



COMSOFT Satellite Services

Presentation

Second Meeting of the Aeronautical
Communication Services Implementation Group
(ACSICG/2)

ICAO MEVA III VSAT Network Project



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MEVA III Network Considerations

Network Transmission:

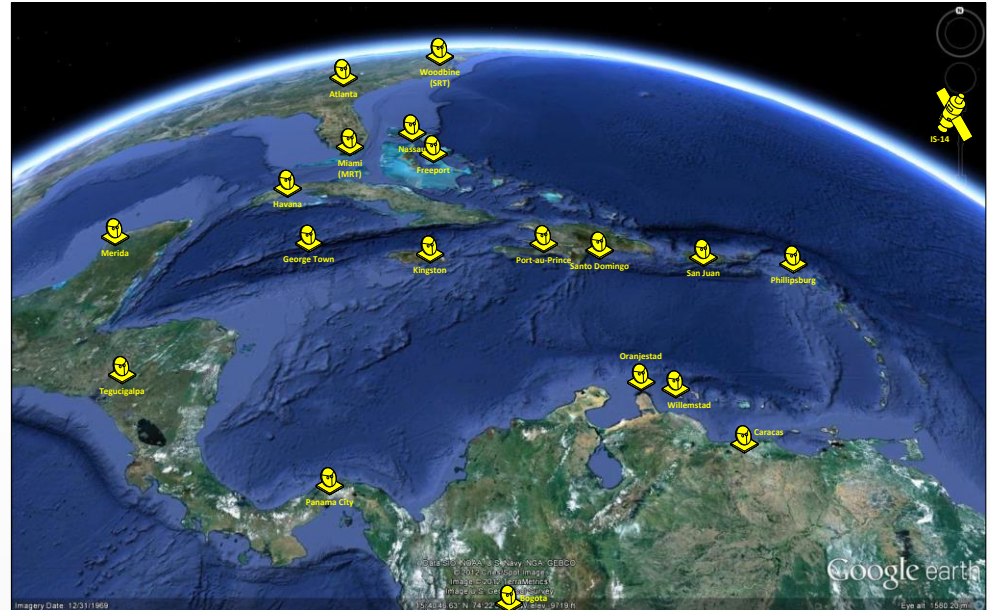
- Data Circuits (Radar (serial), AMHS (IP), AFTN (serial))
- Voice Circuits (AMS, PAMA, DAMA)

Network Topology:

- Meshed / Fully Meshed (MF-TDMA)

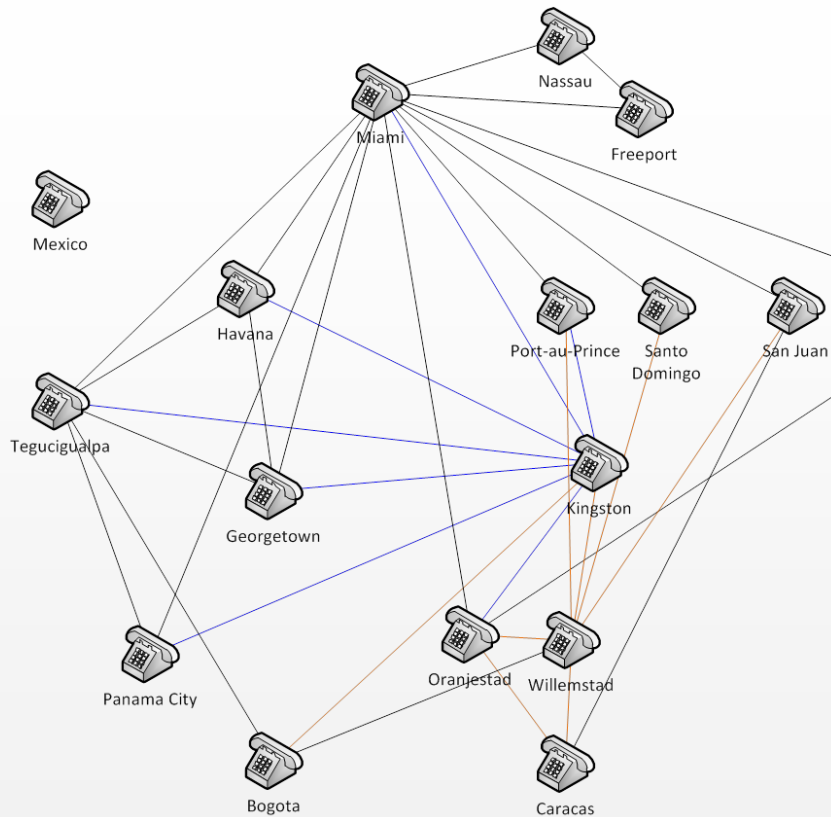
Network Availability:

- 99,90%
- Interconnection with ICAO REDDIG-II Network (sites Bogotá and Caracas)
- Prepared for Interconnection with ICAO E/CAR Network
- Provisioning of Network Design, Implementation, Operation (Monitoring, Maintenance)
- Re-use of existing network equipment (Outdoor Unit as Antennas)
- Know-How Transfer / Detailed Training Package

