International Civil Aviation Organization

ATN Seminar and Third ATN Transition Task Force Meeting

Singapore, 26-30 March 2001

Agenda Item: 3 ATN Ground-Ground Application

AIDC, ATS INTERFACILITY DATA COMMUNICATION

(Presented by Tetsuo Mizoguchi)

AIDC; ATS Interfacility Data Communication

ATN Seminor

Singapore

March, 26-27, 2001

Tetsuo MIZOGUCHI

(Japan)

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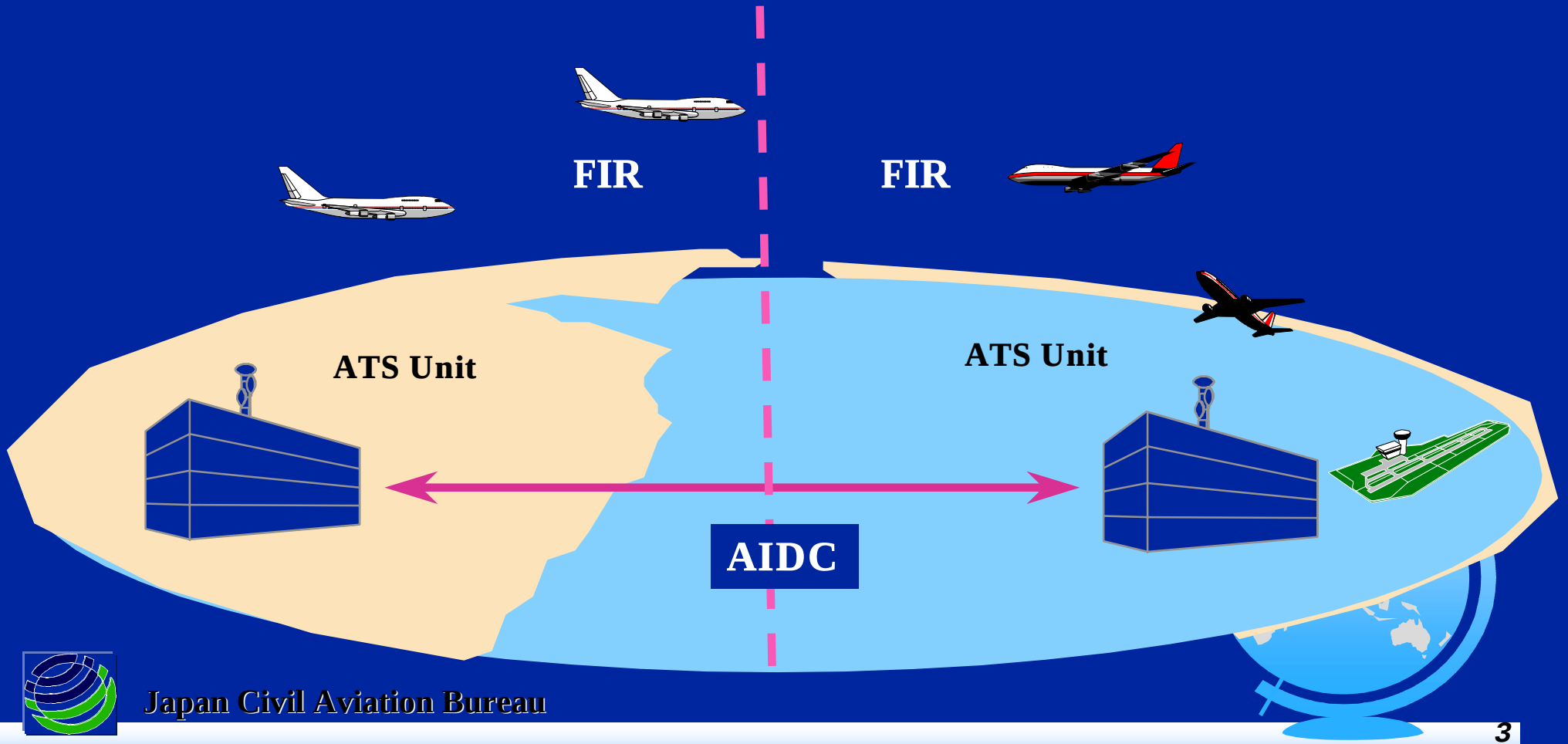
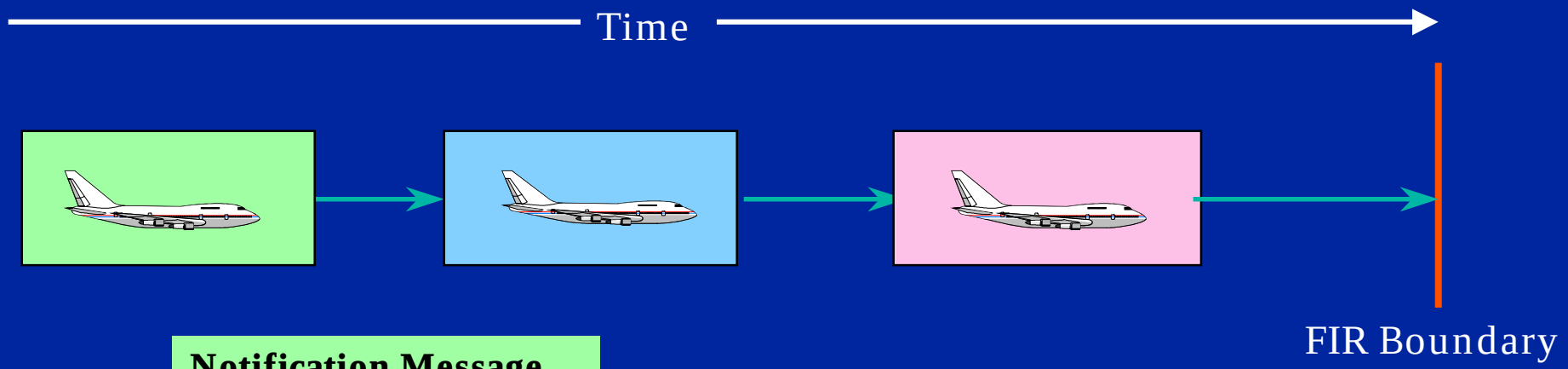
AIDC Scope, Functions

- AIDC; Information exchange between ATS Units in support of ATS functions
- AIDC Functions; Notification, Coordination, and Transfer of Control.



