



SEMINAR/WORKSHOP ON NEW TECHNOLOGIES IN SATELLITE AND GROUND NETWORKS

(Lima, Peru, 18-20 July 2011)

INTRODUCTION

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BACKGROUND ON IMPLEMENTATION CURRENT REDDIG NETWORK



- Since 1994, SAM States started examining various digital communications systems with the aim of implementing a regional network to support voice and data communications between ATS units, increase availability, decrease costs and facilitate the implementation of new services.
- GREPECAS/6 (1996) formulated Conclusion 6/27 - *IMPLEMENTATION OF THE DIGITAL NETWORK FOR THE SAM REGION*, which requested the SAM Regional Office to, in coordination with SAM States, establish a better technological alternative for the implementation of the SAM digital network.
- The third meeting of REDDIG (Lima, Peru, 21 to 23 October 1998) was instrumental in establishing an institutional arrangement among SAM States for the implementation of REDDIG.
- REDDIG became operational in September 2003.

BACKGROUND ON IMPLEMENTATION CURRENT REDDIG NETWORK



SOUTH AMERICAN DIGITAL NETWORK (REDDIG) - RLA/03/901 PROJECT

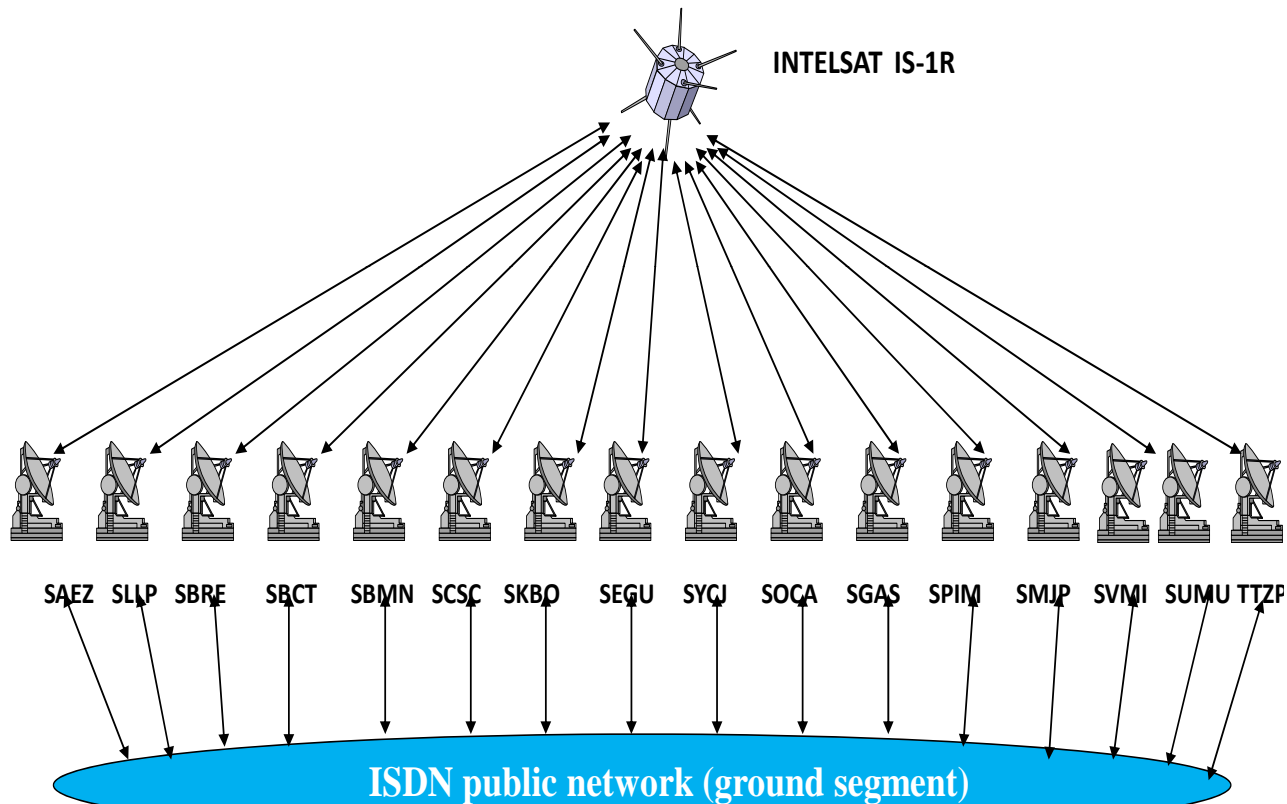
REDDIG GENERAL OBJECTIVES

- Use digital technology to improve current voice and data aeronautical communications, as regards capability, reliability and efficiency.
- Provide a digital communications platform to implement systems and services taken under consideration in the ICAO CNS/ATM systems concept.
- Provide quality service parameters appropriate to the requirements of the ATM units.
- Provide an integral network management.
- Reduce current and future (ten years time frame) communications costs.
- Facilitate regional integration and enable systematic implementation of facilities and services.