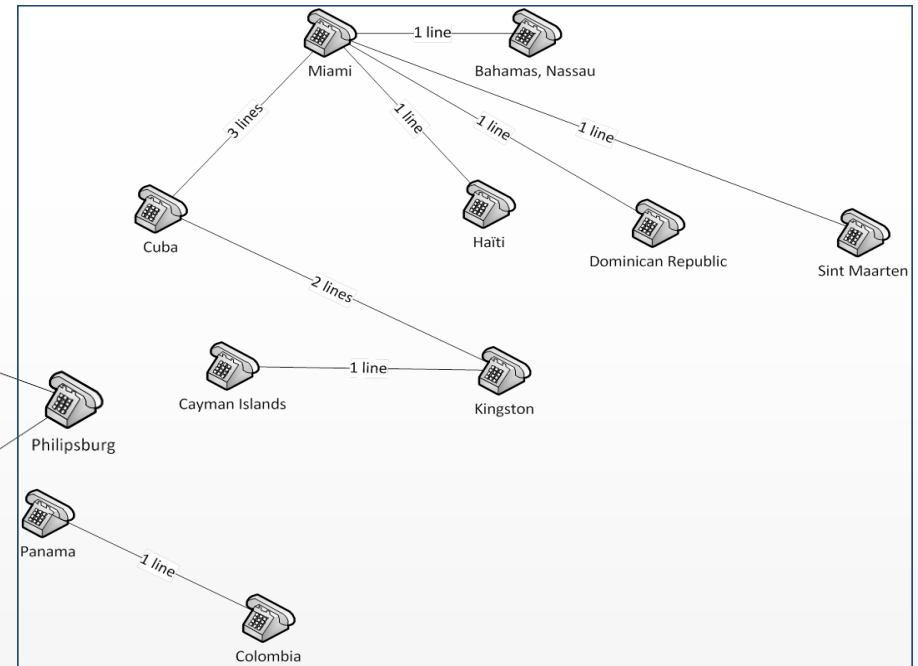


MEVA III – Voice Circuits

Voice Circuit Connectivity (DAMA)

