

Hardware, software and digital platforms for ancillary revenue generation continue to develop. Many airlines are still several steps away from opening these new revenue channels, but a few airlines are pioneering techniques and already seeing the benefits.

The software & platforms for ancillary revenue generation

Ancillary products present an attractive opportunity for airlines to enhance their revenue streams. There are several categories of ancillary products, and to date most airlines have been able to generate revenues from one or two of them. These are extras that are sold to passengers at the time of an on-line ticket purchase, and traditional on-board sales. Other ancillary revenue streams which have yet to be exploited by most airlines are on-board advertising and sponsorship, and new generation ancillary products sold through in-flight entertainment (IFE) systems on board the aircraft. This second category includes the new concept of destination-related products with the potential to generate revenues for airlines via sales commissions. The IFE system hardware needed to generate these revenues has been examined (*see Hardware for growing ancillary revenue streams, Aircraft Commerce, December 2016/January 2017, page 27*). An equally important issue is the software and applications that will be hosted on the IFE system hardware.

Ancillary products

The first generation of ancillary products comprises the basic on-board sales of snacks, drinks and duty-free items. These clearly require little dedicated technology, although credit card sales run the risk of fraud on aircraft not equipped with an external connectivity system.

The second generation of ancillary revenues evolved about 10 years ago, when airlines started offering additional products associated with on-line reservation and ticket purchases made by passengers. These can be divided into two categories: airline products and non-airline products.

Airline products include: baggage check-in; priority or advanced boarding; reserving seats with additional leg room; and buying food and drinks on flights without in-flight catering as standard. Airline products generate direct revenues for airlines.

The second category comprises non-airline products, including travel insurance, hotel reservations, and car hire. This category generates sales commissions for airlines, but requires the airline's reservation system to have dynamic packaging capability.

These pre-flight and reservation-related products are estimated to now account for \$85 billion in revenues for all airlines. This is in contrast to annual airline industry profits of \$35 billion.

There are several categories of ancillary in-flight products. The first of these was when airlines started offering external connectivity to passengers, which made it possible to send text messages and emails, and to browse the web. This was started by the air-to-ground (ATG) connectivity system provided by Gogo overland in North America. This is a service that has been paid for by passengers flying on US domestic flights. Some airlines use other connectivity systems and charge passengers directly. Typical daily rates in the US for domestic flights are \$8-20 per. Similar rates are charged by European carriers.

External connectivity was also extended to some intercontinental flights by airlines that had used high bandwidth satellite communication (satcom) systems, such as Ku- and Ka-band.

These high bandwidth satcom systems also made it possible to provide broadcast and internet protocol (I.P.) TV on aircraft. jetBlue was one of the first airlines to do this, providing broadcast TV on flights on a complimentary basis (*see The technical issues for providing live*

TV, June/July 2017, page 43).

In addition, an increasing number of airlines have opted to provide in-flight external connectivity on a complimentary basis, in response to passengers' growing demands for it. Despite the higher bandwidth of later generation systems, the cost of providing external connectivity is still high, however, so airlines need to formulate business models that somehow cover this cost.

Low-cost carriers (LCCs) and inclusive-tour airlines have followed the same strategy as airlines in North America using Gogo, and charge for the service. Passengers can use the service for text messaging, emails and surfing the web, while airlines can use the external connectivity systems to offer additional IFE services and a wider range of in-flight ancillary revenue products.

Low-cost and charter airlines are the most likely to charge all passengers for in-flight connectivity. The legacy carriers will provide in-flight connectivity on a complimentary basis to premium cabins and in some cases economy classes for Many of the same airlines charge for in-flight connectivity on intra-continental services. US carriers will charge for the use of Gogo on domestic flights, but will provide it for free on long-haul sectors. Lufthansa, however, charges for connectivity across its route network.

Some airlines have recently introduced ways to have in-flight connectivity sponsored, or at least find methods to increase uptake rates. Gogo has partnered with mobile phone service provider T-Mobile. T-Mobile offers allows its customers to access connectivity on board without having to make a payment, although the passenger actually pays for the service through their monthly mobile phone bill.

