Agenda Item 4: **Approval of REDDIG III technical specifications**

REDDIG III CONCEPT

(Presented by the Secretariat)

SUMMARY

This working paper presents information concerning plans for the implementation of the SAM digital network in its REDDIG III version, expected to be operational in January 2025.

References

- Twenty-eighth meeting of the REDDIG Coordination Committee (RCC/28) (Lima, 2-4 May 2022)
- Ninth technical and operational meeting of REDDIG II (RTO/09) (Virtual, 13-14 October 2022)
- REDDIG Contract 22502088 and Amendment I
- Contract 22501200 and Amendment IX

ICAO strategic objectives:	*A – Safety* *B - Air navigation capacity and efficiency*

1. Introduction

1.1 Through a regional technical cooperation project (RLA/98/019), the International Civil Aviation Organization implemented for the participating States the digital network infrastructure called the SAM digital network (REDDIG). REDDIG became operational in September 2003 (REDDIG I).

1.2 For initial management of the network during the first 5 years of operation, the States signed an agreement with ICAO within the framework of another regional technical cooperation project (RLA/03/901 - *REDDIG Management System and Administration of the Satellite Segment*). This agreement was originally envisaged to serve until the Region organised a regional multinational mechanism.

1.3 Since negotiations for the establishment of a regional multinational organisation (RMO) did not take place, REDDIG participating States, through meetings of the REDDIG Coordination Committee, renewed the agreement with ICAO in 2008, 2013 and 2018 in order to keep Project RLA/03/901 in force until 2025. Thus, in September 2023, regional technical cooperation Project RLA/03/901 - *REDDIG Management System and Administration of the Satellite Segment* will have 20 years of existence.

1.4 In addition to activities involving network management and operation, Project RLA/03/901 is also aimed at implementing CNS/ATM applications in accordance with regional air

navigation plans, taking over the satellite segment lease, and taking the necessary measures to upgrade the network infrastructure in accordance with operational needs and available technological developments.

1.5 In addition to the aforementioned activities, this project has enabled continuing interconnection with the NAM/CAR network (MEVA); REDDIG was upgraded in 2015 (REDDIG II) in order to have a ground network (MPLS) as a backup to the primary IP network (satellite); and provides ongoing support to the implementation of new applications such as AMHS (ATS message handling system), AIDC (ATS interfacility data communication) and ADS-B (automatic dependent surveillance - broadcast). The regional project has also installed cyber security equipment (firewalls and associated equipment) to improve the security resilience of the network.

1.6 In order to carry out these activities, the regional project was structured as follows:

- Project coordination committee: Formed by representatives of the States and whose function is to approve, define, follow up and assess the activities carried out by the project and its budget in order to achieve its objectives.
- Technical and administrative management of the project:
  - Responsible party: Director of the SAM Regional Office, supported by the Communications officer and the Technical Assistance officer of the Regional Office.
  - Network administrator, in charge of the technical operation of the network; based in Manaus, Brazil.
  - Administrative support shared with other regional projects and also provided by the Regional Office.

2. Discussion

MANAGEMENT AND ADMINISTRATION OF REDDIG

2.1 In the absence of a clear indication by the participating States of the creation of the regional multilateral organisation to manage and administer the regional network, it is understood that they will have to renew the agreement and keep Project RLA/03/901 in force for another 5 years.

2.2 Although the operation and maintenance of aeronautical systems are the responsibility of the member States of the Organization, within the framework of specific agreements, such as Project RLA/03/901, ICAO is exceptionally performing these tasks in support of member States, who are providing the necessary means so that ICAO may fulfil the commitments undertaken.

2.3 An assessment of project management during the lifetime of Project RLA/03/901 shows that ICAO has satisfactorily performed the task of managing and administering the regional network for the participating States. In this regard, it should be noted that this activity has had some impact on the South American Regional Office, which has a limited number of staff to engage in managing contracts, administering resources, operating and maintaining services/equipment, specifying new systems/services, delivering training and providing maintenance logistical support. This impact has been largely offset by the progress and achievements made by each of the States in the Region, but it is noted that the current structure is showing limitations to absorb more activities on behalf of the network.

