"Simplifying the Business in Aircraft Transfers: IATA’s Efforts"

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IATA Operations

Nov. 16, 2016, Seattle, WA, USA
3rd IATA Paperless Aircraft Operations and RFID Conference
About IATA

- Represents about 265 airlines or 83% of total air traffic
- Mission: represent, lead and serve the airline industry
- Selected activities:
  - Safety procedures and audits (e.g. IOSA)
  - IATA Clearing House services, account settlements
  - Data analysis on various aspects of airlines
  - Guidance Material, Training, Conferences
  - Assigns airport and airline codes, accredits travel agents

...more at: [www.iata.org](http://www.iata.org)
Steps towards accepting Paperless…

- Acceptance of e-records worldwide (ICAO Doc 9760)
- Recognition of e-signatures (identity, authentication etc.)
  - FAA AC120-78A, IATA’s “Aviation Identification & Authorization System”
- Cybersecurity (ensuring accuracy, confidentiality, integrity etc. of data and information handled electronically)
  - ATA SPEC42, RTCA

Spec 42 at www.ataebiz.org
AC 120-78A at www.faa.gov
AIAS at www.iata.org
Aircraft Transfers; Areas of Focus

- Aircraft Documentation (ARL/AIR, IPC, RSPL, engine, LG…)
- Aircraft Maintenance Templates
- Aircraft Leasing
- LLP Traceability
- e – Signature and Cybersecurity

Transition Roadmap
Aircraft Documentation

- Working with OAMs* to harmonize ARL and AIR
  - The FIN number may provide a solution
  - Accuracy of information is critical (need to include RFID as applicable)
- ARL/AIR in line with IPC and RSPL
- Need to define and harmonize engine, landing gear docs etc.
- Need airline and OAM input to optimize ARL/AIR and define the aircraft’s birth documentation

*OAM: Original Aircraft Manufacturer
Aircraft Maintenance

- Maintenance Agreement Templates
- Engine Maintenance Agreement by Dec 2016
- Line Maintenance in Standard Ground Handling Agreement
- Short Term Emergency Engine Lease (STEEL) Template

*OAM: Original Aircraft Manufacturer
Aircraft Leasing

- Incident/Accident Clearance Statement (ICS) to replace Non-Incident Statement (NIS); agreed airlines & leasing companies

- 4th ed. Aircraft Leasing Best Practices
  - Support standard for electronic records

- Standard Transfer Document List
  - Cross Border Transfer (XBT) of Aircraft
  - CoA, CoE, AD Status, Technical Logs, SB/MOD & LLP Status etc.
Life Limited Parts (LLP) Traceability

- Key element in Aircraft Documentation
- Regulatory requirements
- Commercial requirements (various attached docs)
- Need for a worldwide standard for “Back to Birth” (BtB)
  - In-Service History
AGREE ON THE DATA TO BE COLLECTED

AGREE ON THE SUPPORTING DOCUMENTS

TRACKING TEMPLATE
# LIFE LIMIT PART MOVEMENT HISTORY SHEET

**PART NUMBER:** 5A1757  
**SERIAL NUMBER:** RSTDK33910  
**PART DESCRIPTION:** FAN DISK

<table>
<thead>
<tr>
<th>OPERATOR</th>
<th>TYPE AND MODEL</th>
<th>AC REG</th>
<th>MSN</th>
<th>MTOW</th>
<th>TSN</th>
<th>CSN</th>
<th>DATE</th>
<th>TYPE</th>
<th>THRUST RATING</th>
<th>S/N</th>
<th>TSN</th>
<th>CSN</th>
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<td>26,608</td>
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<td>27,000 lbs</td>
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<td>H 25,594 C</td>
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<td>N622AW</td>
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<td>74,771</td>
<td>33,679</td>
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<td>V2500A1</td>
<td>27,000 lbs</td>
<td>V0086</td>
<td>64,615</td>
<td>H 28,989 C</td>
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<tr>
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<td>27,000 lbs</td>
<td>V0086</td>
<td>64,615</td>
<td>H 28,989 C</td>
</tr>
<tr>
<td>JS AIRWAYS</td>
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<td>N633AW</td>
<td>82</td>
<td>250,000</td>
<td>79,449</td>
<td>35,958</td>
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<td>27,000 lbs</td>
<td>V0086</td>
<td>66,103</td>
<td>H 29,887 C</td>
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<td>N633AW</td>
<td>82</td>
<td>250,000</td>
<td>79,449</td>
<td>35,958</td>
<td></td>
<td>V2500A1</td>
<td>27,000 lbs</td>
<td>V0086</td>
<td>66,102</td>
<td>H 29,887 C</td>
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</tbody>
</table>
### LLP Template: Example (2)

