JEPPESEN
A BOEING COMPANY

ICAO - Seminar on SWIM and XML Messages

The Digital Transformation of Managing Aviation Data
A Commercial Data Supplier View

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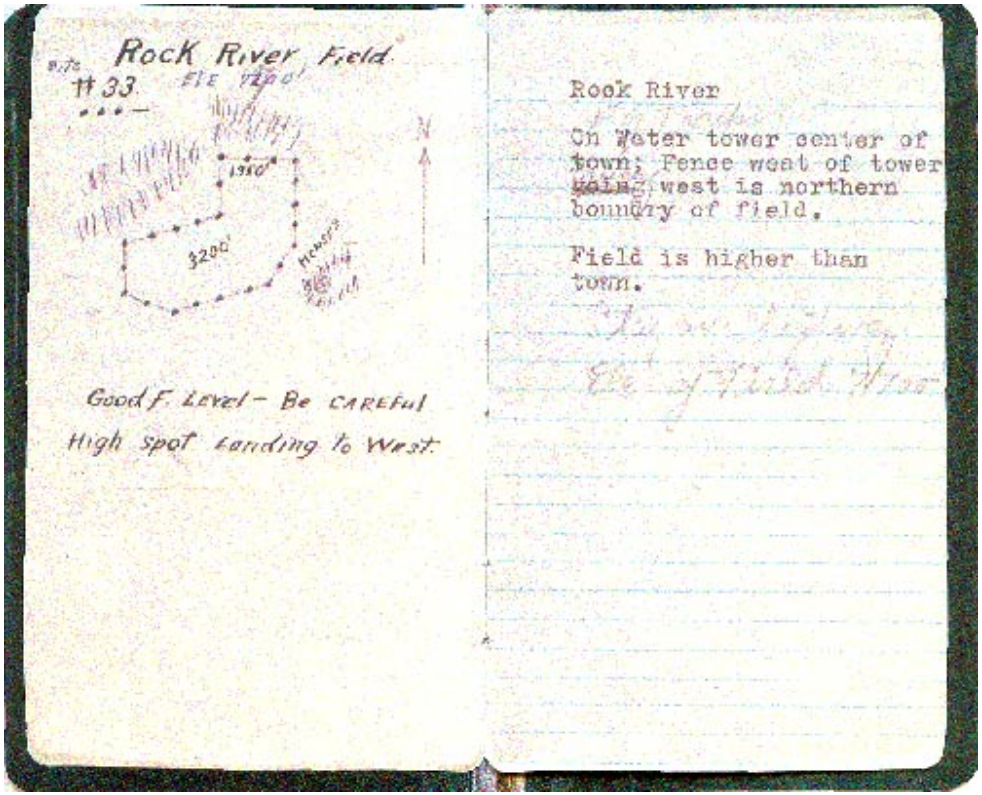
The Jeppesen Commitment

"No hice las cartas para ser famoso, las hice para seguir con vida"

"I didn't make the charts to get famous, I made them to stay alive."

Elrey Jeppesen



Aeronautical Data Supply Chain
Four Tiers of AIM Stakeholders

Each has different roles, responsibilities, obligations and needs

State Civil Aviation Authority

State government organization responsible for the safety, regularity and efficiency of national and international aviation within its borders.

State Designated Service Provider

An organization designated by a State to fulfill State obligations for AIS provision. These are often *corporatized* organizations referred to as ANSPs.