Even though in-flight connectivity may be provided on a complimentary basis, it can still be used to generate

Reservation- and pre-flight related ancillary products are estimated to generate revenues of \$85 billion per year for airlines. The airport environment is also an attractive environment for creating multiple touchpoints for the passengers to engage with multiple vendors.

commissions from passengers gaining access to systems such as Netflix accounts to watch films. Airlines will then generate commissions from Netflix for passengers accessing their accounts in the air.

Following on from in-flight connectivity, a new generation of in-flight ancillary products is emerging. The first of these is live TV, for which passengers can be charged or not, depending on the airline's business model.

IFE systems vary in sophistication, but some provide portals for airlines to offer a variety of services. These portals, such as Lufthansa Systems' BoardConnect, can be branded for the airline. These can provide in-flight shopping, with airlines earning commissions from the sales generated. This differs from the traditional in-flight shopping process that offers snacks, drinks and duty-free. New generation in-flight shopping via a portal offers an extensive range of products, provided by the airline, or in conjunction with an established e-commerce provider, such as Amazon. An inventory of some goods for purchase can be held on the aircraft. Others can be later delivered to the passenger's address, or picked up at the arrival airport.

Another element of new generation in-flight products is passengers paying to access IFE content, in particular films and audio content hosted on the IFE server.

An in-flight ancillary product that has gained interest in recent years has been the use of in-flight advertising and sponsorship. This is a revenue stream that airlines can exploit without aircraft having external connectivity or any capability for in-flight and destination-related shopping. That is, advertising and sponsorship can already be used on the simplest and cheapest portable wireless systems. Advertisers can subsidise the cost of operating a wireless IFE system that is used to provide free content or which markets a limited amount of paid-for content. At the other extreme, advertising and sponsorship revenue can be used to subsidise the cost of providing external connectivity for an IFE system that uses broadband external connectivity, allows passengers to stream content from ground sources, and provides a wide range of in-flight shopping that includes destination-related products.



“A project that investigated the potential digital advertising revenues via IFE systems has recently been carried out,” says Kim Creaven, vice president for partner marketing, advertising and sponsorships, at Global Eagle. “The project calculated that the current annual advertising revenue for airlines using it was about \$250 million. This is both print in the in-flight magazines, and digital on the IFE systems. Most of the revenue is from print adverts.

“However, there is greater ancillary revenue potential from in-flight shopping,” continues Creaven. “Best practices for digital advertising via IFE systems have been defined, and now innovations for advertising in the air should be created. An important issue is the ability to track and report the response to advertising. Digital advertising in the air has not developed as fast as on the ground because of the technological limitations of airlines' IFE systems. Aircraft need to have the connectivity and appropriate servers, but this investment has not yet been made. It therefore depends on how far the airlines want to go.

“Other issues relating to advertising are the attitudes and requirements of airlines' partners, which are mainly car hire companies and hotel chains,” adds Creaven. “Global Eagle provides a connectivity platform which monitors passenger activity via a data analytics process. This technology enables advertising to be personalised and targeted directly to each passenger. Personalisation identifies passengers that are frequent flyers, monitors the routes they fly, and monitors their purchases, for example, of the films they watch.”