**Part SUPPORTING DOCUMENT HANDOVER**

<table>
<thead>
<tr>
<th>P/N</th>
<th>TSN</th>
<th>CSN</th>
<th>LIFE LIMIT</th>
<th>CUMULATIVE UTILIZATION</th>
<th>HOURS &amp; CYCLES REMAINING</th>
<th>REASON FOR RECORD ENTRY</th>
<th>REFERENCE</th>
<th>NAME</th>
<th>SIGNATURE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HOURS</td>
<td>CYCLES</td>
<td>HOURS</td>
<td>CYCLES</td>
<td></td>
</tr>
<tr>
<td>5A1757</td>
<td>0.0</td>
<td>0</td>
<td>0 H</td>
<td>20,000 C</td>
<td>0 H</td>
<td>20,000 C</td>
<td></td>
<td></td>
<td>Production</td>
</tr>
<tr>
<td>5A1757</td>
<td>0.0</td>
<td>0</td>
<td>0 H</td>
<td>20,000 C</td>
<td>0 H</td>
<td>20,000 C</td>
<td></td>
<td></td>
<td>Installation</td>
</tr>
<tr>
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<td>10,538.0</td>
<td>4,596</td>
<td>0 H</td>
<td>20,000 C</td>
<td>10,538 H</td>
<td>4,596 C</td>
<td>0 H</td>
<td>15,404 C</td>
<td>Removal</td>
</tr>
<tr>
<td>5A1757</td>
<td>10,538.0</td>
<td>4,596</td>
<td>0 H</td>
<td>20,000 C</td>
<td>10,538 H</td>
<td>4,596 C</td>
<td>0 H</td>
<td>15,404 C</td>
<td>Installation</td>
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<tr>
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<td>20,000 C</td>
<td>12,849 H</td>
<td>5,638 C</td>
<td>0 H</td>
<td>14,362 C</td>
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<td>20,000 C</td>
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<td>6,680 C</td>
<td>0 H</td>
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<td>Installation</td>
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<td>22,360 H</td>
<td>10,075 C</td>
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<td>11,925 C</td>
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<td>22,000 C</td>
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<td>15,266</td>
<td>0 H</td>
<td>22,000 C</td>
<td>32,537 H</td>
<td>15,266 C</td>
<td>0 H</td>
<td>6,734 C</td>
<td>Change of operator</td>
</tr>
</tbody>
</table>

…whole template will be in electronic standard format - XML
LLP Global Database Survey

...to determine if there is a need for a global LLP Registry

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft operator</td>
<td>89</td>
<td>62%</td>
</tr>
<tr>
<td>Aircraft/engine lessor</td>
<td>23</td>
<td>16%</td>
</tr>
<tr>
<td>MRO</td>
<td>10</td>
<td>7%</td>
</tr>
<tr>
<td>OEM</td>
<td>6</td>
<td>4%</td>
</tr>
<tr>
<td>Parts trader</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>14</td>
<td>10%</td>
</tr>
</tbody>
</table>

143 participants

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft operator</td>
<td>65</td>
<td>60%</td>
</tr>
<tr>
<td>Aircraft/engine lessor</td>
<td>19</td>
<td>17%</td>
</tr>
<tr>
<td>MRO</td>
<td>7</td>
<td>6%</td>
</tr>
<tr>
<td>OEM</td>
<td>3</td>
<td>6%</td>
</tr>
<tr>
<td>Parts trader</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Other</td>
<td>11</td>
<td>10%</td>
</tr>
</tbody>
</table>

109 companies

Map showing distribution of companies and manufacturers worldwide.
Do you think an LLP global database would be of value for your company?

