



**Agenda Item 4: Assessment of operational requirements to determine the implementation of improvements in communications, navigation and surveillance (CNS) capabilities for operations in route and terminal area**

**REDDIG II PERFORMANCE**

(Presented by the Secretariat)

**SUMMARY**

This working paper presents information related with the operation of the new regional digital network REDDIG II from its commissioning in January 2015 up to date. The operation of the new interconnection MEVA III/REDDIG II from April 2015 is also described, as well as the progress of the activities for the implementation of the new REDDIG II node in Brasilia and the training foreseen.

**REFERENCES:**

- Fifteenth Workshop/Meeting of the SAM Implementation Group SAM/IG/15 (Lima, Peru, 11 -15 May 2015).
- Fourth Meeting on the Technical-Operational Implementation of the New REDDIG II Digital Network (RTO/4) (Manaus, Brazil 20 to 24 April 2015).
- First MEVA III/REDDIG II Interconnection Coordination Meeting (MIII-RII/INTERCON/01) (Oranjestad, Aruba, 25 to 26 May 2015).

*ICAO strategic objectives:*

*A – Safety*

*B – Air navigation capacity and efficiency*

**1 Background**

1.1 The REDDIG II, the new regional network, started operating in late January 2015. The REDDIG II is a digital network fully based on the Internet protocol (IP) and is made up by two sub-networks: a satellite network consisting of VSAT stations and a ground sub-network over fiber optic links which act as a supporting satellite sub-network.

1.2 The REDDIG II satellite sub-network consists of CISCO series 2901 and 2911 routers and Skywan 7000 satellite MODEMs for the master stations of Manaus and Ezeiza, and the Skywan 1070 for the remaining stations. Continue to be used the INTELSAT IS 14 satellite with the same bandwidth of 4.4 Mhz and TDMA (Time Division Multiple Access) for satellite access.

1.3 The ground sub-network is based on fiber optic links using the IP-based MPLS protocol. The main piece of equipment of this network is the 1921 router, and each node has an access bandwidth of 256 kbits. The ground sub-network is not managed by the REDDIG Administration but by an international company LEVEL 3, that provides fiber optic telecommunication services, and is present in 70 countries and 600 cities around the world.

1.4 Provisional acceptance tests (PSAT) of REDDIG II were conducted from 13 January to 3 February 2015, obtaining the acceptance and signature of all REDDIG II focal points, with observations. The main observations referred to the inoperability of some AFTN, AMHS, switched ATS speech circuits, administrative circuits, the network management system, and the IP speech network for the ATFM service.

1.5 According to the contract signed between ICAO and the INEO & LEVEL 3 consortium, INEO has 40 days to complete all pending activities identified during the PSAT. For final acceptance of the REDDIG II, the final acceptance tests (FNAT) need to be conducted, which, like the PSAT, will be verified and signed by the REDDIG II focal points and by the project management (ICAO) (REDDIG Administration).

1.6 The interconnection between the new MEVA III and REDDIG was completed in April 2015. To this end, a new MEVA III-REDDIG II interconnection contract was signed between ICAO, on behalf of all REDDIG II member States, and the MEVA III service provider, COMSOFT.

### *REDDIG II performance*

2.1 The REDDIG II had some initial operational problems in some services like AFTN, AMHS, some administrative and ATS speech circuits, the IP telephony network for the ATFM service, the management service (NMS), and the freezing in some satellite modems.

2.2 Over time, most issues have been solved, and performance is now stable with high availability. The network still has some issues that are expected to be resolved as soon as possible, such as the implementation of some functions of the network management system, the capacity of the IP telephony service for ATFM, and the intermittent freezing of some satellite MODEMS.

2.3 The final acceptance of REDDIG II will occur when the INEO & LEVEL 3 consortium resolves the aforementioned issues. All the equipment that makes up the REDDIG II has a two-year guarantee starting on the date of final acceptance of the network.

### *Implementation of a new node in the REDDIG II*

2.4 The new node of Brasilia, like all REDDIG II nodes, will have four parts, with two redundant channels to ensure high availability in the network. The first part consists of outdoor equipment: a new antenna of 3.8m in diameter, the LNB receiver elements, and the SSPA for transmission (40-watt amplifier). The second and most important part of the node includes the CISCO 2901 routers that serve as interface with the services, and the satellite modems (SKYWAN 1070) to transmit and receive satellite information. The other two parts comprise the monitoring system and the VPN router for external connection.

2.5 The equipment to access the LEVEL 3 ground fiber optic network consists of two 2901 routers that take over in case of failure of the satellite network. As in the other REDDIG nodes, the bandwidth to access the ground network is 256Kbits/sec.

2.6 The services at the Brasilia node will be as follows: an AFTN circuit with Guyana, 11 AMHS circuits (all States adjacent to Brazil and the circuit with Atlanta through the MEVA III REDDIG II interconnection). Regarding speech circuits, there are three administrative switched circuits and four ATS switched speech circuits. **Appendix A** to this working paper shows the detailed setup of services at the Brasilia node.

