb)	Completed	Jun 2009
2	Review and assignment of intra-regional routers IP addressing	Secretariat	Assignment of IP addressing	Completed	Jun 2009
3	Review of CAAAS addressing plan	SAM States	Revised CAAS addressing Plan	Completed	Jun 2009
4	Prepare interconnection protocol tests to determine bandwidth required for transmission of AMHS messages between MTAs through REDDIG	RLA/06/901 project CNS Expert	Protocol interconnection tests. A guide for the operational interconnection of AMHS systems was drafted	Completed	Dec 2009
5	Preparation of Guide for the Operational Interconnection of AMHS Systems in the SAM Region	RLA/06/901 project CNS Expert	Guide for the operational interconnection of AMHS systems in the SAM Region	Completed	Oct 2009
6	Drafting of a model MoU for the interconnection of AMHS	Argentina	Model MoU for the interconnection of AMHS	Completed	Oct 2009
7	<p>MoU for the interconnection of AMHS currently implemented in the SAM Region:</p> <ul style="list-style-type: none"> <li>a) Argentina-Brazil</li> <li>b) Argentina-Chile</li> <li>c) Argentina-Peru</li> <li>d) Argentina-Paraguay</li> <li>e) Brazil-Colombia</li> <li>f) Brazil-Paraguay</li> <li>g) Brazil-Peru</li> <li>h) Chile-Peru</li> <li>i) Colombia-Perú</li> <li>j) Colombia-Panama</li> <li>k) Colombia-Venezuela</li> <li>l) Peru-Venezuela</li> <li>m) Brazil-Suriname</li> <li>n) Guyana-Venezuela</li> <li>o) Suriname-Venezuela</li> <li>p) Brazil-Guyana</li> <li>q) Guyana-Suriname</li> <li>r) Brazil-Venezuela</li> </ul> <p>The AMHS interconnection MoU in Bolivia, Ecuador, French Guiana (France) and Uruguay should be drafted once AMHS installation is completed at national level.</p>	SAM States involved	MoU for interconnection of AMHS systems between SAM States having AMHS implemented.	Valid a), b) c), d), f), g) & i) completed	<ul style="list-style-type: none"> <li>e) Jul 2011</li> <li>h) Oct 2011</li> <li>j) Jul 2012</li> <li>k) Oct 2011</li> <li>l) Oct 2011</li> <li>m) Oct 2011</li> <li>n) Oct 2011</li> <li>o) Oct 2011</li> <li>p) Oct 2011</li> <li>q) Oct 2011</li> <li>r) Oct 2011</li> </ul>

ITEM	ACTIVITY	RESPONSIBLE	EXPECTED RESULT	STATUS	FINALIZATION DATE
1	2	3	4	5	6
8	<p>Phase I</p> <p>Interconnection trials between MTAs of:</p> <ul style="list-style-type: none"> <li>a) Argentina-Brazil</li> <li>b) Argentina-Paraguay</li> <li>c) Brazil-Paraguay</li> <li>d) Colombia-Peru</li> <li>e) Argentina-Chile</li> <li>f) Argentina-Peru</li> <li>g) Brazil-Peru</li> </ul> <p>Types of tests to carry out:</p> <p>Network transportation;</p> <p>Network connectivity;</p> <p>Message exchange;</p> <p>Preparatory phase.</p> <p><b>Note:</b> Inclusion has been made of only the AMHS interconnected between States having implemented and signed the MoU.</p>	Argentina, Brazil, Chile, Colombia, Paraguay, Peru and REDDIG Administration	Interconnection trials between Argentina, Brazil, Chile and Paraguay MTAs	<p>Valid</p> <ul style="list-style-type: none"> <li>a) network transportation and connectivity trials carried out with the Manaus node. MoU was updated, since Brazilian entrance node will be Curitiba. Network connectivity, and transport and exchange of messages tests will be repeated</li> <li>b) network transportation and connectivity, and message exchanges trials carried out.</li> <li>c) MoU was updated, as entrance node to Brazil will be Curitiba, and the network connectivity, and transport and exchange of messages tests will be carried out.</li> <li>d) Operational interconnection trials completed.</li> <li>e), f) and g) No tests carried out</li> </ul>	<ul style="list-style-type: none"> <li>a) Jun 2011</li> <li>b) Jul 2011</li> <li>c) Jul 2011</li> <li>e) Jul 2011</li> <li>f) Jun 2011</li> <li>g) Jun 2011</li> </ul>
9	<p>Operational interconnection implementation at the following MTAs:</p> <ul style="list-style-type: none"> <li>a) Argentina-Paraguay</li> <li>b) Argentina-Brazil</li> <li>c) Argentina-Chile</li> <li>d) Argentina-Peru</li> <li>e) Brazil-Paraguay</li> <li>f) Brazil-Peru</li> <li>g) Colombia-Peru</li> </ul> <p><b>Note:</b> Inclusion has been made of only the AMHS interconnected between States having implemented and signed the MoU.</p>	Argentina, Brazil, Chile, Colombia, Paraguay and Peru	Operational implementation of AMHS systems	g) Colombia and Peru completed and operating	<ul style="list-style-type: none"> <li>a) Oct 2011</li> <li>b) Oct 2011</li> <li>c) Oct 2011</li> <li>d) Oct 2011</li> <li>e) Oct 2011</li> <li>f) Oct 2011</li> </ul>

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