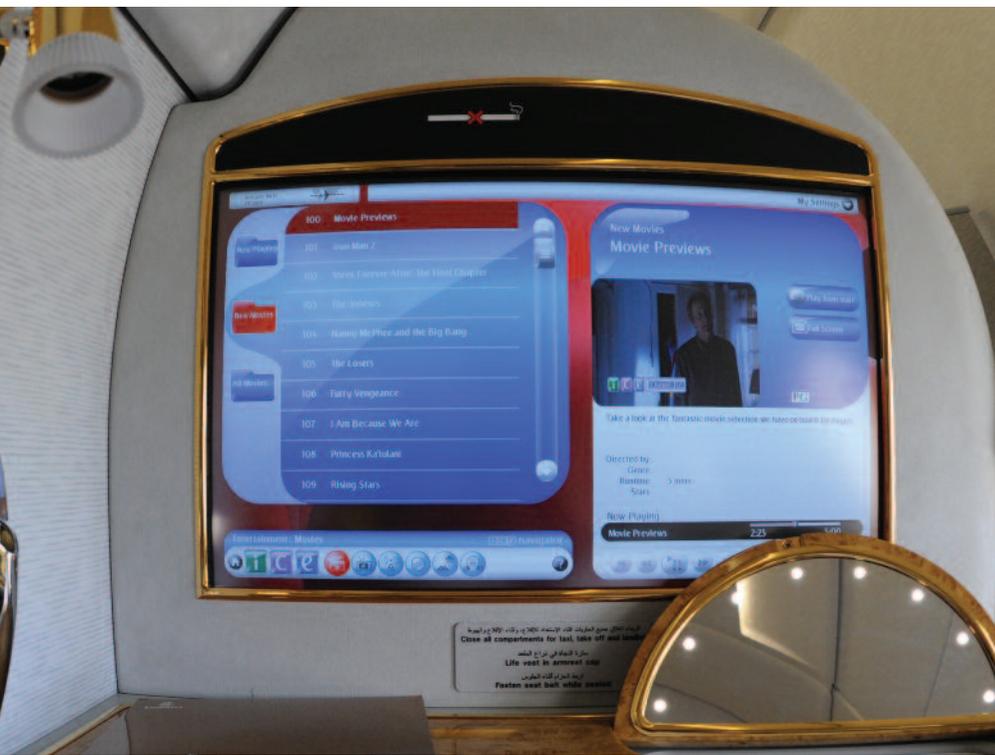
This targeted marketing can be done via an aircraft connectivity platform, but the system would have to be linked to the airline's frequent-flyer and passenger-loyalty programmes. “Passengers may not like this, however, and request privacy,” says Creaven. “There is a lot of resistance from airlines to this type of technology, although we still expect it to be used in the future.”

A new generation of in-flight ancillary products is destination-related products and services. These will be the sale, through the IFE portal, of items, such as hotel and car hire reservations, restaurant bookings, and excursions and trips. All of these require access to the booking engine on the ground, so the aircraft needs to have external connectivity.

What is required?

Few airlines currently offer new generation ancillary revenue products and so do not generate the potential additional revenues. The industry is in its infancy, but there are signs this is changing, and the sale of in-flight and new-generation ancillary products is expected to grow over the next few years.

“While the current volume of reservation-related ancillary products is \$80-85 billion for the industry, the current volume of in-flight products is only \$1 billion,” says Alexis Hickox, head of global business development of cabin solutions at Rockwell Collins. “Projections are that total ancillary revenues could reach \$135 billion by 2035, and that about \$30 billion of this will come from in-flight sales of ancillaries. The revenues from sales of traditional revenues will grow from



current levels. Moreover, ancillaries are forecast to grow at 4.5% per year, and will reach about 10% of total airline revenues.

“The airlines that are ahead in terms of selling in-flight and new-generation ancillaries are LCCs,” continues Hickox. “These are moving ahead faster because they have always charged passengers for items, such as WiFi and catering, on board the aircraft, and so are not restricted when adding further products.”

“Passengers today are paying mainly for connectivity and IFE content, but the biggest potential in the future is targeted and personalised advertising and shopping solutions. Having spare time while on board and being connected opens up so many opportunities for new revenue streams the airline can participate in,” says Stephanie Schuster, senior director business development at Axinom.

There are several steps airlines will have to take before they can start opening these new revenue streams.

The first involves airlines making hardware and technological changes to their on board systems. For example, high bandwidth external connectivity is only provided on a minority of commercial aircraft, although the portion is steadily increasing. “Most aircraft will have external connectivity in the future, and there is a lot of interest from airlines for future deliveries,” says Hickox. “Only about 80 airlines are connected. Emirates is one of the most advanced when it comes to external connectivity.”