AIDC Functions for one Flight

- **Notify Phase**
- **Coordinate Phase**
- **Transfer Phase**



More than One Flight under AIDC ; a snapshot

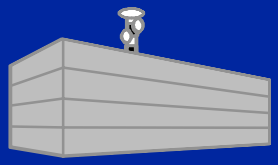

Flight 4


Flight 3


Flight 2


Flight 1

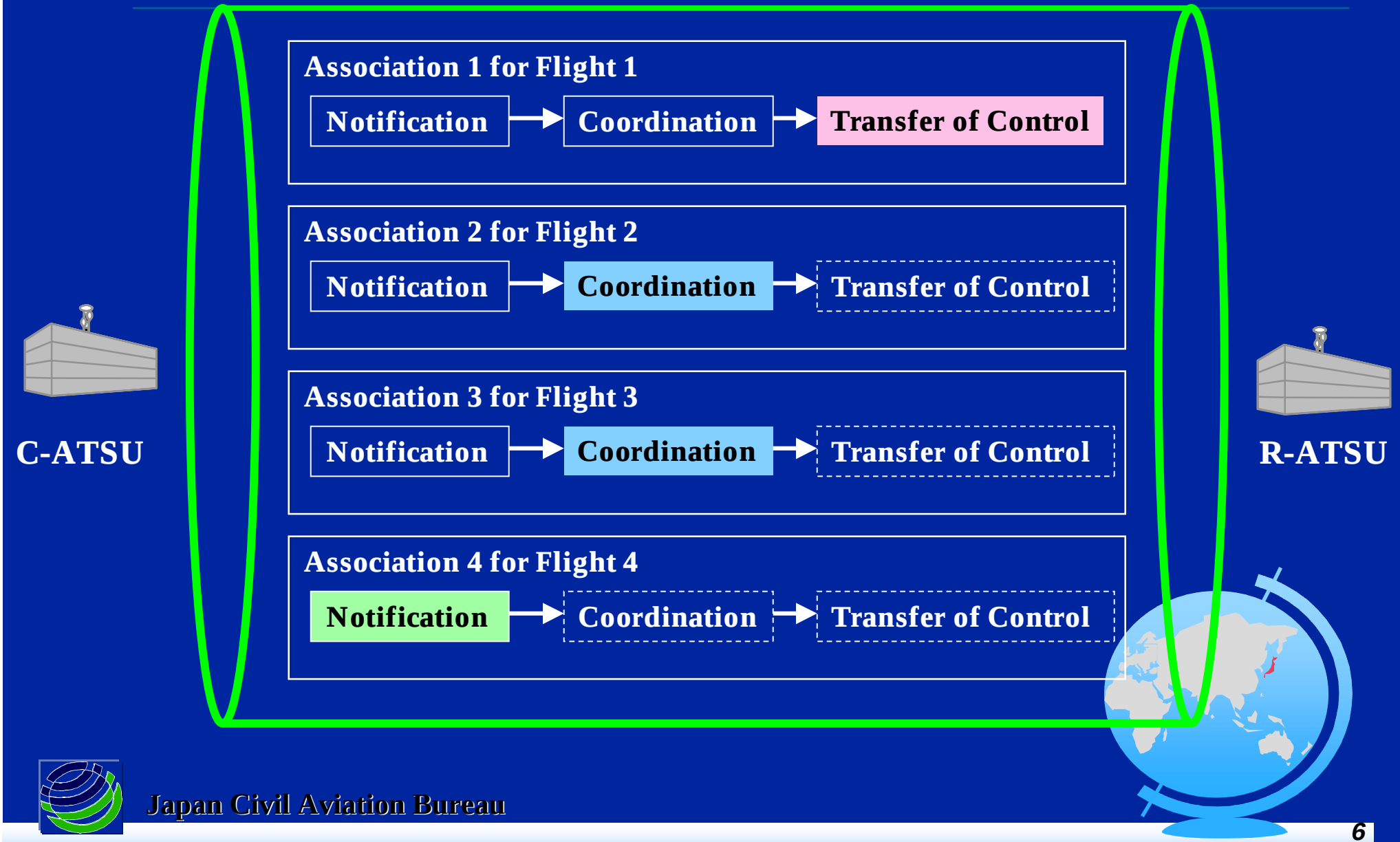
Notify Phase | **Coordinate Phase** | **Transfer Phase**


C-ATSU

Flight 1	**Transfer of Control**	**Coordination**	**Notification**
Flight 2	**Coordination**	**Notification**	
Flight 3	**Coordination**	**Notification**	
Flight 4	**Notification**		

FIR Boundary

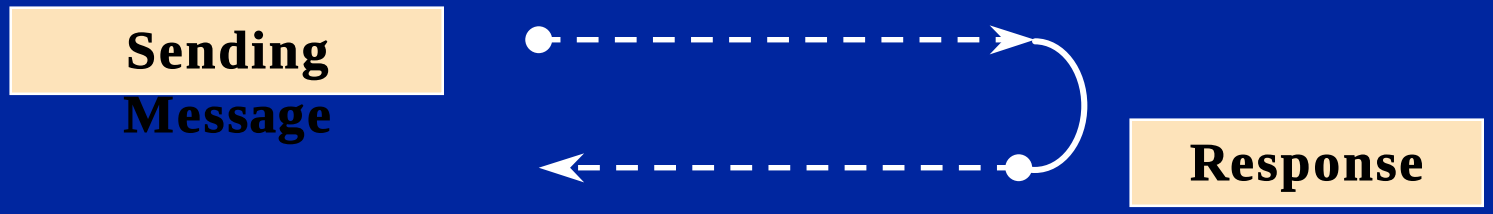
Multiple Associations (One Association per Flight)over ATSU pair



Establishing Associations & Messaging Phases

- **Establish Physical Connection**
- **For Each Flight**
- **Establish Association(Logical Connection)**
- **Messaging ;**
- **Notification ;**
- **Coordination ;**
- **Transfer of Control ;**
- **End of Messaging ;**
- **Close Association**

