AERONAVIGATION DIVISION

Sistemas Aeronáuticos de Gestión y Producción: avances tecnológicos en últimos tiempos (GIS y no solo GIS)

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GREPECAS 12
Lima 23-27 Noviembre 2009

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Agenda

1. Normas de Referencia
2. Sistemas: Indicaciones
3. Implementaciones y Herramientas
4. Sugerencias y Alertas
5. Algunos Ejemplos

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1. Normas de Referencia

Normas de Referencia

- ICAO annex 15 y ICAO Doc 8126
- Mandato OACI a los Estados sobre Data Quality
- CHAIN guidelines
- EUROCAE ED-76, 'Industry Standards for Processing Aeronautical Data'
- EUROCAE ED-77, 'Industry Standards for Aeronautical Information
- SES (Single European Sky)

ICAO Annex 15

"The object of the aeronautical information service is to ensure the flow of information/data necessary for the safety, regularity and efficiency of international air navigation. The role and importance of aeronautical information/data changed significantly with the implementation of area navigation (RNAV), required navigation performance (RNP), airborne computer-based navigation systems and data link systems. Corrupt or erroneous aeronautical information/data can potentially affect the safety of air navigation"

EUROCONTROL CHAIN Project

(Controlled and Harmonised Aeronautical Information Network)

The Upstream Data Chain includes the following functions:

- **Data origination** – origination of raw data (surveyed) and derived data (e.g. procedure design data).
- **Data transmission** – whereby data is moved from one physical location to another. It is performed by all chain participants in a variety of ways (e.g. electronically or paper).
- **Data publication** – whereby aeronautical data are collected prepared and issued into the public domain by the AIS of each Contracting State.
- **Data distribution** – this involves the delivery of the formatted data sub-set to users using various delivery media. The full distribution network involves many actors.

The Downstream Data Chain includes the following functions:

- **Data application / integration** – whereby data, in an application specific configuration and format, is made available to the target application (e.g. filing a chart in a manual or processing data for FMS, for use in flight).
- **Data end-use** – a functional link for accessing and acting upon the output of an application. Aeronautical data end-users are typically aircraft operators, airline planning departments, air traffic service providers, flight simulation providers, airframe manufacturers, systems integrators and regulatory authorities.

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CHAIN 0029: Integrity of Aeronautical Information – Data Exchange

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3.4.1 General

Whenever data is transmitted from one user to the next, processes *shall* be established to protect the data during the transfer.
[CHAIN-0029-1040]

For each phase of the process, the specific criteria for the next phase *shall* be included, together with the basic set of criteria, as shown in Section 3.2 above.
[CHAIN-0029-1050]

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CHAIN 0029: Integrity of Aeronautical Information – Data Exchange

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4.2.2 Application

Wherever aeronautical AIP data is exchanged digitally between two points within the data chain, the AIXM update message *should* be used.
[CHAIN-0029-2010]
Software tools and applications in place which are used to create, transmit and receive the AIXM update message, *shall* validate the data values present in the message.
[CHAIN-0029-2020]
When a complete AIXM entity has been created, full validation against the AIXM schema *shall* be performed.
[CHAIN-0029-2030]
The extensibility features of the AIXM *shall* be used to provide the associated metadata within the same AIXM update message.
[CHAIN-0029-2040]
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CHAIN 0030: Integrity of Aeronautical Information – Data Publication

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2.4.2 Consistency of Documentation

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Where information is presented within more than one publication, it *shall* be taken from the same source.
[CHAIN-0030-1250]

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Note: Publications made using database technology greatly assist in ensuring the consistency of information within and across publications

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CHAIN 0030: Integrity of Aeronautical Information – Data Publication

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4.1 General

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Whenever a conversion is necessary from one unit of measurement to another, the conversion value provided in ICAO Annex 5 *shall* be used.
[CHAIN-0030-3060]

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CHAIN 0030: Integrity of Aeronautical Information – Data Publication

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7. USE OF AUTOMATED SYSTEMS

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Any system used to provide automated document preparation *shall* be implemented in such a way to ensure that the underlying data may be updated in a timely manner.

[CHAIN-0030-6030]

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CHAIN 0072: Data Integrity – A Practical Guide

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2.7 SES Regulation

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The SES Common Requirements impact those within throughout the data chain not just AIS Service Providers, for example, by having to be able to demonstrate that they are compliant with the ICAO SARPs, including, for instance, ICAO Annex 15's integrity requirements**.....**

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SES (Single European Sky) DAL (Data Assurance Level)

"The Data Assurance Level (DAL) Specification supports the Implementing Rule (IR) for processing aeronautical data from origination to the publication by the AIS to the next intended user
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The mission of providing aeronautical data and information is its contribution to the intrinsic safety of air traffic operations.

