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Cloud Computing Service for High-Volume ECM Applications

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CEOCFO: *Mr. Oldham, what is the idea behind AIRVAULT®?*
Mr. Oldham: AirVault is a cloud computing service in the Enterprise Content Management (ECM) market, managing unstructured content like digital images, electronic forms, pictures, and video. Our focus is on mission-critical, high-volume ECM applications requiring significant regulatory compliance and security, such as PCI, FAA, or HIPAA. These attributes have been the key to our success deploying the technology to manage aircraft maintenance records for commercial airlines. The product, branded AirVault, is offered as a software subscription that provides airlines a complete service to manage electronic aircraft maintenance records in a hosted cloud. The big advantage of AirVault is that the cloud connects all the internal and external participants of the airline's maintenance operation, including the line stations, and their external suppliers such as MROs (Maintenance Repair & Overhaul), lessors, parts suppliers, regulatory authorities, advisors, and OEMs like Boeing and Airbus. As an aircraft travels worldwide, maintenance repair documentation and data is now immediately accumulated and accessible in AirVault from all of the airport repair locations, including the airline's facilities and their maintenance partners. The AirVault's cloud-computing architecture has the distinct advantage of a bi-directional communication conduit for complete visibility of both their internal and external activities throughout the entire aircraft maintenance process. The cloud is actually the perfect architectural metaphor for this industry.

CEOCFO: *Why the decision to go into this industry?*
Mr. Oldham: Historically, the ECM software industry has been mostly focused on applications in financial, insurance, healthcare, and

government, all the paper intensive processing applications. And, while we certainly have those applications as part of our company, in 2011 we made the decision to go all out on aviation, partly because we had a great marquee customer, Southwest Airlines that worked with us in developing our system to manage aircraft maintenance records. Commercial aviation maintenance is a very collaborative marketplace. The participants are constantly evaluating the best practices with one another because their industry goal is to maintain the highest level of aviation safety throughout the world. Southwest Airlines encouraged us to take the product into the airline market that we rebranded as AirVault to focus on aviation. The market response was just tremendous! From then until now we have gained over thirty airline customers, and today in North America 50% of the aircraft maintenance records are managed in the AirVault cloud.

CEOCFO: *Would you tell us about competition?*
Mr. Oldham: Sure, in general our competition is from two sources, the traditional ECM systems, and the aviation services companies offering a level of software capability. Most of our airline customers have replaced a legacy ECM system, usually supported by their internal IT group or consultants. These systems are generally premise-based with substantial costs relating to administration, support, computers, storage, and software maintenance that are almost eliminated in a cloud operation. In contrast, the aviation services vendors offer a hybrid, bundling their software with a number different labor and consulting services specific to airlines. For these types of vendors the business objective is really outsourcing the management of the entire aircraft maintenance department as well as hosting software. The service labor is their major revenue component, and as such, is in direct conflict to offering higher levels of technology automation to reduce labor. AirVault, in contrast, is a pure software supplier, and we focus constantly on improving the efficiency and functionality of the system. For example, AirVault offers a number of sophisticated data acquisition technologies, integrations to the airline's internal systems, and cloud connectors, all designed to save time.

CEOCFO: *Can an airline mandate that a supplier or one of the other participants use your system?*
Mr. Oldham: Yes they can, as they do with their other systems. AirVault provides a subset of the system for input and access, called MRO Connectors. For example, we have set up our capture services and these connectors in at least twenty of the MROs in the aviation industry. Certainly we are also encouraging those MROs to acquire a broader capability and sell them on the AirVault system, too. The document management requirements and information storage requirements are very similar to what the airlines, but with more limited records retention requirements. However, the airlines mandate that their suppliers use their technologies for the maintenance for their aircraft, as part of the airlines FAA approved aircraft maintenance program.

CEOCFO: *Is everyone using some system today or is it still new?*
Mr. Oldham: Not everybody, but the FAA and its European equivalent, EASA, have produced guidelines for electronic aircraft maintenance records and are encouraging their use. Most of the North America and European carriers have some level of imaging systems in operation, although in aircraft maintenance there continues to be a mix of

automation and paper-based operations. Aircraft maintenance records are kept for the entire service life of an aircraft that could be over thirty years, possibly with different owners and maintenance programs, so assembling a complete file without an imaging system is a time consuming challenge.