BACKGROUND ON IMPLEMENTATION CURRENT REDDIG NETWORK



REDDIG current configuration

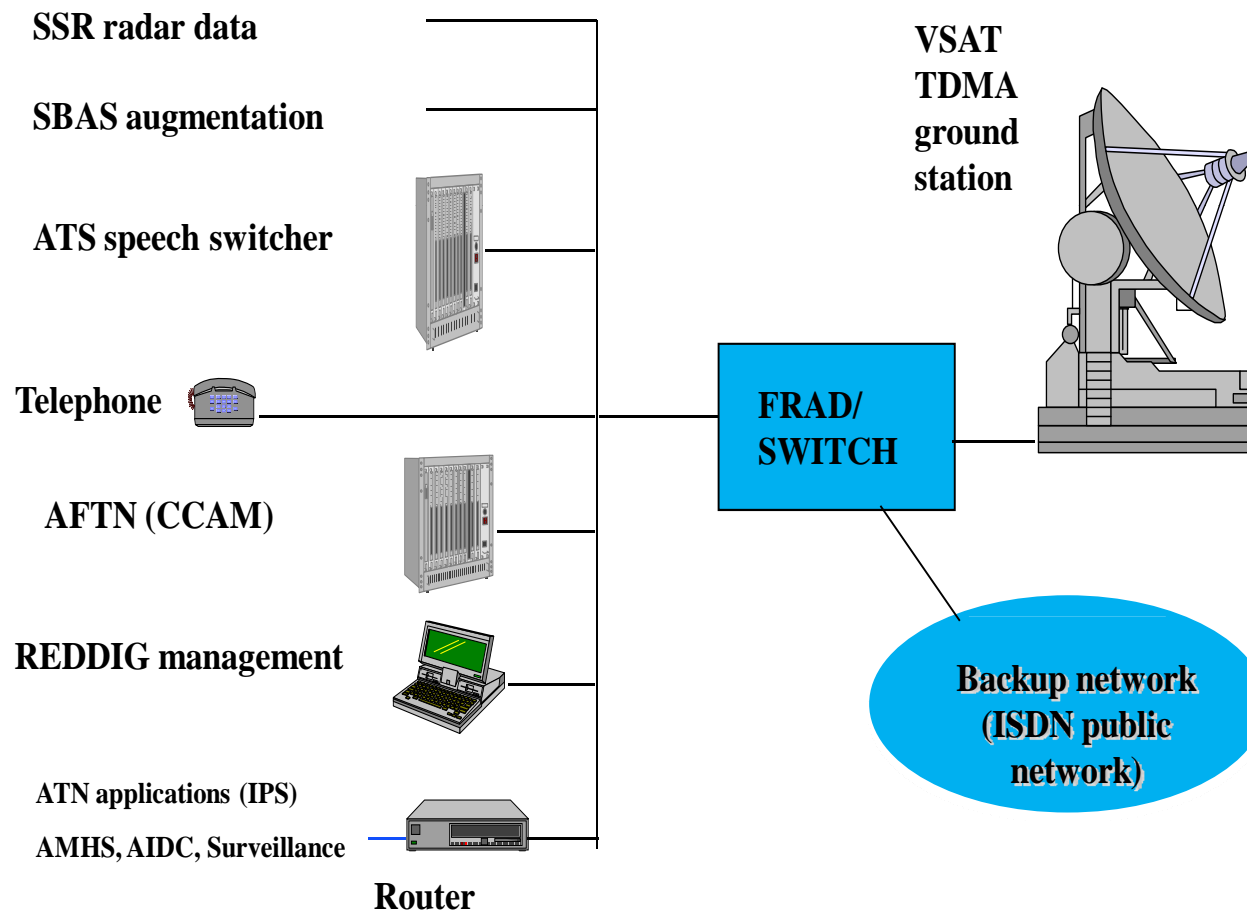


Open multiservice/multiprotocol architecture network with frame relay platform, frame relay TDMA access and the ISDN public network as a secondary means

