Asia/Pacific ATN Regional Planning

ATN Seminar

Chiang Mai, 11th - 14th December 2001

Presented by Craig Head

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ATN Transition Task Force

- The ATN Transition Task Force (ATNTTF) was established by APANPIRG/9 (1998) to address ATN Issues and to deal with residual AFS Issues.

- The ATNTTF reports are reviewed by CNS/MET Sub-Group before being submitted to APANPIRG

- The ATNTTF will schedule its fourth meeting in Mumbai in April 2002.

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ATNTTF ATN Responsibilities

- The ATNTTF is Responsible for the Development of:
  - ATN Transition Guidance Material
  - ATN Transition Plan
  - ATN Interface Control Documents
  - Technical Information on security, performance and system management issues
  - Provide Planning and Implementation Information in the Air Navigation Plan
  - Develop the ground ground part of the CNS Facilities And Services Implementation Document (FASID)

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ATNTTF Working Groups

■ The ATNTTF Established Two Working Groups:

➔ Working Group A
- Development of ATN technical plans

➔ Working Group B
- Development of an ATN transition plan and other ATN technical documents

ATNTTF Working Group A

■ Established to develop the following Plans:

➔ ATN Routing Architecture Plan

➔ ATN NSAP Addressing Plan

➔ AMHS Naming Plan

➔ ATN NSAP Registration Plan

■ WG A Includes Representatives from:

➔ Australia

➔ Japan

➔ Thailand

➔ United States

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Status of Plans

- Plans submitted for review at the ATNTTF/3 in March 2001.
- Plans were reviewed at CNS/MET Sub Group/5 in July 2001.
- Plans were approved by APANPIRG/12 in August 2001.
- Plans to be circulated to States for comments.

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ATNTTF Working Group B

- Established to develop the ATN Ground-Ground Transition Plan for the Asia/Pacific Region and other technical documents
- WG B Includes Representatives from:
  - ➔ Australia
  - ➔ Fiji
  - ➔ Hong Kong China
  - ➔ Japan
  - ➔ Singapore
  - ➔ Thailand
  - ➔ United States

ATN Technical Documents

- ATN Transition Plan
- AMHS Interface Control Documents
- Router Interface Control Documents
- Routing Policy for IDRP
- Routing Policy for MTA
- Directory Services
- System Management
- Security
- Performance

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Status of Documents

- ATN Transition Plan was submitted for review at the ATNTTF/3 in March 2001.
- Other Documents are currently in the development phase.
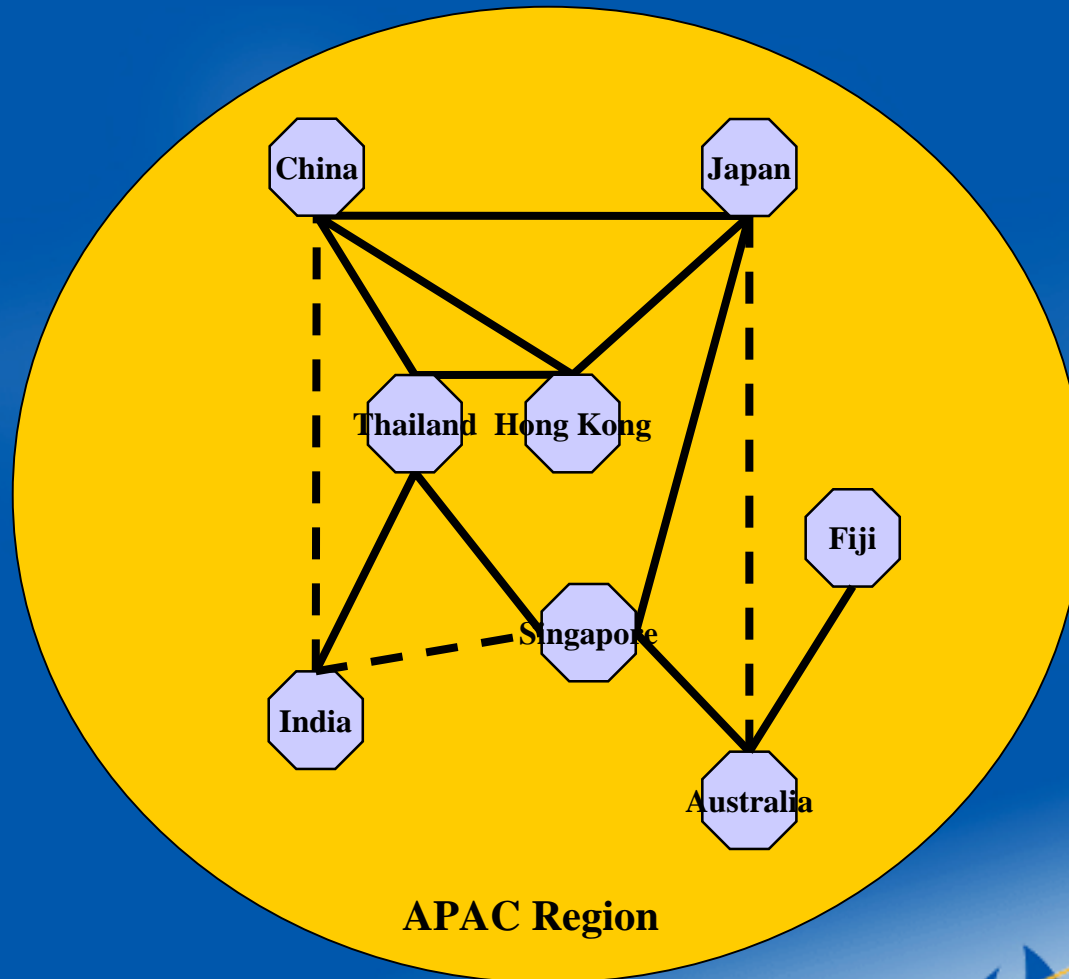- ICDs and other critical documents to be presented at the ATNTTF/4 meeting.

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ATN Routing Architecture Plan

- The establishment of Backbone Boundary Intermediate Systems (BBIS)
- Describes the role of a BBIS:
  - Must be very reliable
  - Capacity - capable of supporting significantly more traffic
  - Alternative Routing - have access to multiple links
  - Routing Policies - must support Regional transit traffic and dynamic re-routing of traffic

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Backbone BIS

APAC Region

ATN NSAP Addressing Plan

- Development of a Network Service Access Point (NSAP) Address Scheme.

- Provides guidance in assigning values to the 20 byte address fields of the NSAP.

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ATN NSAP Address Structure

AFI 1 Octet	IDI 2 Octets	VER 1 Octet	ADM 3 Octets	RDF 1 Octet	ARS 3 Octets	LOC 2 Octets	SYS 6 Octets	SEL 1 Octet

AFI - Authority and Format Identifier - defined by SARPS

IDI - Initial Domain Identifier - defined by SARPS

VER - Version - defined by SARPS and by Plan

ADM - Administration Identifier - defined by Plan

RDF - Routing Domain Format - not used set to zero

ARS - Administration Region Selector - defined by Plan

LOC - Location - defined by Plan

SYS - System Identifier - to be defined by State

SEL - NSAP Selector - defined by SARPS

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AMHS Naming Plan

- ■ Aligned with the Global AMHS Naming Convention to be adopted by ICAO

- ■ ATN Panel Working Groups have recommended that the Global AMHS Naming Convention be included in Edition 3 of the ATN Manual

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AMHS Name Assignments

■ Proposed to use the following name attributes:

➔ Country Name - XX

➔ ADMD - ICAO

➔ PRMD - States to register preferred name with ICAO

➔ Organisation Name

➔ Unit Name

➔ Common Name (includes the AFTN Indicator)

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AMHS Naming Summary

Attribute	Assigned By	Value	Comment
Country-name (C)	ITU-T	XX	International Organization
ADMD (A)	ICAO	ICAO	ICAO Responsibility to register
PRMD (P)	ATSO	e.g. THAI	ATSO registered private domain with ICAO.
Organization name (O)	ATSO	e.g. AEROTHAI	Local/national geographical information, which can be based on ICAO Location Indictors (Doc 7910)
Organizational-Unit name (OU1)	ATSO	e.g. BB	ICAO Location Indicator (Doc 7910)
Common Name (CN)	ATSO	e.g. VTBBYFYX	AFTN indicator address