External connectivity is clearly essential to integrate real-time payment solutions and CRM systems, provide live TV, allow access to live streaming content

from providers, such as Netflix, and allow the purchase of destination-related items. Airlines have generally considered high-bandwidth external connectivity to be too expensive, and need to implement a business model that subsidises or fully covers the cost of providing the service. New-generation high-bandwidth connectivity systems will, however, help airlines reduce the cost of external connectivity.

“We have so far provided our wireless IFE system to airlines that operate without external connectivity,” says Jimmy Martinez, chief executive officer at Immfly. “These include easyJet, Sun Express, Iberia Express, Iberia Regional and Excel Airways. Our customers are clearly mainly LCCs and charter/inclusive tour airlines. They have used the IFE system to provide passengers with access to content, but some of our customers are now interested in generating revenues from these new-generation ancillary revenue products. Our IFE platform went into service in December 2014, and we see that there is more potential for revenue generation with the IFE system combined with external connectivity.

“This means several steps have to be taken. None of our customers has yet been using external connectivity, but they want to enter the new-generation ancillary product market,” continues Martinez. “We expect to have the first aircraft with our IFE platform interfaced with an external connectivity system soon.

“There are several business models that airlines can use to provide external connectivity to passengers,” adds Martinez. “This can include complimentary access, charging a fixed

Airlines can optimise the effectiveness of the data they have at hand by integrating their multiple passenger-related systems from booking via frequent flyer data to on-board IFE usage data to generate a seamless data flow behind the scenes, thus enabling the front end to create a holistic and unified passenger interface and experience.

fee for unlimited access or charging on a pay-per-view basis.”

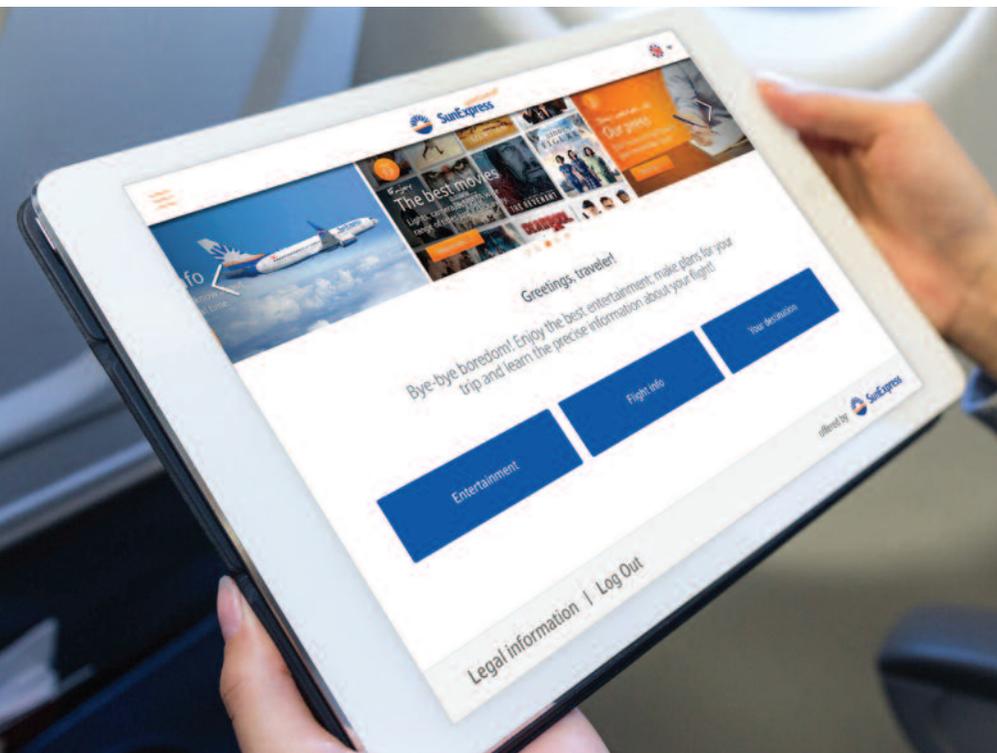
This raises the issue of what is the appropriate business model for providing external connectivity. “This is highlighted by the fact that paid-for external connectivity often has low take-up rates by passengers,” says Eckart Wallis, product manager of in-flight entertainment at Lufthansa Systems. “The main problem is that many airlines charge too much for it.”

