

Yields have fallen on long-haul routes over a sustained period. Airlines have to find more sophisticated ways to defend against this erosion. What IT tools are available on the market to assist in these defences, and what techniques are airlines employing to halt the decline?

Systems & techniques to battle the decline in long-haul yields

There are several forces at work in the air travel market that result in downward pressure on long-haul yields. There are now methods and systems available, however, to slow down or even stop this erosion.

The majority of long-haul routes are flown by the long-standing network carriers which dominate the route rights and lucrative slots at the major international airports. Data from the International Air Transport Association (IATA) (see chart, page 41) shows that in real terms, long-haul yield per revenue passenger kilometre (RPK) for European airlines has declined by a third since the early 1990s. IATA says that increased competition among the network carriers is the main factor in this downward trend, in spite of some shake-out in this segment in recent years.

The availability of more efficient aircraft with larger seat capacities, and therefore lower operating costs per available seat kilometre (ASK), is one reason why these network carriers have been able to offer lower fares.

Another trend is the movement of business-class passengers backwards into the cheaper economy cabin, as corporations look more carefully at their travel costs and start to insist that employees travel by the lowest cost method. Some low-cost carrier (LCC) business models have already been tried in these long-haul markets. An early example is Laker Airways in the 1970s. In more recent times there has been OASIS Hong Kong, which started operating between Hong Kong and London this year.

These long-haul LCC models generally struggle to survive because of

the complexity of connecting traffic and interlining between airlines and the sheer scale advantage of the network carriers. The downward pressure on yields is dependent on the type of market served. Routes from Europe to Asia behave very differently from one another. London-Tokyo will have a higher concentration of business traffic than London-Bangkok, for example, which makes London-Tokyo less prone to yield erosion.

Yield management

Yield refers to the amount of money per RPK flown that an airline receives on each flight. It is the average fare received per seat divided by the length of the flight.

Since a seat on a flight that departs at a given moment cannot be resold once the flight has left, airline seat inventories behave like perishable goods, such as fresh fruit, and proper yield management is paramount.

How does an airline maximise this yield? Airlines realised early on that even with a single cabin class, they could fill it more profitably if they could find a way to segment the market according to passengers' willingness to pay. Demand patterns vary by time of day, day of the week and by season. 'Fences' were therefore introduced to impose restrictions on travel to force passengers to buy into different fare segments. Fences include restrictions and rules such as advanced purchase, minimum stays and limited flexibility.

Yield management techniques were developed that were relatively good at managing this situation, but initial trust in how sophisticated these systems are

has been replaced by some scepticism regarding their actual business benefit. Airlines began to ask how much reliance they should place on the computer, and the extent to which they should apply human judgement to interpret data and make management decisions on price adjustment.

The LCCs, and new distribution methods like on-line booking, started to change airlines' approach to yield management. Price became the main factor affecting a passenger's purchasing behaviour, and price fences were removed. This meant that no Saturday night or minimum stays or return bookings were necessary, and passengers could book one-way seats at the fare available at the time of booking.

The only segmentation possible in this situation is through the time of booking and the choice of flight. On-line bookings are done directly by the client electronically. Transparency means that passengers can see the fare available at any time, and see that prices generally go up the longer they delay making a booking. Buying in advance is cheaper.

The risk of a traditional approach to revenue management (RM) is that gains in higher seat factors are offset by reductions in yield, through higher-yield customers simply purchasing the cheaper fare. If these cheaper fares are made available for sale too early in the booking process, travellers will naturally accept these lower prices for the same seat and booking conditions. In other words, seats are being given away too cheaply.

A new approach is needed, whereby the RM system can forecast demand patterns, and suggest when prices should change and what the next price increase

or fare level should be. This would be based on historical data or a good model of expected demand. The system will need to gather information, however, about demand and prices paid to accurately gauge what will happen to demand if the available fare changes.

If the fare is too low, then the flight will fill up too early, which means that higher-yielding bookings closer to departure will be turned away. If the price is too high, the airlines risks the flight departing with empty seats that could have been sold and made an incremental contribution to the total revenue.