2.7 The installation of the new REDDIG node in Brasilia will start in December 2015 and it will be operational by January 2016. **Appendix B** to this working paper contains the implementation timetable for the Brasilia node.

### ***REDDIG II training courses***

2.8 As part of the 2015 training plan for REDDIG II maintenance personnel approved at the Eighteenth REDDIG Coordination Meeting (RCC/18) held in Lima, Peru, on 2-4 March 2015, a basic course on CISCO switches and IP routers will be held in Lima, Peru, on 9-13 November 2015.

2.9 The purpose of this course is to provide the necessary training to the technical personnel responsible for REDDIG II maintenance that lack a solid foundation of knowledge of IP networks and associated equipment (CISCO routers and switches). The objective of the course is to provide the skills and knowledge required for installing, operating and resolving connectivity issues of REDDIG II, including the configuration of switches, routers, and the respective safety implementation.

2.10 The complete basic course consists of two independent parts, and in view of the cost and duration involved, the idea is to conduct the course in two segments: A first segment entitled “*Interconnecting Cisco Network Devices Part 1 (ICND1)*”, to be conducted on 9-13 November 2015, and a second segment entitled “*Interconnecting Cisco Network Devices Part 2 (ICND2)*”, tentatively scheduled for 4-8 April 2016. Course contents (ICND1 and ICND2) are shown (only in English) in **Appendix C**.

2.11 The cost of the course (ICND1) for a maximum of 16 participants is approximately USD 8,000.00 (eight thousand US dollars), to be covered by Project RLA/03/901. In this regard, a fellowship is contemplated for each node installed in REDDIG II.

### ***MEVA-REDDIG interconnection***

2.12 The first MEVA III-REDDIG II coordination meeting was held in Oranjestad, Aruba, 25 to 26 May 2015 in order to coordinate the final activities required for the implementation of aspects still pending for the interconnection of the new MEVA III and REDDIG II networks, the implementation of new interconnection services, the review of the Memorandum of Understanding that provides for technical, operational, and administrative coordination between the MEVA III and REDDIG II networks.

2.13 The coordination meeting was attended by 29 delegates of 9 CAR and SAM States/Territories, one international organisation (COCESNA), the MEVA III service provider, and the REDDIG II Administrator. The main results of the meeting are listed below:

- Establishment of the steps to be taken to complete the implementation of the data (AFTN) and switched speech circuits foreseen for the MEVA III – REDDIG II interconnection.
- Establishment of the action to be taken to complete the implementation of hot lines in Bogota and Caracas, and AFTN circuits with Atlanta from Bogota and Caracas.
- An analysis of the implementation of new circuits in the MEVA III – REDDIG II interconnection during the 2015-2017 period. The circuits considered were the following:

No.	Circuits required	Estimated implementation date
1	Radar data exchange between Curacao and Venezuela	Before 2017
2	Radar data exchange between Colombia and Panama	Mid- 2016
3	Implementation of SAM AMHS circuits with Atlanta <ul style="list-style-type: none"> <li>• Caracas - Atlanta</li> <li>• Brasilia - Atlanta</li> <li>• Lima - Atlanta</li> </ul>	2016-2017
4	<ul style="list-style-type: none"> <li>• Bogota - Panama</li> </ul>	2016- 2017
5	Implementation of Atlanta- PIARCO AMHS circuit through the REDDIG II COCESNA node	2016
6	PIARCO- Curacao AFTN circuit	After 15 June 2015

2.14 In this regard, the meeting formulated Conclusion MIII/RII 1/2, *Confirmation of new interconnection circuit requirements*, requesting the States concerned to confirm the implementation of the circuits listed in the table under paragraph 2.3, so as to coordinate as needed for their implementation.

2.15 Finally, through conclusion MIII/RII 1/3, the meeting reviewed and approved the Memorandum of Understanding between MEVAIII and REDDIGII member States/Territories/International Organisations concerning coordination and cooperation for the MEVA III – REDDIG II interconnection, which is presented as **Appendix D** to this working paper.


## 2 Suggested action

3.1 The Meeting is invited to:

- a) Take note of the information provided;
- b) Follow-up REDDIG II activities as well as the MEVA III/REDDIG II interconnection; and
- c) analyse any other aspect deemed necessary regarding this Agenda Item.