Yes: 118 (83%)
No: 25 (17%)

Operator: 89% (11%), Lessor: 65% (35%), MRO: 100%, OEM: 67% (33%), Parts trader: 100%, Other: 64% (36%)
Would your company be willing to participate in the IATA LLP Global Database?

- Yes: 107 (75%)
- No: 36 (25%)

By category:
- Operator: 79% (21% No)
- MRO: 90% (10% No)
- Parts trader: 100% (0% No)
- Lessor: 57% (43% No)
- OEM: 67% (33% No)
- Other: 71% (29% No)
Which type of data system does your company use to keep life limited parts (LLP) records?

<table>
<thead>
<tr>
<th>Software</th>
<th># of users</th>
<th>Software</th>
<th># of users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excel</td>
<td>20</td>
<td>Mi</td>
<td>6</td>
</tr>
<tr>
<td>SWISS Aviation Software</td>
<td>15</td>
<td>ORACLE</td>
<td>3</td>
</tr>
<tr>
<td>AERDATA</td>
<td>11</td>
<td>THE SCEPTRE GROUP</td>
<td>3</td>
</tr>
<tr>
<td>SAP</td>
<td>7</td>
<td>ULTRAMAIN</td>
<td>3</td>
</tr>
<tr>
<td>OASES</td>
<td>7</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>
LLP Next Steps

- 2020 Target date
  - Template available by Q2 2017

- Key stakeholders through ALAG ([www.iata.org/alag](http://www.iata.org/alag))
  - Airlines, Lessors, Parts Providers, OAMs/OEMs…

- Standardization and harmonization
  - “In-service history”; ATA e-business

- LLP Global Database
  - Exploring the value and feasibility of business model
Industry Status on Cybersecurity

- 2013: ICAO, IATA, ACI, CANSO, ICCAIA established an Industry High Level Group (IHLG) on cybersecurity
- Oct. 2016: 39th ICAO Assembly Resolution calls for:
  a) States to act to counter cyber threats to civil aviation
  b) ICAO to ensure that cybersecurity matters are fully considered and coordinated across all relevant disciplines
- FAA and EASA working together to produce harmonized rule language to address ASISP (Aircraft Systems Information and Security Protection)
e-signature: Aircraft Records

- OEM (Lessee 1)
- Airline (Lessee 2)
- LESSOR (Owner)
- FAA, EASA

! Mandatory modifications
(Airworthiness Directive / Service Bulletin)

Lease #1
Lease #1 return
Lease #2

Airline (Lessee 1)
Part A
modifications
Part B

Airline (Lessee 2)
What parts are on the plane?
Are those “right” (compliant to airworthiness) parts?

Missing, incorrect paper maintenance records

Part B

Part A

OEM

FAA, EASA
Use of various forms of CA-PKI*

- The PKI is being used for a long time and is sufficient for most web applications
- It provides adequate security at a price
- Various robust implementations are available

However,

- It is the highest value target for adversaries
- Computers trust a huge amount of CAs by default

CA-PKI: very good solution but may not be applicable for every problem

*CA-PKI: Certificate Authority-Public Key Infrastructure
DNSSEC* & DANE** for e-signatures

- Lower cost than CA-PKI management
- Scalable auditing and integrity capabilities
- Easy data analytics
- Harmonized tracking

- Working with Georgia Tech that has expertise
  - 37th IEEE Symposium on Security and Privacy (Oakland), 2016
  - [Poster Abstract](http://www.ieee-security.org/TC/SP2016/poster-abstracts/54-poster_abstract.pdf)