The key objectives are:

a) The provision of aeronautical data of requisite quality for use in air traffic management and airspace operations
b) The timely presentation of aeronautical data for the provision of use in planning and operating services
c) The processing of aeronautical data in circumstances where the 'chain' or part of it is subject to degraded operation (business continuity)
d) A generic (unified) aeronautical data process supporting a unified approach to meeting the data needs of existing and future air traffic operations"

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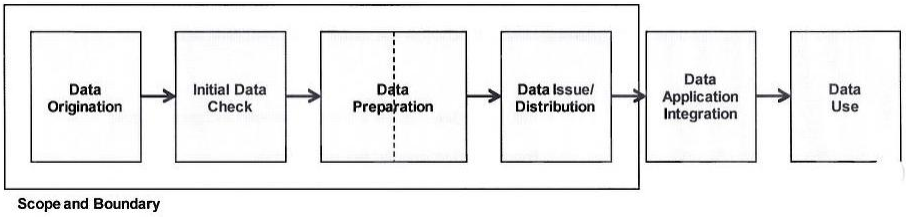
SES (Single European Sky) DAL (Data Assurance Level) Aeronautical Data Chain

"The Aeronautical Data Chain is a conceptual representation of the process stages for aeronautical data and information from its origination through to end use. The aeronautical data chain is well established in concept and practice, having a number of defined stages from data origination to operational use (end user).
….."



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SES (Single European Sky) DAL (Data Assurance Level) Aeronautical Data Chain

The Data Origination stage is concerned with the acquisition of source data, and generation of derived data. These activities are controlled between the originating and requesting

The Initial Data Check activity receives data from Data Origination and conducts the process of assessing, evaluating, and

The Data Preparation stage is divided into two distinct activities:

a) The Data Preparation (storage, publication assessment) provides the capability to store the data and assess the publication method;

b) The Data Preparation (select, assemble, translate, quality check)

The Data Publication activity provides the necessary printing, publishing, and distribution of aeronautical information in both electronic and hard copy form to the next intended user.

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2. Sistemas: Indicaciones

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Sistemas de Gestión y de Producción: Indicaciones de tipo Técnico Operativo

1. Información Centralizada, o de cualquier forma almacenada una sola vez y extraída desde su repositorio univoco para el siguiente uso
2. Transferencia controlada de la información para control de integridad
3. Filtro en el ingreso de datos para comprobar por los menos los niveles mandatarios mínimos de consistencia
4. Extracción univoca de los datos para generación de todos los productos
5. Disponibilidad "al tiempo requerido" de la información a tratarse para la publicación (AIRAC)
6. Proceso lo mas posible automático para evitar errores humanos
7. Control de CRC en los pasos varios de uso de los paquetes de datos
8. Control de flujo end-to-end
9. AIXM para intercambio de paquetes de datos aeronáuticos
10. Conformidad con las normas OACI, u otras aplicables: **"consciencia aeronautica del sistema"** en su funciones y lógica de trabajo

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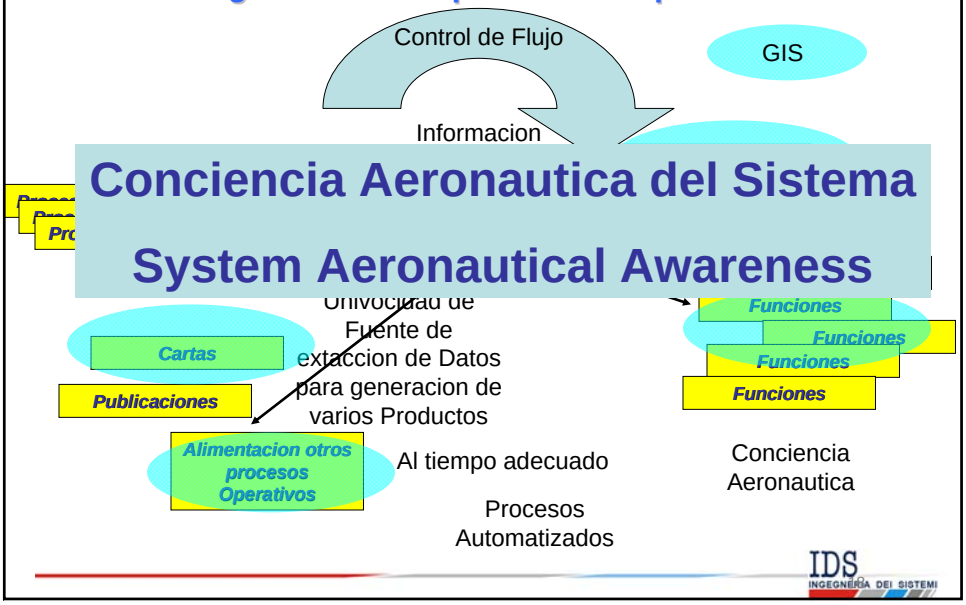
Sistemas de Gestión y de Producción: Sugerencias de tipo Técnico Operativo