- END -

APPENDIX A

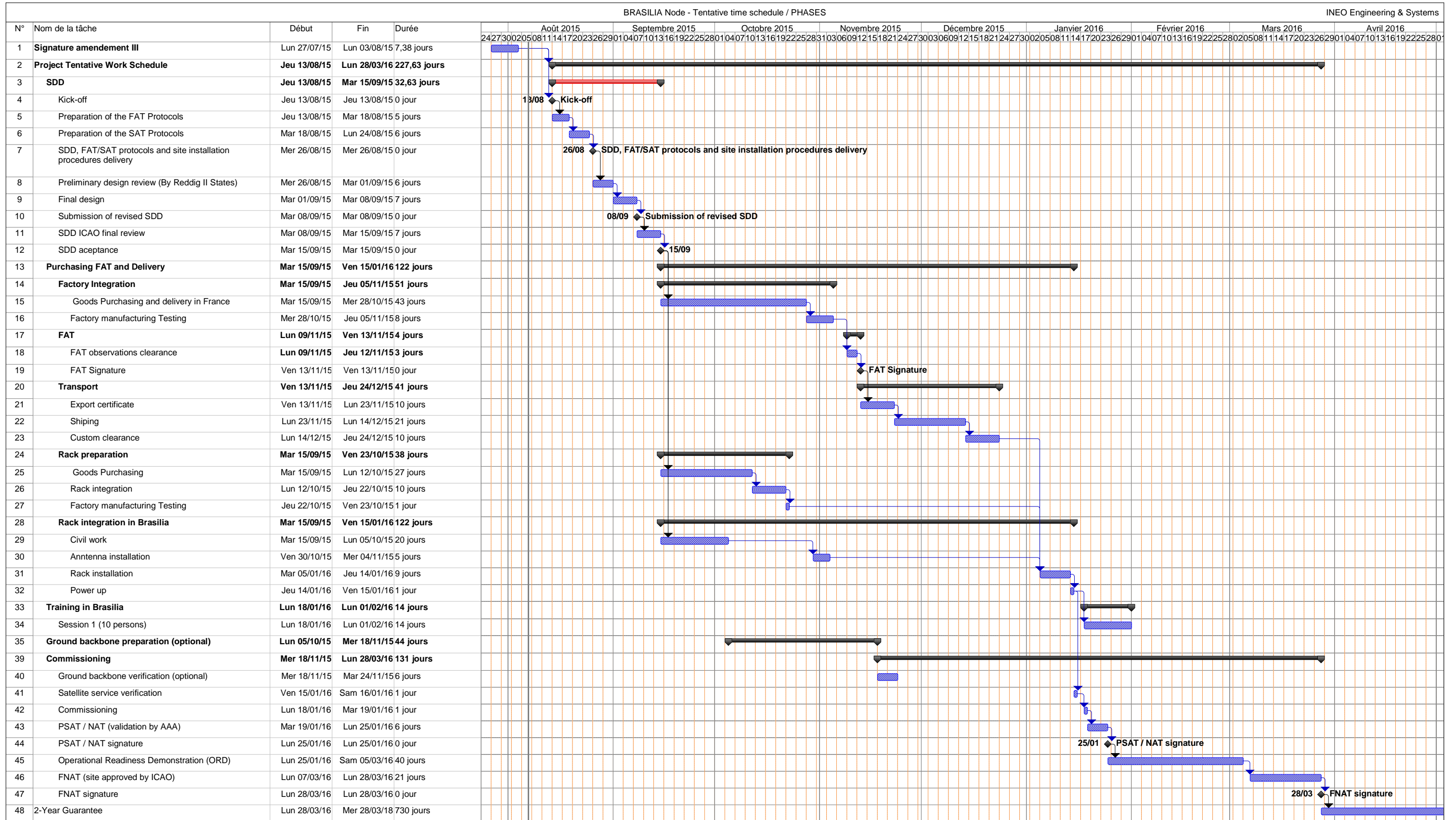
COFELY INEO				Brasilia Services							
TELEPHONY											
Service	PLAR number (autodial)	Destination routing number	Translation rule	Local routing number (station id-number)	#of difgits forwarded	Usual dial number	Router name	Slot/port	Type	Cable number	Plug
							SBBR-CISCO-VSAT-1	0/1/0	FXO		
							SBBR-CISCO-VSAT-1	0/1/1	FXO		
							SBBR-CISCO-VSAT-1	0/1/2	FXO		
							SBBR-CISCO-VSAT-1	0/1/3	FXO		
Mant/Adm						3401	SBBR-CISCO-VSAT-1	0/2/0	FXS		
						Libre	SBBR-CISCO-VSAT-2	0/2/1	FXS		
Mant/Adm						34XXXX	SBBR-CISCO-VSAT-2	0/0/0	E&M type V		
Mant/Adm						34XXXX	SBBR-CISCO-VSAT-2	0/0/1	E&M type V		
ATS/Swtc						34XX	SBBR-CISCO-VSAT-2	0/1/0	E&M type V		
ATS/Swtc						34XX	SBBR-CISCO-VSAT-2	0/1/1	E&M type V		
ATS/Swtc						34XX	SBBR-CISCO-VSAT-2	0/2/0	E&M type V		
ATS/Swtc						34XX	SBBR-CISCO-VSAT-2	0/2/1	E&M type V		
Service	PLAR number (autodial)	Destination routing number	Translation rule	Local routing number (station id-number)	#of difgits forwarded	Usual dial number	Router name	Slot/port	Type	Cable number	Plug
ATS/Swtc						34XX	SBBR-CISCO-GBB-1	0/1/0	E&M type V		
ATS/Swtc						34XX	SBBR-CISCO-GBB-1	0/1/1	E&M type V		
ATS/Swtc						34XX	SBBR-CISCO-GBB-1	0/2/0	E&M type V		
ATS/Swtc						34XX	SBBR-CISCO-GBB-1	0/2/1	E&M type V		
Mant/Adm						3401	SBBR-CISCO-GBB-2	0/0/0	FXS		
							SBBR-CISCO-GBB-2	0/0/1	FXS		
							SBBR-CISCO-GBB-2	0/1/0	FXO		
							SBBR-CISCO-GBB-2	0/1/1	FXO		