ATN Transition Plan

■ **Recommends a Three Stage ATN Transition Phase:**

➔ Stage 1 - Upgrade Current/Existing Infrastructure

➔ Stage 2 - Establishment of a Ground ATN Backbone Router Network

➔ Stage 3 - Connectivity of User ATN Routers to the Backbone

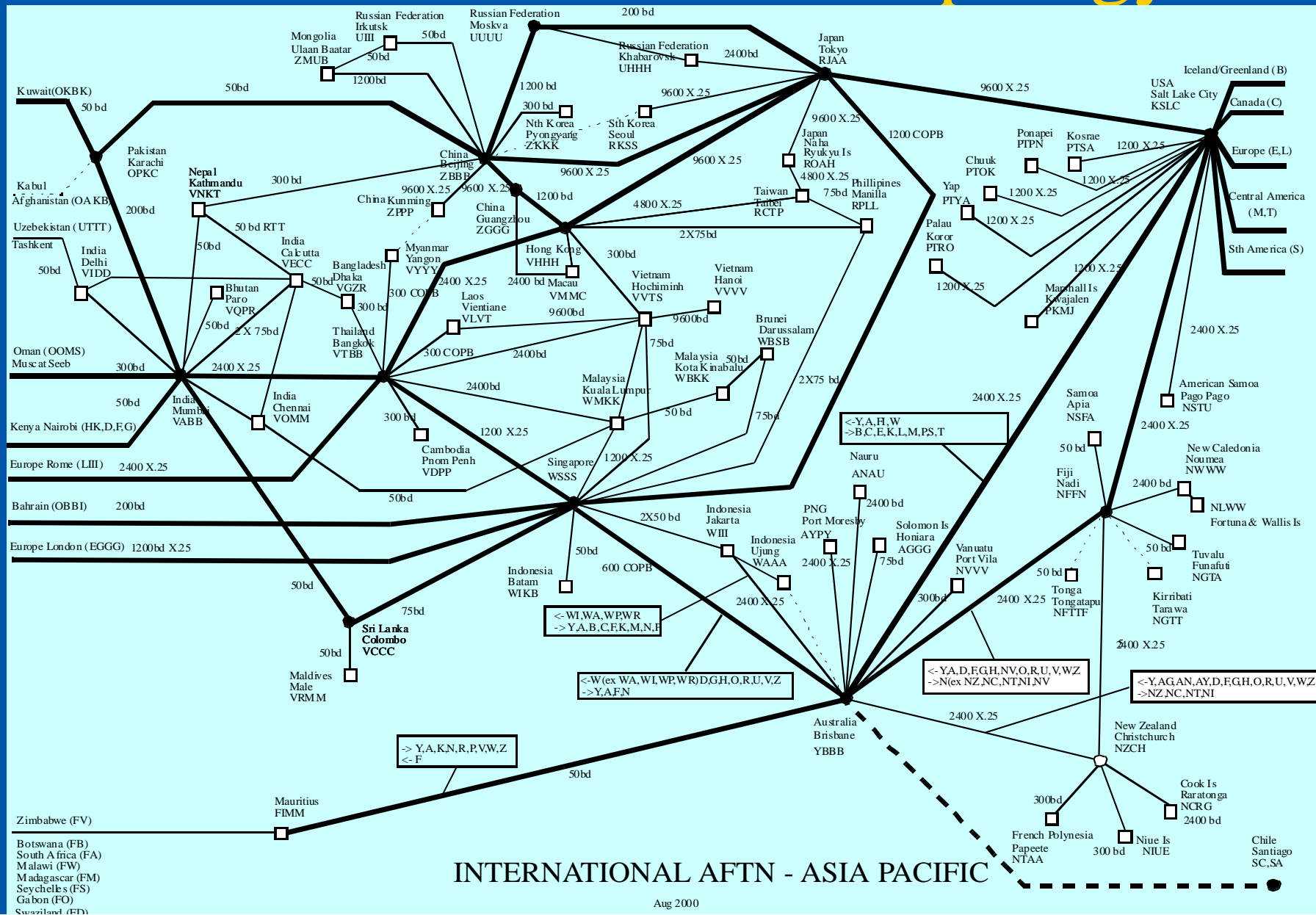AIRSERVICES AUSTRALIA

Existing AFTN Infrastructure

- AFTN Infrastructure
  - Based on point to point circuits
  - Majority of Circuits are low speed: 50 baud through to 9600bps
  - Circuit Protocols range from no protocols through to COPB and X.25

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Asia/Pacific AFTN Topology

INTERNATIONAL AFTN - ASIA PACIFIC
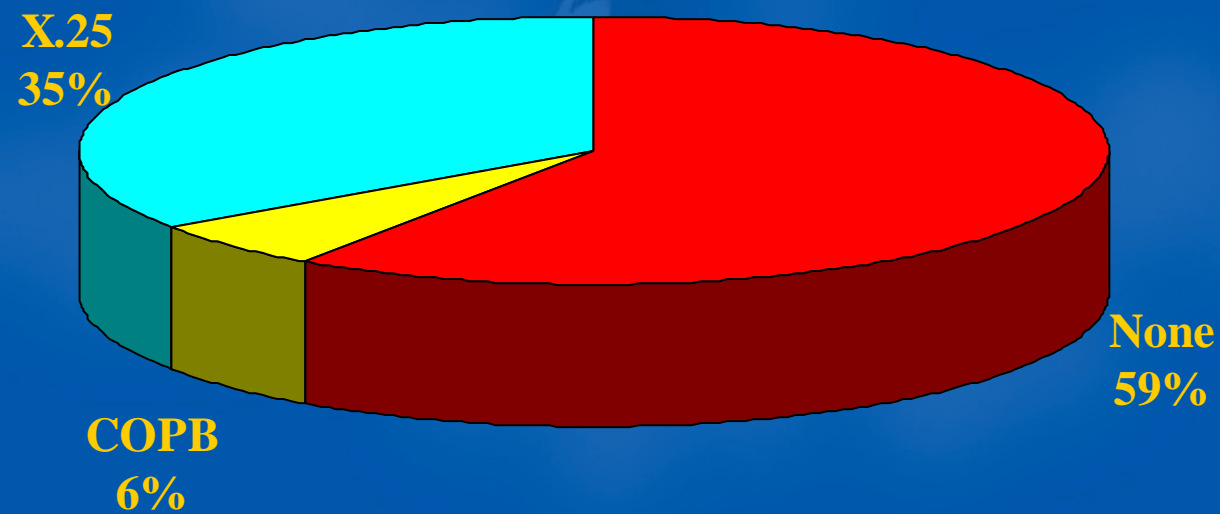
Aug 2000