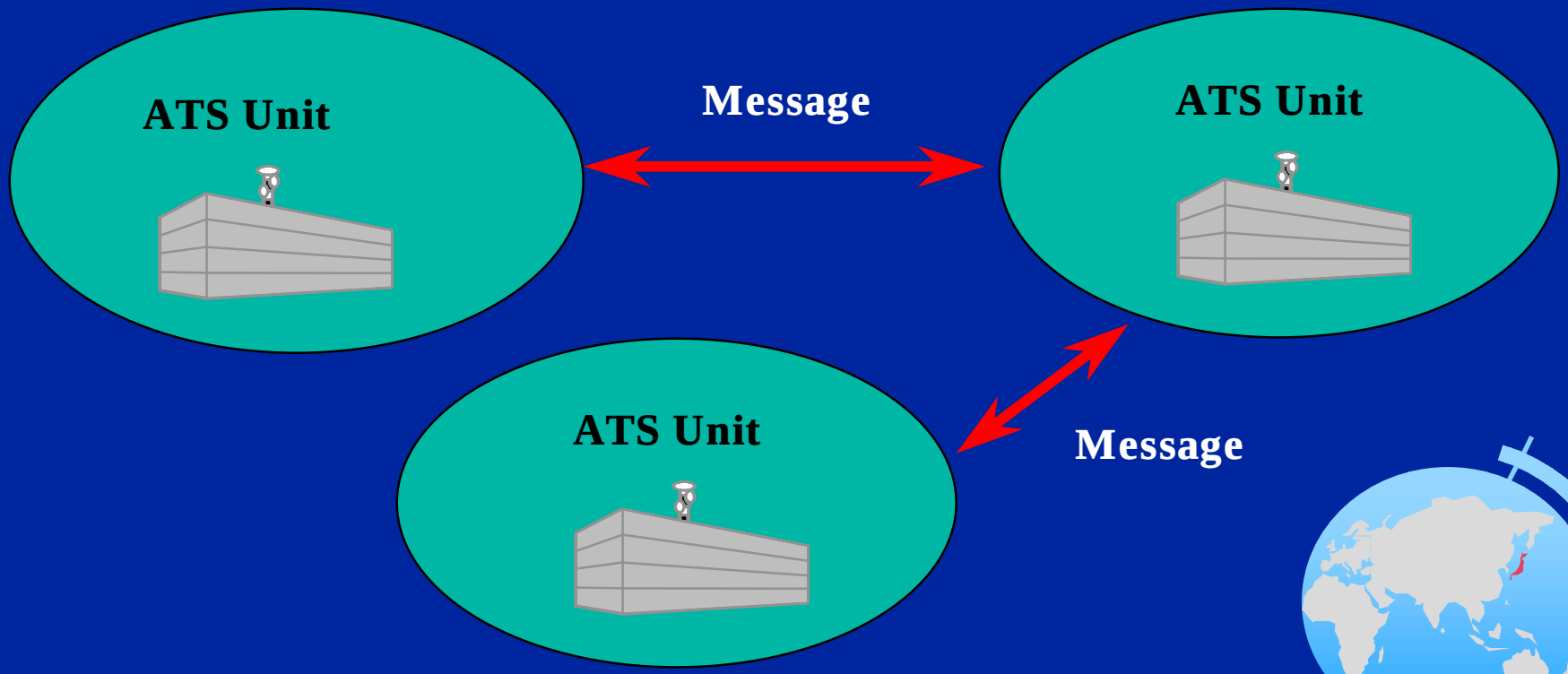
Sending and Responding



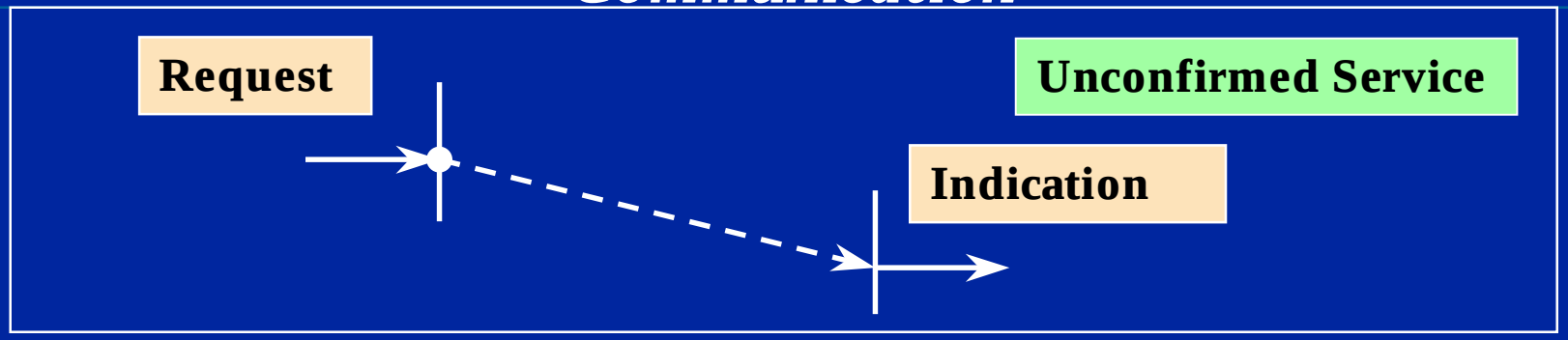
- Two Types of Responses
- Application Response (Technical Response) : Message sent is validated and accepted (AppAccept) or rejected due to errors(AppError)
- Operational Response : e.g. acceptance (CoordianteAccept) / rejection (CoordinateReject) of trajectory as proposed by CoordinateNegotiate