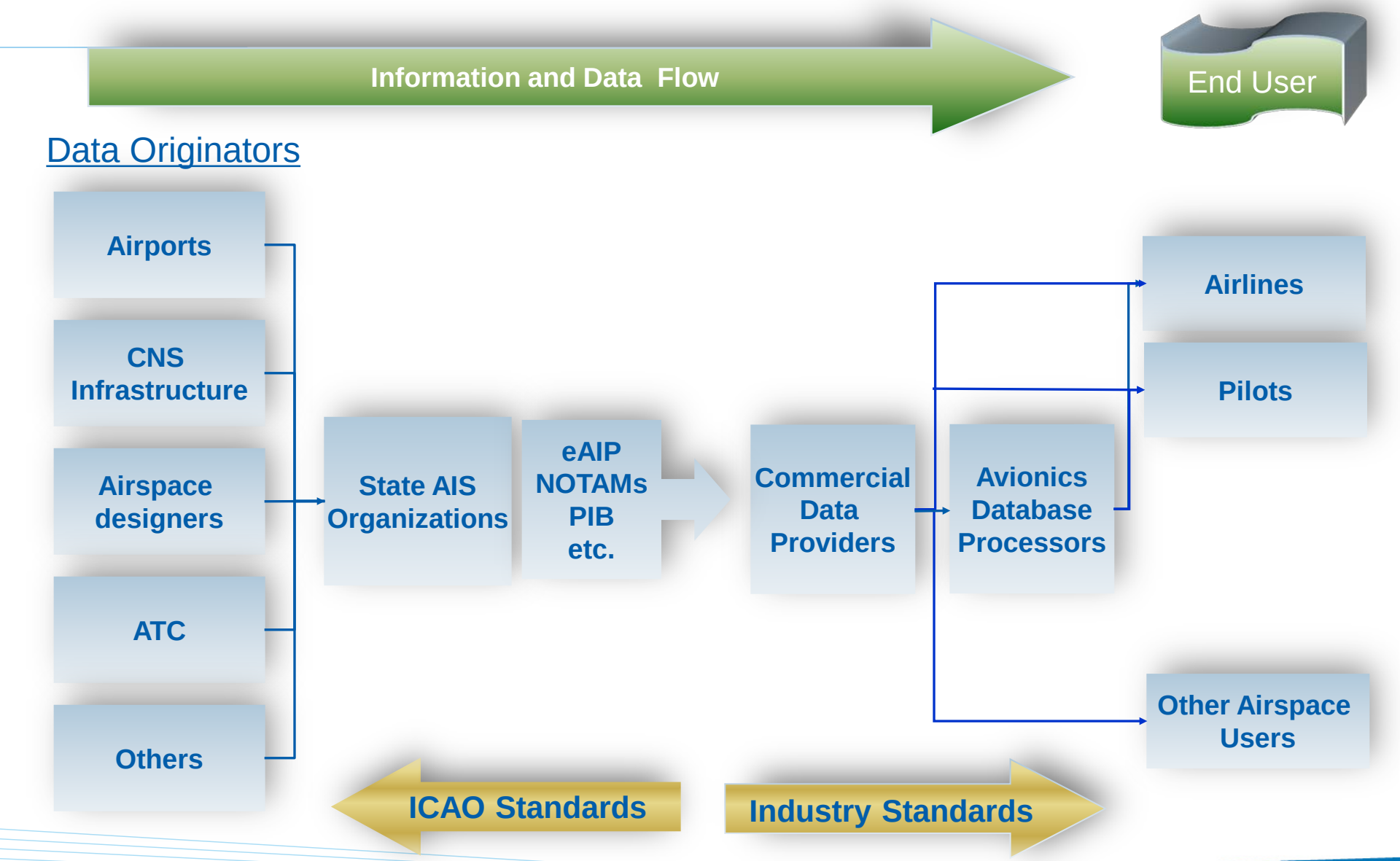
Commercial Service Provider

An organization, generally a corporation, that creates value-added services from the „official“ facts, data and information about the State aviation system.