2.4 The increased scope of the network and the complexity of the new systems/services supported by the regional network require the provision of the necessary means so that those responsible for its management and administration can meet the expectations of the participating States.

2.5 In order to ensure efficient management without overstraining the ICAO SAM Office, it is important that Project RLA/03/901 has the necessary human resources dedicated exclusively to the activities of the project.

2.6 In this sense, it is deemed important that the participating States consider the possibility that, for REDDIG III, Project RLA/03/901 have a Project Manager who would be exclusively responsible for the management of the regional project, with the support of an administrative assistant. It should be noted that, in this proposal, the Regional Office continues to support the project; it just considers having staff fully dedicated to the management of the project.

2.7 The Project Manager and the administrative assistant would work in the premises of the SAM Regional Office, receiving direct support from CNS and Technical Cooperation officers, as well as from the other Regional Office staff, as appropriate.

2.8 Figure 1 illustrates the proposed management structure for Project RLA/03/901.

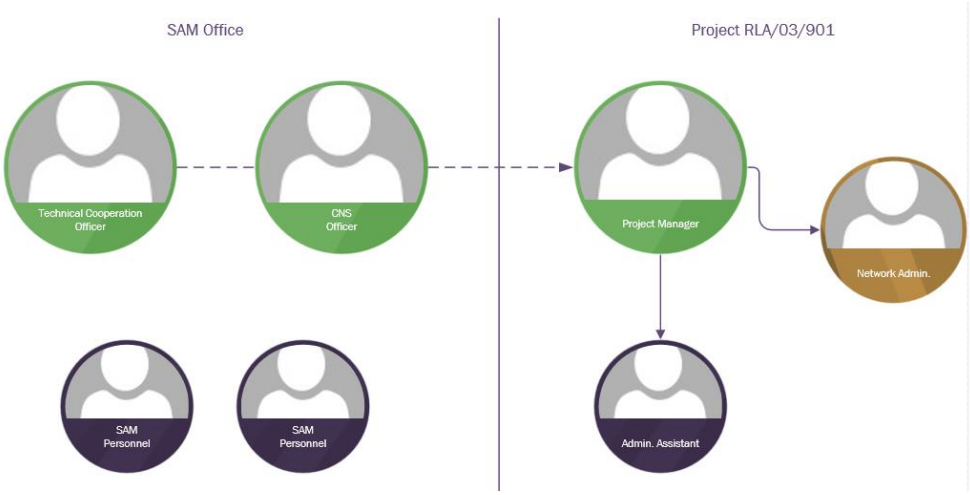


Figure 1 – Management proposal for Project RLA/03/901

2.9 This proposal would imply the inclusion in the project of the annual cost of the project manager of USD150,000, and the annual cost of an administrative assistant of USD30,000.

REDDIG III

2.10 The experience gained in REDDIG II with the contracting of the MPLS service through a telecommunication service provider (TSP) has shown that the telecommunication infrastructure has improved significantly in the Region, and that it is no longer necessary to implement a telecommunication system of its own, as was the case with the satellite network (VSAT) of REDDIG I and REDDIG II.

2.11 The analyses performed by the REDDIG III *ad hoc* group revealed that high CAPEX (capital expenditure) to upgrade the satellite network, as well as significant OPEX (operating expenses) to operate and maintain the satellite network during its lifetime are no longer justified, since telecommunication services are already being provided at more reasonable costs and with media redundancy.

Basic architecture for REDDIG III

2.12 The REDDIG III concept is that the MPLS service provider will provide, at the very least, a primary link (preferably fibre optics) and a redundant link that could be fibre optics, radio link, satellite link, or other available technology that meets the technical requirements.

2.13 It is important that the redundant link does not share the infrastructure used by the primary link, to avoid the possibility of a common point of failure. For example, if the redundant link is also fibre optics, it should have a completely different path from the primary link, not sharing duct infrastructure or common areas.