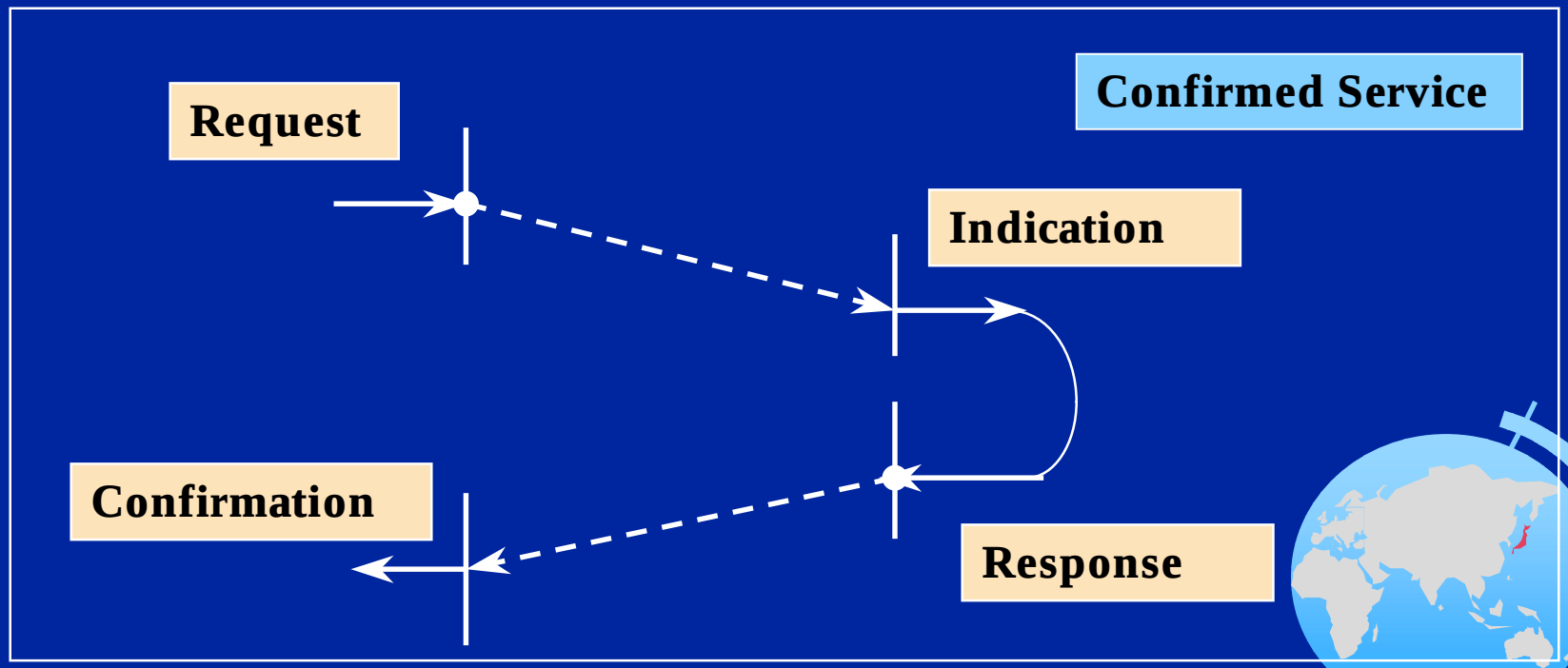
Standards of AIDC;

- **Why we need Standards?**
- **Standardization; Protocol and Message Format (at Interface)**



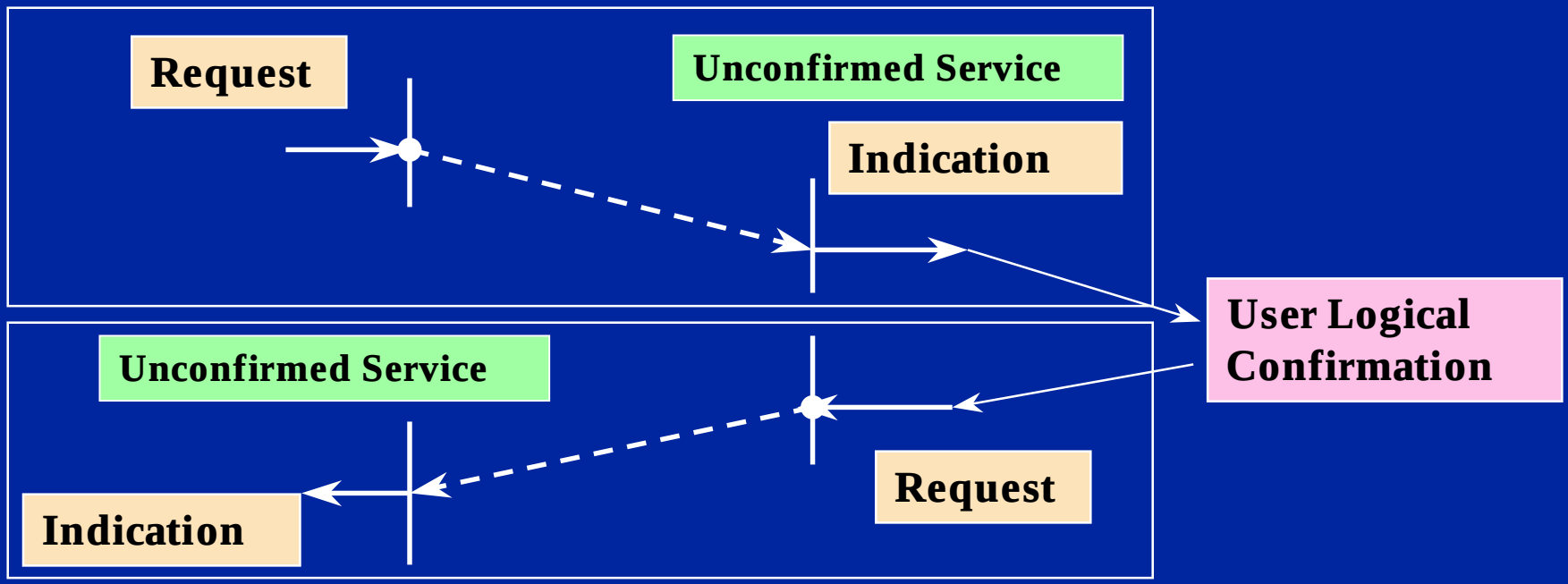
Protocol; Confirmed/Unconfirmed Services in Communication