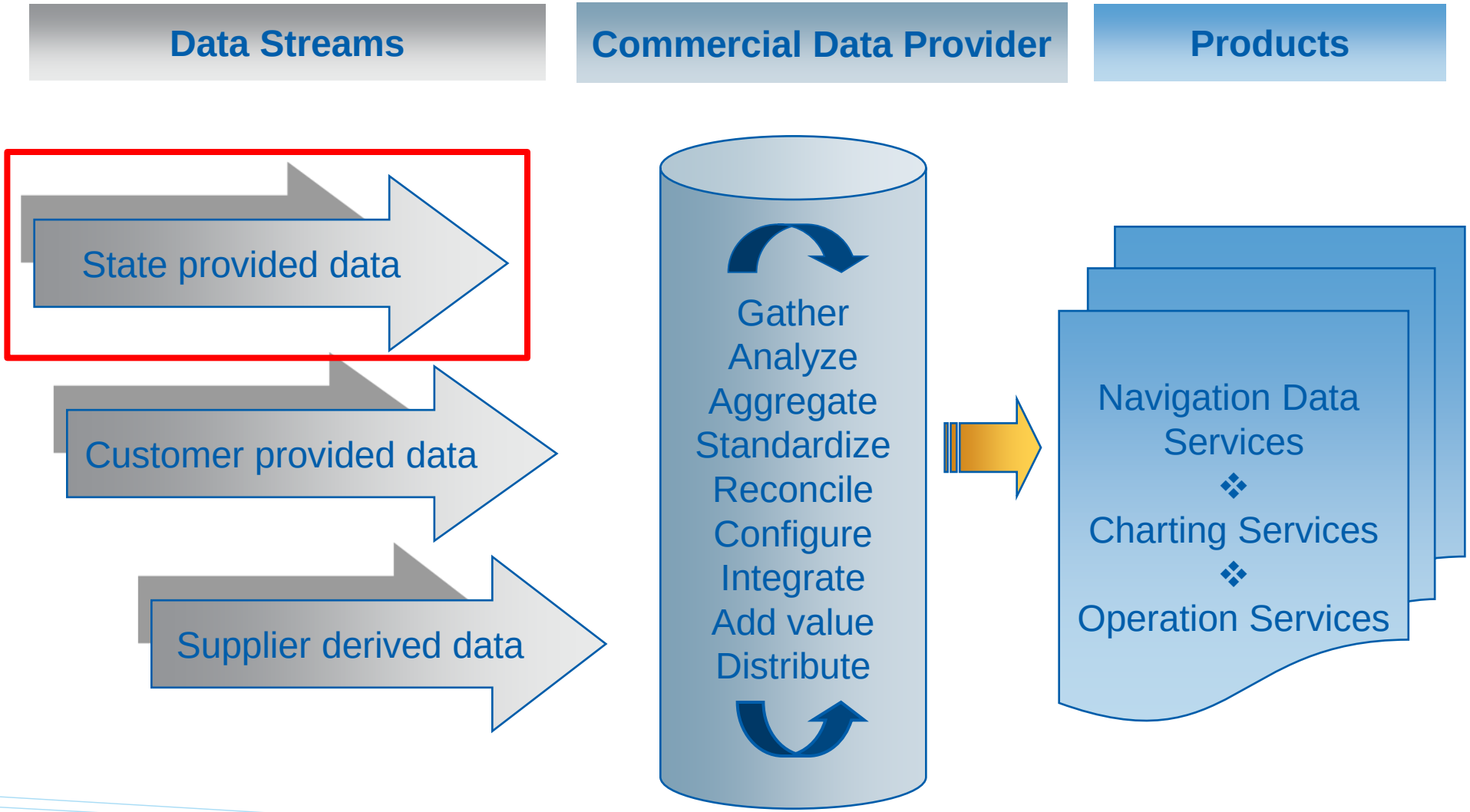
End user

Pilots, aircraft operators, ATS organizations, flight support organizations and other entities that use aeronautical information to support safe, efficient and orderly flight operations.

Aeronautical Data Supply Chain



Aeronautical Data Flow



Transition AIS to AIM

- **Gestion de informacion areonautica global segura y eficiente que respalda un entorno de informacion aeronautica digital, en tiempo real, acreditado y seguro.**

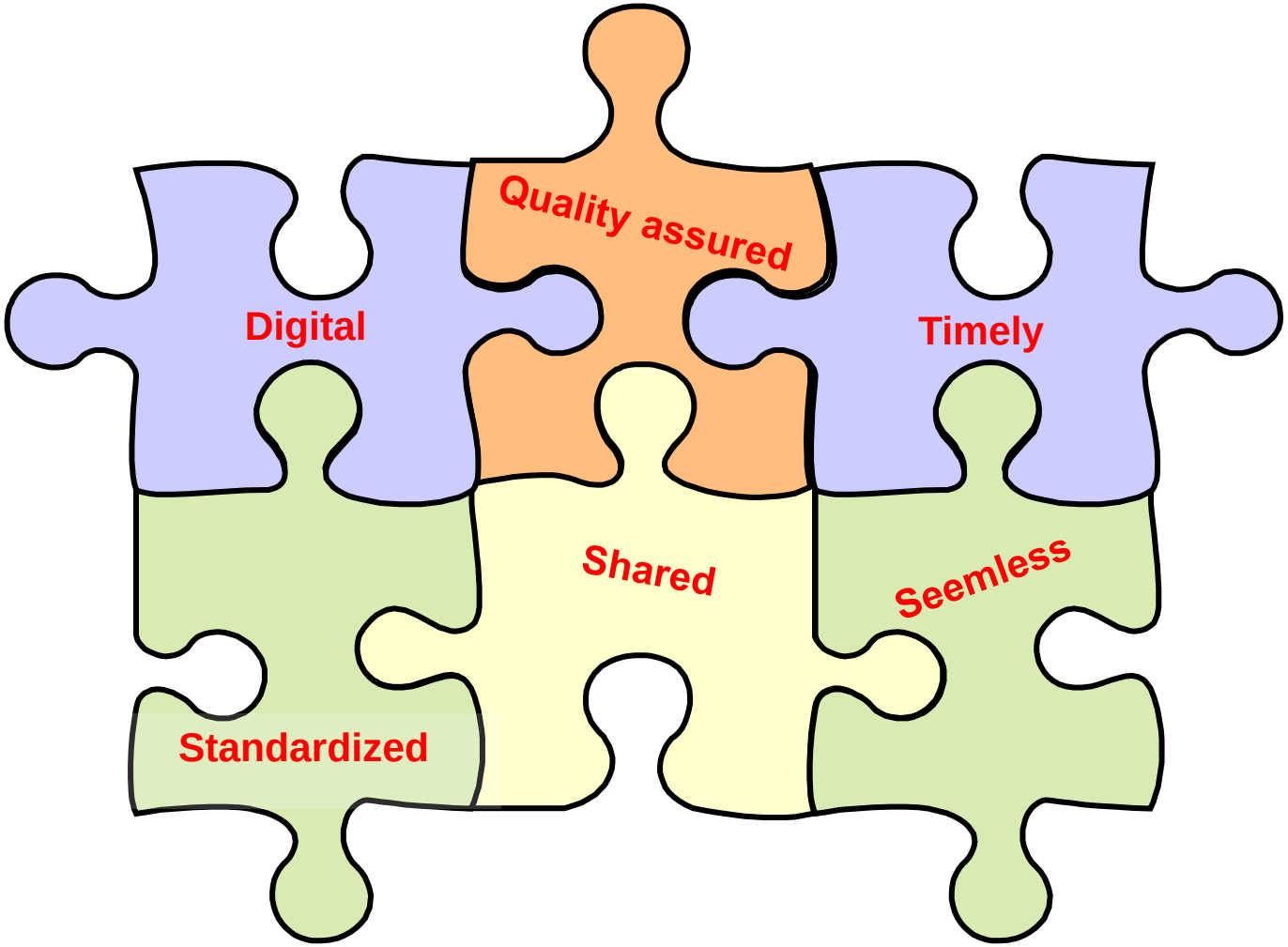
Safe and **efficient global aeronautical information management** that supports a **digital**, **real-time**, **accredited** and **secure** aeronautical information environment.