Current Regional Circuit Speeds
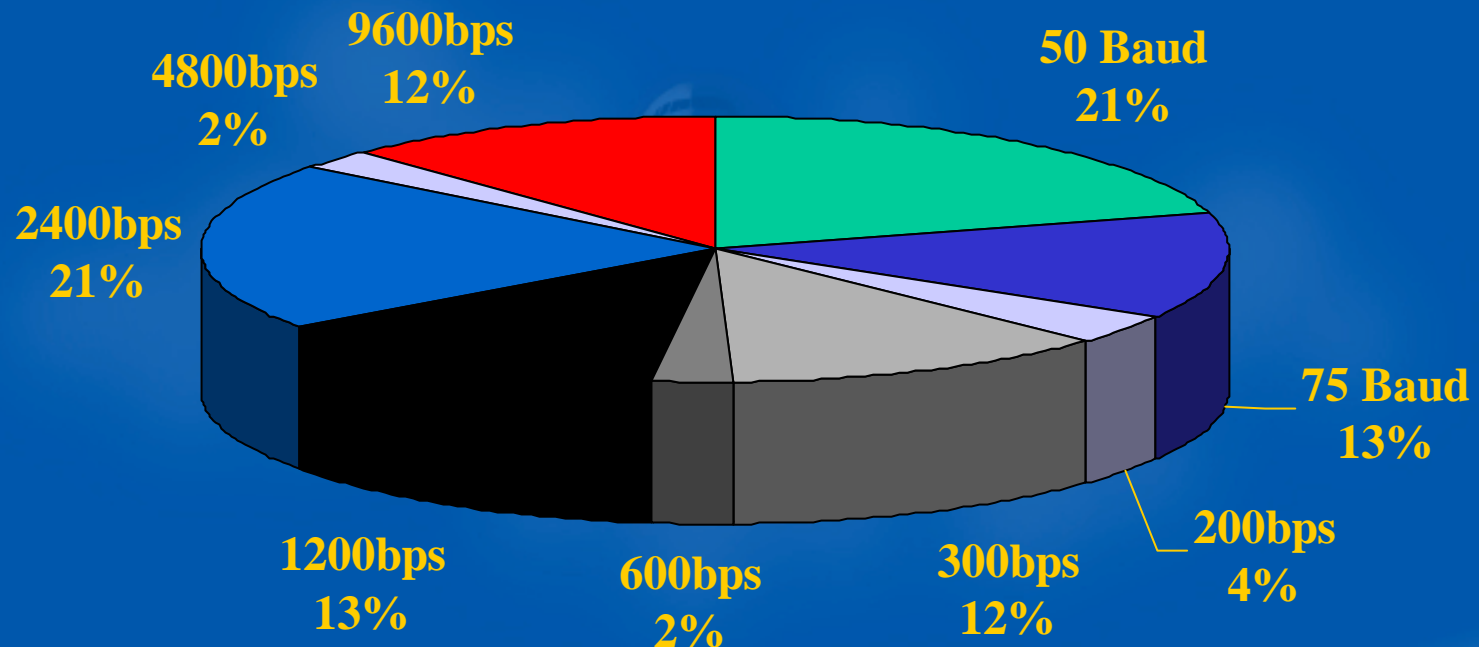
50 baud to 1200bps = 65%
50 baud to 4800bps = 88%

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Current Regional Protocols

X.25
35%

COPB
6%

None
59%

Non ATN Protocols = 65%

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Stage 1 - Upgrade of Circuits

- ATN at present requires Subnetworks to interface at X.25
- Currently the majority of AFTN circuits (88%) will not be suitable for ATN
- This will require new circuits to be implemented or existing circuits to be upgraded
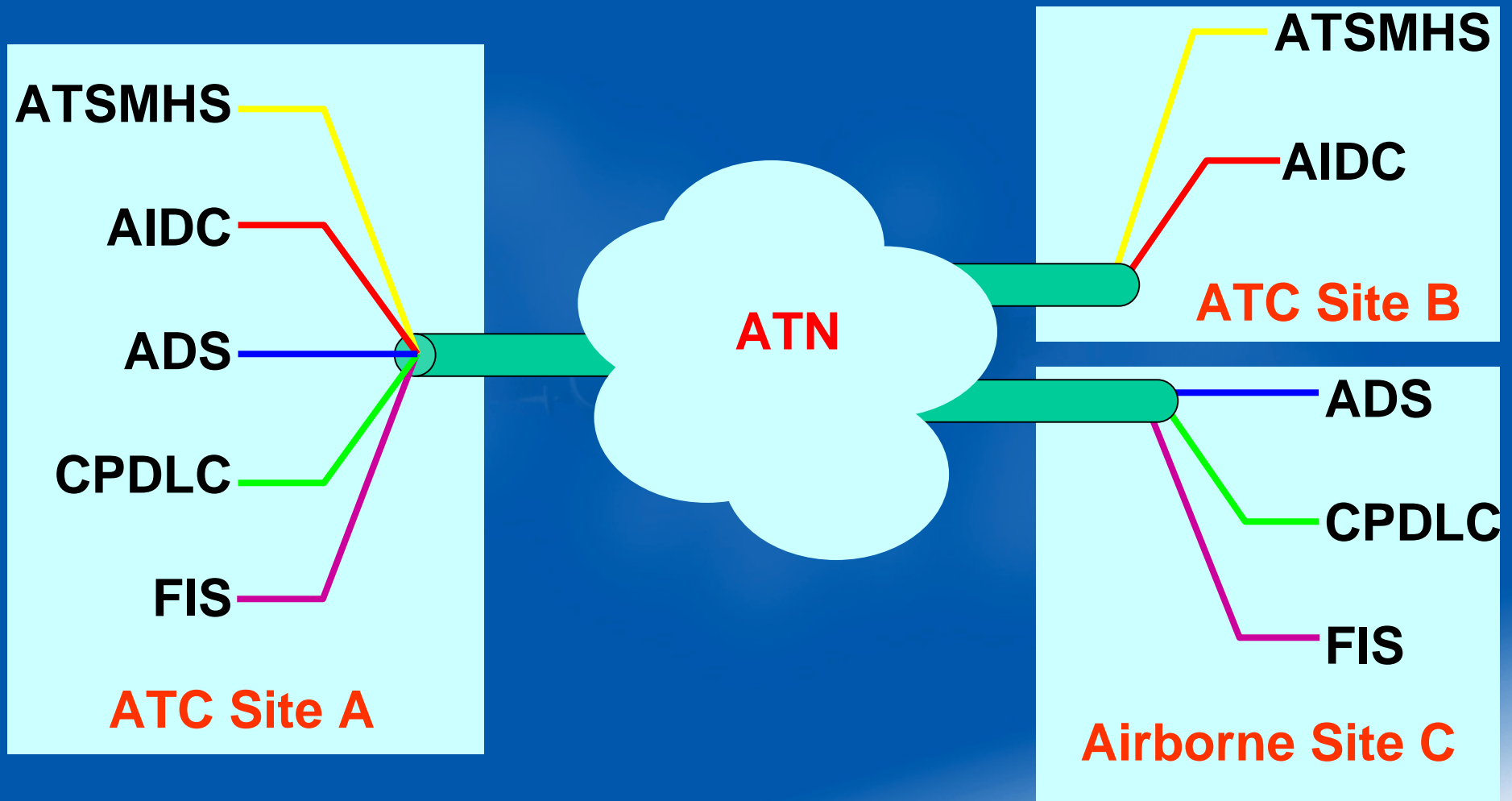
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Stage 1 - Bandwidth Issues

- Bandwidth for circuits will need to be increased substantially.

- Speeds from 9.6kbps to 64kbps or higher will need to be considered.