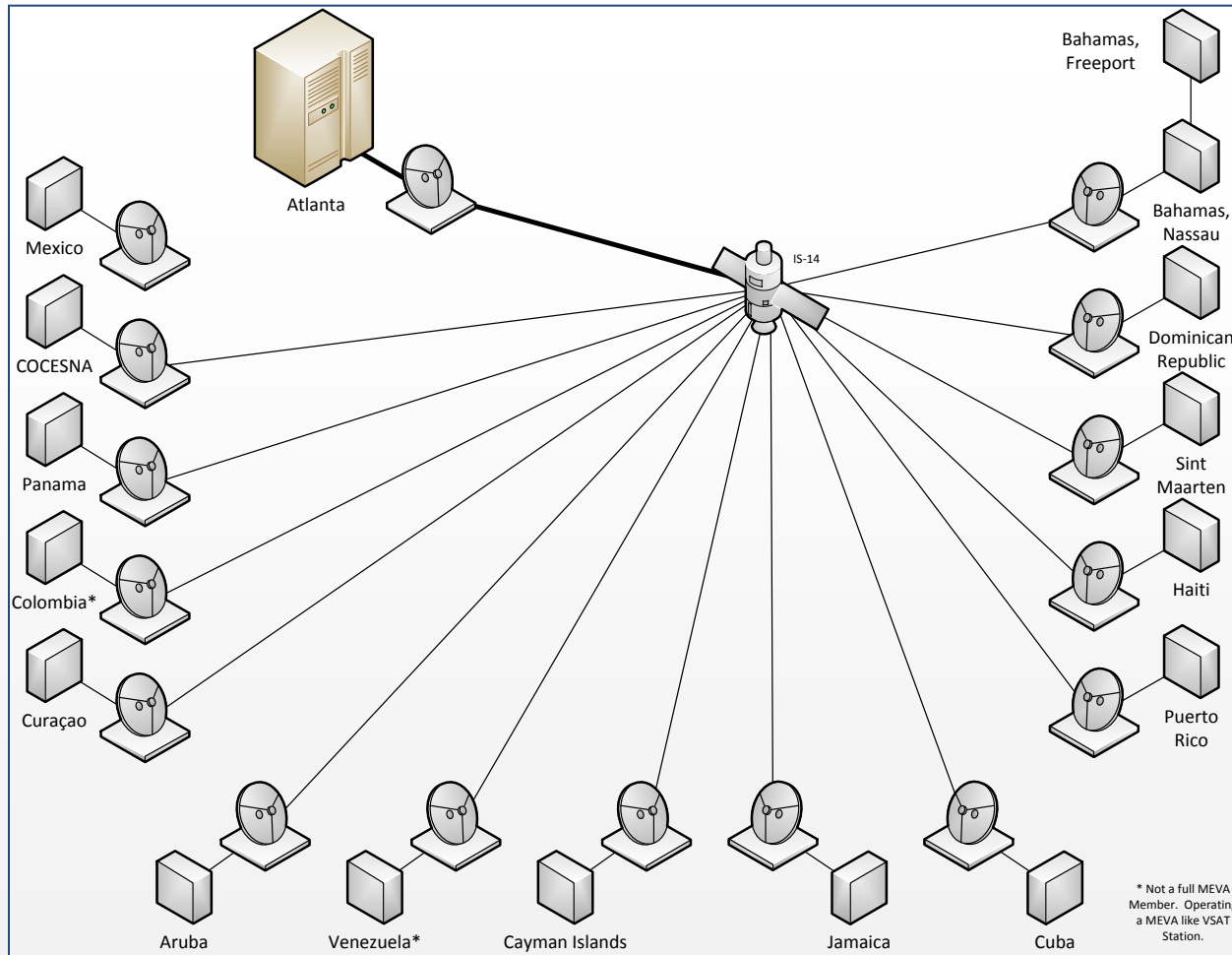


Voice Circuit Connectivity (PAMA)



MEVA III – Data Circuits

Data Circuit Connectivity (AFTN/AMHS)



MEVA III Network Architecture – Traffic Assignment

- Several Network Services needs different bandwidth allocation at user port
- Traffic will be differentiated into PAMA and DAMA allocation
 - *PAMA > Permanently Assigned Multiple Access (fixed)*
 - *DAMA > Dynamically Assigned Multiple Access (shared and on demand)*
- PAMA Voice (VSD) > bandwidth is permanent reserved and available
- DAMA Voice (SWV) > bandwidth is dynamically allocated – ERLANG calculation

PAMA					DAMA			
AFTN synch	Radar	AIDC	Remote Radio link	PAMA Voice	AFTN asynch	AFTN asynch	AHMS IP	DAMA Voice
9,6kbps	9,6kbps	16,0kbps	12,6kbps	12,6kbps	2,4kbps	9,6kbps	64,0kbps	12,6kbps

- Type of Traffic
- Bandwidth @ User Port

MEVA III – Overview of Network Traffic

	PAMA					DAMA			
	AFTN synch	Radar	AIDC	Remote Radio link	PAMA Voice	AFTN asynch	AFTN asynch	AHMS IP	DAMA Voice
Data Rate	9,6kbps	9,6kbps	16,0kbps	12,6kbps	12,6kbps	2,4kbps	9,6kbps	64,0kbps	12,6kbps
Atlanta	13							7	1
Aruba	1				2				4
Bahamas, Nassau	2				1				9
Bahamas, Freeport	1								5
Cayman Islands	1				1			1	7
COCESNA	1	1		1				1	3
Colombia	2				3	1			8
Cuba	1	2			7		1	1	7
Curaçao	1	1	1		4	1		1	4
Dominican Republic		3	1		5			1	7
Haïti	1				3				5
Jamaica	1	1		1	7			1	5
Mexico					1		1		3
Panama	1				2	1			6
St Maarten	1	2			2			1	6
US, Puerto Rico		3			4				13
US, Miami		1			8				18
Venezuela	1				3	1			4
Total by Site	28	14	2	2	53	4	2	14	115
	268,8kbps	134,4kbps	32,0kbps	25,2kbps	667,8kbps	3,2kbps	6,4kbps	298,7kbps	126,0kbps
				PAMA:	1.128,2kbps			DAMA:	434,3kbps