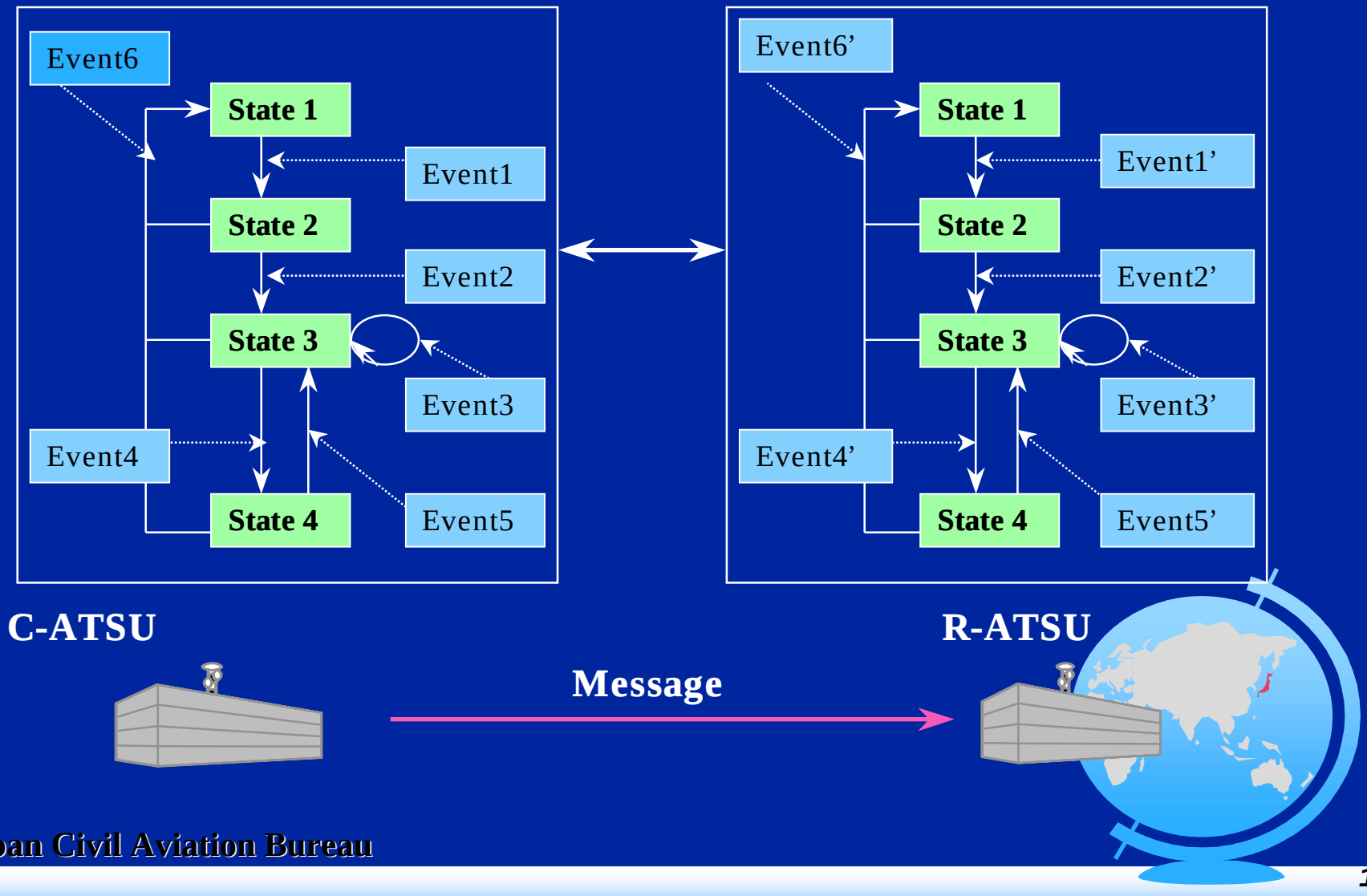
Protocol; Application Response

- **User Logical Confirmation as Application Response**

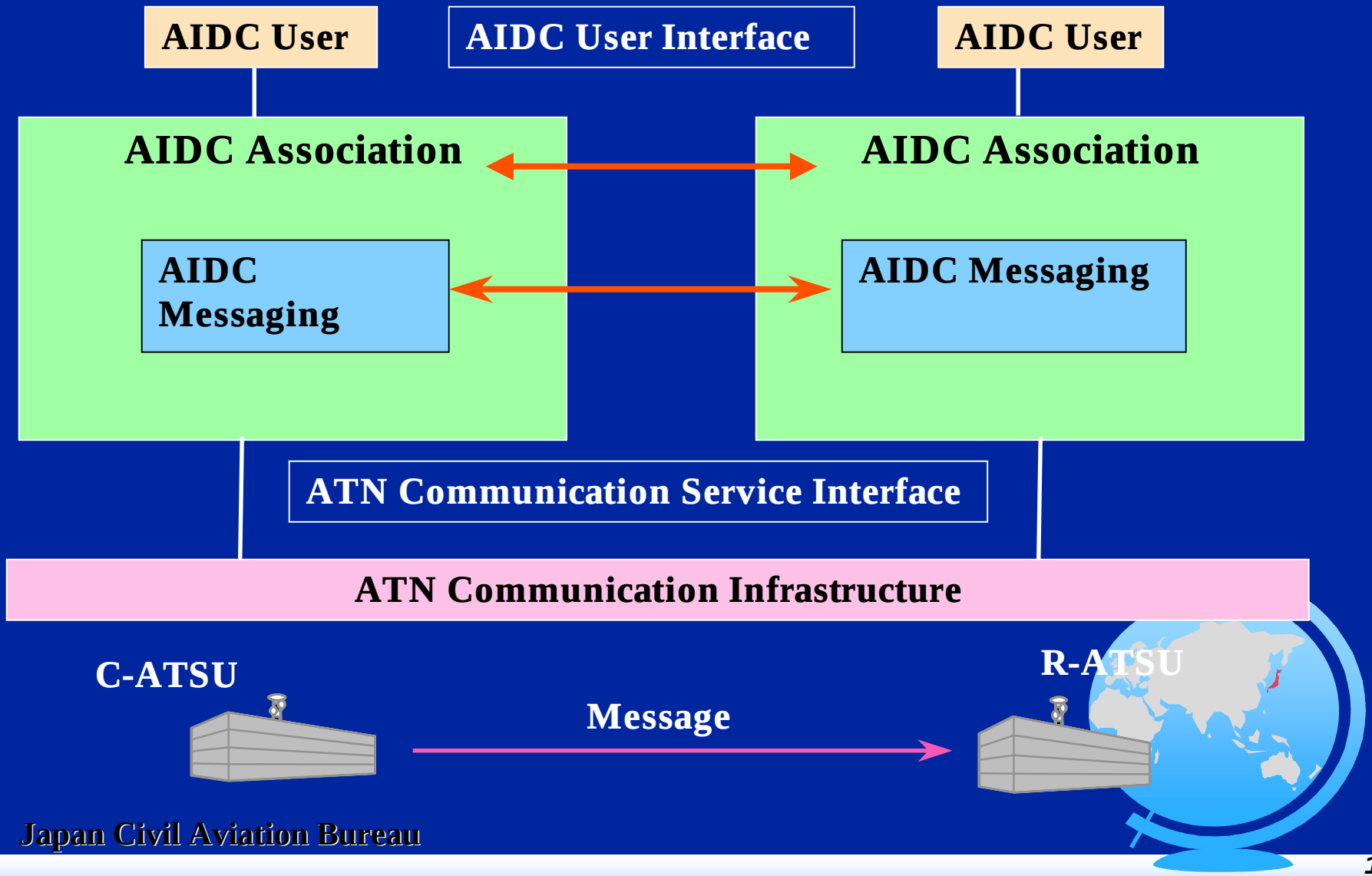