While the basic requirement for adding external connectivity clearly has to be met to exploit all possible ancillary revenue products and revenue streams, there are several other issues that have to be considered. “There are clearly some hardware and technology issues that affect or limit an airline’s ability to generate ancillary revenues,” says Wallis. “These technological issues can be overcome relatively easily, and there are several software platforms available that make it possible to provide all the required content, and to complete all elements of purchasing transactions.”

Holistic systems

“The main issues are that providing ancillary products and marketing them requires several complex steps and a lot of data and intelligence. This has so far not been done or configured properly,” continues Wallis. “Airlines and vendors have initially configured IFE systems autonomously, as standalone items, so they can provide an in-flight experience on the aircraft. However, none of these systems pays for itself by generating enough revenue. This is mainly due to the cost of providing premium content. Adding extra and new-generation products, especially items such as in-flight shopping and destination-related products, really requires the IFE system to be integrated or interfaced with the airline’s booking, reservation, frequent-flyer and revenue accounting systems.”

There are multiple reasons for this. First, a complete range of all categories of ancillary products from pre-flight to post-flight needs to provide the passenger with a seamless experience. “Several factors are preventing airlines from moving faster ahead with generating more from these ancillary revenue streams. One issue is payment and personalisation, and most



airlines' IFE systems do not have seamless integration. If they did, passengers would not have to re-enter their credit card and personal details each time they make a purchase," says Stephanie Schuster, senior director business development at Axinom.

There is also the integration of an airline's system, such as frequent-flyer and customer relationship management (CRM) with the on-board system, as well as issues relating to aircraft hardware and external connectivity equipment.

One reason for integrating the entire reservation, frequent-flyer and combined IFE and ancillary revenue system is to allow a seamless service by simplifying the payment process for the passenger. "Passengers are uncomfortable with typing in credit card numbers, and it is hard to get high take-up rates by passengers. Single-click payment systems are preferable," says Wallis. "Airlines need an on-line credit card payment system to prevent credit card fraud."

An integrated and holistic system means that the IFE system will recognise the passenger when they are in their seat, and link this to their personal data from the CRM system or the ticket purchase. "There are now initiatives providing open specifications for interoperability. A new one is called the Seamless Air Alliance," says Schuster.

The Seamless Air Alliance has been formed by Airbus, Delta Air Lines, Ku-band satcom provider OneWeb, Sprint and Airtel. By having mobile operators extend their services in airline cabins, passengers can use their smartphones and personal electronic devices (PEDs) to have a low latency authentication with the ground.

This system will bypass the need for installing expensive hardware and associated system infrastructure, and make a purchasing system accessible for passengers and allow integrated billing. Payments with mobile phone contracts can therefore run through telecoms providers. This method is popular in Asia. The advantage is that a passenger will not be required to have an app on their smartphone to use the system, and the functionalities can be realised with browser-server applications.

There are several possible ways to configure a system to provide a seamless service using connectivity. "One example is a hybrid solution for payment," says Schuster. "This would show the passenger options like duty free articles, food and beverages, destination vouchers, entertainment, telecommunication services, flight upgrades, further transport services like Uber, baggage claim information. Airport services, such as terminal hotel and meeting options for purchase. These services could make use of an integrated connected catalogue, CRM and payment service. The usage of selected partner services, for example, ground transport or hotels services could be free, while other connectivity services for the internet in general could be charged."