MEVA III – Network Traffic Calculation

- Allocated PAMA Network Services Traffic
 - *1.128,2 kbps*

- Allocated DAMA Network Services Traffic
 - *434,3 kbps*

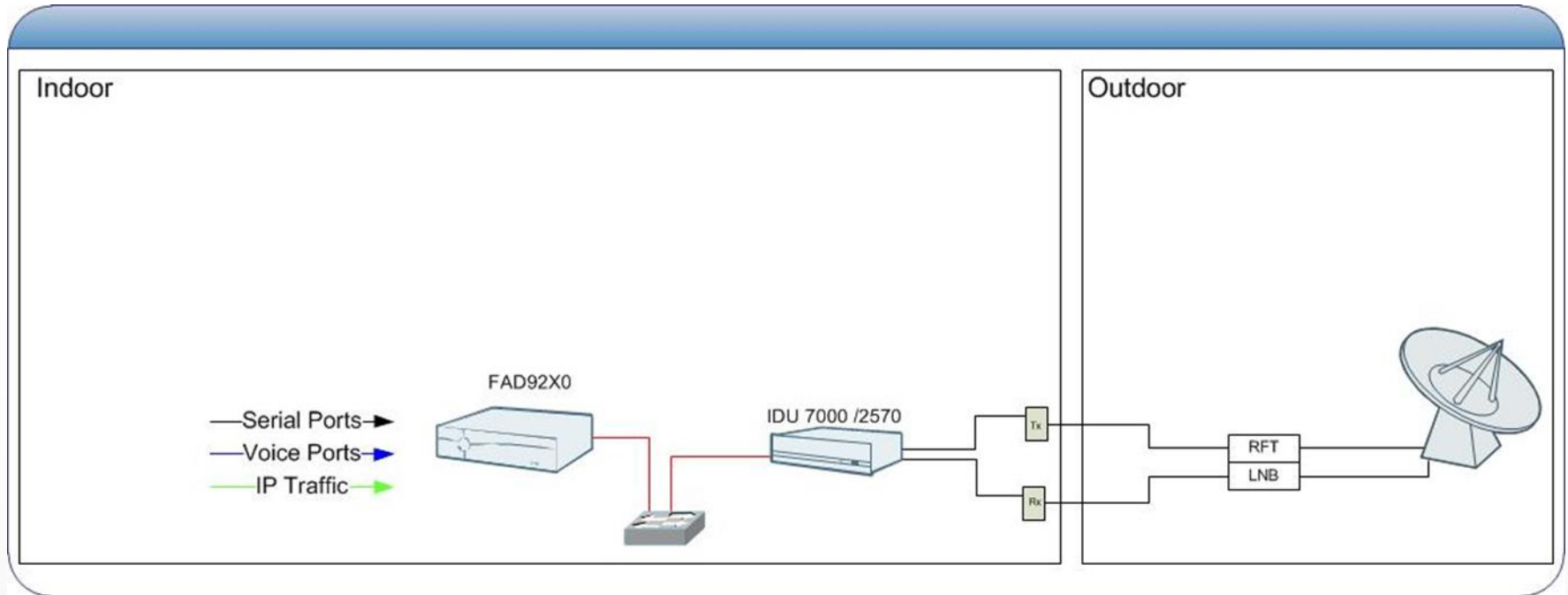
- Resulting overall Network Traffic
 - *1.562,5 kbps (network traffic)*
 - *312,5 kbps (TDMA overhead)*
 - **1.875,0 kbps** (*Information Rate*)

MEVA III – Bandwidth Comparization

- Allocated bandwidth satellite solution
 - *1.875,0 kbps*
- Allocated bandwidth terrestrial solution
 - *3.136,0 kbps*
- No savings in DAMA reduction
- Huhg amount of not used bandwidth on leased lines

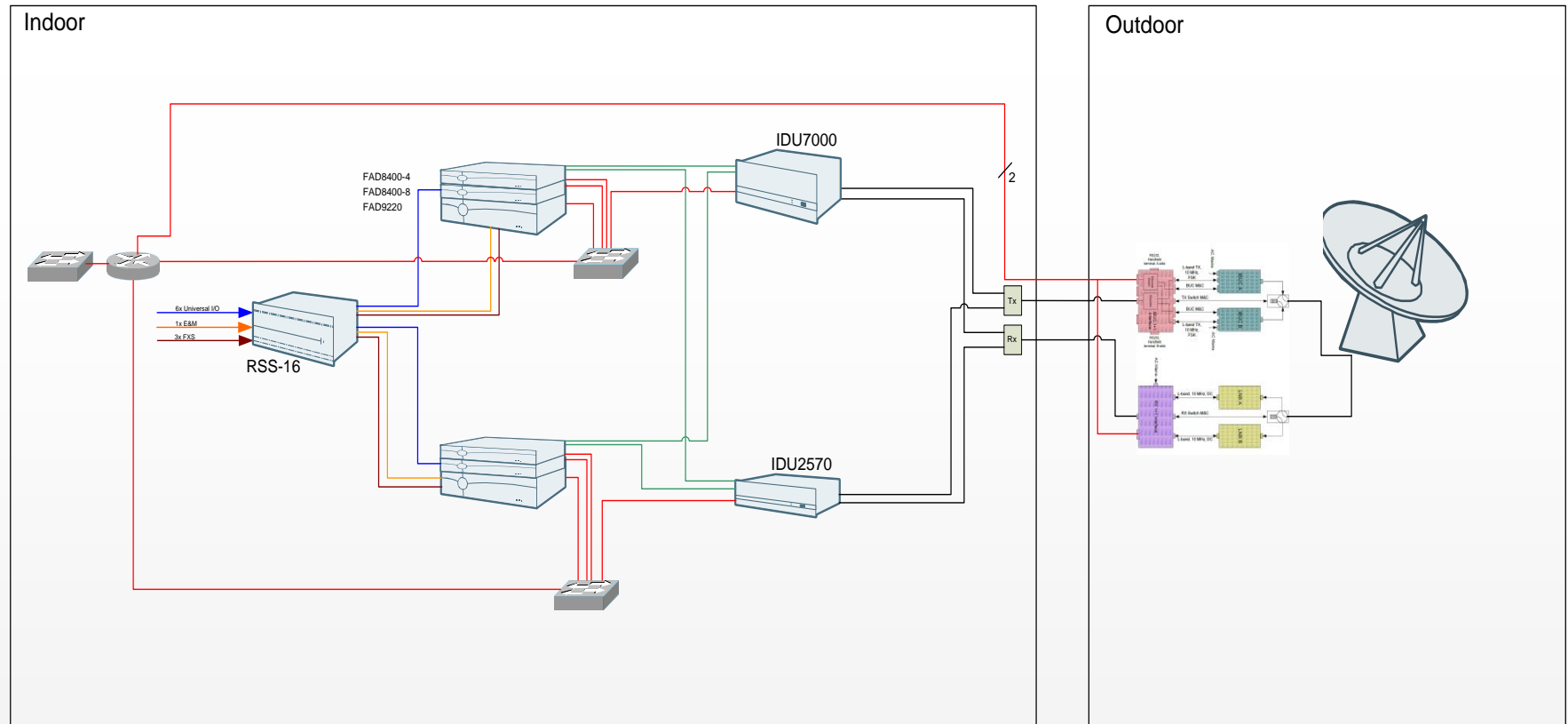
	Traffic Share (per site)	Leased Line (size per site)
Atlanta	275,2kbps	512,0kbps
Aruba	39,2kbps	64,0kbps
Bahamas, Nassau	41,7kbps	64,0kbps
Bahamas, Freeport	15,1kbps	64,0kbps
Cayman Islands	51,2kbps	64,0kbps
COCESNA	56,4kbps	64,0kbps
Colombia	66,6kbps	256,0kbps
Cuba	149,2kbps	256,0kbps
Curaçao	112,1kbps	256,0kbps
Dominican Republic	136,8kbps	256,0kbps
Haïti	52,9kbps	64,0kbps
Jamaica	146,8kbps	256,0kbps
Mexico	19,1kbps	64,0kbps
Panama	42,2kbps	64,0kbps
St Maarten	81,9kbps	256,0kbps
US, Puerto Rico	93,4kbps	256,0kbps
US, Miami	130,1kbps	256,0kbps
Venezuela	52,6kbps	64,0kbps
Total	1.562,5kbps	3.136,0kbps