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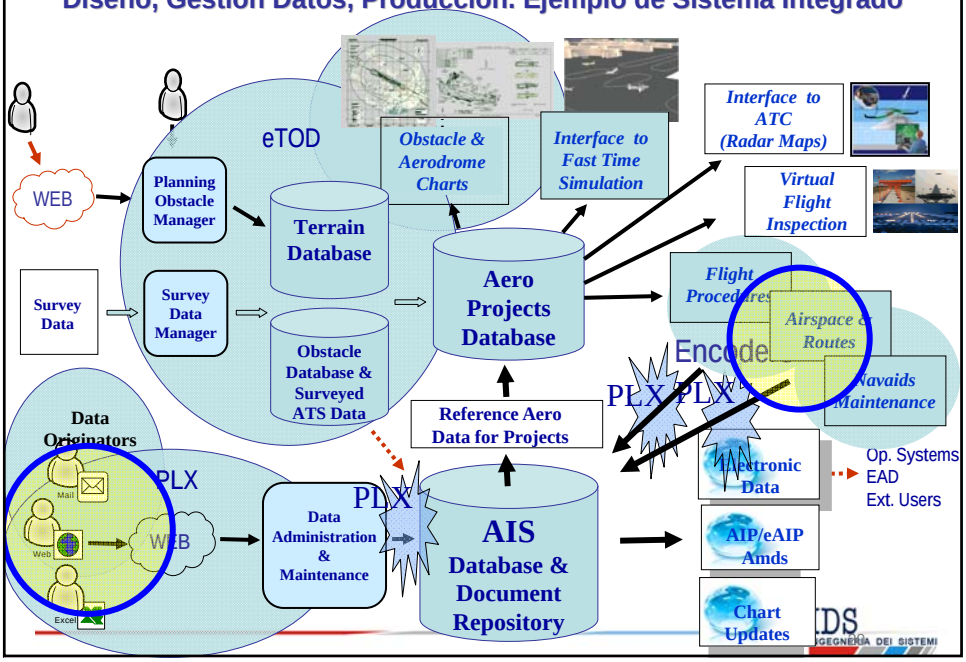
3. Implementaciones y Herramientas

Diseño, Gestión Datos, Producción. Ejemplo de Sistema Integrado



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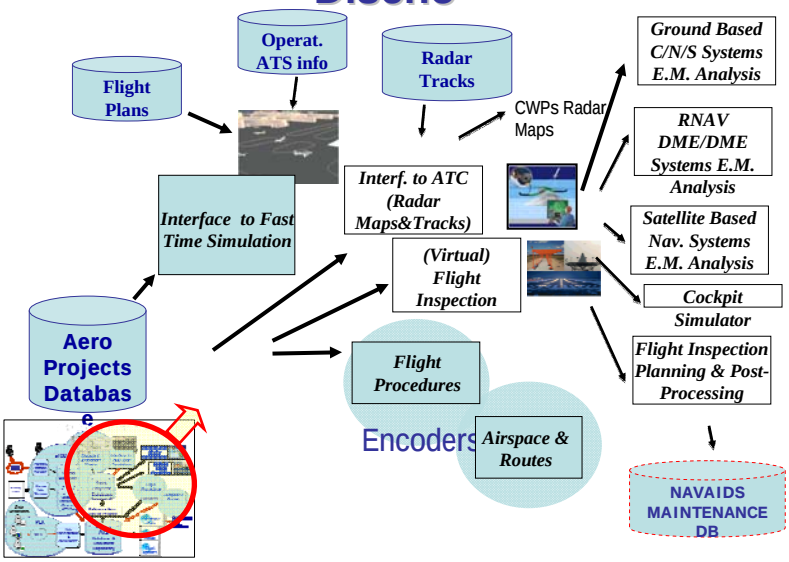
Diseño