Touchpoints

Having a seamless payment system is the more preferable configuration for an IFE system because there are multiple 'touchpoints' during the complete ticket purchase and journey experience to offer or promote ancillary products. "Each touchpoint is an appropriate stage of the

Externalising the handling of the selection and purchasing process onto the passenger's own device is very beneficial for all involved parties. It increases customer satisfaction, airline marketing and payment processing.

reservation, check-in, boarding, flying, and post-flight phases of an entire journey where a passenger can be marketed with appropriate ancillary products," explains Wallis. Examples of existing touchpoints in the reservations process are those where items, such as priority boarding, baggage check-in, and seats with extra legroom can be offered for supplemental fees. Other examples are where non-airline products, such as travel insurance, hotels, and car hire, can be offered at the last stages of the on-line reservations and ticketing process.

The new-generation ancillary products will also have to be offered at appropriate touchpoints. Examples of these can include ordering drinks, and stating meal or movie content preferences during on-line check-in, travel to the airport, airport check-in, and the pre-departure period. Such promotion of these sorts of ancillary products can be conveyed through the airline's app on the passenger's PED. Other appropriate products during these touchpoints may include destination-related products, or post-flight products, such as grocery items or taxi reservations to take the passenger home after a returning from a trip. Marketing via the app on a PED would be convenient at these pre-flight touchpoints and would make use of WiFi connectivity available on the ground and mainly within the airport terminal.

At touchpoints in later stages, such as during the flight, it would then be appropriate to offer destination-related products, and in-flight shopping, access to streamed IFE content from on-ground sources and in-flight items such as drinks.

The large number of touchpoints at the off- and on-aircraft phases of the entire journey and passenger experience, and the appropriate products to offer, have to be carefully identified and analysed, so that the passenger does not get annoyed by the over-promotion of an excessive number of products at too many touchpoints. "This requires a holistic view of the process, as well as creating a fully integrated reservation and IFE system," says Wallis. "Not only is this required to provide the passenger with a seamless service, which avoids the need to re-enter credit card details, but also so that the buying behaviour of individual passengers can be analysed. This is an extension of using frequent-flyer information to target particular fares

For some LCCs and holiday carriers, the so-called ancillary revenue becomes a central contribution to their income and especially profitability.

and offers, and provide appropriate loyalty bonuses to passengers. Frequent-flyer or loyalty points can also be used by the passenger to buy some of the ancillary revenue products in the case of a fully integrated system, making it even easier to target a passenger with relevant products.”

Not only does frequent-flyer data allow airlines to better target appropriate ancillary products to particular passengers, but so does analysis of passengers’ buying behaviour. This is similar to using data from global distribution systems (GDSs), and revenue management and revenue accounting systems to re-optimize available fares on each route at regular intervals.

Therefore, as well as creating a holistic reservations, IFE and ancillary revenue-generating system, airlines would benefit from having the post-ancillary product purchasing analysis process in place at the start so as to refine touchpoints and the appropriate products to promote to regular passengers at each one.

Partnerships

Expanding IFE systems to include a large number of in-flight shopping and destination-related products involves a large number of processes as well as an increase in the carrier’s activities and expertise.

“The staff and expertise can be gradually added and developed by an airline if it wants to be independent,” says Wallis. “It will, however, take a long time to acquire this and it has risks. Many airlines will instead form partnerships with e-commerce companies to provide this expertise and infrastructure. They will, therefore, be able to generate ancillary revenues from these sources after just a short period. The further advantage of forming relationships with e-commerce partners is that they can also share the cost of the hardware and software with the airline. Moreover, the processes and related infrastructure will already be in place, so airlines can avoid all the issues with developing their own capabilities in house.”

Integrating various elements of the reservation, IFE and ancillary revenue platforms and systems has further



implications and issues. “Many IFE systems are digital platforms. These not only need to be integrated with an airline’s various other systems, but also with passengers’ mobile devices and PEDs. In turn, the airline needs to supply user-friendly apps for use on the devices that complete the holistic system and seamless services,” says Hickox. “There are several levels of integration required for the system, including integration with: an e-commerce partner in the case of on-board and in-flight shopping, and destination-related products, credit card transaction providers and payment gateways, such as Apple Pay, and third-party content providers that allow movies and audio to be streamed from on-ground sources, such as Netflix. Airlines are also likely to form or extend partnerships with organisations, such as hotel chains and car hire companies. We can assist with completing these integrations via our Cabin Connect system provisioning service. Cabin Connect is a connectivity and IFE systems, a new iteration of which has wireless IFE and connectivity. It is possible for the system to integrate with any third party via the use of an application programming interface (API).”