Data

SERIAL - AFTN DESTINATION	Router	Port	BSTUN num	Primary /secondary	Cable number	Plug
SOCA	SBBR-CISCO-VSAT-1	0/0/0				
	SBBR-CISCO-VSAT-1	0/0/1				
	SBBR-CISCO-VSAT-1	0/0/2				
	SBBR-CISCO-VSAT-1	0/0/3				
	SBBR-CISCO-VSAT-GBB-1	0/0/0				
	SBBR-CISCO-VSAT-GBB-1	0/0/1				

APPENDIX B



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## Interconnecting Cisco Network Devices Part 1 (ICND1)

### Quién debería asistir

#### Target candidates:

Individuals seeking the Cisco CCENT certification, or Cisco CCNA Routing and Switching certification. The course is also appropriate for support technicians involved in the basic installation, operation, and verification of LAN networks.

#### Key job tasks:

**Configure:** Implement the identified solution by applying the planned implementation processes using Cisco IOS commands and applications in the correct order to the selected devices and portions of the network.

**Verify:** Use the appropriate show commands and applications to ensure that the solution was correctly implemented and is performing as desired.

**Job roles:** Entry-level network engineer, network administrator, network support technician, and help desk technician

### Prerrequisitos

The knowledge and skills that a learner must have before attending this course are as follows:

- Basic computer literacy
- Basic PC operating system navigation skills
- Basic Internet usage skills
- Basic IP address knowledge

### Objetivos del curso

Upon completing this course, you will be able to meet these objectives:

- Describe network fundamentals and build simple LANs
- Establish Internet connectivity
- Manage network device security
- Expand small- to medium-sized networks with WAN connectivity
- Describe IPv6 basics

### Contenido del curso

Interconnecting Cisco Networking Devices, Part 1 (ICND1) v2.0 is a five-day, instructor-led training course that teaches learners how to install, operate, configure, and verify a basic IPv4 and IPv6 network, including configuring a LAN switch, configuring an IP router, connecting to a WAN, and identifying basic security threats. Optionally, this course can be followed by the [Interconnecting Cisco Network Devices Part 2 \(ICND2\)](#) course, which covers topics in more depth and teaches learners how to perform basic troubleshooting steps in enterprise branch office networks, preparing learners for Cisco CCNA certification.

### Esquema Detallado del Curso

#### Day 1: Course Introduction, Building a Simple Network

- Course Introduction
- Module 1: Building a Simple Network
- Lesson 1-1: Exploring the Functions of Networking
- Lesson 1-2: Understanding the Host-to-Host Communications Model
- Lesson 1-3: Introducing LANs
- Lesson 1-4: Operating Cisco IOS Software
- Lesson 1-5: Starting a Switch
- Lab 1-1: Performing Switch Startup
- Lesson 1-6: Understanding Ethernet and Switch Operation
- Lesson 1-7: Troubleshooting common Switch Media Issues
- Lab 1-2: Troubleshooting Switch Media Issues

#### Day 2: Establishing Internet Connectivity

- Review of Day 1
  - Module 2: Establishing Internet Connectivity
  - Lesson 2-1: Understanding the TCP/IP Internet Layer
  - Lesson 2-2: IP Addressing and Subnets
  - Lesson 2-3: Understanding the TCP/IP Transport Layer
  - Lesson 2-4: Exploring the Functions of Routing
  - Lesson 2-5: Configuring a Cisco Router
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## Interconnecting Cisco Network Devices Part 1 (ICND1)

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- Lab 2-1: Performing Initial Router Setup and Configuration
- Lesson 2-6: Exploring the Packet-Delivery Process
- Lesson 2-7: Enabling Static Routing
- Lesson 2-8: Managing Traffic Using ACLs
- Lesson 2-9: Enabling Internet Connectivity

### Day 3: Managing Network Device Security

- Review of Day 2
- Lab 2-2: Connecting to the Internet
- Module 3: Managing Network Device Security
- Lesson 3-1: Securing Administrative Access
- Lab 3-1: Enhancing the Security of the Initial Configuration
- Lesson 3-2: Implementing Device Hardening
- Lab 3-2: Device Hardening
- Lesson 3-3: Implementing Traffic Filtering with ACLs