2.14 For some nodes, the contracting of the secondary link will be optional, depending on the availability required and the costs proposed by the telecommunication service provider (TSP).

2.15 Figure 2 illustrates the concept of the basic architecture for REDDIG III.

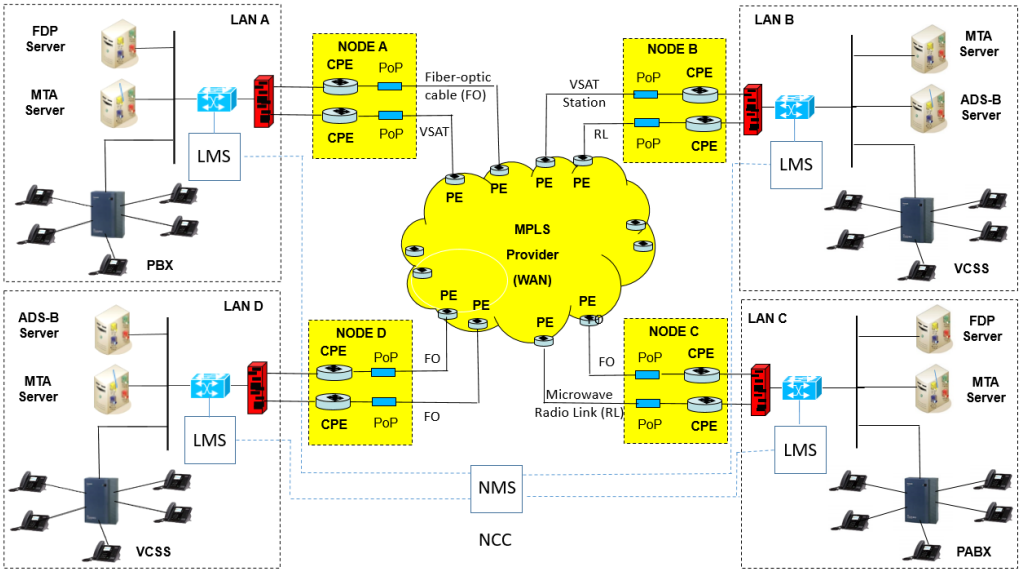


Figure 2 – Basic architecture for REDDIG III

Interconnection with other regional networks

2.16 Another important concept applied in REDDIG III is for the telecommunication service provider to ensure interconnection with other regional IP networks of the aeronautical context.

2.17 The contractor must make the necessary arrangements with other telecommunication service providers that provide services in other ICAO Regions to ensure communication between REDDIG III nodes and the nodes of existing regional IP networks. Figure 3 illustrates this requirement.

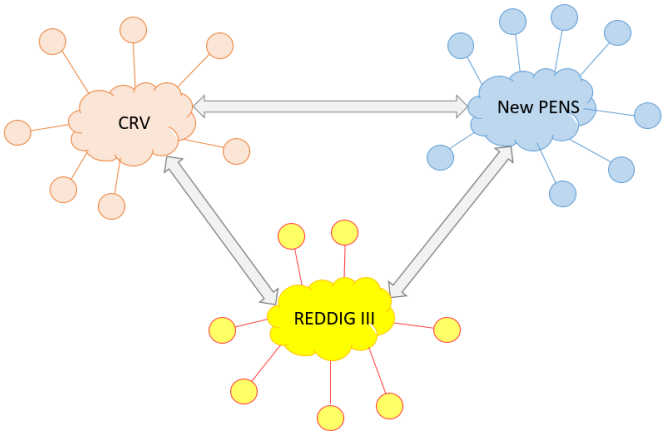


Figure 3 – Interconnection with other regional IP networks

2.18 Table 1 lists the minimum connections that need to be ensured between REDDIG III nodes and nodes of other regional networks. Contracting interconnection with other regional IP networks will be optional, depending on implementation conditions and cost.