Transition AIS to AIM

Los sistemas de navegacion actuales y futuros, y otros sistemas de gestion de trafico aereo dependen de los datos. Todos requieren acceso a informacion aeronautica global de amplia base y de considerable alta calidad y mas puntual en su disponibilidad de lo que es en la actualidad. La provision de informacion aeronautica es el elemento esencial de los servicios de navegacion aerea.

Present and future navigation systems and other air traffic management systems are **data-dependent**. All require access to global, broad-based aeronautical information of a considerably **higher quality** and in a **more timely manner** than is generally available today. The provision of **aeronautical information is a core element of air navigation services**.

Aeronautical Information Management Jigsaw Puzzle



Mapa de ruta del AIS
AIS-AIM Roadmap

- **Fase 1 – Consolidacion**
  - Requerimientos de calidad
  - Adherencia al AIRAC
  - Implementacion al Sistema de referencia standard (WGS-84)
  - Provision de datos de terreno y obstaculos
- **Fase 2 – Digitalizarse**
  - Introduccion de procesos basados en datos
  - eAIP
- **Fase 3 – Gestion de la Informacion**
  - Gestion de informacion completamente digital
  - Intercambio de informacion digital
  - Mejoramiento de la calidad y disponibilidad

- **Phase 1 – Consolidation**
  - Quality Requirements
  - AIRAC adherence
  - Implement coordinate reference standard (WGS-84)
  - Provision of terrain and obstacle data
- **Phase 2 – Going Digital**
  - Introduce data driven processes
  - eAIP
  - Improve quality and availability
- **Phase 3 – Information Management**
  - Fully digital information management
  - Digital information exchange
  - Further quality and availability enhancement

Desafio del volumen de datos
Data Volume Challenge

Volumen mundial de datos aeronauticos

- Muy grande y creciendo
- Cada vez es mas dificil gestionarlos con la calidad requerida

Worldwide aeronautical data volume

- Very large and growing
- Increasingly difficult to manage with required quality

- 14,600 Airports
- 89,200 Airport Details
- 10,600 Airport Comms
- 28,600 Navaids
- 4,600 ILS Approaches
- 6,300 VOR Approaches
- 3,600 NDB Approaches
- 7,100 RNAV Approaches
- 17,500 Departures
- 13,200 Arrivals
- 72,000 Terminal Waypoints
- 3,400 High Airways
- 3,000 Low Airways
- 2,800 High/Low Airways
- 22,600 Enroute Waypoints

América del Sur Volumen de Datos

- 1125 Conventional Procedures
- 396 RNAV Procedures
- 716 Conventional Departures
- 459 RNAV Departures
- 246 Conventional Arrivals
- 256 RNAV Arrivals

Problemas de los Datos Aeronauticos Globales
Typical Aeronautical Data Problems Today

- **Publicacion tardia para el ciclo AIRAC**
  - Publicacion
  - Aplazamiento
- **Publicaciones no recibidas (numeracion fuera de secuencia)**

- **Late information per AIRAC**
  - Publication
  - Postponement
- **Publications not received (numbers not in sequence)**

Problemas de los Datos Aeronauticos Globales
Typical Aeronautical Data Problems Today

- **Informacion antagonica**
- **Relacion inconsistence de datos**
  - Actualicacion de datos sin la correspondiente actualizacion de procedimientos afectados
  - Inconsistencia entre procedimientos
  - Datos communes no actualizados en todas las areas afectadas

- **Conflicting information**
- **Inconsistent data relationships**
  - Detail data changes without corresponding procedure changes
  - Inconsistency between procedures
  - Common data not changed in all affected uses