Platforms

There are now several on-board platforms available of varying capability that provide airlines with the capability to offer some or all of the ancillary products. Some platforms are able to complete a holistic system to provide the passenger with a seamless service. These include Board Connect provided by Lufthansa, Global Eagle’s airconnect

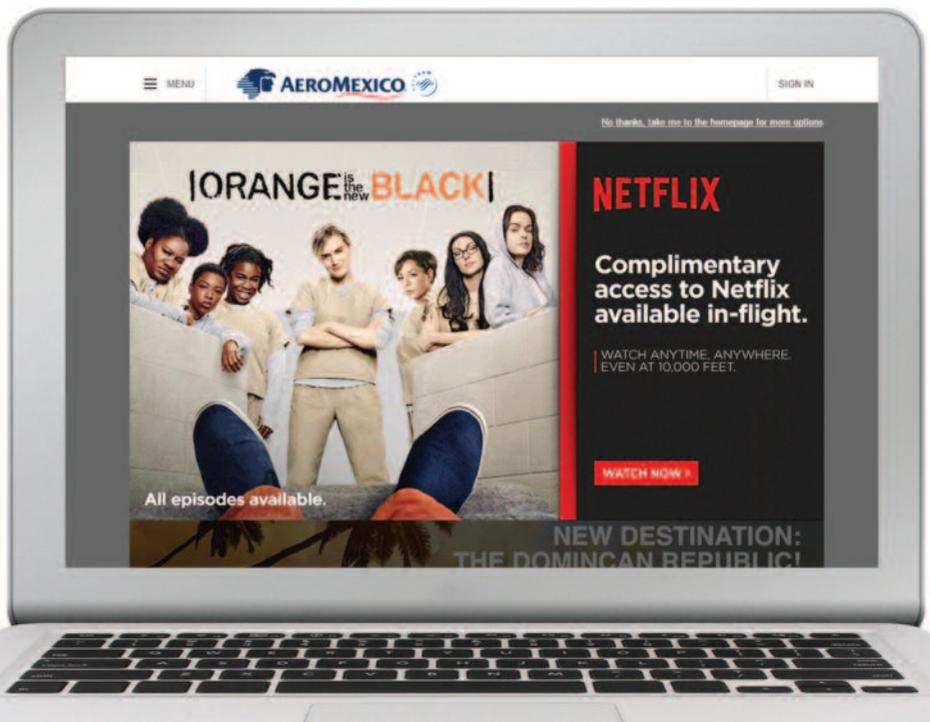
global system, and platforms provided by vendors, such as Gogo and Rockwell Collins.

“Our Board Connect system has shopping integrated with its software,” says Wallis. “The new 5.0 version of Board Connect is an open digital platform that can host third-party applications and integrate with other systems, such as a reservations or frequent-flyer system. Board Connect 5.0 includes shopping, advertising and retail platforms. As an example of the complexity of a complete platform, the system needs to have a lot of related data, such as where the aircraft is flying, to have the appropriate items available for the passenger user.

“The platform links to the airline’s frequent-flyer programme, so that passengers can use their points to make purchases,” continues Wallis. “There is, however, little or no digital experience on most flights, but the target is for airlines to be able to build a fully digital IFE and passenger experience system.”

Digital Platforms built by Axinom are different because the offer is based on software only. Axinom’s products and services that are used for IFE systems or connectivity portals are individualised and custom built, installed on existing hardware, integrated with on-ground and on-board services and certified by the buyer. The company is also specialised in content protection and studio approvals for customer solution, but content itself is not part of the offer.

The Axinom platform has been designed to take all the elements into account. “There are several main modules. The first of these modules are hosted on an airline’s ground-based systems, while latter modules are hosted



in the IFE platform server.