Communication Protocol (Abstract) State Machine

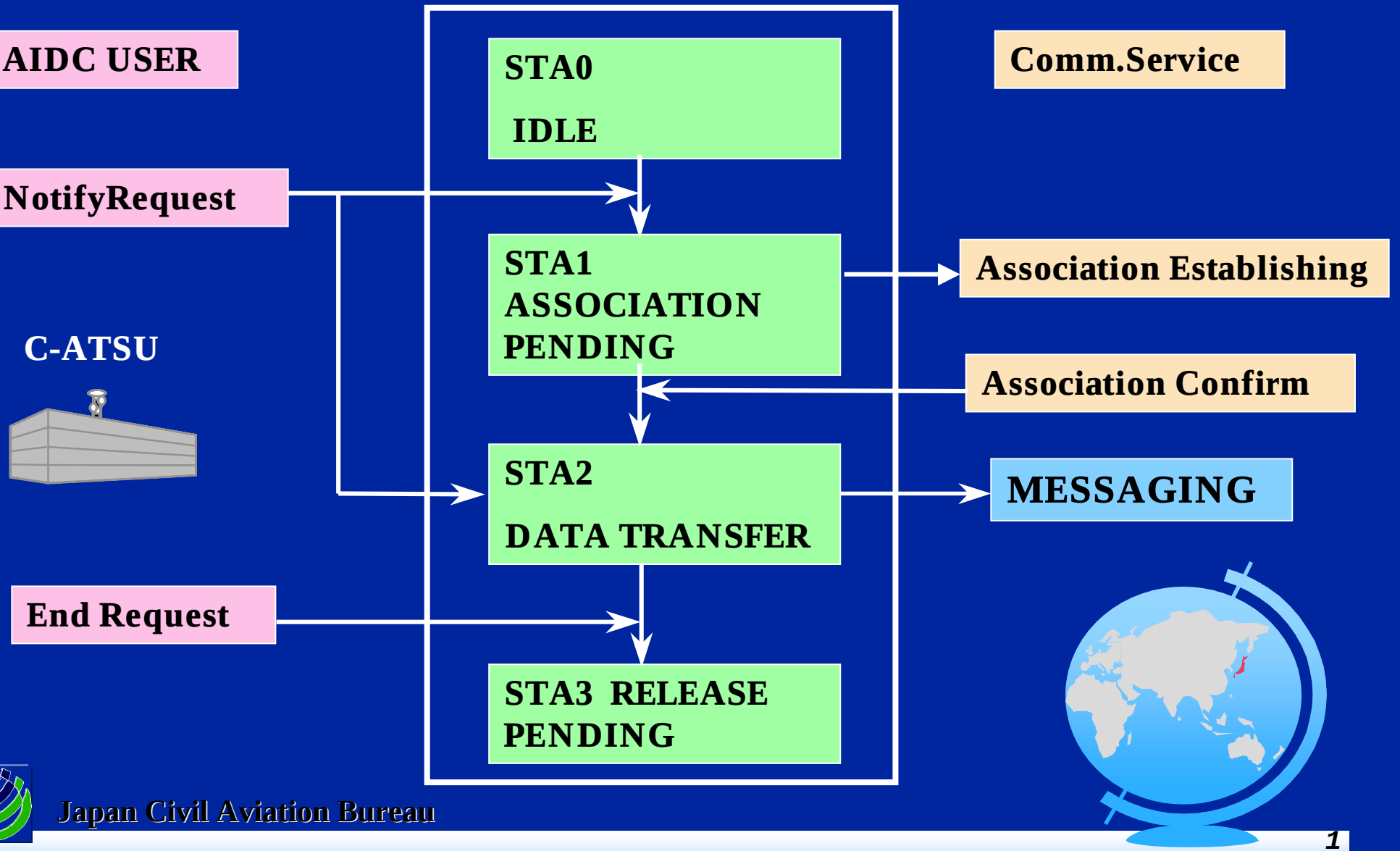
- **Protocol Machine State Transition**



ATN AIDC SARPs; Associating Peer AIDCs (1)



ATN AIDC SARPs; Associating Peer AIDCs(2)