- Overheads from each layer of the OSI stack will increase total message size as much as 94% (standard AFTN message size using AMHS)
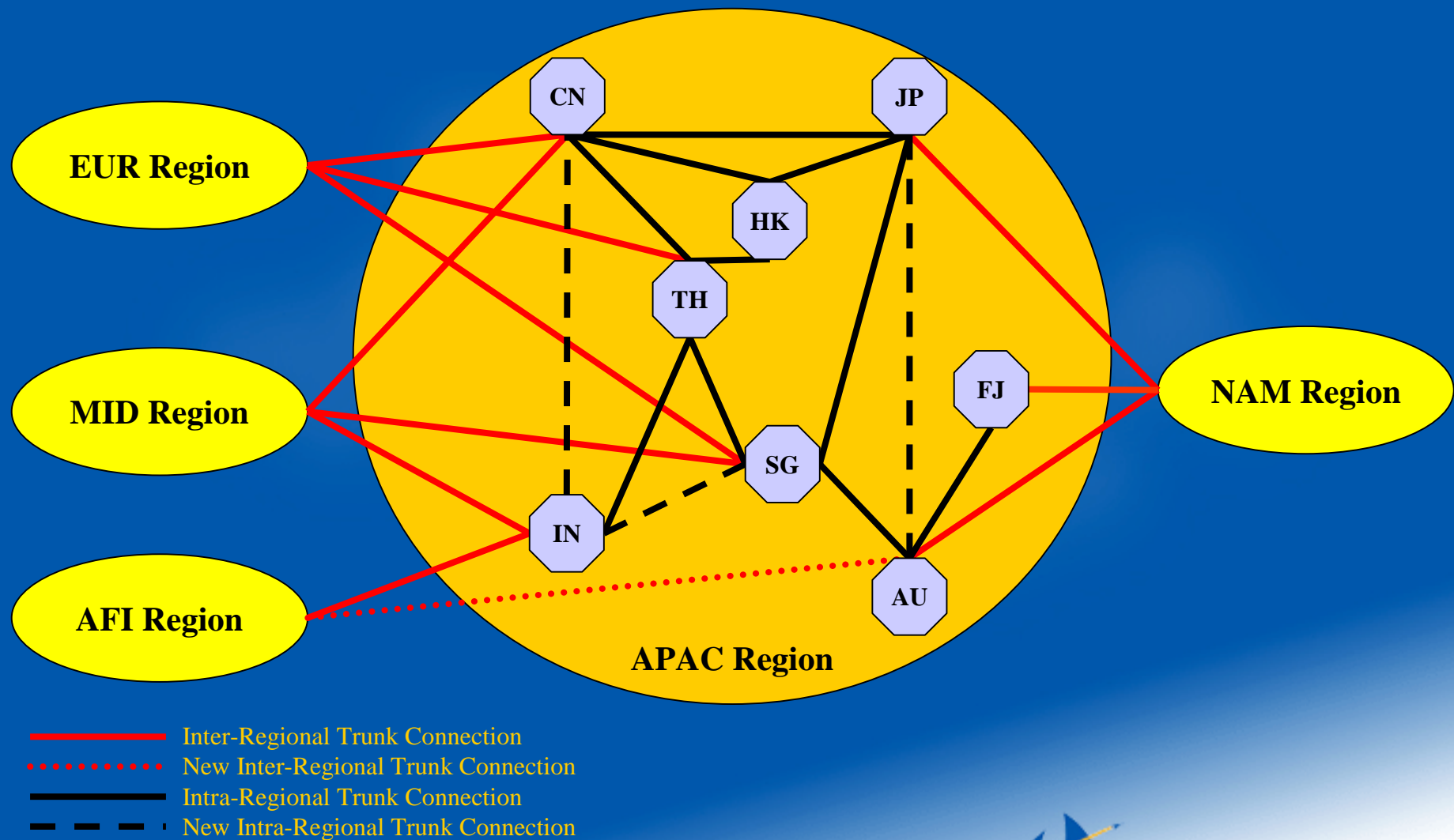
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ATN Applications

Stage 2 - ATN Backbone

- Selection of Locations based on Existing Inter-Regional Connections and Main Internal Connections

- Diversity for Backbone Connectivity within the Asia/Pacific Region and Neighbouring Regions

- Min of 56kbps to 64kbps for Backbone Trunk Speeds
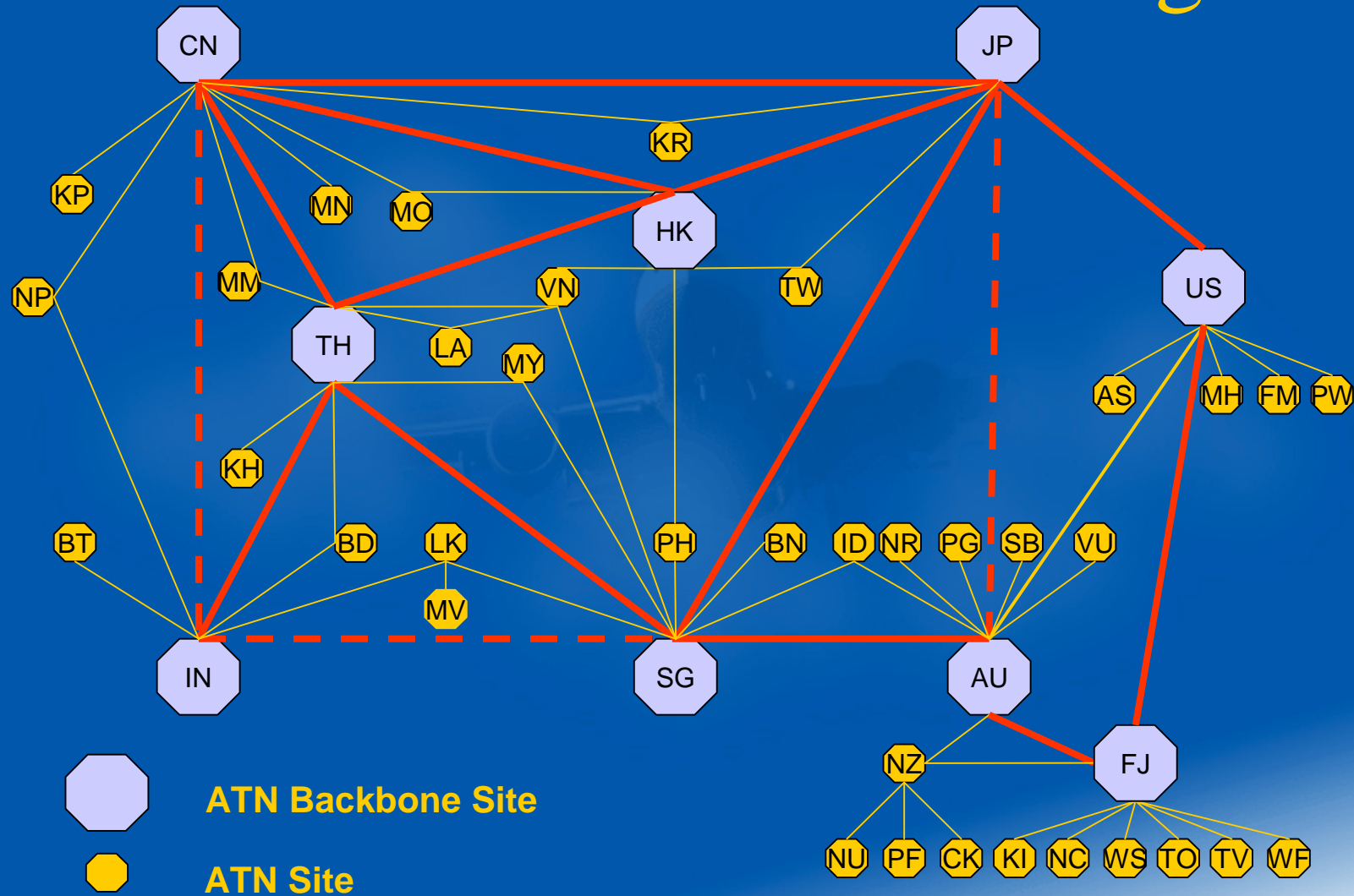
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ATN Regional Backbone

Diagram showing ATN Regional Backbone. The APAC Region (orange circle) contains nodes: CN, JP, HK, TH, FJ, SG, IN, AU. External regions connected: EUR Region, MID Region, AFI Region (left), and NAM Region (right).

Legend:
- Inter-Regional Trunk Connection (red solid line)
- New Inter-Regional Trunk Connection (red dotted line)
- Intra-Regional Trunk Connection (black solid line)
- New Intra-Regional Trunk Connection (black dashed line)

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Stage 3 - ATN Connectivity

- Generally ATN Routers will connect to the ATN Backbone
- In some cases ATN Routers will connect to other ATN Routers to get to the ATN Backbone

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Asia/Pacific ATN Routing

ISO3166 Country Codes

Country	ISO Code	Country	ISO Code
American Samoa	AS	Mongolia	MN
Australia	AU	Myanmar	MM
Bangladesh	BD	Nauru	NR
Bhutan	BT	Nepal	NP
Brunei Darussalam	BN	New Caledonia	NC
Cambodia	KH	New Zealand	NZ
China	CN	Niue	NU
Cook Islands	CK	Pakistan	PK
Fiji	FJ	Palau	PW
French Polynesia	PF	Papua New Guinea	PG
Hong Kong China	HK	Philippines	PH
India	IN	Samoa	WS
Indonesia	ID	Singapore	SG
Japan	JP	Solomon Islands	SB
Kiribati	KI	Sri Lanka	LK
Korea, Democratic People's Republic of	KP	Taibei	TW
Korea, Republic of	KR	Thailand	TH
Lao	LA	Tonga	TO
Macau China	MO	Tuvalu	TV
Malaysia	MY	United States	US
Maldive Islands	MV	Vanuatu	VU
Marshall Islands	MH	Viet Nam	VN
Micronesia, Federated States of	FM	Wallis and Futuna Islands	WF

AMHS ICD - (1)

- Development of an Interface Control Document for interconnection of AMHS in the Asia Pacific Region.

