A350 Entry In Service

Case Study S1000D & Spec 2000 Ch. 15

FINNAIR

Data Challenge at New Aircraft EIS

- When the first aircraft of a new type is delivered, it must start flying within days
- Maintenance Information System (MIS) needs to be set up before that
- Huge amount of data required for Maintenance processes to work
- Data is coming from different sources in different formats having different revision cycles
- High percentage of the data is one-time-only involving manual processing

→ How to streamline and digitalize this?

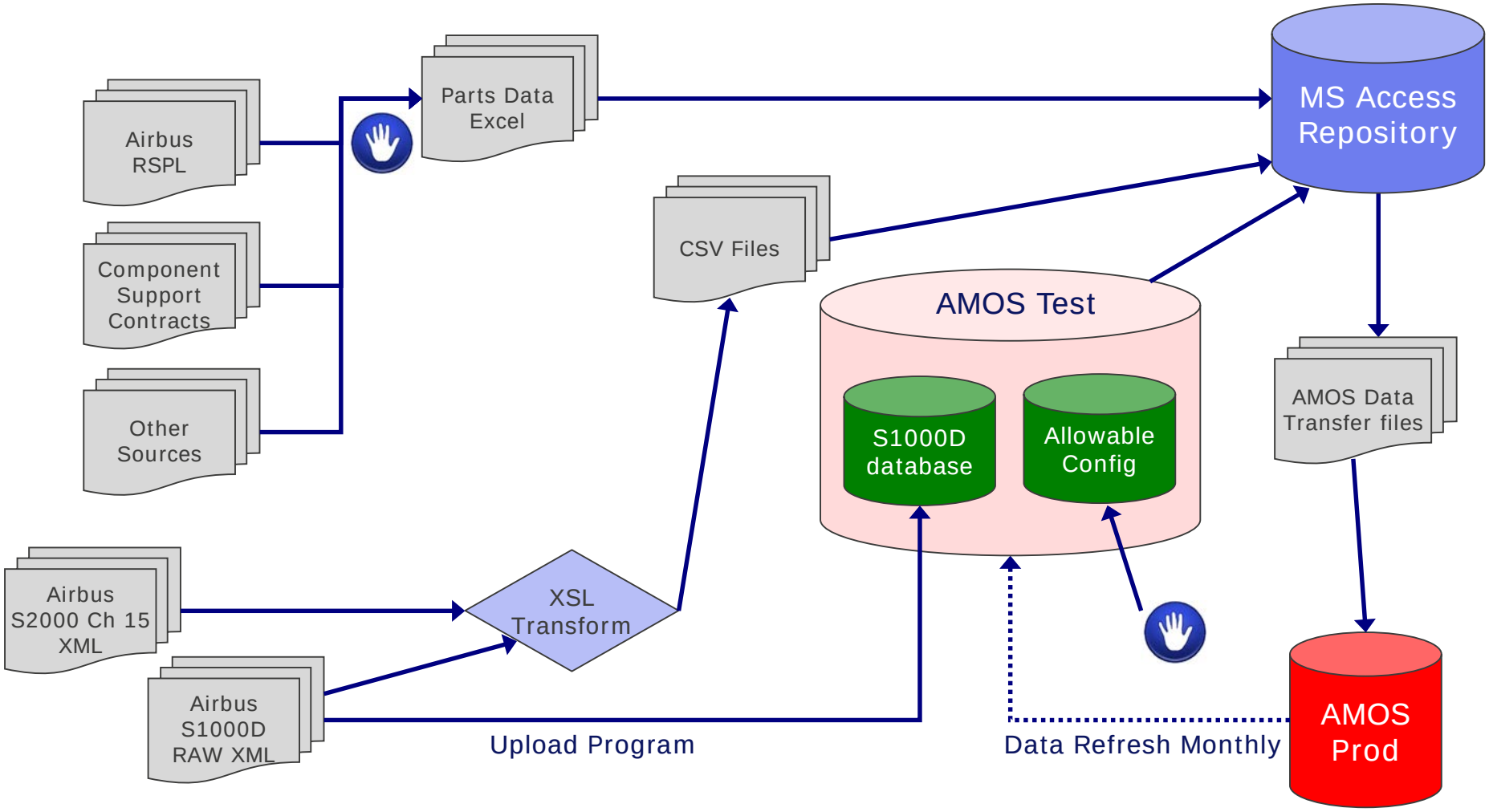
Key Data in Aircraft Maintenance

- **Consumable Parts with Supply Chain Data**
- **Rotable Parts with related data sets**
  - **Rotables Support in-house or through pooling contracts**
  - **Rotable Part Requirements**
  - **Warranty Data**
- **Maintenance Program with Taskcard Data**
- **Allowable Configuration with related data sets**
  - **Function Positions**
  - **Fleet Applicability**
  - **Assembly Configurations**
- **Actual Configuration with Serial Number Data**