### Day 4: Building a Medium-Sized Network

- Review of Day 3
- Lab 3-3: Filtering Traffic with ACLs
- Module 4: Building a Medium-Sized Network
- Lesson 4-1: Implementing VLANs and Trunks
- Lesson 4-2: Routing Between VLANs
- Lab 4-1: Configuring Expanded Switched Networks
- Lesson 4-3: Using a Cisco Network Device as a DHCP Server
- Lab 4-2: Configuring a DHCP Server
- Lesson 4-4: Introducing WAN Technologies
- Lesson 4-5: Introducing Dynamic Routing Protocols
- Lesson 4-6: Implementing OSPF
- Lab 4-3: Implementing OSPF

### Day 5: Introducing IPv6

- Review of Day 4
  - Module 5: Introducing IPv6
  - Lesson 5-1: Introducing basic IPv6
  - Lab 5-1: Configure and Verify Basic IPv6
  - Lesson 5-2: Understanding IPv6
  - Lab 5-2: Configure and Verify Stateless Autoconfiguration
  - Lesson 5-3: Configuring IPv6 Routing
  - Lab 5-3: Configure and Verify IPv6 Routing
  - Lab: ICND1 Superlab
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## Interconnecting Cisco Network Devices Part 2 (ICND2)

### Quién debería asistir

ICND2 is designed for those who have a firm background in data networking, have some hands-on experience with Cisco routers and switches, and are looking to increase their knowledge of installation, maintaining, and troubleshooting medium-sized switched and routed networks or for those who are looking to achieve the first level of Cisco certification, the CCNA.

We strongly recommend that other students start with ICND1.

### Prerrequisitos

Before taking [Interconnecting Cisco Network Devices Part 2 \(ICND2\)](#), students should take:

- [Interconnecting Cisco Network Devices Part 1 \(ICND1\)](#)

### Objetivos del curso

Upon completing this course, you will be able to meet these objectives:

- Operate a medium-sized LAN with multiple switches, supporting VLANs, trunking, and spanning tree
- Troubleshoot IP connectivity
- Configure and troubleshoot EIGRP in an IPv4 environment, and configure EIGRP for IPv6
- Configure and troubleshoot OSPF in an IPv4 environment, and configure OSPF for IPv6
- Define characteristics, functions, and components of a WAN
- Describe SNMP, syslog, and NetFlow, and manage Cisco device configurations, Cisco IOS images, and licenses

### Esquema Detallado del Curso

#### Module 1: Implementing Scalable Medium-Sized Networks

- Lesson 1: Troubleshooting VLAN Connectivity
- Lab 1-1: Troubleshooting VLANs and Trunks

- Lesson 2: Building Redundant Switched Topologies
- Lab 1-2: Optimizing STP
- Lesson 3: Improving Redundant Switched Topologies with EtherChannel
- Lab 1-3: Configuring EtherChannel
- Lesson 4: Understanding Layer 3 Redundancy
- Module 2: Troubleshooting Basic Connectivity
- Lesson 1: Troubleshooting IPv4 Network Connectivity
- Lab 2-1: Troubleshooting IP Connectivity
- Lesson 2: Troubleshooting IPv6 Network Connectivity

#### Module 3: Implementing an EIGRP-Based Solution

- Lesson 1: Implementing EIGRP
- Lab 3-1: Implementing EIGRP
- Lesson 2: Troubleshooting EIGRP
- Lab 3-2: Troubleshooting EIGRP
- Lesson 3: Implementing EIGRP for IPv6
- Lab 3-3: Implementing EIGRP for IPv6
- Lesson 4: Module Summary
- Lesson 5: Module Self-Check

#### Module 4: Implementing a Scalable, Multi-area Network, OSPF Based Solution

- Lesson 1: OSPF Overview
- Lesson 2: Multiarea OSPF IPv4 Implementation
- Lab 4-1: Configuring Multiarea OSPF
- Lesson 3: Troubleshooting Multiarea OSPF
- Lab 4-2: Troubleshooting Multiarea OSPF
- Lesson 4: Examining OSPFv3
- Lab 4-3: Configuring OSPF for IPv6
- Lesson 5: Module Summary
- Lesson 6: Module Self-Check

#### Module 5: Wide-Area Networks

- Lesson 1: Understanding WAN Technologies
  - Lesson 2: Configuring Serial Encapsulation
  - Lab 5-1: Configuring and Troubleshooting a Serial Connection
  - Lesson 3: Establishing a WAN Connection Using Frame Relay
  - Lab 5-2: Establishing a Frame Relay WAN
  - Lesson 4: Introducing VPN Solutions
  - Lesson 5: Configuring GRE Tunnels
  - Lab 5-3: Establishing a GRE Tunnel
  - Lesson 6: Module Summary
  - Lesson 7: Module Self-Check
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## Interconnecting Cisco Network Devices Part 2 (ICND2)

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### **Module 6: Network Device Management**