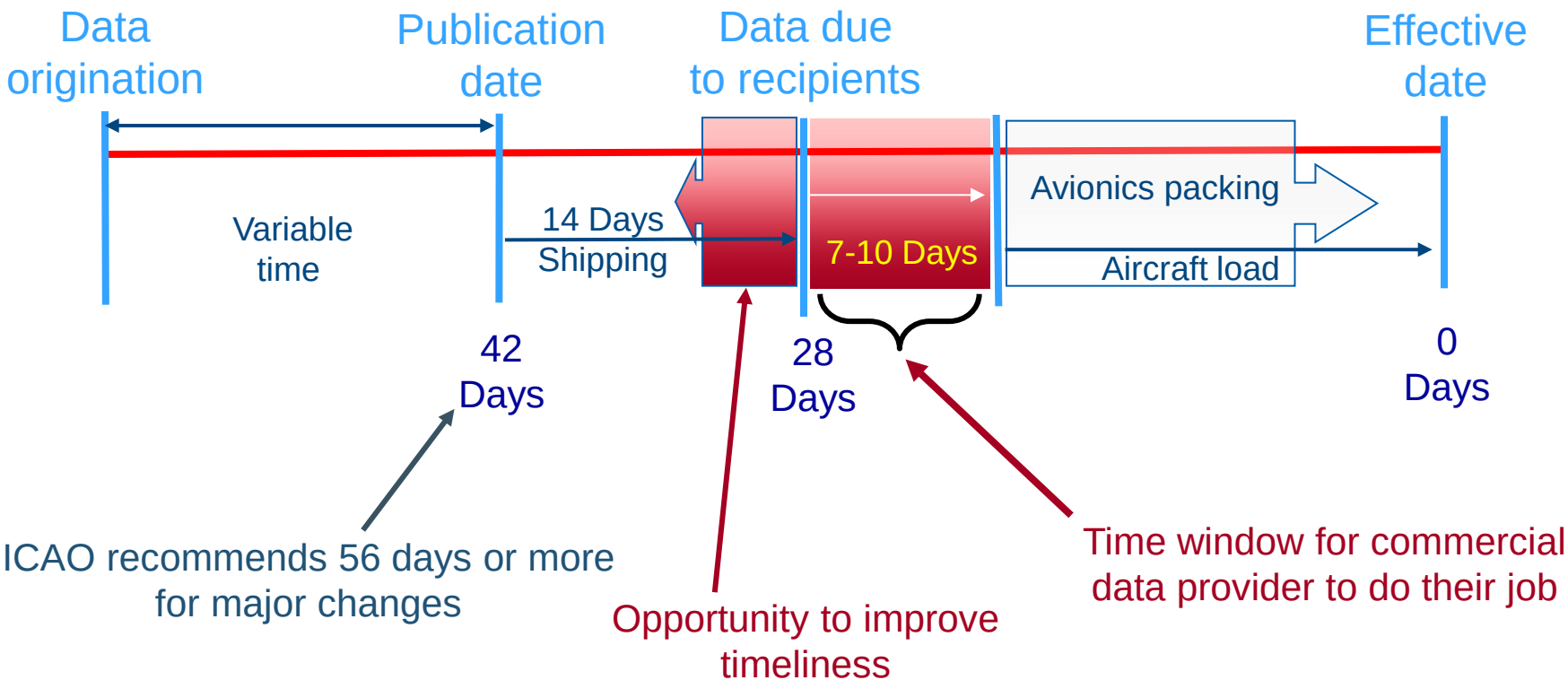
Problemas de los Datos Aeronauticos Globales
Typical Aeronautical Data Problems Today

- Inconsistencia de datos con Estados fronterizos

- Inconsistent data across state boundaries

Timeliness

AERONAUTICAL INFORMATION REGULATION AND CONTROL (AIRAC)



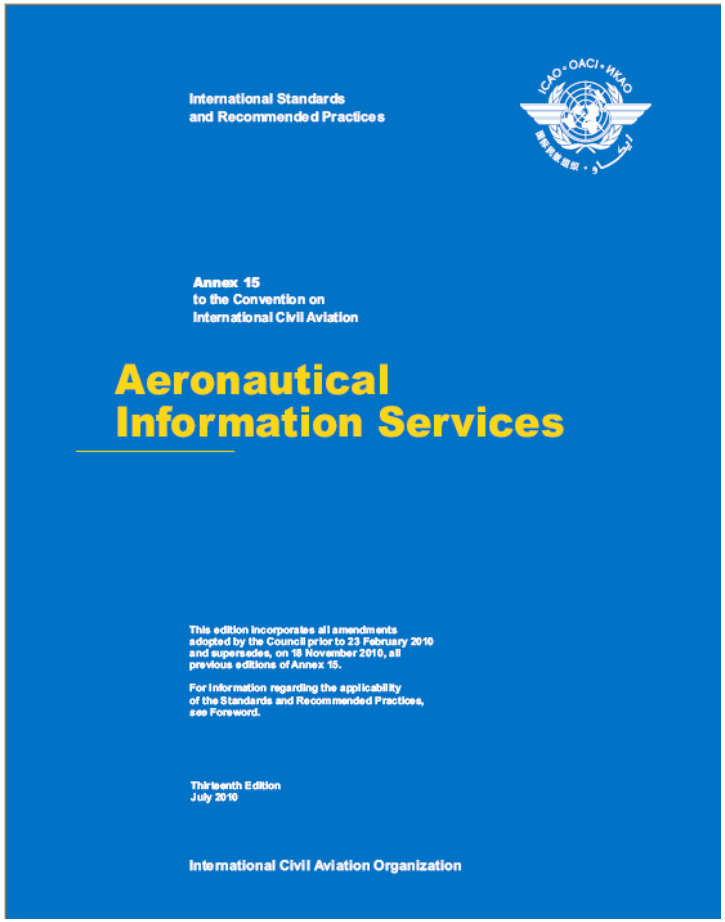
Cambios Substanciales/Major Changes

Annexo 15 (Apendice 4, Parte 3) define “cambio substancial”:

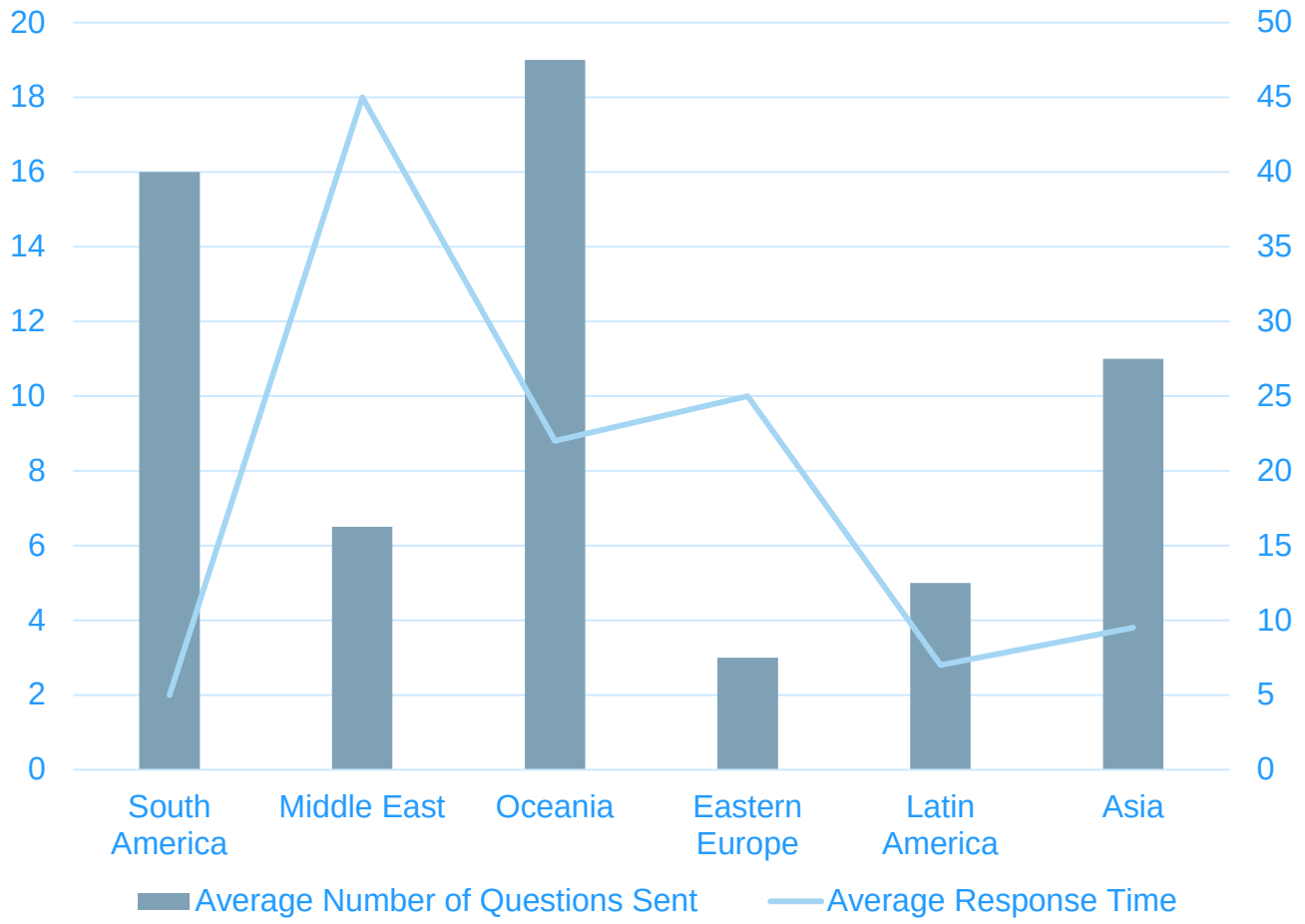
- Nuevo aerodromo abierto para trafico IFR INTL
- Nueva pista(s) para operaciones IFR en aerodromos internacionales
- Diseño y estructura de la red de rutas ATS
- Diseno y estructra un conjunto de procedimientos terminales (incluyendo cambios de rumbos de 1)

Annex 15 (Appendix 4, Part 3) defines “major change”:

- New aerodrome open for intl IFR traffic;
- New runway(s) for IFR operations at international aerodromes;
- Design and structure of the ATS route network;
- Design and structure of a set of terminal procedures (including change of procedure bearings by 1)