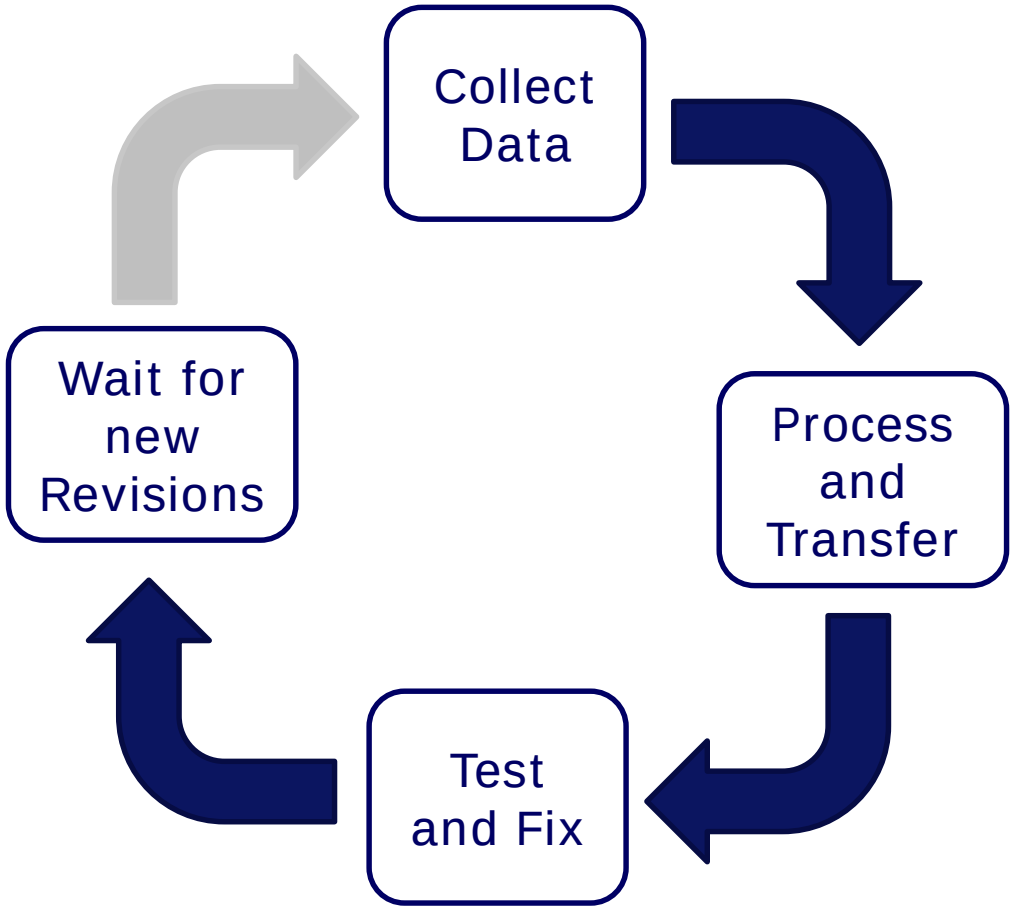
Airbus A350 Next Generation Data

- **With A350, Airbus applies two next generation standards providing operators better data**
  - **S1000D**
    - New standard for delivering Technical Data
    - Data content more exhaustive than previous iSPEC2200 standard
    - Data structured in a relational way
    - Deliverables in XML format
  - **SPEC2000 Chapter 15 Delivered Parts List**
    - New standard for delivering Serial Number data at aircaft EIS
    - Data more punctual, robust and easily machine readable than earlier Excel based delivered parts lists
    - Deliverable in XML format