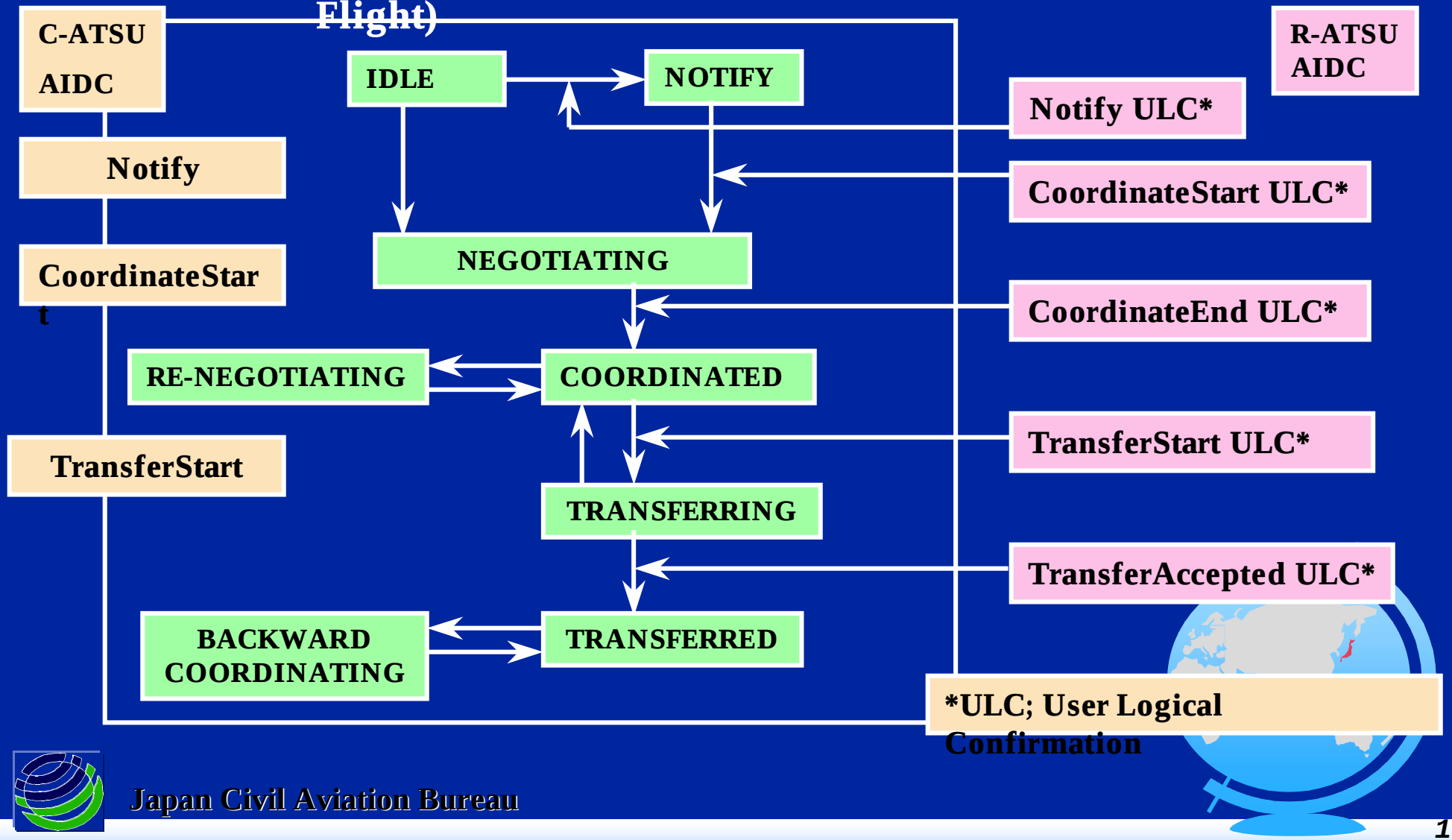


ATN AIDC SARPs ; Sending/ Receiving Messages(1)

- **Messages (APANPIRG Equivalent Message Subset)**
  - **Notification**
    - **Notify**
  - **Coordination**
    - **Coordinate-Start**
    - **Coordinate-Negotiate**
    - **Coordinate-End**
  - **Transfer of Control**
    - **Transfer-Control (Confirmed Service)**
  - **Asynchronous Information Transfer**
  - **Termination**
    - **End (Cancel)**
    - **User-Abort**
    - **Provider(Comm. Service)-Abort**

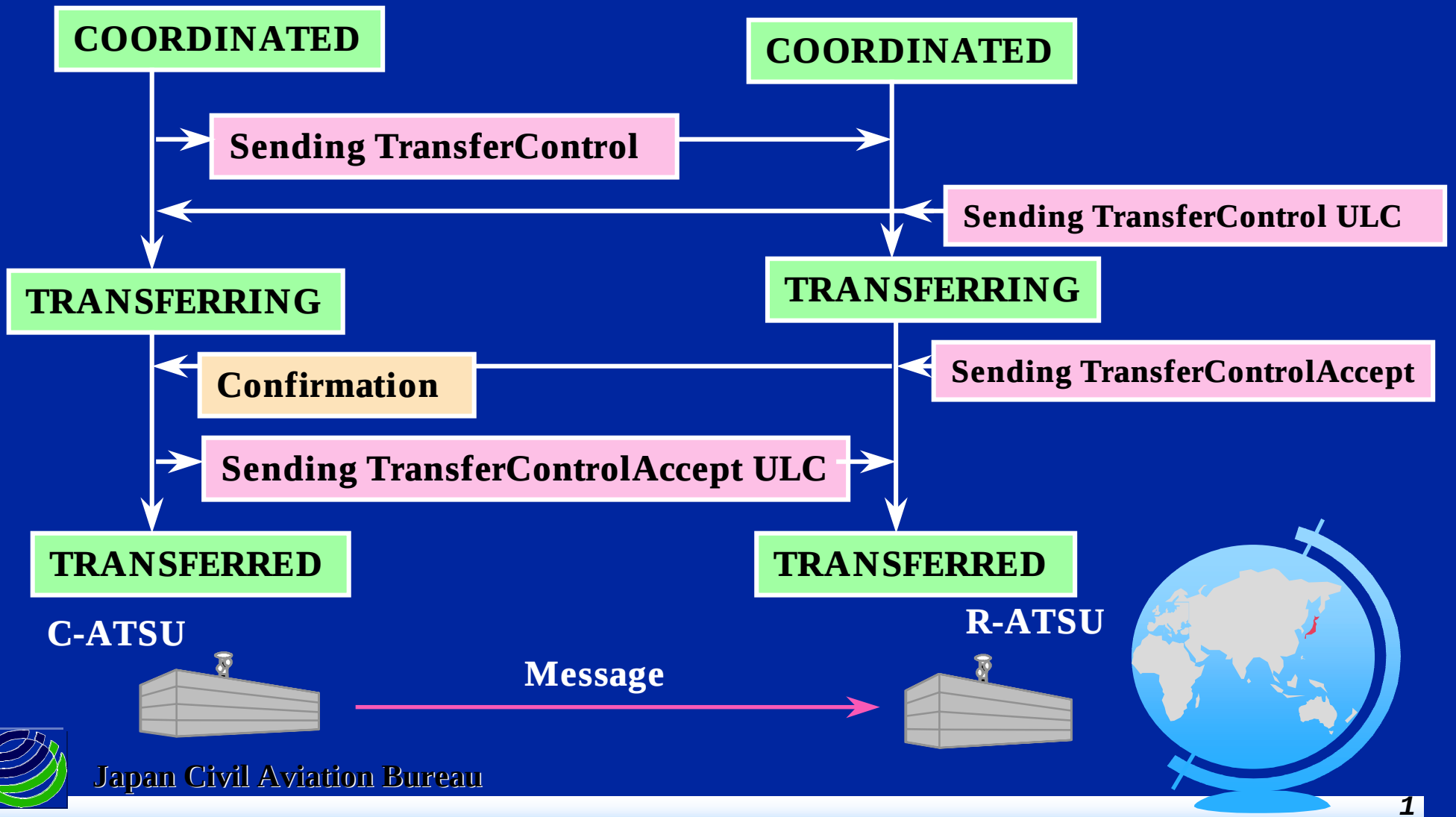
ATN AIDC SARPs ; Sending/ Receiving Messages(2)