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4. Sugerencias y Alertas

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Sistemas de Gestión y de Producción: Sugerencias y Alertas (1/2)

1. El fin está aclarado por las normas internacionales (ICAO Annex 15 statement: “ENSURE THE FLOW OF INFORMATION/DATA….)
2. GIS como herramienta y como un medio para obtener felizmente el fin
3. El Sistema tiene que tener la **“consciencia aeronáutica”** o **“aeronautical awareness”.** Sin esto el riesgo de ser un beta tester de un prototipo es muy alto
4. El “dueño” de los datos no es el sistema adquirido, tiene que ser el usuario. Esto implica la certitud de poder crear paquetes de intercambio de datos estándar, que puedan llegar al “snapshot total” de los datos de la base centralizada (AIXM…)
5. Univocidad de los datos en los flujos de producción y gestión
6. Gestión de flujo total desde el originador del dato al usuario final (producción, diseño, ATM, etc…). Trazabilidad de la información y de su historia
7. Distribución de las funciones operativas para cumplir con tareas en organizaciones de grande tamaño
8. Acceso externo, con gestión del flujo de datos y de trabajo, con control de la seguridad, para optimizar las tareas de actualización, verificación, aceptación y ingreso de datos
9. Estrictas políticas de seguridad de acceso a los datos configurables y controlables

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Sistemas de Gestión y de Producción: Sugerencias y Alertas (2/2)

10. Evaluación de la flexibilidad de configuración/expansión del Sistema y de la Base de Datos
11. Evaluación de la proyección de evolución futura del Sistema (planes de desarrollo futuro) con atención a la evolución de las normas aeronáuticas. Quiere transformarse la Entidad misma en un “System Integrator” ?
12. Conocimientos “aeronáuticos” del sistema y de quien lo provee

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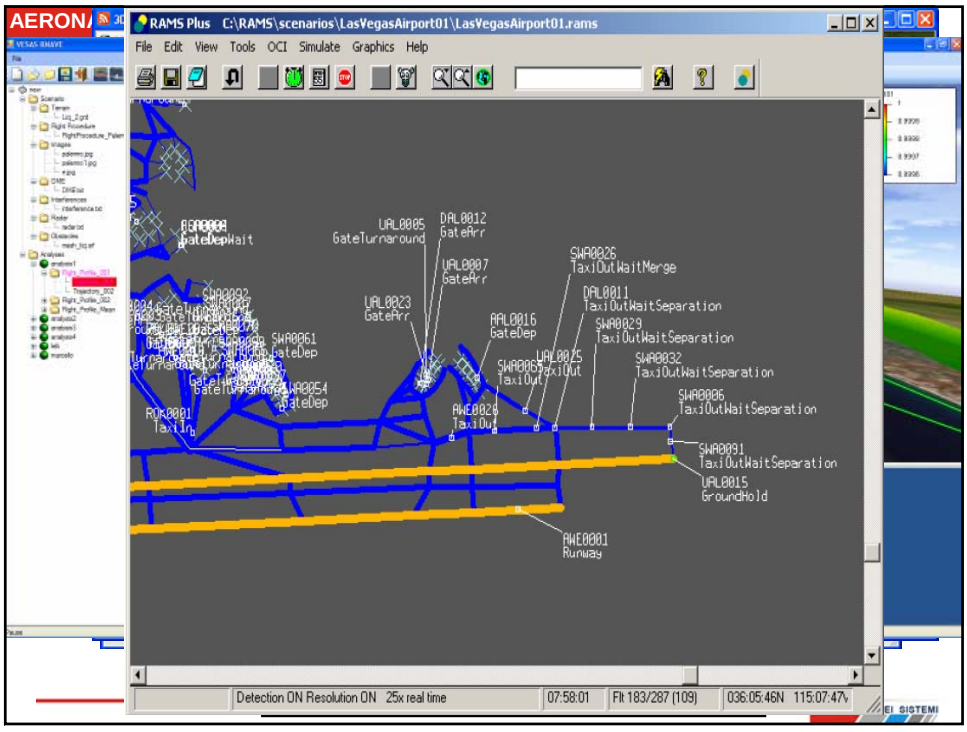
5. Algunos Ejemplos



5. Algunos Ejemplos

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Gracias por su Atención !!

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