A350 Data Upload to Finnair AMOS

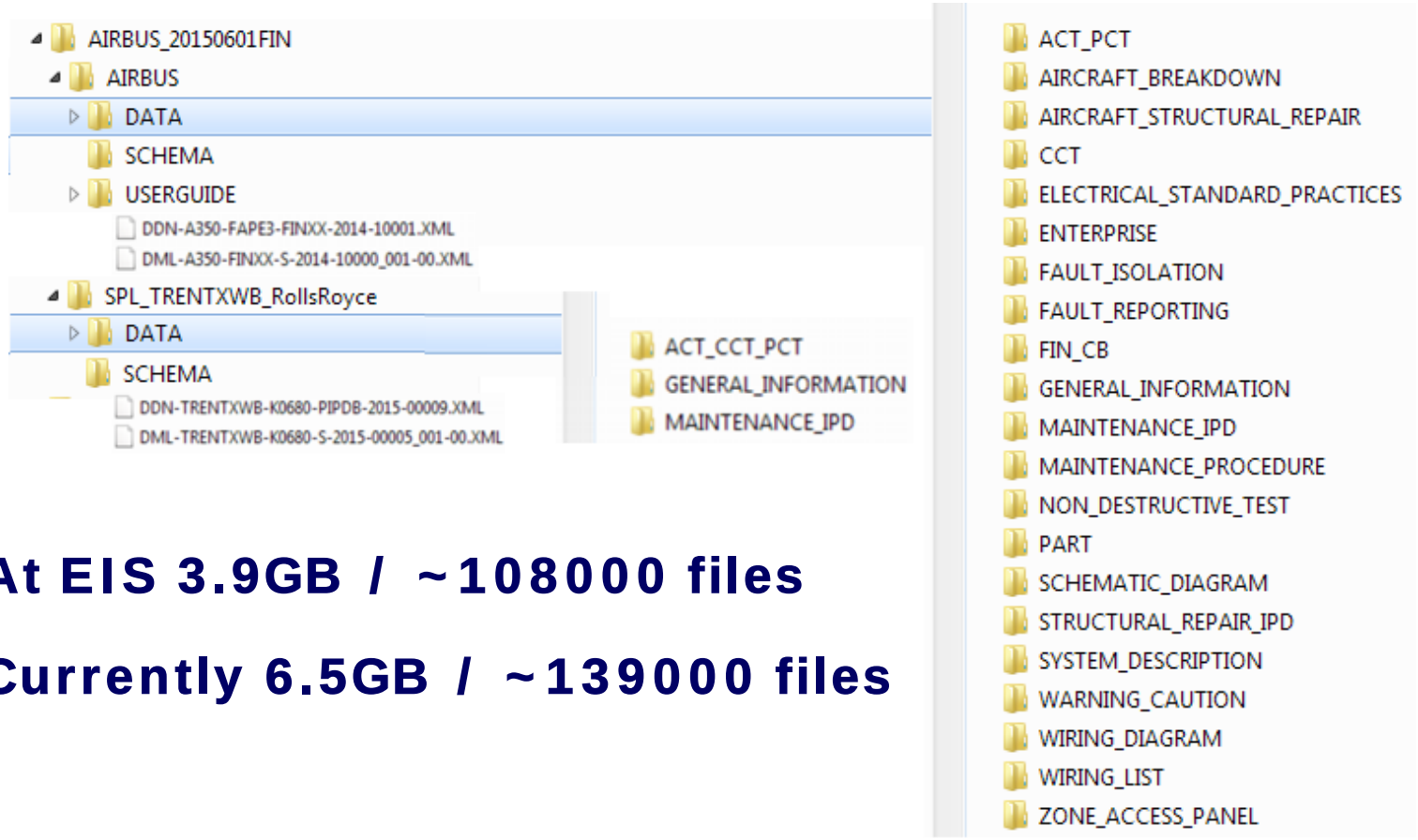


Iterative Way of Working



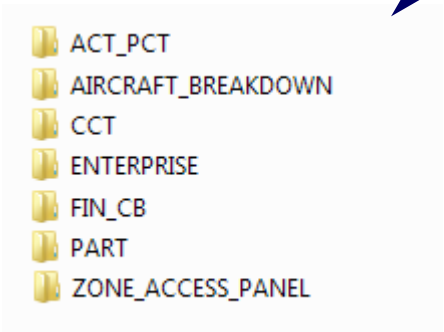
- **22 rounds of iteration for the first A350**
- **Average 8 rounds per subsequent A350**