“All content is chosen and purchased by the customer and can be ingested by the content service providers that include publishers, TV broadcasters and channels, telecommunications companies, radio stations,” says Schuster. “The content can also include existing TV channels, recorded TV shows, movies, images, audio content, and any related meta data. It also includes adverts, an inventory of items available for in-flight shopping, or destination information and content related to destination-related products and shopping.”

A first module is the video ingest and processing (VIP) hub. This is purely related to movie and video content. It is required for encoding and encrypting or decrypting video content provided by film and movie studios that has to be protected.

The VIP module can integrate forensic watermarking solutions on visual content to make it identifiable in the case of theft, and can host multiple language versions of the same content for use on various parts of the airline’s route network. The managed content can be transferred to the content management system (CMS).

This module is the central interface managing all kind of digital assets, for example, also from third parties that are not media. These include information related to destination, in-flight catering, the moving map, all adverts that the customer wishes to show via the portal, and the inventory of items that can be bought by the passenger in the shopping function.

The media and content modules flow data and information into the CMS. “The CMS is a web-based interface for managing all content types, and is used

by the ground-based editor,” explains Schuster. “The functions of the CMS can include captive portal content and subscriptions assigning pricing, managing advertising, and creating content for each fleet and sub-fleet. The CMS can create content sets and rules, so as to provide the right content and accompanying languages, according to the routes and geographical region in which the aircraft of the sub-fleet is operating. These rules can include instructions on which part of the content set should be shown to which passenger group or in which time period.

“One rule is that the IFE system needs the ability to detect when a passenger is using a PED, and specify what content can be viewed on the device,” continues Schuster. “This applies to issues such as early window (EW) and late window (LW) movies, since only LW movie content can be viewed by PEDs. Another set of rules could specify which items are complimentary, and which have to be paid for, and how this varies according to cabin class.

Following on from the CMS is the content delivery system (CDS). “The CDS transfers the content from the CMS to the IFE server on the aircraft,” says Schuster. “Many systems are simply using USB drives, but we want to be able to use all available connection pipelines to get data onto the aircraft. These include the cellular and WiFi on-ground connectivity systems, as well as the high bandwidth satcom systems. In addition to the main content uploads, there are also incremental content updates. The CDS is able to prioritise certain parts of the content. The CDS also has to switch between the on-ground (mass storage, cellular) and satcom connectivity systems to achieve the lowest possible cost. The

Enabling an ‘at home’ feeling through, for example, offering the streaming services passengers are used to on the ground generates substantial passenger satisfaction as well as revenue.

switch also depends on whether content is being loaded while the aircraft is on the ground or in the air.”

Information, including IFE and aircraft operational and maintenance data, has to be downloaded from, as well as uploaded to, the aircraft. The CDS therefore synchronises all data in both directions.

The in-flight services (IFS) module is hosted on the IFE server on the aircraft, and receives the data and information from the CDS. “The IFS has software running on the on-board server, and the digital rights management (DRM) runs on the server. There are various functions provided by the IFS, depending on the feature set and required backend integrations of the on-board portal,” says Schuster. “One of these is the media server, to stream content from the server to the client devices (personal or seatback screens) captive portals to manage connectivity, there is the DRM which has the ability to authorise protected content, there can be a local advert targeting server, and there is the management of content rules. Public announcements made in the cabin are also controlled by the server, and coordinated with showing and running the content, so that showing movies, playing audio content and running other types of content, such as completing purchasing transactions, are all paused while public announcements are in progress.”

The IFS will also hold the catalogue of the entire content available on the system. The advert server has rules, such as what days of the week adverts are displayed and which adverts are displayed before the start of a film, or while viewing certain classes of content. In a hybrid setup, this can also include targeted online advertising by utilising connectivity, on ground customer CRM and cloud-based advert exchange servers.

The final module in the Axinom platform is the connection to the front-end applications, which is what the passenger sees via the IFE system portal of the PEDs that are used to view the IFE system and all the related content. The front-end SDK controls the connection between the server software and the front-end application.

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