MEVA III Network Station Architecture – Single Chain



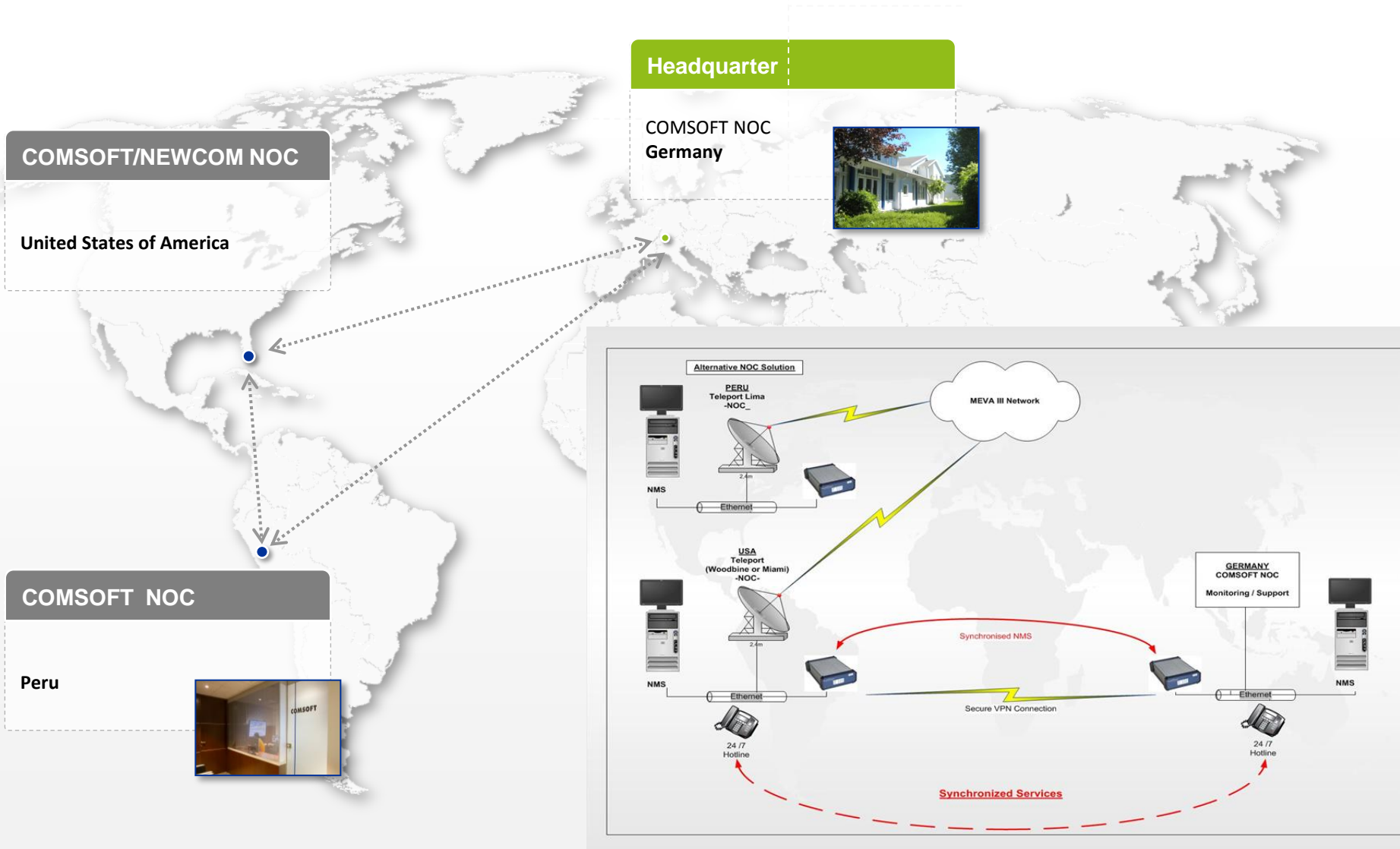
Solution with single chain: 1 MUX and 1 IDU and 1 BUC/LNB at single antenna