BACKGROUND ON IMPLEMENTATION CURRENT REDDIG NETWORK



TYPICAL REDDIG NODE



REDDIG II IMPLEMENTATION PROCESS



- During the twelfth meeting of the REDDIG Coordination Committee (RCC/12) (Lima, Peru, 9-10 March 2009), information was provided that ViaSat and MEMOTEC would no longer be commercializing their Linkway 2100 (Modem satelital) and CX950/950e (FRAD) products, respectively.
- The Meeting decided to purchase a lot of equipment and spare parts for the satellite modem and FRAD equipment, and draft an initial plan for the completed technological change of the current REDDIG equipment, formulating Conclusion RCC 12/1 - *Actions to keep the operability of REDDIG equipment of the next years.*

REDDIG II IMPLEMENTATION PROCESS



Conclusion RCC/12-1 Actions to keep the operativity of REDDIG equipment of the next years

Taking into consideration that REDDIG's current equipment meets current and future services' requirements, and that the MEMOTEC FRAD and Linkway MODEM will be discontinued, it is urged that:

- a) the current REDDIG equipment is kept for a minimum initial period of three years;
- b) by 30 July 2009 REDDIG project purchases the MEMOTEC FRAD equipment presented in Appendix F to this Agenda Item;
- c) by 2010 the Linkway MODEM equipment spare parts listed in Appendix G to this Agenda Item be purchased; and
- d) the REDDIG Administration elaborates a plan for a complete technology change to the current REDDIG equipment, for its implementation within a period minimum of three years, starting 2009, taking under consideration aspects related to MEVA II / REDDI G interconnection, and that it be presented at RCC/13 meeting.

REDDIG II IMPLEMENTATION PROCESS



- RCC/13 meeting (Lima, Peru, 9-10 March 2010), in follow-up to the implementation of RCC 12/1 - *Actions to keep the operability of REDDIG equipment of the next years*, regarding the drafting of a plan for a complete technology change of the current REDDIG equipment, analyzed two action plans, one proposing the gradual technology change of REDDIG and the other, considering an overall change.
- The Meeting established an Ad Hoc composed by Argentina, Brazil and Peru which, after having analyzed the indicated proposals, considered it necessary to complete a preliminary study before being able to implement any action plan.
- To make progress in the studies made by the Ad Hoc Group, the Meeting considered the possibility that the study continue being analyzed by the SAM/IG/5 meeting, to be held in Lima, from 10 to 14 May 2010.

REDDIG II IMPLEMENTATION PROCESS



PRELIMINARY STUDIES TO BE CONDUCTED FOR THE CHANGE OF THE REDDIG TECHNOLOGICAL PLATFORM

(Information prepared by the ad Hoc Group made up of Argentina, Brazil and Peru)

For the study, the following criteria were taken into consideration: Availability; BER; Bandwidth (BW); Current Technology (equipment installed); Types of services to be implemented; AND Unique telecommunications provider.

1.2 Considering the criteria previously determined, the following is proposed:

Case 1:

Analyze a primary terrestrial network for current applications and ATN and necessary bandwidths.
Analyze a back up satellite network in case of contingency.

Case 2:

Analyze a primary satellite network for current applications and ATN and necessary bandwidths.
Analyze a back up network in case of contingency.

To determine the appropriate equipment.

Perform cost-benefit studies for each of the proposed solutions

The final solution (full or gradual change) will be analyzed after the associated costs to study the impact on each of them are available.