- Lesson 1: Configuring Network Devices to Support Network Management Protocols
- Lab 6-1: SNMP and Syslog Basic Configuration
- Lab 6-2: Analyzing NetFlow Data
- Lesson 2: Managing Cisco Devices
- Lesson 3: Licensing
- Lab 6-3: Managing Cisco Devices and Licensing

### **Module S: ICND2 Superlab**

- Lab S-2: ICND2 Superlab
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## APPENDIX D

### MEMORANDUM OF UNDERSTANDING BETWEEN STATES/TERRITORIES/INTERNATIONAL ORGANISATIONS MEMBERS OF MEVA III AND REDDIG II PROJECT ORGANISATION

#### 1. SECTION 1. INTRODUCTION AND PURPOSE OF THIS DOCUMENT

##### 1.1 INTRODUCTION

1.1.1 With the aim of effectively and efficiently fulfilling aeronautical telecommunications requirements in these regions, the members of the MEVA II and REDDIG VSAT networks decided to interconnect the two networks. For this purpose, the Members agreed to establish this Memorandum of Understanding (MoU). This Agreement is being established jointly under coordination of the ICAO North American, Central American, and Caribbean (NACC) Office in Mexico City, Mexico and the ICAO South American (SAM) Office, in Lima, Peru.

1.1.2 The Third MEVA II / REDDIG Coordination Meeting (MR/3) concluded that the interconnection implementation will operate for a five-year period, as an initial basis, after finalising the implementation.

1.1.3 The First MEVA III / REDDIG II Coordination Meeting concluded that the interconnection implementation will be renewed for five initial year period, after finalizing the implementation.

1.1.4 The main body of this document consists of four (4) sections and 2 Appendices. The content of the sections and appendices is summarised below: In accordance with the interconnection development, when considered necessary, and if the interested Parties of both networks agree to do so, other Appendices could be added as necessary.

Section 1.0: Presents a brief overview and statement of purpose.

Section 2.0: Provides an explanation of the Technical Cooperative Agreement process.

Section 3.0: Describes the technical terms of reference.

Section 4.0: Describes the financial responsibilities of the parties to this agreement.

Appendix A: A list of reference documents used in support of this Agreement.

Appendix B: Technical-operational coordination agreement for the establishment of VSAT MEVA III and REDDIG II networks interconnection

1.1.5 This document is based on the former MEVA II - REDDIG Memorandum of Understanding (MoU).

## 1.2 SECTION 1 – PURPOSE

1.2.1 The goal of this MoU is to foster a coordinated plan for in the development of MEVA III and REDDIG II networks and its interconnection implementation.

1.2.2 This MoU is a living document through which members of the MEVA III and REDDIG II networks shall convene, as necessary and at locations agreed upon, to review or amend the details of the Agreement. Revised versions of this Agreement, or paragraph changes, shall be coordinated and distributed by the ICAO NACC and SAM Regional Offices to the signatory parties of the Agreement as appropriate.

1.2.3 This MoU document establishes the following coordination and cooperation process:

a) The holding of coordination meetings, if required, to analyse and identify the new service requirements for the MEVA III and REDDIG II VSAT networks interconnection.

b) The exchange of technical reports and documentation, program plans and schedules, as may become necessary, to assure the successful and timely completion of these efforts.

c) Operational-technical coordination between the Parties involved in MEVA III and REDDIG II networks, as necessary.

d) Planning, technical coordination, and development participating member States/Territories/International Organisations of the MEVA III and REDDIG II Networks.

## 2. SECTION 2 – THE TECHNICAL COOPERATIVE AGREEMENT PROCESS

2.1 To reach the goal of this MoU, the MEVA III and REDDIG II members have developed an interconnection solution to operate during a five-year phase after the implementation of the interconnection of the MEVA III and REDDIG II Networks.

### 2.2 RELATIONSHIPS AND RESPONSIBILITIES OF THE PARTIES

2.2.1 In order to achieve the interconnection of the networks in a timely and mutually beneficial way, the parties to this Agreement recognise the need to coordinate their actions and exchange updated operational-technical information.

2.2.2 The Parties also recognise the need to develop common technical solutions for interconnecting and/or integrating these networks, in a manner that shall not negatively impact the planned operation, performance, or management of the either network.

2.2.3 ICAO NACC and SAM Regional Offices shall convene coordination meetings, as needed.

2.2.4 The Parties of this MoU agree to exchange reports, technical documents, plans and programming that may be necessary in order to guarantee the interconnection and the implementation of the new services.

2.2.5 The Parties of this MoU agree to implement during a 5 year phase the MEVA III / REDDIG II interconnection solution as presented in Appendix B.

3. **SECTION 3 – TECHNICAL TERMS OF REFERENCE**

3.1 The interconnection solution's objectives and their technical operational principles are described under the Appendix B of this document.

4. **SECTION 4 – FINANCIAL RESPONSIBILITIES OF THE NETWORK PARTIES**

4.1 MEVA III / REDDIG II Members shall, as individual administrations, be responsible for their own financial obligations, in accordance with the Agreement contained in Appendix B.