CEOCFO: *What are people using? Are you replacing systems or is AirVault a new idea?*
Mr. Oldham: About three quarters of our AirVault systems replace other sorts of image management technology. Airlines have everything from sophisticated legacy systems, to simple file systems that store Adobe PDFs on a file system, to a paper-based file operation, perhaps in Iron Mountain, for long-term archive. While there are elements of electronic imaging that most of the airlines are using, we are finding in the global market, that there are still many paper based systems. Paper, from an information management standpoint, is the lowest common denominator of business recording and exchange. For example, when aircraft are transferred or sold internationally, a regulatory jurisdiction might not accept electronic images, based on the airlines operating certificate, and the file would need to be printed to paper, resulting in a number of pallets of paper file boxes. The high level of airline fleet expansion, replacement, and reconfigurations by the airlines we are experiencing today has the aviation community now working to solve this issue.

CEOCFO: *Why is this the time to go global?*
Mr. Oldham: The airline industry is booming right now. Last week at the Paris Air Show, both Boeing and Airbus announced record orders for new aircraft, following the trend of the last few years, with increased production backlogs. There are approximately 21,000 commercial jets in the worldwide fleet increasing at about five percent a year, and the number of aircraft in service is expected to double within the next twenty years. Airlines are now much more reactive to market and technology changes. Throughout the world, airline fleets are being quickly reconfigured based upon the economic conditions, market opportunity, fuel efficiencies, lower cost financing, and superior technology. The trade association, Airlines for America, reports that US commercial aviation will drive 5% of GDP, that's $1.5 trillion in US economic activity and 11 million US jobs annually. While North America has been our primary market, we are seeing a much more dynamic global market. Europe is the next largest market for AirVault to conquer, and simultaneously promote our service in the higher growth areas in the Latin America, Middle East, and Asia-Pacific, specifically China.

CEOCFO: *You recently added AVIDEO. What does that bring to the process?*
Mr. Oldham: This is unique service that was originally designed with the help of Air Canada, to manage a library of hundreds of DVDs containing their video borescopes of aircraft engine inspections. The same AirVault cloud and network access service used to store images, forms, and data, now manages these videos. The video is a recording from a camera probe that systematically travels through the inside of aircraft engines to help engineers better examine the current condition of a jet engine, and flag any type of abnormality or defect as part of the aircraft maintenance record. These videos are generally between about three to six gigabytes in size, and about twenty or thirty minutes in length depend on the format. The videos are linked to the repair documents and index data in

the AirVault maintenance application for a complete engine history. The jet engines, one of the most expensive, maintenance intensive, and critical parts of the aircraft, are carefully tracked is managed. Now a video can be accessed simultaneously by all the maintenance participants from all different locations throughout the world. We have just started with this service at Air Canada, a very forward thinking airline, and finding cost reductions in copying and mail distribution.

CEOCFO: *What do you understand fundamentally about managing the data from all of the different sources that perhaps others do not?*
Mr. Oldham: First is that data is stored in many different formats that are all constantly evolving. This includes the unstructured scanned digital images and documents managed in a cloud facility for long-term storage management. For an aircraft, the active maintenance records retention period can be over 30 year of operational life. We concentrate on maintaining the longevity of data access, through all the continual technology changes of storage media, software, networks, etc. Data formats are dynamic and new ones are being constantly invented and improved. For example, the Adobe PDF format has gone through thirteen version iterations since introduced in 1993. We make sure that all of our facilities and capabilities are forward compatible. Second is understanding that image content is becoming a source for big data analytics. For example, all the electronic documents that AirVault manages in the aviation industry are also scanned via multiple OCR processing technologies in our cloud. This produces a rich set of forms-data in SQL database tables and full-text searchable data. Our airline users are now able to access a massive data file for performance, optimization, and predictive uses. Third, there is a codified process that is unique to each customer that establishes how documents and data are stored, accessed, managed, audited, and reported, including security access rights and encryption levels. Every so often there is an aircraft incident, a problem has occurred, perhaps an equipment issue, and the system records are electronically locked down programmatically, only to be viewed by the NTSB, FAA or specific senior management, so that no changes can be made in those records. Finally, the complete solution requires a robust cloud input and access infrastructure, and that requires the establishment of a large network of connectors, remote capture scanners, data warehouse, forms processing, and storage, all available as a web service.