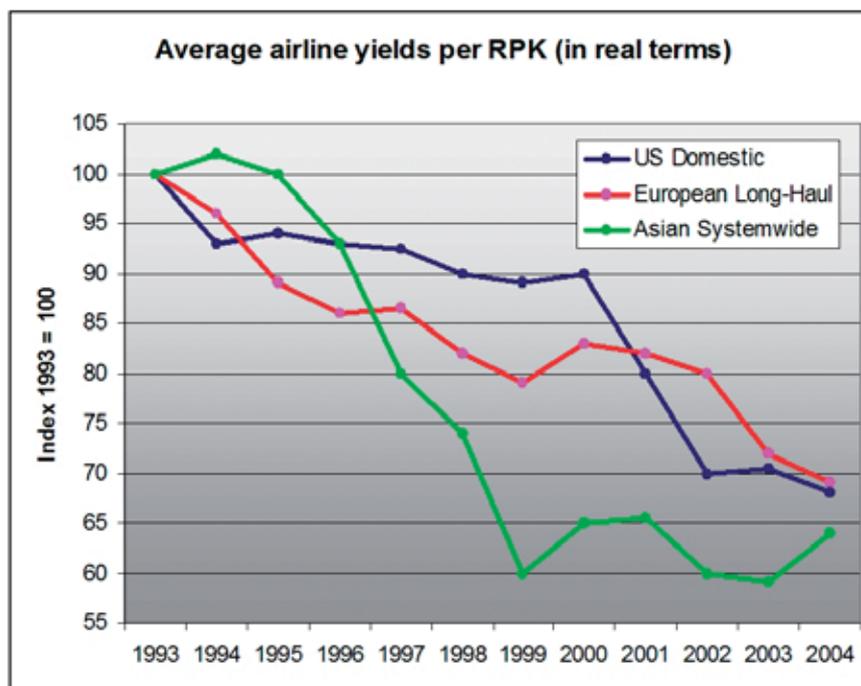
Passenger demand is price elastic and a new and different approach is needed, with the problem being now one of price optimisation. Studies from MIT in the US, and others, have shown that airlines can increase revenue by 3% to 6% by applying yield management techniques.

Managing yields effectively

A theoretically sound approach to yield management is therefore important. But so is having effective organisation in place to take the right pricing decisions quickly enough. THY Turkish Airlines is one of the fastest growing traditional network carriers in the world, and represents a good example of the organisational challenges, and possible solutions, facing network carriers. Figures from the Association of European Airlines (AEA) show a growth of 20% in ASKs for THY over the past 12 months. The next highest growth rate in the AEA data was Austrian Airlines with 9%.

THY is undergoing some significant structural changes, spinning off its maintenance and engineering division as a standalone company called Turkish Technic. THY's senior vice-president of revenue management is young and dynamic. Sami Alan started his career in airline RM with America West in 2001, having completed an MBA in Irvine, California. After three years he was head-hunted by THY to take a job running its revenue department for the executive vice president of commerce at THY in Istanbul. "I run a department that is responsible for the complete spectrum of revenue issues," says Alan. "This ranges from initial strategic pricing management, which typically has a time horizon of more than a year, to yield management, which is from 365 days before the flight until the time of departure of the flight. We have two managers responsible for analysing and segmenting the market to understand our strategic pricing position, and two managers for tactical yield management. We also have a separate team for the domestic market and long-haul routes.

"On the international side, we have 20 people actively managing yields,"



continues Alan. "Five of them deal with larger group bookings. In fact, I feel that we should have a staff of 25 to 30 for an operation of our size. We are looking to strike a balance between not diluting prices too much with lower fare classes, and not lowering our load factors by being too aggressive on pricing. We have 23 separate booking classes, each essentially being a different product segment. Each of these fare 'products' needs some careful management in terms of how many seats on each flight are sold at each price. We also pay particular attention to what our competitors are doing. Their pricing decisions can change the market significantly."