REDDIG II IMPLEMENTATION PROCESS

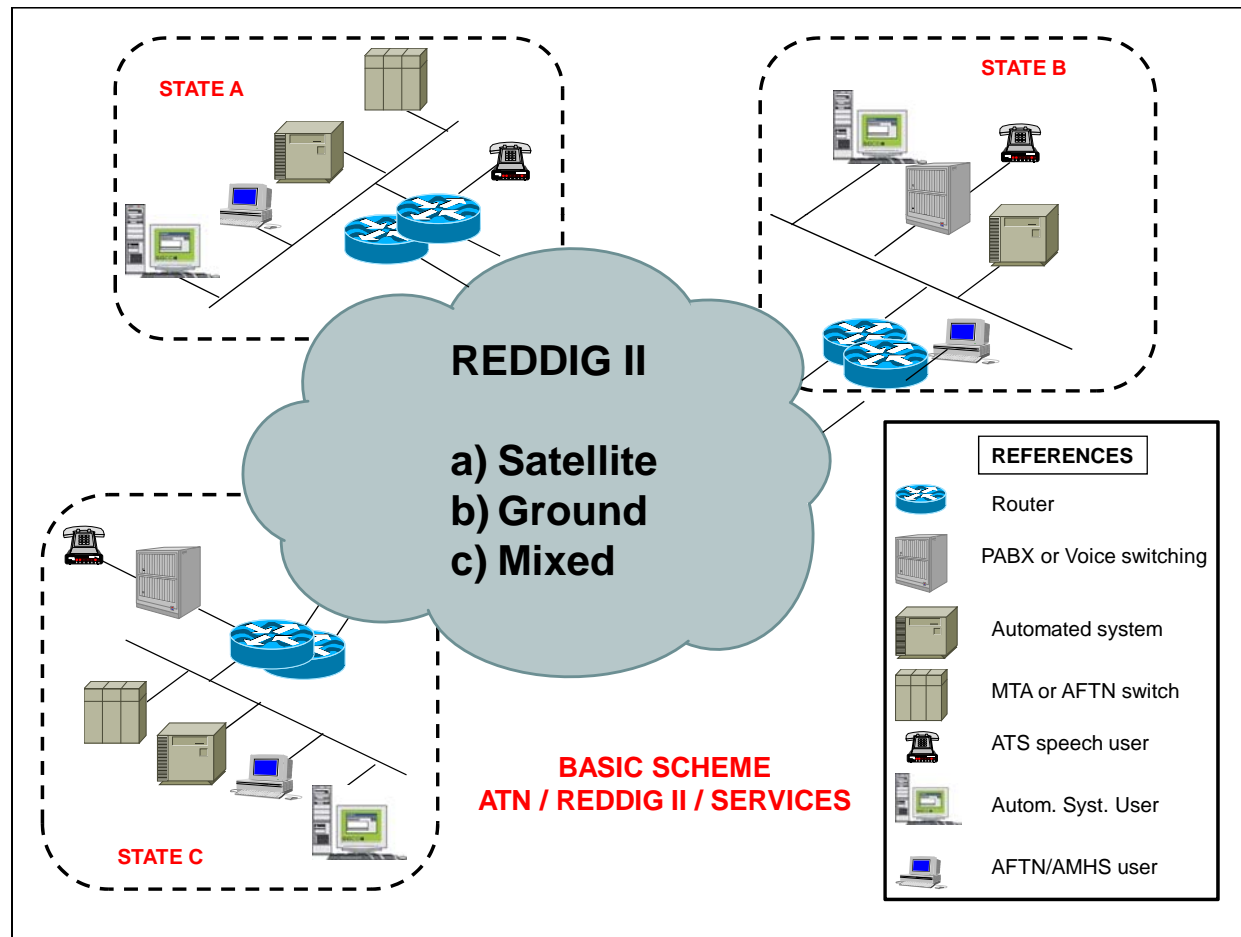


- The study on the new digital network was carried out thanks to the active participation of communications experts from two SAM States, Argentina and Brazil. These experts worked practically throughout 2010 in the search for the necessary information (REDDIG current status, type of communications network technology, communications services costs), as well as the holding of trials to determine the bandwidth required for the implementation of new services in support of air navigation.
- The study carried out takes under consideration an analysis on the current situation of REDDIG, the bandwidth requirements necessary to support current aeronautical fixed services, radar data, as well as the new services foreseen to support air navigation, an analysis of the various network configurations (satellite, ground and mixed) and a comparative study to the networks under analysis.

REDDIG II IMPLEMENTATION PROCESS



NEW DIGITAL NETWORK STUDY



REDDIG II IMPLEMENTATION PROCESS



The SAM/IG/6 meeting (Lima, Peru, 18 to 23 October 2010) took note of the work presented for the implementation of an ATN network for the SAM Region, which proposes a mixed configuration (satellite + ground) as the most appropriate backbone for this network, which brought about a long debate which concluded that, even though a first analysis makes that the proposed option seem the most convenient, the following actions be established:

- a) That the study be circulated to States for comments by 31 January 2011;
- b) Request the Fourth Coordination Committee Meeting (RCC/4) of RLA/06/901 project to approve the holding of a “seminar/workshop on new satellite and ground network technology”, where providers and service integrators can expose the various available technological solutions, but delimited within the basic guidelines required. Same would be carried out from 14 to 16 March 2011;
- c) That during the Fourteenth Coordination Committee Meeting (RCC/14) of REDDIG, to be held in Lima from 17 to 18 March 2010, the final configuration to be adopted be established; and
- d) Request the fourth coordination committee meeting of RLA/06/901 project to approve the requirement for a communications expert for a 15-day period to elaborate a technical specifications document for the implementation of a SAM ATN network.