- Document based on the AMHS work performed between Japan and USA.

- Outlines the Mandatory and Optional Requirements described in the AMHS PICS that are to be implemented within the Asia Pacific Region to maintain operability.

- Document will be presented at the Fourth ATNTTF meeting.

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AMHS ICD - (2)

- *The ICD does not include any additional features such as CIDIN/AMHS Gateway, Security and Directory Service which are in ICAO Doc 9705/AN-965, THIRD EDITION.*
- *The ICD can be enhanced to include such additional features in the future.*

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AFTN to AMHS Transition

- ATS Message Handling System will most likely be one of the first ATN Applications to be implemented by most States in the Region.
- Transition to AMHS can involve a number of steps
  - → Introduction of AFTN/AMHS Gateways.
  - → To full AMHS Interconnection between States.

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Current AFTN Environment
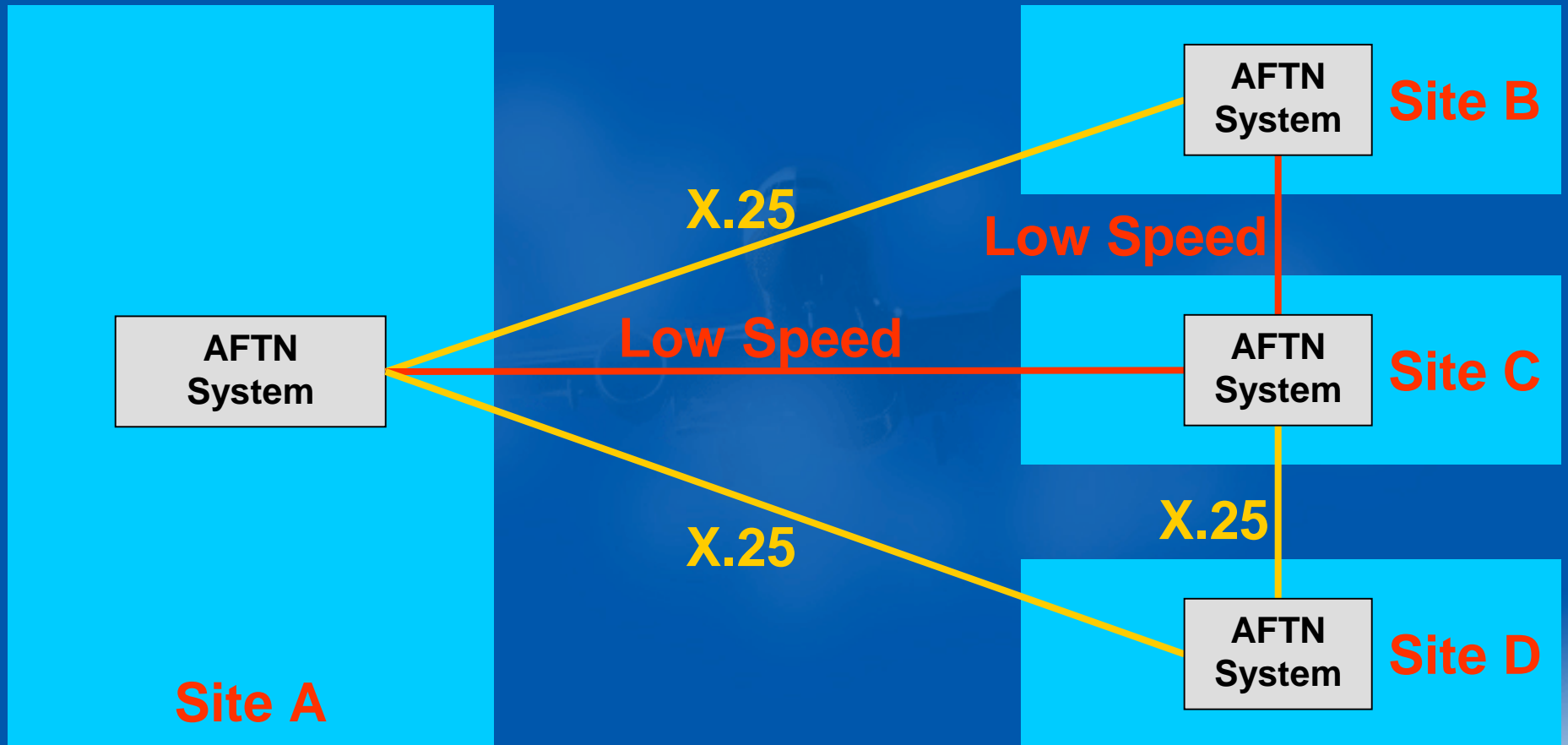
Full Implementation of AMHS
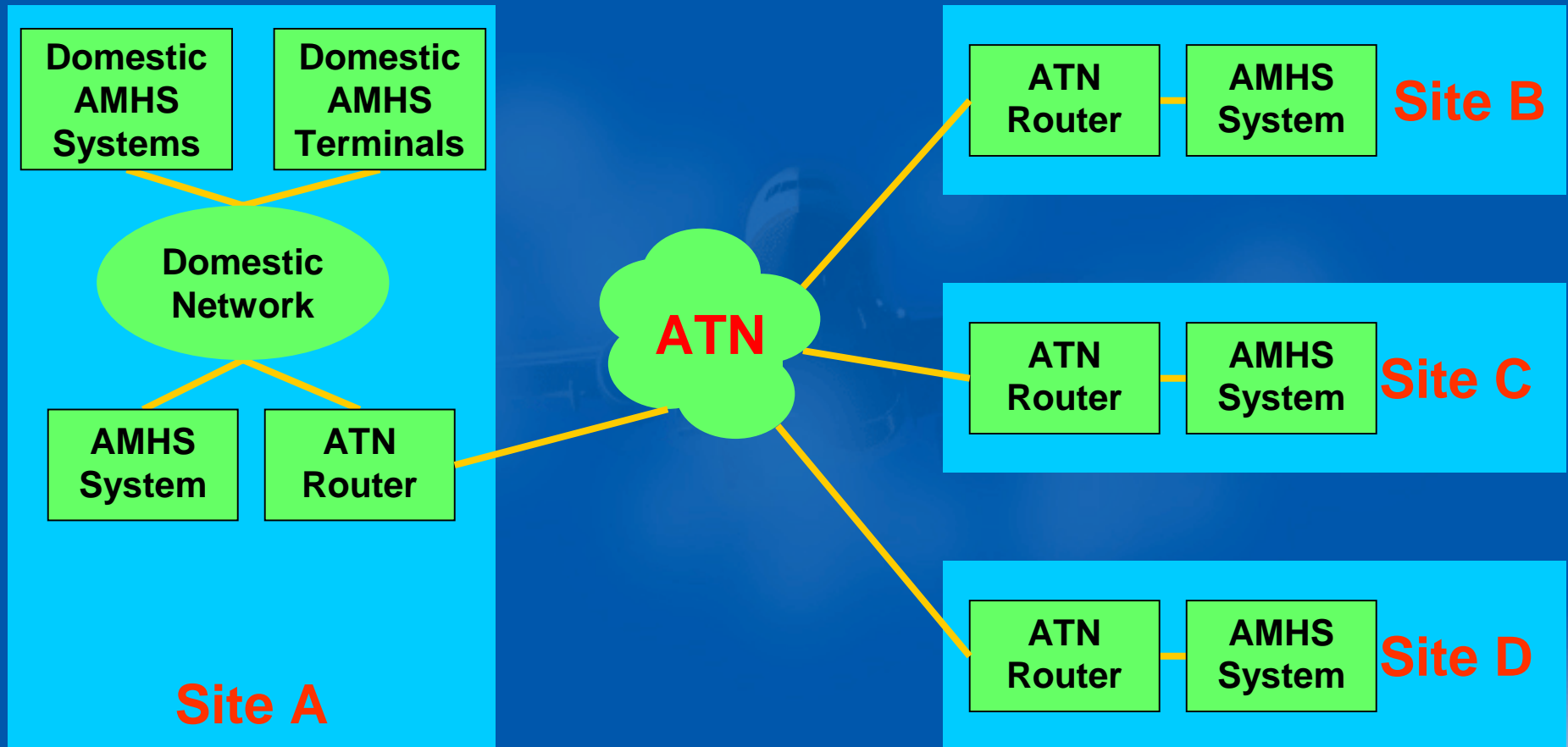
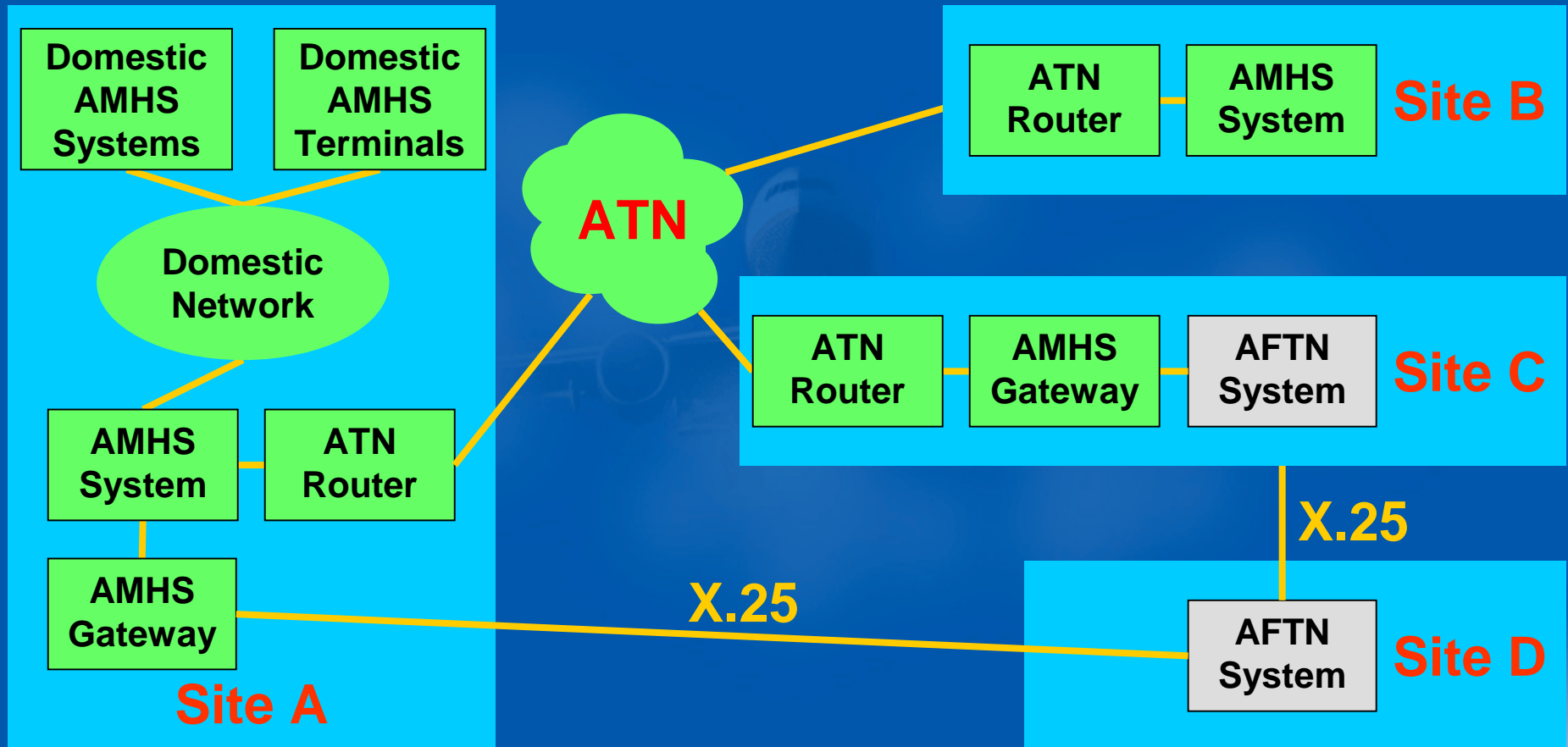# Implementation of AFTN/AMHS Gateways
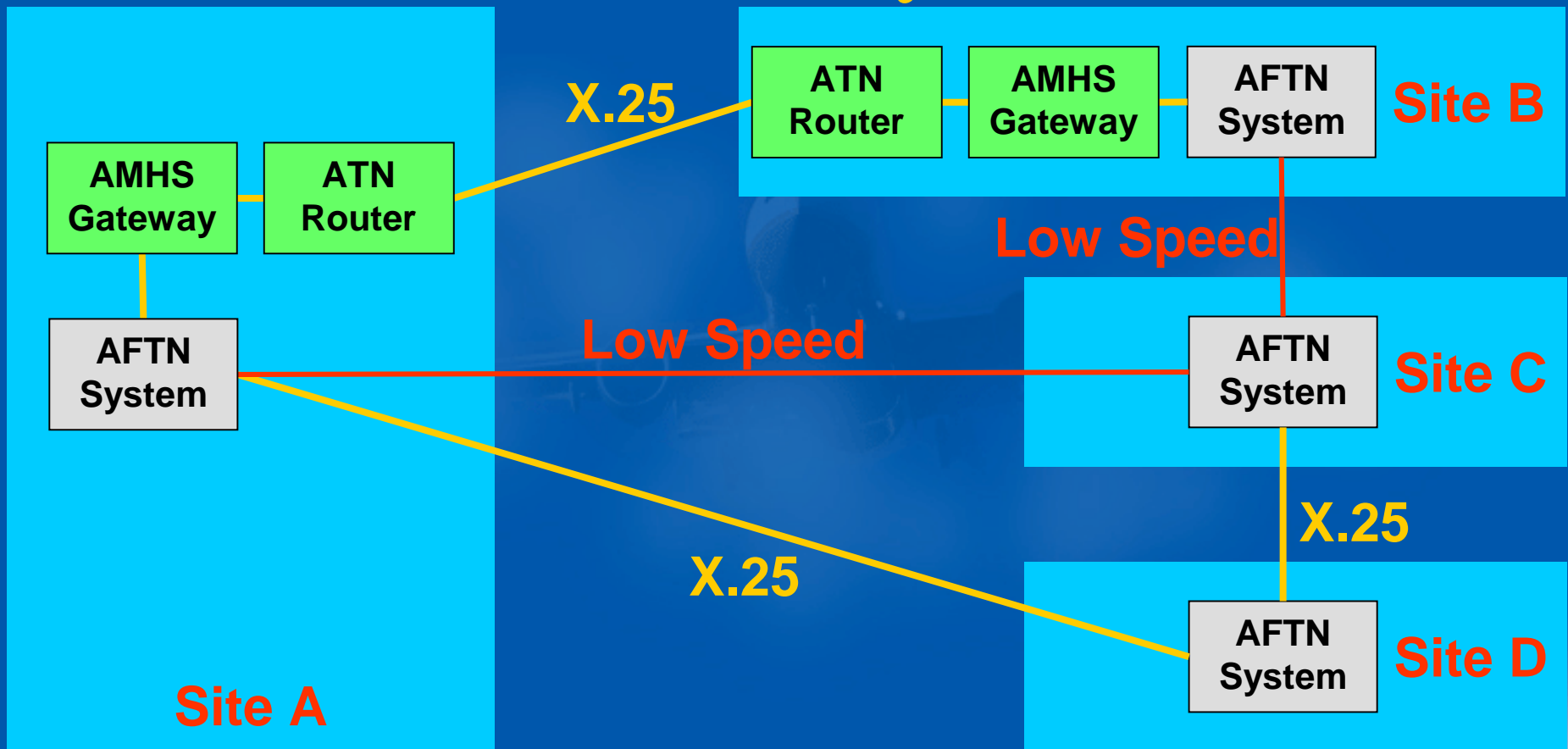
Migration to AMHS - 1