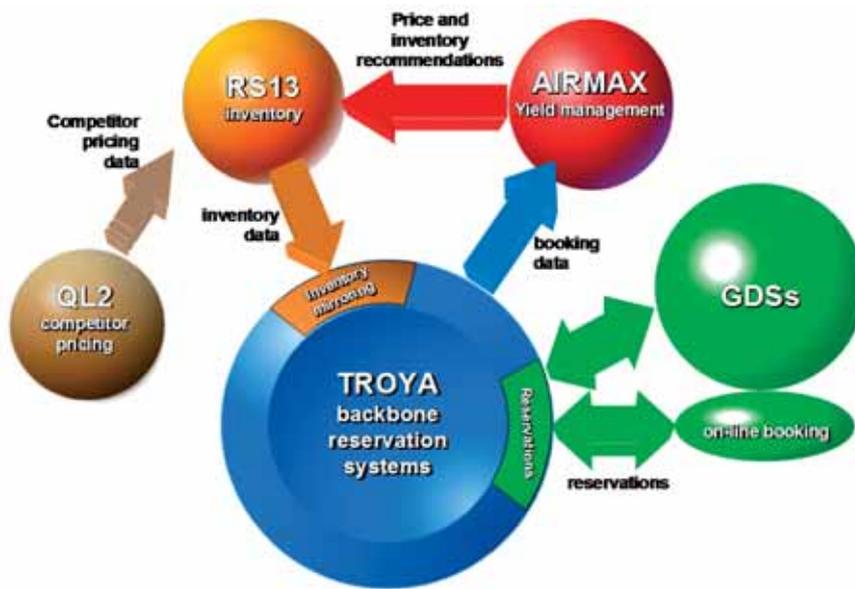
Integrated systems

It is important for airlines to have an effective team to set prices, and to have sufficient numbers of staff. With the enormous amounts of data to be manipulated and analysed, and the complexity of the relationships between influences which need to be considered, computer systems are inevitable. In fact, the basic algorithm underpinning traditional yield management systems has been around for a while. The technique, named Expected Marginal Seat Revenue (EMSR) analysis by Peter Belobaba in the US at MIT in the late 1980s, has been the foundation of all the main yield management software tools.

"The yield management tools need to be used in the context of an integrated systems framework," continues Alan. "The tools feed off actual live reservations data in the backbone system of the airline. They also need to pass recommendations on re-setting price and seat inventory levels for each flight in the

database. THY is a good example of this, as shown (see chart, page 42). Our main reservations system is a UNIX-based home-grown system called TROYA. We have added an internet-booking engine to cater for direct e-commerce on our website. Our inventory is held in a separate system called RS13, which is a heavily customised version of an early British Airways package. The inventory in RS13 is mirrored in the TROYA reservations tool, which is then subsequently made available through the Global Distribution Systems (GDSs). The key tool for us in yield management is the AirMax tool from Sabre Airline Solutions. This takes a daily feed from TROYA of actual bookings and then processes the data through the yield management algorithm in AirMax. AirMax then recommends changes to the inventory settings in RS13, which is finally reflected back in TROYA.

"We have customised the standard off-the-shelf AirMax tool. One reason for taking an off-the-shelf tool, rather than making our own, is that we can continue to upgrade the software as Sabre continues to develop it," continues Alan. "We are moving to the latest AirMax 6 version in the middle of next year. In my view there are only a couple of systems available in the market capable of doing a proper job for an airline like THY, and AirMax is one of them. PROS is another. While we use the traditional EMSR algorithm on most of our long-haul routes, Sabre has introduced a new LCC model that works on a price-elastic demand principle. While we plan to use this new algorithm on mainly domestic routes sometime next year, we may find ourselves introducing this new algorithm on long-haul routes."



payback without critical data. It is virtually impossible to gather this critical data manually. Systems are needed to reach out and grab the relevant data, deliver it back and organise it in a timely manner, to feed the large corporate systems like yield management.

Early attempts at software tools for 'web harvesting' and unstructured data mining emerged, and started to get the attention of information professionals. These products did a reasonable job of finding and extracting web information for intelligence gathering purposes. But this was not enough. Organisations like THY needed to reach the 'deep web' and other electronic information sources, which are capabilities beyond simplistic web content browsing and data extraction from the website. A new generation of information extraction tools is significantly improving productivity for information analysts and application developers. Other companies offering this 'web harvesting' and competitor pricing tracking include Rubicon from the UK, and are used widely in the airline industry.

Yield & other targets

"THY operates with six 'banks' of flights into Istanbul daily, so connecting traffic is important for us," explains Alan. Istanbul is ideally located to connect people coming from Asia through to western Europe and the Americas. Since these long-haul routes are so important to THY, the yield management team spends every day looking carefully at a number of management reports.