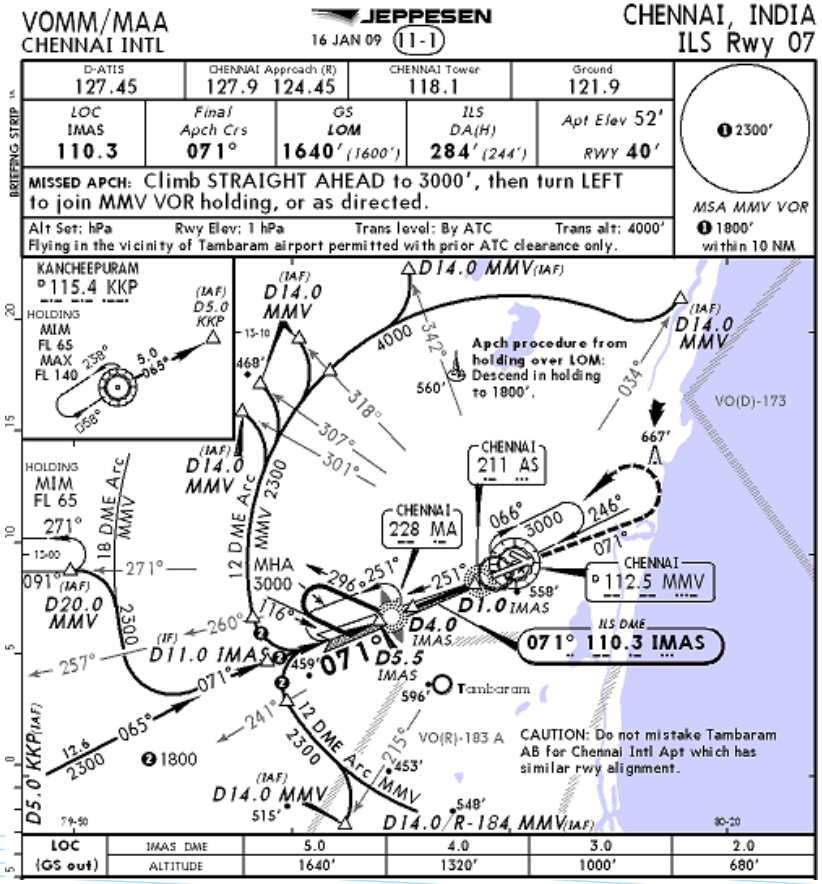
Clarificiones/Clarifications



Evolution of Procedure Design and Charting

Analog Past

Ground navaid, complex, rigid paths, non-standard, manually flown, paper

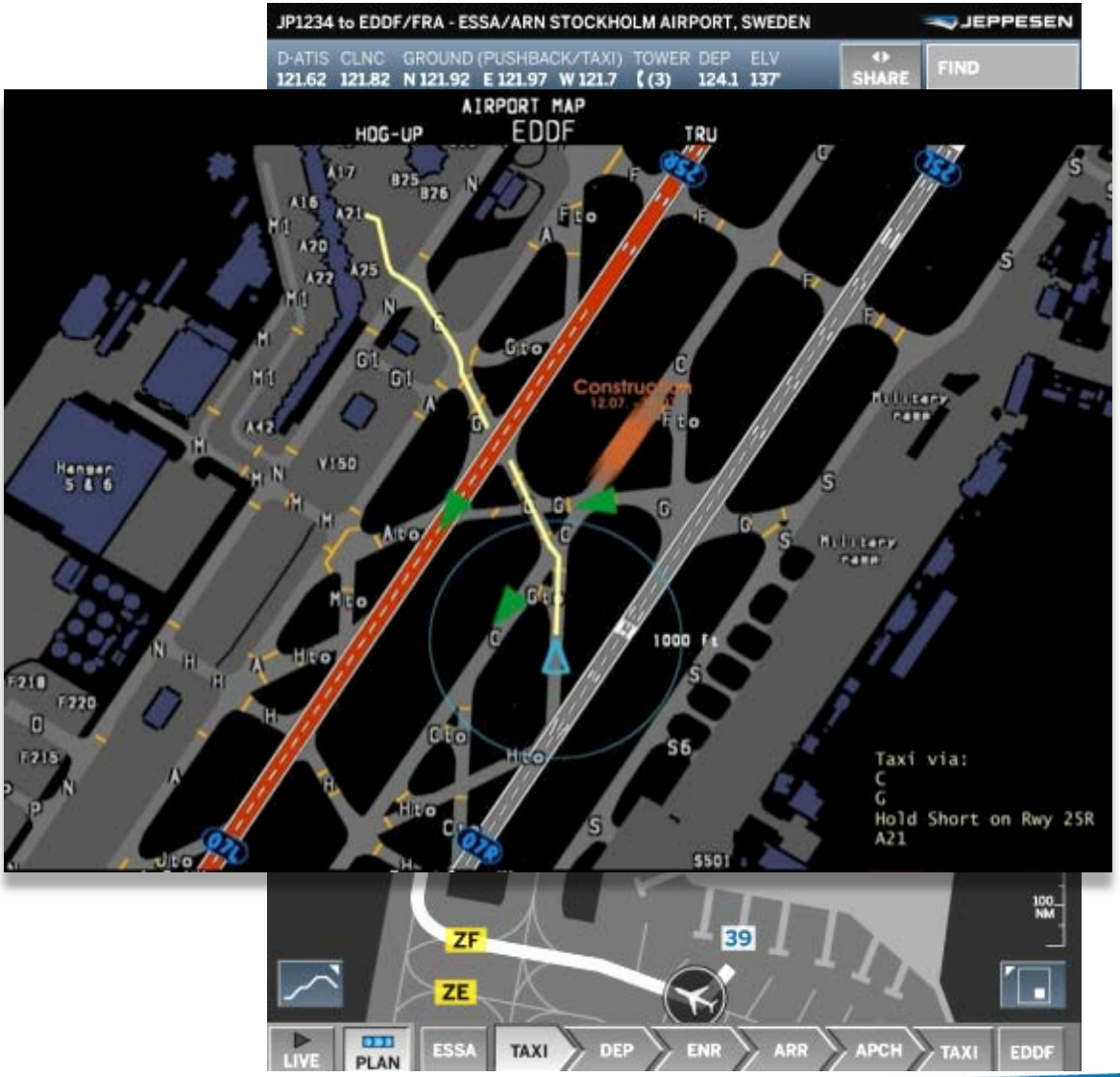


Digital Future

Satellite based, simple, flexible paths, repeatable, predictable, data-driven, electronic

Airport Moving Map

- Real time closure information
- Taxi clearances & route depiction
- Taxi advisories on apron & taxiways
- Runway Incursion support for Situational Awareness



Air Traffic Management System

Today: Not optimized

ATC

- Separation, safety
- Optimize flow, increase capacity
- Global interoperability

Airline Operations Center

- Flight Planning/Dispatch/Tracking
- Contingencies, Disruption Recovery
- ATC Collaboration

CURRENT SITUATION

- Massive amounts of paper
- Labor-Intensive processes
- Limited systems Integration
- Missed opportunities to share information
- Heavy reliance on voice communications