MEVA III Network Station Architecture – Redundant Chain



Solution with multiple MUX and 2 IDU and redundant BUC/LNB at single antenna

COMSOFT – Regional Presence / Service Concept



COMSOFT – Network Operation Center (NOC)

Network Monitoring



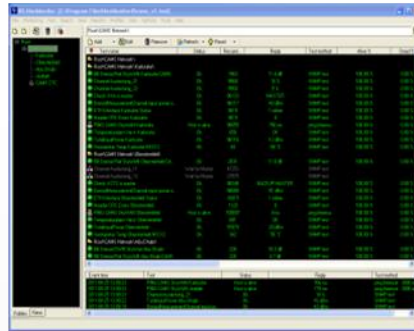
Early Fault Detection and Alerting

Quick Operator Response

Configurable according to Customer Requirements

Redundant and High-Availability Live Monitoring

Network Management



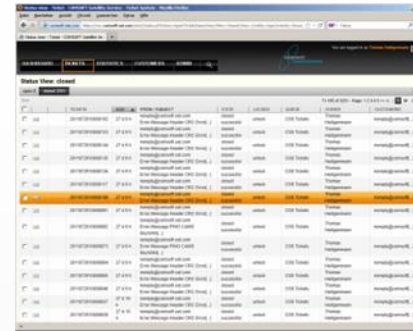
Satellite Network Setup and Maintenance

System Components Configuration

Live Performance Measurement and Optimization

Selectable Service Levels

Trouble Ticket



24/7 Online Access

Multi-lingual User Interface

Agent Availability and Response

Telephone Service on Demand

Customer Access

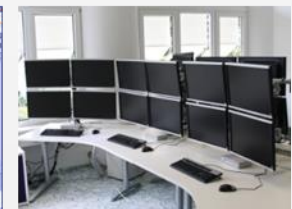
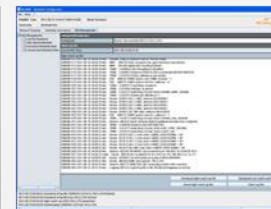


Access on Live Data

View on Components Availability

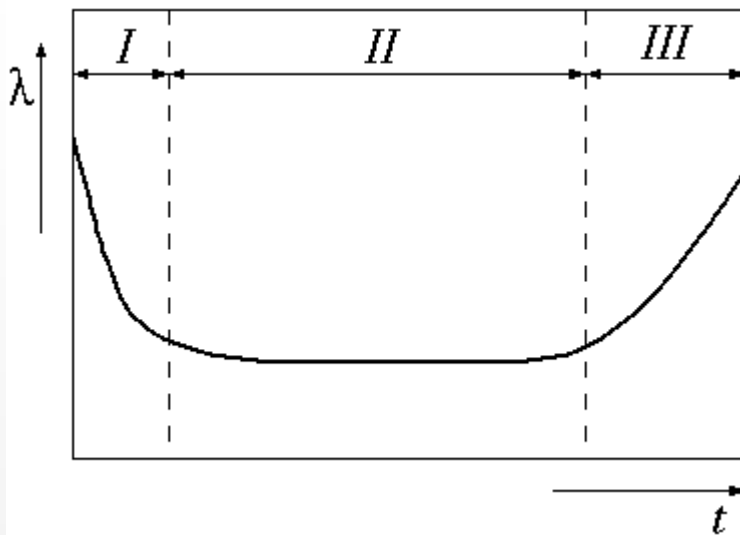
Graphical Operation Statistics

Network Performance Track



MEVA III – Network Availability (April 2015)