Table 1 – Interconnections with other regional IP networks

REDDIG III node	**Regional IP network**	**Service provider**	**Node**
SAEZ (Ezeiza)	New PENS	BT	Madrid
SVMI (Maiquetia)	New PENS	BT	Madrid
SBBR (Brasilia)	New PENS	BT	Madrid
SBBR (Brasilia)	New PENS	BT	Lisbon
SBRJ (Rio de Janeiro)	New PENS	BT	EUROCONTROL
SCEL (Santiago)	CRV	PCCW Global	Christchurch
MSSS (Ilopango)	CRV	PCCW Global	Tahiti
SPIM (Lima)	CRV	PCCW Global	Tahiti
SEQU (Guayaquil)	CRV	PCCW Global	Tahiti
SKBO (Bogota)	CANSNET	To be determined	Kingston
SKBO (Bogota)	CANSNET	To be determined	Curacao
SVMI (Maiquetia)	CANSNET	To be determined	Curacao
SVMI (Maiquetia)	CANSNET	To be determined	Aruba
SVMI (Maiquetia)	CANSNET	To be determined	San Juan

Network administration

2.19 In the current version of the network (REDDIG II), the network manager is responsible for managing network services, providing assistance for the implementation of new services/circuits (permanent or temporary) in support of aeronautical applications. Additionally, with the assistance of technicians from the Manaus NCC (provided by the Brazilian administration), the network manager monitors the satellite network equipment and supports the technicians of the participating States in the maintenance of the nodes.

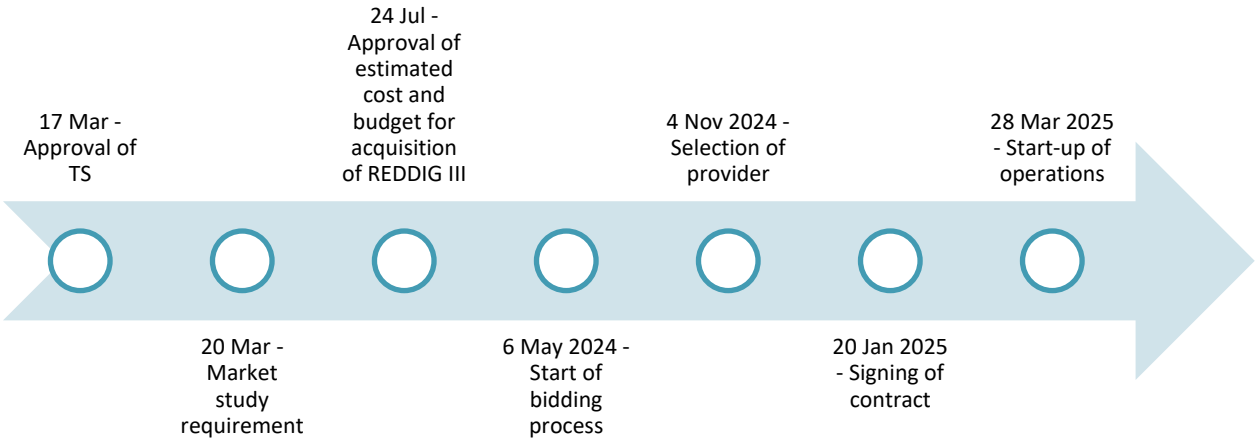
2.20 Once the proprietary satellite network ceases to exist in REDDIG III and all the telecommunication structure to provide the (primary and redundant) links of the nodes belongs to the telecommunication service provider (TSP), the network manager can focus exclusively on the management of the services carried on the network.

2.21 It is deemed advisable for States to start considering relocating the Network Manager to Lima, Peru, so as to have the work team in one single location.

Technical specifications for REDDIG III

2.22 The draft technical specifications have been forwarded to the representatives of each State, and each item will be reviewed during the Meeting.

2.23 Once the draft technical specifications have been reviewed, subsequent steps to begin the bidding process can be taken. Accordingly, the following tentative work schedule is submitted to the consideration of the Meeting:



3 Suggested action

3.1 The Coordination Committee is invited to:

a) take note of the information provided herein;
b) discuss Project RLA/03/901 management proposals;
c) review the draft technical specifications for REDDIG III; and
d) discuss any other issue related to this topic.

– END –