CEOCFO: *What is involved in an implementation?*
Mr. Oldham: Based upon other IT projects, our implementations are pretty quick, and depending on the complexity, an airline can be in full production in 12-16 weeks. With thirty airline customers, we have developed a set of best practices based on our experience in the industry. AirVault provides a standard aircraft maintenance data schema and forms templates for all the usual document types. AirVault is a pure Software as a Service offering that operates in a multi-tenant environment; however, the software is flexible enough to accommodate the unique requirements of each customer, and airlines do make configuration changes based on their operational policies. Deploying AirVault is a fast process compared to many legacy ECM systems, where there was considerable time spent on a customize business analysis, system design, code development, documentation and training,

CEOCFO: *Are there features available in your system that many companies do not use?*

Mr. Oldham: Software as a Service by definition tries to avoid superfluous features that add to our processing, storage, or bandwidth. As a result, most of our customers are using the full records management capability, all of the data acquisition capability, both OCR and full text, the business process capability, records auditing, and all the best practices of maintaining compliance with the FAA. Our systems development roadmap is primarily customer driven, and we get terrific product guidance from users, including Southwest Airlines, Air Canada, SAS, Flydubai, and American Airlines. Our customers represent the best practices of airlines in the future, and once defined, we are seeing the capabilities being fully utilized. Certainly our major initiative is providing enhanced data analytics and reporting capabilities, a project that is highly anticipated for all our customers.

CEOCFO: *Is the number of crashes that have happened recently and the intensive coverage they get helpful for you or has the industry advanced enough that they are not being reactive, but more proactive these days?*

Mr. Oldham: No, our airline customers are very proactive on maintenance related technology. I don't believe any of the aircraft incidents recently, at least the catastrophic ones of major notoriety, were aircraft maintenance related. However, incidents do happen, and whatever the cause, the mechanical condition of the aircraft is always closely investigated. New aircraft improvements are helping to drive our business. Composite airframes, more fuel efficient aircraft engines, and advanced flight avionics are all adding considerable data management opportunities. For example, it was reported that the Boeing Dreamliner generates a terabyte of information per flight, including a large amount of systems monitoring information. Maintaining the performance of this aircraft, priced at over $250 million, an expensive revenue producing asset for an airline, is critical. The aircraft maintenance records managed by AirVault provide a primary source for the documentation and compliance not only for the long-term operational performance, but also as important, helping to maintain the economic valuation of this asset. From a compliance perspective, some airlines provide free AirVault access to the FAA and other regulatory authorities, offering a better view, and perhaps less intrusive inspection into airline maintenance operations.

CEOCFO: *Why should people choose AIRVAULT?*

Mr. Oldham: There are three major reasons. First, we have quite a few airline customers right now, and all are testimonials for the AirVault service. A big part of our mission is to get as many new airlines using AirVault because this adds to our best practices, and these improvements we make available to all our customers. When a new airline prospect is considering AirVault, I always encourage them to travel and visit an AirVault customer. We have a very robust AirVault User Group that talks about all the issues around aircraft maintenance management. The second reason is AirVault has established a network of "cloud connectors" across the commercial aviation maintenance supply chain, providing a secure market platform for airlines to exchange information and assemble data analytics. This bi-directional communication conduit offers complete visibility for the airline to both

their internal and external maintenance partner's activities, capturing aircraft repair data and compliance documentation throughout this worldwide aerospace maintenance ecosystem of airline operations, MROs, Lessors, Parts Suppliers, Regulators, and OEMs. And finally, AirVault has an extremely high level of technological capability today and a detailed roadmap in the future, all delivered with the efficiencies of cloud computing and Software as a Service. The AirVault technology stack of records management, the data acquisition, business process, and data analytics is complete and can be quickly deployed. Our team attacks every business problem from a software development standpoint to increase the level of technical automation for our customers.

Interview conducted by: Lynn Fosse, Senior Editor, CEOCFO Magazine