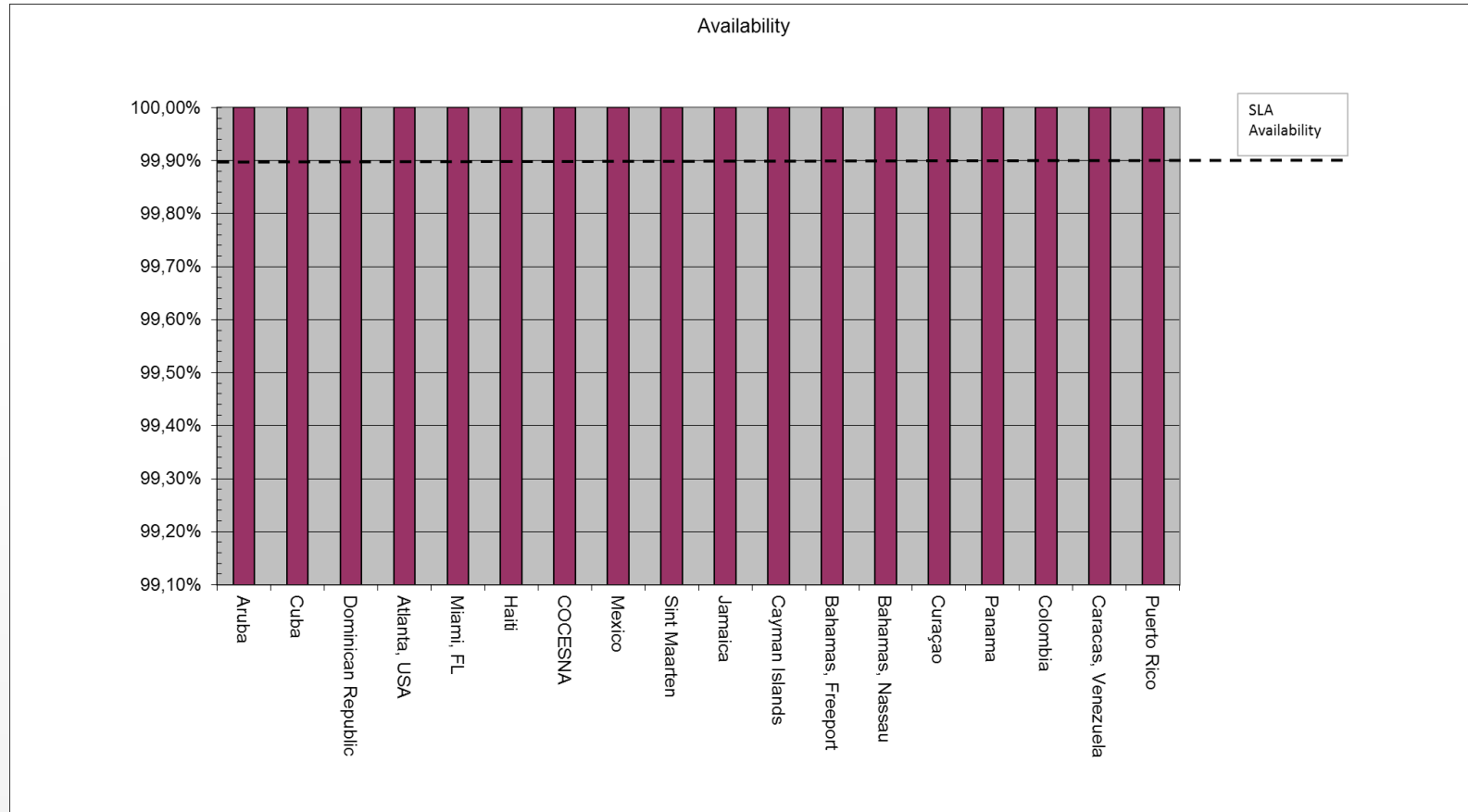
- COMSOFT has implemented the MEVA III to a fully operational status at April 1st → in time.
- As consideration, the first operational month of a new network is most critical to failures.
- Typically, most equipment related outages occur within the first month (I) and to the end of network life-time (II)



As for the MEVA III Network only one LNB failed due to water leak within the first month of operation. The station outage time was "0" since the redundancy switch worked correctly → **fail-over switching**.

MEVA III – Network Availability (April 2015)

- COMSOFT's measured network availability (Period April 1st o April 30th)



MEVA III – Spare Part Management

COMSOFT's Maintenance / Support Program provides the choice of two Spare Part Management Solutions to optimize the network availability in MEVA III.

- Centralized / Regional Spare Management (Teleport / NOC Miami)
 - *Cost-effective for all Network Members (Cost-Sharing)*
 - *Longer response times in equipment replacement (transport, customs)*

- Site related Spare Part Management (at each network site)
 - *Fast Response Times*
 - *Cost intensive (double equipment components, stock preparation)*

According to the proposed redundant solution at some network sites, COMSOFT implemented a mix of both for the MEVA III network operation.



MEVA III – Contractual Considerations

- **General Service Level Agreement (SLA)** for the overall MEVA III Network including
 - *Dedicated network availability*
 - *Defined reaction times*and
 - *escalation procedures*
- **Individual Framework Agreement / Contract** negotiated with each MEVA Member State including
 - *Pricing*
 - *Payments*
 - *General Terms&Conditions*
- The negotiated Framework Agreement / Contract was prepared by COMSOFT, but adapted to the Member States rules and regulatories