A350 S1000D data package



- **At EIS 3.9GB / ~108000 files**
- **Currently 6.5GB / ~139000 files**

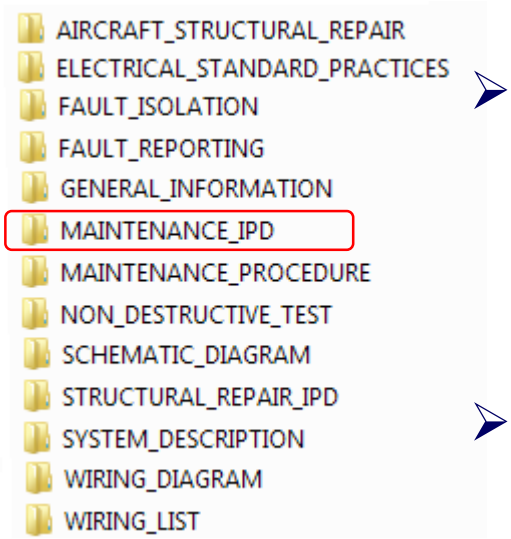
CIR data modules



- **CIR data extraction one-time-only with simple xslt scripts**
  - **ACT, PCT and CCT to resolve effectivity**
  - **AIRCRAFT BREAKDOWN -> A350 ATA list**
  - **ZONE -> Zone list to AMOS**
  - **ACCESS_PANEL-> Access panels with open/close times, fastener type & quantity and hinge Y/N to AMOS**

- **AMOS S1000D Upload automatically extracts some CIR data modules**
  - **ENTERPRISE -> Supplier list**
  - **FIN list reduced set (4500) to AMOS**
  - **PART -> Part list w. classification, alternates and suppliers**

Business data modules



- **S1000D business data consists of more than 60000 small data modules**
- **Simple xslt scripts traverse Maintenance IPD and select data modules for processing based on DDN**
  - **CSN – Part No and CSN – FIN relations from Maintenance IPD data modules**
- **AMOS S1000D Upload automatically extracts some Business data modules**
  - **Externalised applicability**

A350 Parts to AMOS

- **Sources for A350 Part data**
  - **A350 S1000D CIR Part and Maintenance IPD**
  - **Airbus RSPL**
  - **Preliminary Airbus SPEC2000 Chapter 15 Delivery Data**
  - **Component Support Contracts**
  - **AMOS System**
- **Selected Parts collected manually in Excel**
  - **Appended with related data from above sources**
  - **Complex network of cross-checks between different data sets and against current AMOS data**
- **After multiple test rounds ~1800 Consumable Parts and ~2100 Rotable Parts were transferred to AMOS with all related data**
- **In addition to that hundreads of Parts were manually typed in AMOS during the EIS project**

A350 Configuration Data to AMOS

- **Allowable Configuration**
  - **First draft built in semi-automated way using data from:**
    - A350 S1000D CIR FIN and Maintenance IPD
    - Preliminary Airbus SPEC2000 Chapter 15 Delivery Data
  - **Allowable Configuration completed manually and revised manually for each new MSN**
    - ATA CMWG is working on a standard to enable automatic MIS upload
- **Actual Configuration**
  - **Built for each new MSN using data from:**
    - Airbus SPEC2000 Chapter 15 Delivery Data
    - Panasonic IFE Configuration Data Dump
    - Rolls-Royce Engine Configuration Excel
    - Messier Landing Gear Configuration Pdf
  - **Complex network of cross-checks between different data sets and against Allowable Configuration**
  - **Each A350 Configuration has ~5400 Serial Numbers**

Lessons Learned after nine A350 aircraft

- **Learning Curve at Airbus**
  - **Our first A350 was MSN 18**
  - **S1000D IPD data was far from complete to start with**
  - **Finnair was a pilot customer with Spec 2000 Ch. 15**
  - **Major configuration changes between MSNs**

- **Learning Curve at Finnair**
  - **A350 was the first aircraft type with digital data EIS**
  - **Continuous development and evolution**
  - **From coping with missing data to utilizing new data**

- **Massive amount of repetitive manual work saved**
- **Finnair A350 data quality is high and consistent, and improves with each new delivery**

Thank You!

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