Conclusion SAM/IG/6-10 - *Review to the study for a new SAM digital network was formulated.*

REDDIG II IMPLEMENTATION PROCESS



- In follow-up to Conclusion SAM/IG/6-10, Argentina, Brazil, Chile and Panama sent their comments to the ICAO SAM Regional Office regarding the study for a new digital network in the SAM Region.
- The fourteenth meeting of the REDDIG Coordination Committee (RCC/14), held in Lima from 16 to 17 March 2011, approved the study and examined the action plan for the implementation of the new digital network in the SAM Region.

REDDIG II IMPLEMENTATION PROCESS



ACTION PLAN FOR THE IMPLEMENTATION OF REDDIG II

ACTIVITIES	ACTION TO BE TAKEN BY	DELIVERABLE	TARGET DATE	REMARKS
1	2	3	4	5
1 Identify current voice and data services requirements, as well as those scheduled to be implemented in the short, medium and long term in the SAM Region, in support of air navigation	SAM/IG Group for the implementation of CNS improvements	List of services requirements in support of air navigation for the SAM Region, including those scheduled for the short, medium and long term	SAM/IG/6	Completed. Identified in the study
2 Analysis of band width required for the services identified in Activity 1	SAM/IG Group for the implementation of CNS improvements	Amount of band width required to support the requirements specified in Activity 1	SAM/IG/6	Completed. Identified in the study
3 Determination of costs for the band width increase in REDDIG	SAM/IG Group for the implementation of CNS improvements	Implementation costs of new REDDIG services	SAM/IG/6	Completed. Identified in the study
4 Study of the new REDDIG technological platform and determination of its cost	SAM/IG Group for the implementation of CNS improvements	Definition of the REDDIG technological platform	SAM/IG/6	Completed. Identified in the study
5 Study of a ground SAM IP structure supporting the services required and defined in Activity 1, as well as of the band width requirements defined in Activity 2	SAM/IG Group for the implementation of CNS improvements	Definition of a SAM ground IP network model structure	SAM/IG/6	Completed. Identified in the study
6 Determination of costs for the implementation of Activity 5	SAM/IG Group for the implementation of CNS improvements	Implementation costs of SAM ground IP network structure	SAM/IG/6	Completed. Identified in the study

REDDIG II IMPLEMENTATION PROCESS



ACTION PLAN FOR THE IMPLEMENTATION OF REDDIG II

ACTIVITIES	ACTION TO BE TAKEN BY	DELIVERABLE	TARGET DATE	REMARKS
1	2	3	4	5
7 Study on the structure of a mixed (ground and satellite) SAM digital network structure	SAM/IG Group for the implementation of CNS improvements	Model definition	SAM/IG/6	Completed. Identified in the study
8 Determination of the costs for the implementation of Activity 7	SAM/IG Group for the implementation of CNS improvements	Implementation costs of a mixed (ground and satellite) digital network structure	SAM/IG/6	Completed. Identified in the study
9 Comparisons between the network infrastructure models specified in Activities 4, 5 and 7	SAM/IG Group for the implementation of CNS improvements	Comparative study between the ground IP and mixed (satellite and ground) satellite network models	SAM/IG/6	Completed. Identified in the study
10 Determination of SAM network infrastructure model, on the basis of results of Activity 9	SAM/IG Group for the implementation of CNS improvements	Definition of a SAM network infrastructure model	SAM/IG/7	The study for the new SAM digital network was distributed to all SAM States for comments, which were received from Argentina, Brazil, Chile and Panama. SAM/IG/7 meeting defined the model SAM network infrastructure.
11 Holding of a seminar/workshop on new satellite and ground networks technology	Secretariat	Technological solutions for the new network configuration in the SAM Region	Lima, Peru, 18-20 July 2011	During this seminar, the communications services providers, integrators and manufacturers will present initial implementation proposals on the new SAM digital network
12 Acceptance process for the implementation of the network infrastructure model determined by Activity 10, through a public bidding process	SAM/IG Group for the implementation of CNS improvements	Acceptance of the public bidding process for the implementation of a SAM network infrastructure	SAM/IG/7	SAM/IG/7 meeting approved the network infrastructure model for the SAM Region