- Limited updates to planes once airborne
- Outdated air traffic control system
- Regulatory not on pace with technology

Navigation, Flight Optimization

Reference Information

Maintenance Operations

Airport Operations

Cabin Services

Technical & Admin Tasks

Air Traffic Management System

The Vision: Optimized, Shared

ATC

- Separation, safety
- Optimize flow, increase capacity
- Global interoperability

Airline Operations Center

- Flight Planning/Dispatch/Tracking
- Contingencies, Disruption Recovery
- ATC Collaboration

TARGET

- Transformed from Paper to Digital
- Automated processes
- Systems Integration/interoperability
- Intelligent information sharing
- Heavy use of data link communications
- Airplane gets regular/contextual updates
- Modern air traffic management system
- Responsive & pro-active regulatory

Navigation, Flight Optimization

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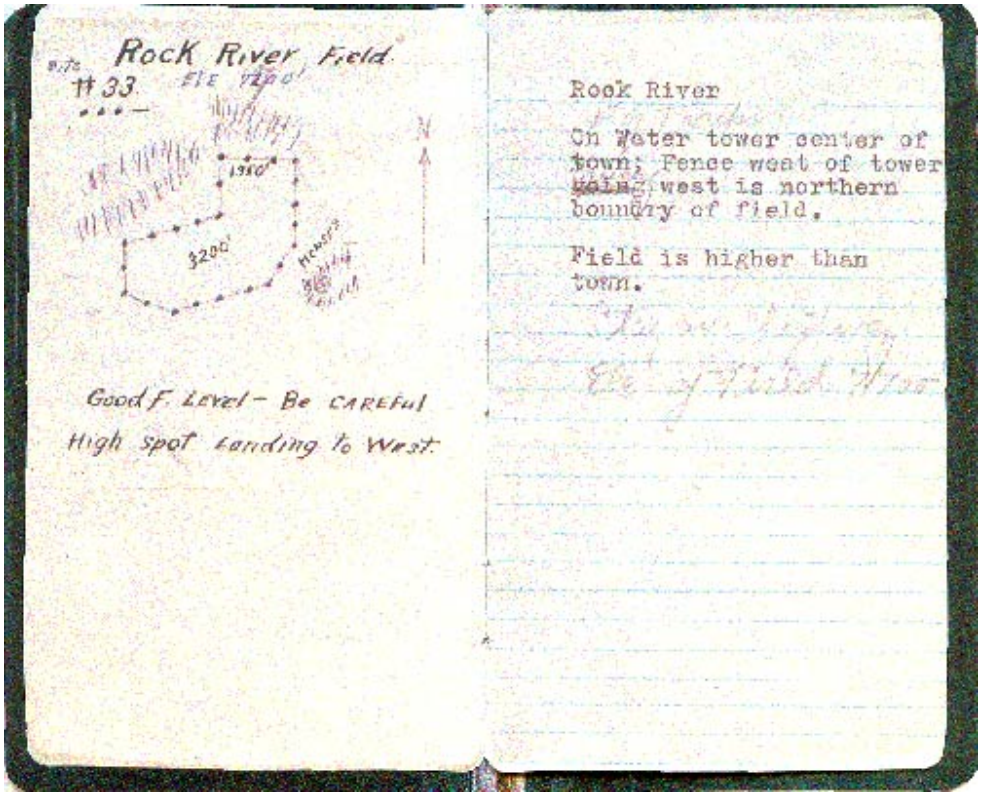


THANK YOU