"Like a pilot, we have some targets and levels we want to control against," says Alan. "We look at each route and pay attention to how future bookings are progressing, particularly compared to the same point the previous year. We also take a look at competitors on a route. We gather this competitor data from various sources such as the marketing information data tapes (MIDT), which hold the reservation system bookings for other airlines. We also get capacity data for our competitors on each route. We are very interested in market shares on long-haul markets, not just yields. Taking as an example London Heathrow-Istanbul, we see from capacity data that THY provides 54% of the ASKs, BA 45% and other carriers the remaining 1%. If we look at seats sold, BA is at around 38%, and THY at around 62%. This indicates that we enjoy a disproportionate market share on the route, and we are actively investigating drill-down reports from different perspectives managing the share of the London market that we are capturing. Often decisions will be made on trade-offs between short-term profitability (yields, loads and unit revenue) and long-term profitability (market share, preparing for growth and pocket shares of critical sales channels),

because 8-10% of this traffic will connect on to further revenue flights with THY."

Watching the competition

Taking capacity and reservations data as a starting point for yield management strategy is one element. However, systems are now available in the market to become even cleverer in terms of keeping track of competitors' behaviour. "At THY, we use a commercial product from a US company called QL2," says Alan at THY. "This fits into our overall yield management strategy, by dumping large volumes of competitor data into our systems and allowing us to analyse our pricing compared to theirs on key routes. We harvest the data off the web on a regular basis and feed this into a Monte Carlo simulation. This type of modelling technique can help assess and predict changes in demand based upon competitors' behaviour. This is very important for us because market share is one of our key objectives on major routes."

QL2 has been around since 2000 and serves a number of business markets. The software is focused on web mining and unstructured data extraction. The web has created an explosion of freely available information, and even the most basic computer has gigabytes of storage space on which important information is stored and can be hard to find. Yet despite all this available data, there is a problem. How do airlines extract the information they want, in the format they want, quickly, easily and without great expense? Solving this problem is critical to staying competitive.

Companies like QL2 recognise that in today's internet world, expensive corporate applications cannot achieve a

Impact of poor distribution

Internal airline decisions on pricing and capacity will affect yield on long-haul routes, but how seats are distributed and sold can also have far-reaching consequences. "Revenue management is about selling the right seat, to the right person, at the right time and at the right price," says Stéphane Pingaud, head of distribution marketing of the Airline Business Group at Amadeus. "There are three main activities that an airline will use to achieve this. The first is traffic or demand forecasting. The second is to manage capacity at a given price. The third is to manage the booking process, for example, by trying to minimise the number of 'no-shows' or people who do not check in. What airlines need to do is sell their product profitably through good use of booking classes, controlling distribution channels effectively, targeting specific customer segments, and off-setting no-shows through managed overbooking. In the first instance, network carriers need to manage complete origin and destination (O&D) itineraries, typically over multiple legs. They need to be able to show a different price as the legs of the itinerary change. For example, a network carrier may 'give' away a connecting flight from Madrid to London to get the passenger onto a connecting London-Bangkok flight with the same airline or code-share partner. The Madrid to London flight booked separately as a single leg, however, may be shown as expensive. This system can lead to abuse if the people booking the flights understand the details behind the

The Amadeus availability Management software tool can be configured to provide a customised display of availability for each travel agent.

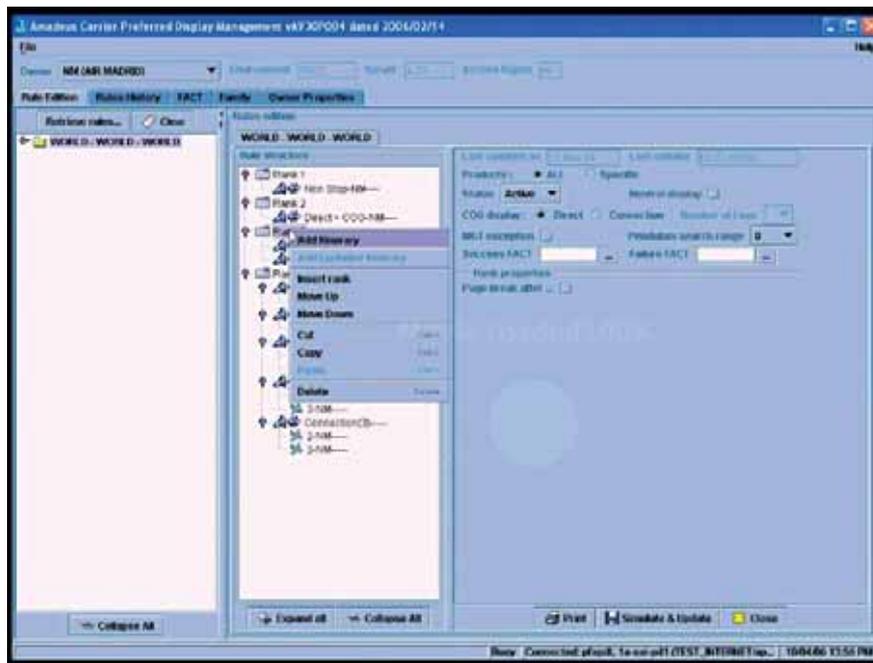
systems. They could break the rules and book 'cheap' connecting flights, and later cancel the expensive long-haul leg.