- **States & State Transitions for Messaging(Per Flight)**



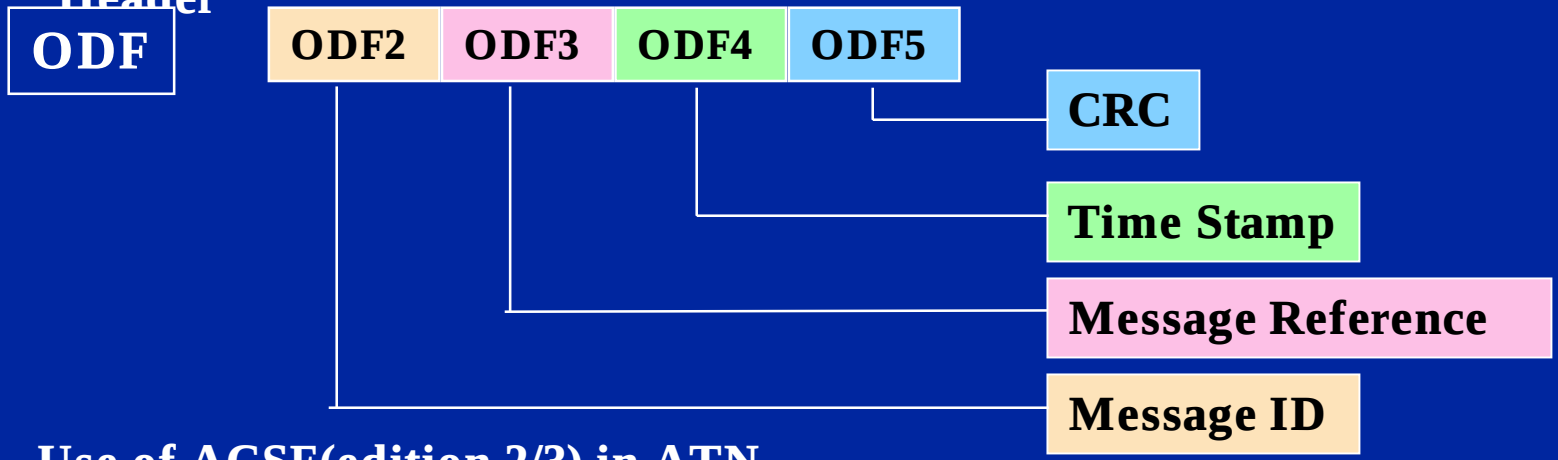
ATN AIDC SARPs ; Sending/ Receiving Messages(3)

- **Confirmed Service; Transfer of Control**

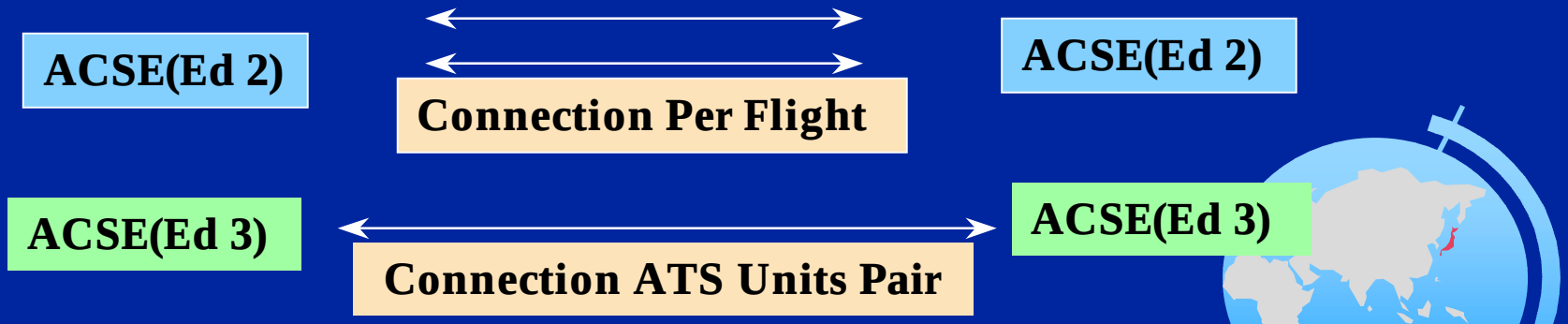


Remarks on AIDC Implementation(1) ;AIDC Standards

- **Comparing APANPIRG AIDC ICD and ATN AIDC SARPs**
  - **Use of AFTN vs ATN and Use of ODF; Optional Data Fields, in AFTN Header**



- **Use of ACSE(edition 2/3) in ATN**



Remarks on AIDC Implementation(2) ;AIDC Standards

- More Rulings in AIDC for SARPs AIDC Implementation
- Most of Checking in Application for APANPIRG AIDC Implementation

SARPs AIDC Application

SARPs AIDC

Flight Phase Ruling

Message Sequence Ruling

APANPIRG AIDC Application

Flight Phase Ruling

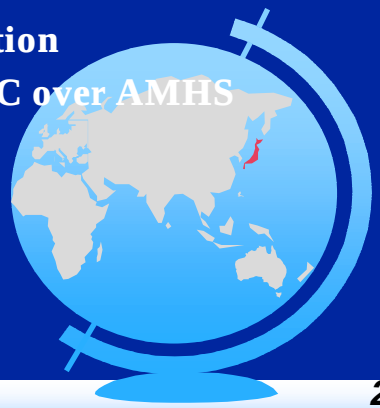
Message Sequence Ruling

Interacitve Dialogue Communication

Messaging(Stored-Forward) Communication;AFTN

Remarks on AIDC Implementation(3); Transition

- **Transition Issues**
  - **From APANPIRG ICD Based AIDC Implementation**
  - **To ATN SARPs Based AIDC Implementation**
- **No impacts to Controller Interface are desirable**
- **AIDC User could be an application process, possibly mapping between Controller Interface and AIDC User Interface would be needed**
- **Message Format and Contents Differences**
  - **Message Type; No Surveillance Data Transfer in SARPs**
  - **Message Parameters; Variables, Ranges, Resolutions; No many but some**
- **Communication Performance, may not be same**
  - **Data Integrity**
  - **Delay**
  - **Availability**
- **Communication Infrastructures**
  - **APANPIRG AIDC via AFTN/ATN Gateway may not be a transition solution**
  - **Interoperability between APANPIRG AIDC over AFTN and SARPs AIDC over AMHS via AFTN/AMHS Gateway or AIDC adaptor, or**
  - **New development needed**



Remarks on AIDC Implementation(4); Mutual Coordination

- Coordinated Development with Other Applications, e.g. CPDLC
- Mutual Agreements between ATS Units/CAAs
  - Agreement over Message Set to be used
  - Agreement over flight related conditions dictating the invocation of AIDC services
  - Agreement over the timing associated with the AIDC services