Migration to AMHS - 2
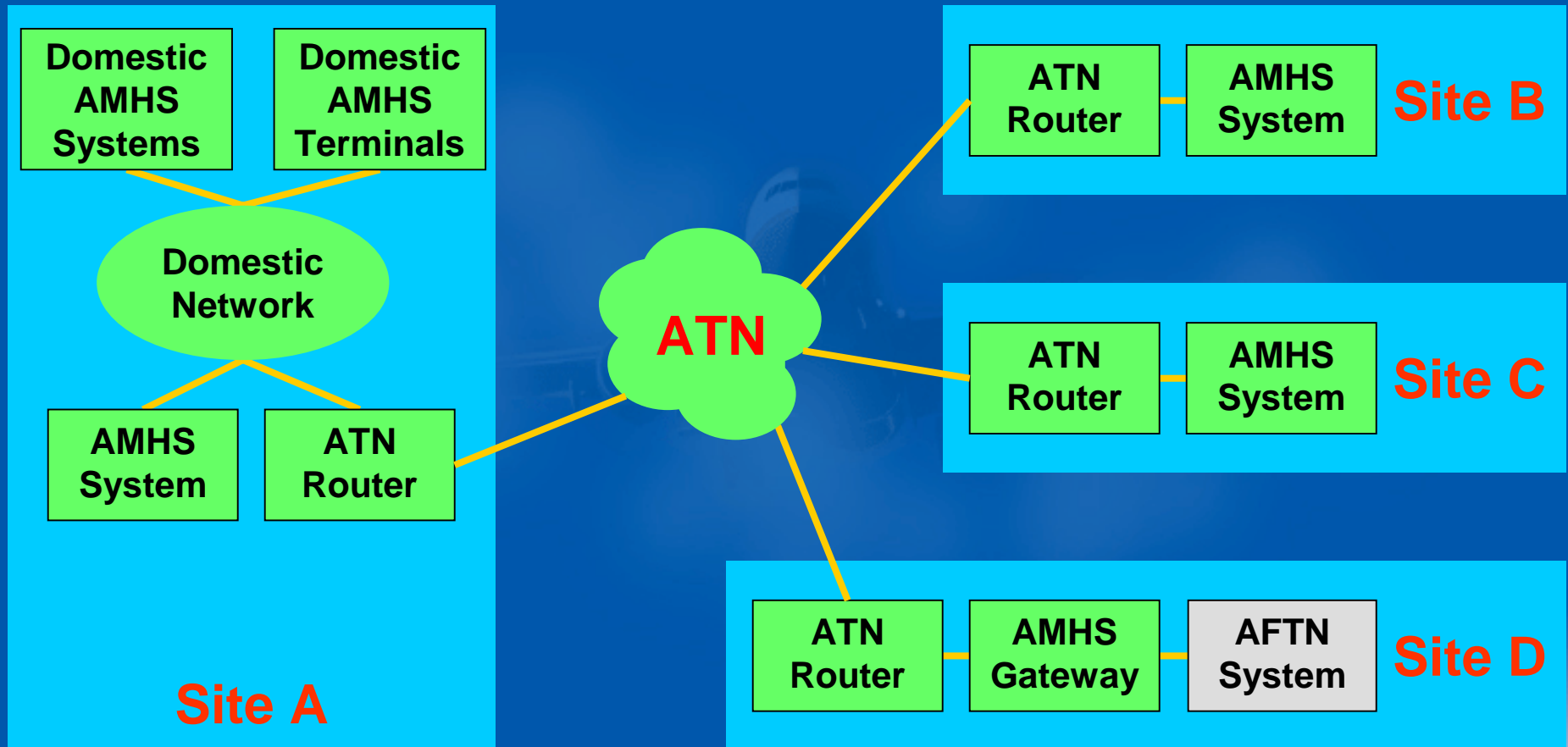
Full AMHS Implementation
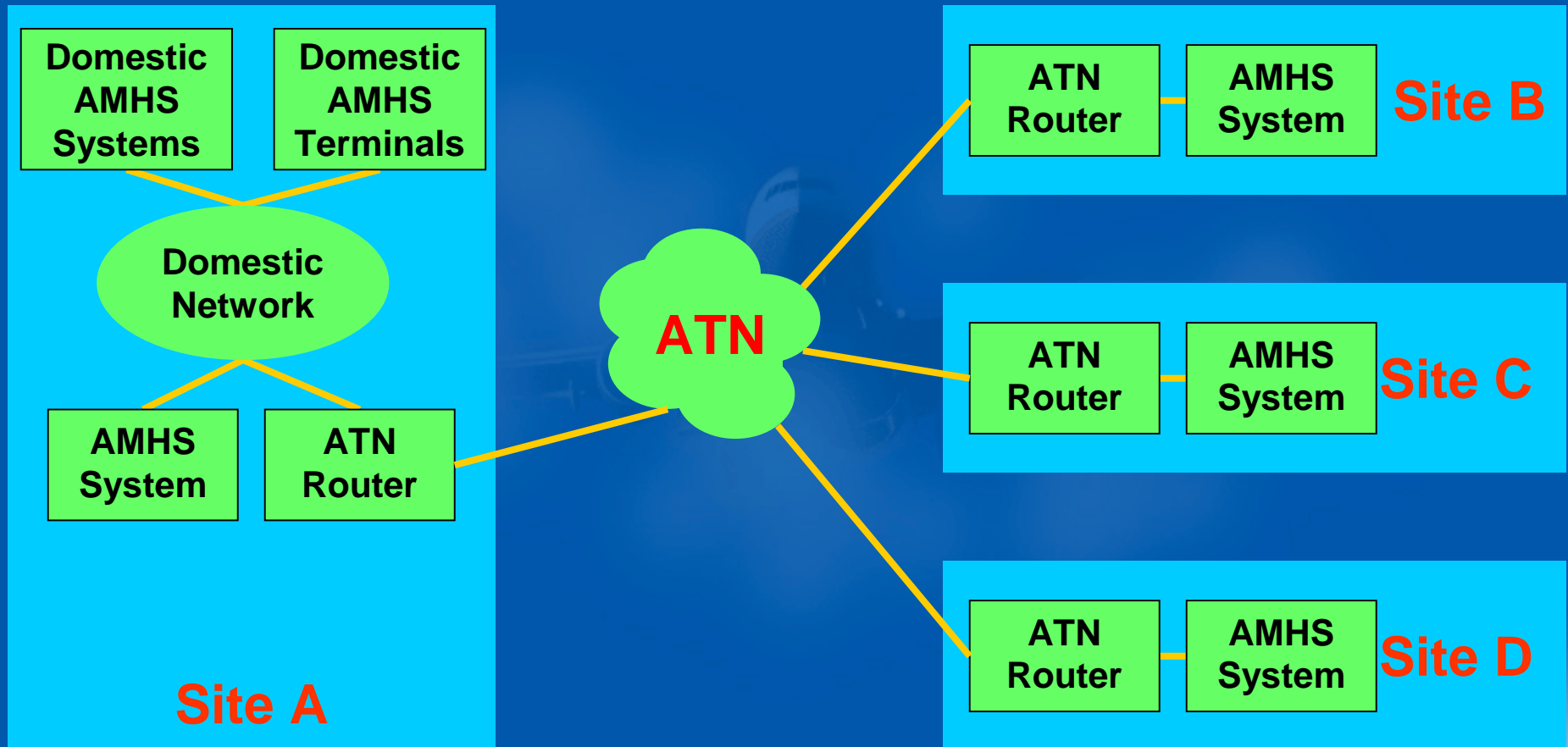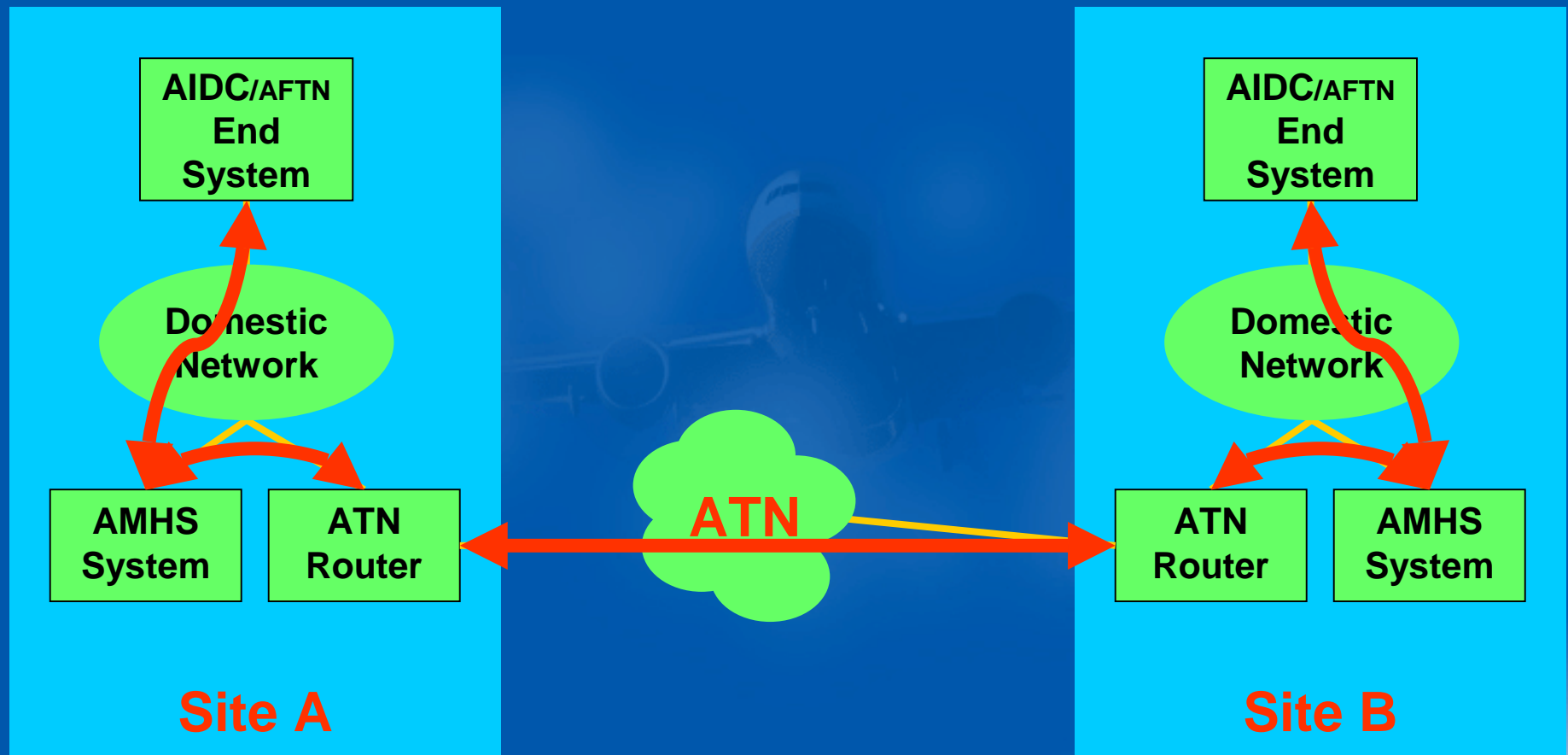
AIDC Implementation