*Domain Name System Security Extensions (DNSSEC)
**DANE: DNS-based Authentication of Named Entities
## Comparison (1)

<table>
<thead>
<tr>
<th>Claims Mgmt Controls</th>
<th>CA-PKI</th>
<th>DNSSEC &amp; DANE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage</td>
<td>Complete</td>
<td>Inherent</td>
</tr>
<tr>
<td>Renewal/Re-Issuance</td>
<td>Partial</td>
<td>Inherent</td>
</tr>
<tr>
<td>Revocation and Destruction</td>
<td>Partial</td>
<td>Inherent</td>
</tr>
<tr>
<td>Event Logging</td>
<td>Partial</td>
<td>Complete</td>
</tr>
<tr>
<td>Retention Period for Audit Logs</td>
<td>Complete</td>
<td>Complete</td>
</tr>
<tr>
<td>Protection of Audit Logs</td>
<td>Complete</td>
<td>Complete</td>
</tr>
<tr>
<td>Audit Collection System (Internal vs. External)</td>
<td>Complete</td>
<td>Complete</td>
</tr>
<tr>
<td>Records, Transfer and Archival Controls</td>
<td>Protection of Subject Data</td>
<td>Complete</td>
</tr>
<tr>
<td>Transmission of Registration Data</td>
<td>Partial</td>
<td>Inherent</td>
</tr>
<tr>
<td>Record Retention</td>
<td>Complete</td>
<td>Inherent</td>
</tr>
<tr>
<td>Types of Records Archived</td>
<td>Anything</td>
<td>Anything</td>
</tr>
<tr>
<td>Protection of Archive</td>
<td>Objection!</td>
<td>Complete</td>
</tr>
<tr>
<td>Archive Backup Procedures</td>
<td>Complete</td>
<td>Complete</td>
</tr>
</tbody>
</table>
## Comparison (2)

<table>
<thead>
<tr>
<th></th>
<th>CA-PKI &amp; TLS</th>
<th>DANE</th>
<th>DANE &amp; TLS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compromise</strong></td>
<td>System will trust any certificate</td>
<td>Entity will not be validated by parent node</td>
<td>The certificate will not be validated</td>
</tr>
<tr>
<td><strong>Revocation</strong></td>
<td>Certificate Revocation List (CRL) is rarely queried</td>
<td>Remove entity from the tree node</td>
<td>Remove Certificate from the node</td>
</tr>
<tr>
<td><strong>Client Validation Bugs</strong></td>
<td>No countermeasure</td>
<td>Secure (if the DNS works)</td>
<td>Mitigation (like flipping a switch)</td>
</tr>
<tr>
<td><strong>Geographic Diversity</strong></td>
<td>Trust multiple CAs</td>
<td>DNS is inherently distributed</td>
<td>Certificates are placed in the DNS</td>
</tr>
<tr>
<td><strong>Collaboration</strong></td>
<td>Need trust anchor or another CA</td>
<td>All entities can be linked to the root</td>
<td>Trust is delegated to the certificates</td>
</tr>
<tr>
<td><strong>DNS</strong></td>
<td>Based on DNS (IPs can change)</td>
<td>It is the DNS</td>
<td>It is based only on the DNS</td>
</tr>
</tbody>
</table>
IATA: e-signature and Cybersecurity

- Promote use of electronic record keeping
  - Finalize work with ICAO that ensures worldwide usage
- Ensure worldwide acceptance of e-signature
  - Meet highest standards, worldwide use, simplicity, cost
  - Work towards innovative, cost efficient and simple solutions
- Participate and drive industry efforts towards ensuring the cybersecurity in aircraft operations
  - Regulators (ICAO and States), Standards, Industry
Questions?

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- Elli Margeirsson: margeirsson@iata.org
- Dave Edwards: david.edwards@vtechstrategies.com

3rd IATA Paperless Aircraft Operations and RFID Conference

November 15-17, 2016
Boeing Head Quarters
Seattle, WA | USA