REDDIG II IMPLEMENTATION PROCESS



ACTION PLAN FOR THE IMPLEMENTATION OF REDDIG II

ACTIVITIES	ACTION TO BE TAKEN BY	DELIVERABLE	TARGET DATE	REMARKS
1	2	3	4	5
13 Preparation of technical specifications for the implementation of the SAM network infrastructure specified in Activity 10	SAM/IG Group for the implementation of CNS improvements	Technical specifications for the implementation of a SAM network infrastructure	Aug 2011	Experts will be hired for a 15-day period to draft the definite technical specifications. RLA/06/901 RCC/4 meeting approved the activity
14 Circulation to States of the technical specifications for the implementation of the SAM network infrastructure	States of the Region	Approval of technical specifications for the implementation of the SAM network infrastructure	Sep 2011	
15 Presentation of REDDIG network study and technical specifications to RAAC/12 meeting	Secretariat	Go ahead for the public bidding process through ICAO	Oct 2011	
16 Evaluation of offers presented	SAM/IG Group for the implementation of CNS improvements	Assessment of offers	Mar 2012	
17 Determination of winning bidder	SAM/IG Group for the implementation of CNS improvements	Designation of winning bidder for the network implementation	Jun 2012	

SEMINAR/WORKSHOP AGENDA



MONDAY 18 JULY 2011

SESSION 1: REDDIG II DIGITAL NETWORK STUDY

09:00-09:30	Introduction Seminar/Workshop	Onofrio Smarrelli, ICAO
09:30-10:00	REDDIG current situation	Luis Alejos, REDDIG Administrator
10:00-10:30	Services requirements to support air navigation in the short, medium and long term through the Regional network	Onofrio Smarrelli, ICAO
10:30-11:00	<i>Coffee Break</i>	
11:00-11:30	Study of the band width requirements for the implementation of new services in the REDDIG II	Athayde Frauche, DECEA Brazil
11:30-12:30	Study of satellite, ground and mixed (satellite & ground) communications networks models for REDDIG II	Athayde Frauche, DECEA Brazil

SEMINAR/WORKSHOP AGENDA



MONDAY 18 JULY 2011

SESSION 2: NEW TRENDS IN SATELLITE COMMUNICATIONS NETWORKS

- | | | |
|-------------|---|---|
| 13:30-14:00 | Introduction to Satellite Network Technology | Luis Alejos, REDDIG
Administrator |
| 14:00-14:30 | New trends in satellite communication network
(modulation and multiplexing techniques,
satellite access, coding techniques and error
correction) | Aleksandra Civric-Heim,
ND SatCom |
| 14:30-15:00 | New trends in satellite communication network
(modulation and multiplexing techniques,
satellite access, coding techniques and error
correction) | Clément Chevallier,
INEO |
| 15:00-15:30 | New trends in satellite communication network
(modulation and multiplexing techniques,
satellite access, coding techniques and error
correction) | Domingo Soltero, INSA
and Carlos Belaustegui,
SES |



SEMINAR/WORKSHOP AGENDA

TUESDAY 19 JULY 2011

SESSION 3: NEW TRENDS IN GROUND COMMUNICATIONS NETWORK

09:00-09:30 Introduction to terrestrial network technology Luis Alejos, REDDIG Administrator

09:30-10:00 New trends in ground communications networks Telefónica

10:00-10:30 New trends in ground communications networks Daniel Coslovsky, SITA

10:30-11:00 *Coffee Break*

SESSION 4: SOLUTIONS PROPOSED BY THE INDUSTRY TO THE REDDIG II DIGITAL NETWORK MODEL

11:00-12.30 REDDIG II -- network proposed solution Clément Chevallier, INEO
Daniel Coslovsky, SITA
Domingo Soltero, INSA and
Carlos Belaustegui, SES

12:30-13:00 *Coffee Break*

13:30-15:00 REDDIG II -- network proposed solution Telefónica
Wolfgang Wunderlich, ND
SatCom

SEMINAR/WORKSHOP AGENDA



WEDNESDAY 20 JULY 2011

**SESSION 4: SOLUTIONS PROPOSED BY THE INDUSTRY
TO THE REDDIG II DIGITAL NETWORK
MODEL**

09:00-10:30 REDDIG II -- network proposed solution

10:30-11:00 *Coffee Break*

11:00-12:30 Analysis of the proposed solutions ICAO, States