- ATS Inter-facility Data Communication
- ATN AIDC is not Compatible with AIDC over AFTN.
- Implementation of ATN AIDC will need to be implemented by agreement between States.
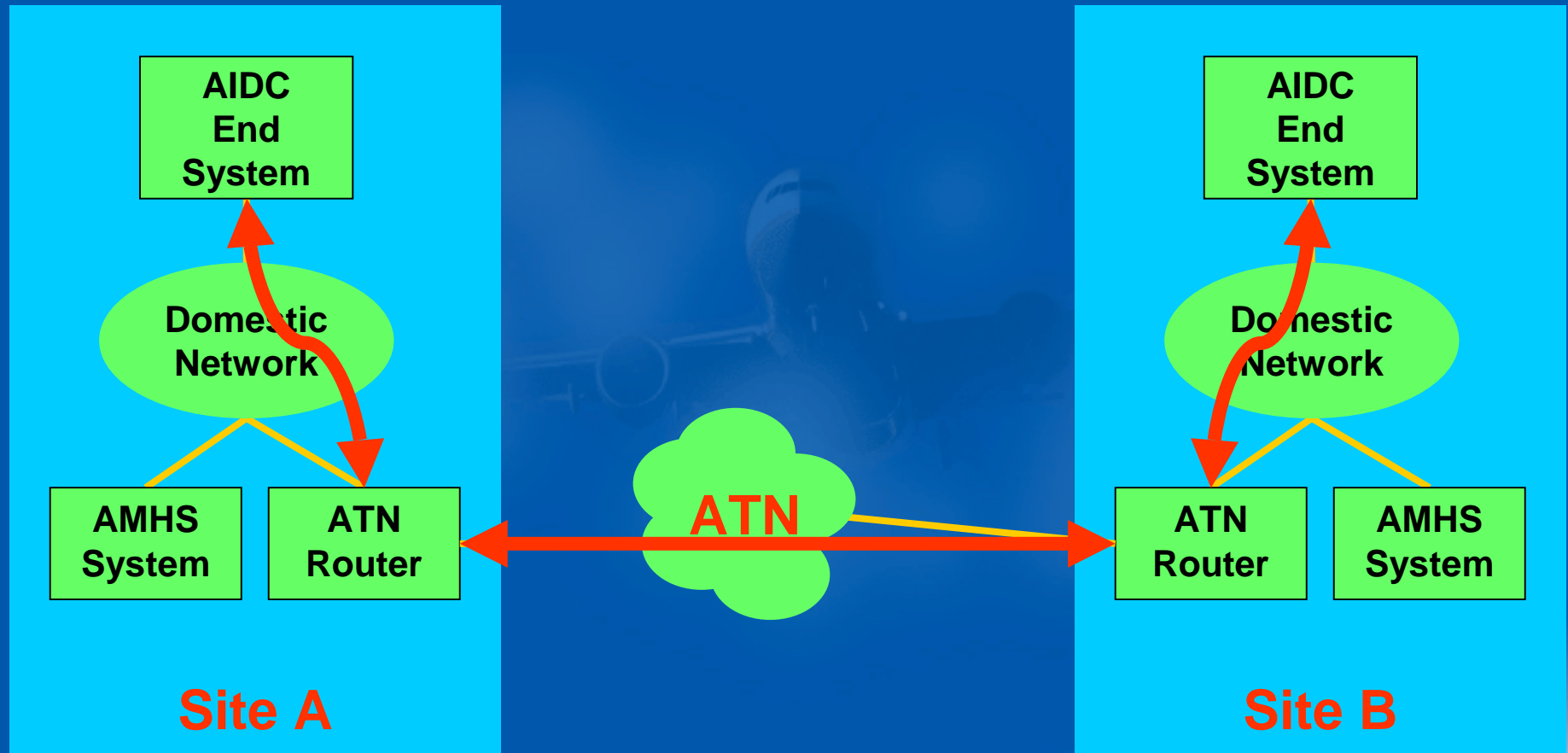- Possible phased implementation could be AIDC over AFTN to AIDC/AFTN over AMHS.

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AIDC/AFTN Over AMHS

Full AIDC Implementation

Summary

- Implementation of new links or Upgrade existing AFTN links where appropriate to be compatible with ATN protocols.
- Plan for adequate bandwidth which can be increased without restriction.
- Interim arrangements can be set up between States which have already started their implementation programs.

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