4.2 The Parties to this Agreement understand that they shall not commit to any action that may result in a financial obligation to other Parties, without first obtaining an Agreement, in writing, from all other parties to this Agreement.

**NOTES:**

MEVA III - The term "MEVA III", as used in this document, refers to the VSAT network currently providing voice and data aeronautical telecommunications services to States/Territories/International Organisations in the Caribbean Region. The network is managed by Caribbean States/Territories/International Organisations members, through the Technical MEVA Group (TMG), and is coordinated by the ICAO NACC Regional Office.

REDDIG II - The term "REDDIG II", as used in this document, refers to the VSAT network presently implemented in the South American region under the technical cooperation project RLA/03/901 coordinated by the ICAO Lima Office.

**APPENDIX A**

## A LIST OF REFERENCE DOCUMENTS USED IN SUPPORT OF THIS AGREEMENT

- Contract N| 2250128 between the International Civil Aviation Organization and COMSOFT GmbH for the provision of the Interconnection of the MEVA III and REDDIG II Satellite Telecommunications Network for MEVAIII and REDDIG II Member States/Territory/International Organization
- Acuerdo de gestión de servicios entre la Cooperación Centroamericana de Servicios de Navegación Aérea (COCESNA) y la OACI Proyecto RLA/09/901 Interconexión del Nodo MEVAII de COCESNA a la REDDIG
- Contract No. 22501200 between the International Civil Aviation Organization and the consortium consisting of INEO Engineering and Systems and LEVEL 3 PERÚ S.A. for the Provision of a New Regional Aeronautical Telecommunication Network (REDDIG II)and associated equipment and services
- Manual de operación de la REDDIG II
- MEVA III Document of Agreement
- MEVA III Service Level Agreement

## **APPENDIX B**

### **TECHNICAL-OPERATIONAL COORDINATION AGREEMENT FOR THE ESTABLISHMENT OF VSAT MEVA III AND REDDIG II NETWORKS INTERCONNECTION**

#### **1. SECTION 1 – PURPOSE OF THIS AGREEMENT**

##### **1.1 PURPOSE**

1.1.1 To establish technical, operational and administrative aspects necessary for the digital VSAT MEVA III and REDDIG II networks interconnection, to meet aeronautical telecommunications requirements between the CAR/SAM Regions.

#### **2. SECTION 2 – CO-OPERATIONAL TECHNICAL PROCESS OF THE AGREEMENT**

##### **2.1 RELATIONSHIP AND RESPONSIBILITIES OF THE PARTIES**

2.1.1 During this stage, the management of MEVA III and REDDIG II shall continue with their respective service providers, i.e, REDDIG II shall continue with its REDDIG Administration, and MEVA III, with the MEVA III Service Provider.

2.1.2 States/Territories/International Organisations members of MEVA III and REDDIG II networks shall be responsible for the normal operation of each of their nodes, having to establish mechanisms necessary to ensure the degree of availability required for each of the services under consideration.

#### **3. SECTION 3 – TECHNICAL TERMS OF REFERENCE**

##### **3.1 TECHNICAL TERMS OF REFERENCE**

3.1.1 Members of MEVA III and REDDIG II networks have mutual interest in establishing the interconnection of their respective communications networks in a manner that they provide the capacity for current and future voice and data aeronautical telecommunications services between the designated nodes within these networks, so as to support aeronautical telecommunications in the CAR/SAM Regions.

3.1.2 The interconnection technical solution shall be carried out under premise that the REDDIG II and MEVA III VSAT network is developed under a full mesh network topology, using TDMA satellite access, as well as a IS-14 satellite transponder with a beam directed over United states / Latin America, C-band operation frequencies and co-linear vertical polarisation.

3.1.3 For the interconnection of the additional equipment to be initially installed at each node involved, MODEM, as well as any other necessary equipment required.

3.1.4 The interconnection implies the following implementations:

a) Additional equipment at Bogota (Colombia) and Caracas (Venezuela), REDDIG II nodes; and

- b) Additional equipment at Tegucigalpa, Honduras, COCESNA MEVA III node.

### 3.2 MANAGEMENT TERMS OF REFERENCE

3.2.1 Implementation of the interconnection option shall not involve modifications to the technical, operational and control management of MEVA III and REDDIG II networks, with exception of the necessary maintenance coordination procedures detailed in paragraph 3.2.5 of this Attachment.

3.2.2 The configuration, synchronisation, supervision and control of additional MODEMS participating in the interconnection and installed at REDDIG II nodes, shall be carried out by the MEVA III Network Control Centre (NCC). Also, the configuration, synchronisation, supervision and control of additional MODEMS participating in the interconnection and installed at MEVA III nodes, shall be carried out by the REDDIG NCC.

3.2.3 The bandwidth, number and type of circuits installed in the MEVA III node for communications with REDDIG II, shall be managed by REDDIG II.