MEVA III – Contractual Considerations / Timeline

MEVA III
Invitation for
Contract
Negotiation

SLA
Approval of final
SLA by all
Member States

Contract
Start of Contract
Negotiation with
each Member
State

SDD Meeting
Mexico

Installation
Start of
Project
Installation

**Dec.
2013**

**Jan./Feb.
2014**

**April
2014**

**May
2014**

**June
2014**

**Aug.
2014**

**Oct.
2014**

**Oct. /Nov.
2014**

**Jan.
2015**

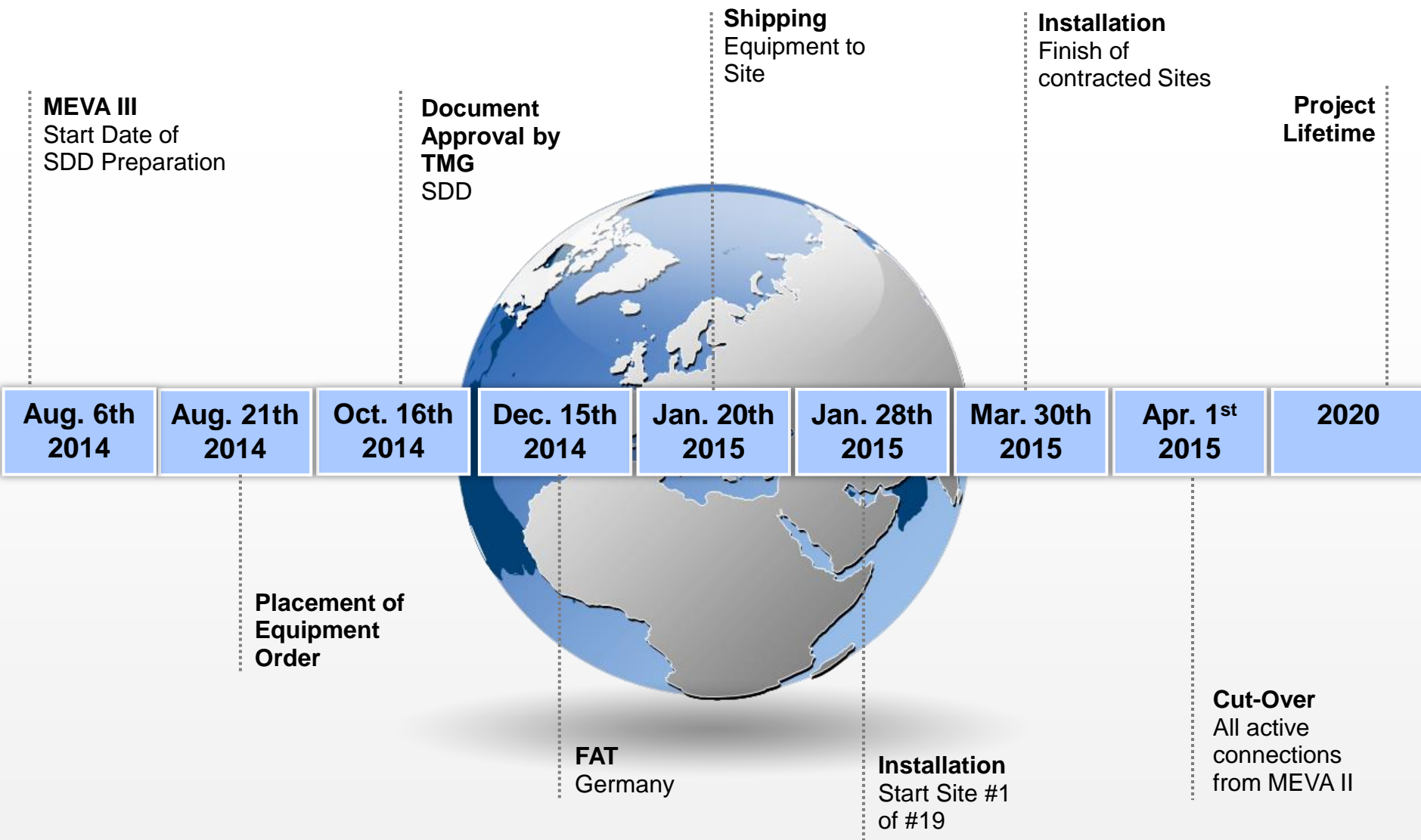
SLA
Start of SLA
Negotiation

TMG/29
Conclusion on
SLA and Pre-
Start of SDD

SDD
Start of SDD
Preparation

**Finalization of
SDD & Contracts**
Approval on SDD
Package #1 and
most Contracts are
signed

MEVA III – Project Timeline



MEVA III – Challenges

- Max. re-use of existing Equipment
 - *Antennas, cabling,*
- Co-existing of MEVA II & MEVA III
 - *Keeping both networks running in parallel during transition*
- Minimum Network Downtime
 - *Keeping of agreed network availability during commissioning*
- Dedicated Installation Schedule
 - *Coordination of 5 installation teams*
- Equipment Delivery
 - *Packing, customs, transportation on-site*
- Network Cut-Over
 - *All network sites to be cut-over at the same date*
- Dismantling of MEVA II Equipment
 - *Remove/disconnect MEVA II from MEVA III at all sites*



Thank you for your attention.

Time for your questions ...



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