"A study by MIT in June 2003, called 'Inventory Control Impact of CRS/GDS', showed that if travel agents booking flights broke these O&D rules on one in ten occasions, airline revenues could fall by 30%," continues Pingaud. "Also, the airline wants to control the way that availability is shown to different customers. If the passenger is booking online, the system may detect the country from which the booking is coming, and offer a different price, for example. Or, if the passenger is recognised as a 'gold' member, the airline may want to display more availability. This flexibility will become a more important weapon in the airlines' fight against yield erosion as customer relationship management (CRM) and frequent flyer programme (FFP) systems become more advanced."

Real life experience

"From our past experience, the revenue dilution of not having proper GDS controls in place could be as much as 4%, depending on the route," says Fernando Lara, director of distribution at TACA, a Latin American carrier that operates an integrated network of routes covering the entire American continent. It is a consolidation of four airlines: the flag carriers of Guatemala, Costa Rica and Nicaragua, and TACA Peru. In 2005, TACA transported more than 3 million passengers, 47% of which connected to other flights across TACA's network. TACA's travel agency distribution represented 62% of its overall 2005 channel distribution. TACA's inventory is currently hosted by Lufthansa Systems and it is fully integrated to ProfitLine/Yield O&D-based RM system.

Given the large network that TACA operates, managing its distribution in the most effective and profitable manner is a challenge. TACA uses an RM system with full O&D control and point-of-sale (POS) to manage distribution of its flights across the entire network. Its prime objective for distribution is to ensure that its RM decisions are accurately reflected in all its sales and distribution channels. TACA



needs seamless connectivity with its GDS for this, which it achieves with a product called Dynamic Availability from Amadeus.

TACA obtains all the necessary information for its O&D decision-making from its yield management system results. Then, using Amadeus Dynamic Availability, it is able to return a customised response through the GDS displays. TACA uses Amadeus Dynamic Availability in a selective manner, having its inventory polled for availability only under predetermined circumstances, typically for critical flights reaching a certain load factor threshold, which is 60-70% on average.

Inventory polling is the process whereby a GDS will make a request to an airline's reservation system about the availability of seats on a flight. The airline reservation system sends a response to the GDS, with additional information concerning price.

TACA sets these polling parameters based on market restriction (MR) indicators, whereby the GDS system takes the information from TACA's inventory and automatically triggers polling from it. "We always try to increase our chances of selling our seats at the best price, and our current RM system together with our inventory makes it possible through several O&D optimisation processes," explains Lara. "Using Amadeus Dynamic Availability and Amadeus Availability Management, which work together in conjunction with our inventory, we support inventory polling for our last seat availability. Polling management allows us to control the price shown, and the number of seats available, for multiple leg itineraries. Our yield management system will try and maximise the price we achieve for each

seat. If we have, for instance, reached a critical load factor on our San Jose-San Salvador flight, and subsequently receive three different availability requests (for example: Caracas-San Jose-San Salvador, Lima-San Jose-San Salvador and Panama-San Jose-San Salvador) from three different agents, we will customise our displays for all three requests so as to provide a preferential availability to the one that our systems consider represents the highest revenue for us."