3.2.4 The bandwidth, number and type of circuits installed in the REDDIG II node for communications with MEVA III, shall be managed by MEVA III.

#### 3.2.5 Maintenance coordination procedures between the NCCs

3.2.5.1 When there is any problem in a REDDIG II node, with the MODEM or other equipment involved in the interconnection with MEVA III, the following shall be applied:

- a) MEVA III Service Provider shall call the REDDIG II Administration informing of the happening;
- b) The REDDIG II Administration shall phone the respective node and shall establish an audio teleconference between MEVA III Service Provider and Caracas or Bogota local technicians, as necessary;
- c) REDDIG II NCC, under control of the REDDIG II Administration, shall supervise communications between MEVA III Service Provider and REDDIG II nodes technicians.
- d) The MEVA III Service Provider is the only one that may call the REDDIG II Administration to start or close the respective trouble ticket.

3.2.5.2 When there is any problem in a MEVA III node, with the MODEM or other equipment affect the interconnection with REDDIG, the following shall be applied:

- a) The REDDIG II Administration shall call the MEVA III Service Provider informing of the happening;
- b) The MEVA III Service Provider shall call the respective node and shall establish an audio conference between REDDIG II Administration and local technicians, as necessary;

- c) MEVA III NCC, under control of the Service Provider, shall supervise communications between REDDIG II Administration and MEVA III nodes technicians.
- d) The REDDIG II Administration is the only one that may call the MEVA III Service Provider to start or close the respective trouble ticket.

### 3.2.6 Security requirements

3.2.6.1 The minimum security arrangements required by REDDIG II, and that should be followed by the MEVA III, are:

- a) MEVA III network have no direct communications with public networks.
- b) The equipment is not shared with services different to MEVA III.
- c) Access restriction to equipment belonging to the network, through the use of a password.
- d) The network must exclusively support services to which it was originally constituted for.

3.2.6.2 The minimum security arrangements required by MEVA III, and that shall be followed by REDDIG II, are:

- a) REDDIG II network have no direct communications with public networks.
- b) The equipment is not shared with services different to REDDIG II.
- c) Access restriction to equipment belonging to the network, through the use of a password.
- d) The network must exclusively support services to which it was originally constituted for.

## 4. SECTION 4 – FINANCIAL RESPONSIBILITIES OF THE PARTIES

### 4.1 EQUIPMENT PURCHASING

4.1.1 Additional equipment to be installed at REDDIG II nodes, with MEVA III MODEMs requirements, can be included in the leased contract established between ICAO, in behalf of the REDDIG II members, and the MEVA III Service Provider in accordance with the requirements established for the interconnection.

4.1.2 Additional equipment to be installed at MEVA III nodes, with REDDIG II MODEMs requirements, can be purchased by MEVA III members (States, Territories, Organisations) in accordance with the requirements established for the interconnection.

## 4.2 SPARE PARTS LOT PURCHASING

4.2.1 The spare parts for the additional equipment to be installed at the REDDIG II nodes, with MEVA III MODEM and other device requirements, can be included in the leasing contract established between ICAO, on behalf of the REDDIG II States, and the MEVA III Service Provider.

4.2.2 The spare parts for the additional equipment to be installed at the MEVA III nodes, with REDDIG II MODEM and other device requirements, shall be purchased by MEVA III Members.

## 4.3 MAINTENANCE

4.3.1 The additional equipment that would be installed in the REDDIG II nodes and that would route communications requirements with MEVA III nodes, shall be maintained by the MEVA III Service Provider, under the coordination of the REDDIG II Administration.

4.3.2 The additional equipment that would be installed in the MEVA III node, with communications requirements with REDDIG II nodes, shall be maintained by MEVA III Member, in coordination with the REDDIG II and the MEVA III Service Provider.

## 4.4 SPACE SEGMENT

4.4.1 The carriers, as well as the band width requirement for communications between REDDIG II nodes shall be the same as those currently rented with INTELSAT. The payment of the space segment to INTELSAT shall continue being carried out through the REDDIG II Administration, who shall be in charge of collecting contributions from each SAM State member of REDDIG II.

4.4.2 The carriers, as well as the band width requirement for communications between MEVA III nodes shall be done through the MEVA III Service Provider. MEVA III members shall pay the bandwidth consumption to the MEVA III Service Provider.

4.4.3 The circuits necessary for communications between a REDDIG II node having MODEMs participating in the interconnection with MEVA III shall be administrated by the MEVA III Service Provider. The amount charged for circuits used by the REDDIG II Member of the aforementioned node mentioned shall be provided by the MEVA III Service Provider, and the respective consumption payment to the provider shall be made through REDDIG II Administration.

4.4.4 The circuits necessary for communications between a MEVA III node having MODEMs participating in the interconnection with REDDIG II shall be administrated by REDDIG II. The amount charged for circuits used by the mentioned node shall be provided by the REDDIG Administration, and the respective consumption payment shall be made by the MEVA II member of the aforementioned node to the REDDIG II Administration.