TACA further optimises its polling traffic via Amadeus Availability Management, beyond the poll controls for critical flights. "Amadeus Availability Management helps us manage our polling traffic more effectively and with the least impact on our internal systems. We receive polling reports from Amadeus that we analyse on a regular basis, and cross-reference the polling data with our ticket and revenue reports. We then adjust our polling traffic, using different rules and controls directly in Amadeus. We would, for instance, set up rules, inhibiting polling of our inventory by those Amadeus points-of-sale that are not commercially viable, such as those with a too high look-and-book ratio."

Applying O&D-based decisions in its distribution, it is critical for TACA to ensure that its O&D revenue gains are not exposed to O&D abuse. To address the issue, TACA has implemented Amadeus Married Segment Control to work in conjunction with its inventory. This means that all TACA's on-line flight connections booked in the GDS system are by default married, and any subsequent changes or cancellations are handled by TACA interactively in line with its policies. Typically, following a partial cancellation by an agent, if the remaining flight segment is still open for



THY uses a balance of brain and computing power in the battle against eroding yields on long-haul routes. THY uses the Sabre AirMax yield management tool in combination with competitive pricing analysis from QLz.

sale, the cancellation is allowed. If this flight segment is closed, the cancellation is inhibited and the agency has to cancel the whole itinerary for the cancellation to proceed. This prevents people from booking a cheap connecting flight and subsequently cancelling the expensive long-haul leg to retain the low-priced leg.

“Of course O&D abuse such as this is not the only trick in the travel agents’ armoury,” says Pingaud. “In many cases they will try and block book seats with no names, so as to secure cheaper seats that they can then sell on at a profit, adding the real passenger’s name later. Also booking-class abuse is widespread. This is the tactic of booking several seats for the same person, on the same flight, and then offering the passenger various options to choose, cancelling the ones that are not required. We offer tools for all these cases.

“Of course, on the positive side, the GDS can be used to promote and reinforce an airline’s product to the travel agents,” continues Pingaud. “Although the displays for GDS have been very heavily regulated, in terms of the ranking and order of display of flights, airlines can use the Amadeus suite to make a specific display for themselves that the airlines can access, separate from the GDS. To offset no-shows, airlines have employed over-booking for a long time. But now the airlines have a strong tool-set to use to more accurately gauge the correct percentage of over-bookings. The GDS will provide real-time data on booking patterns, and these can be fed back into inventory-setting decisions by the airlines. The final element that can be addressed by Amadeus is revenue

integrity. This deals with the process after a booking is made. We have solutions to ensure the maximum amount of bookings is turned into a flown revenue passenger. For example, duplicate bookings need to be identified and removed for the same flight, to free up availability for additional real bookings.”

The future?

Systems and techniques evolve continuously. The introduction of competitor price ‘harvesting’ techniques is a good example. Where are future innovations likely? “I expect the low-cost carrier yield management model to become more widespread across more of our routes,” says Alan at THY. “EMSR assumes that market segments behave completely differently and that is becoming less true. Price elasticity is becoming the norm for demand behaviour on our routes and our yield management models need to reflect that behaviour more accurately, or we could price ourselves out of business. I also strongly believe we have a distinct advantage at THY. We have chosen to employ people to watch our commercial position every day and make judgements based upon data presented to them by our computer systems. Others who simply let the computers make the decisions can never react quickly or accurately enough to stay ahead of the competition. Another area that will continue to grow in the future is supplementing the erosion in yields with ancillary revenue. We expect in the future that airlines will sell other services to our passengers, and THY will be tapping into

a loyal customer base to sell hotels and car hire in a more targeted manner. This will take time, however. Only 15% of our bookings today are through the web, and only 50% of THY passengers use credit cards. Having said that, we need to keep it simple and avoid complicating things because organisational and system complexity will kill any airline in the long run. In the end, an airline needs two things to succeed. The first is the very best customer service: being on time and safe, and providing good on-board services. Second, you need the best possible brain power, supported by good systems. You need to understand your markets as best as you can and apply your understanding to serving that market.”

Summary

Long-haul yields are under attack from a number of directions, and clever yield management decisions, combined with clever sales distribution techniques can be employed to minimise the impact of this. It seems that technology for competitor pricing analysis and newer algorithms for yield optimisation based on different market assumptions coming from the low-cost world will be the next set of weapons for airlines to use more generally. Ancillary revenue generation is also becoming a more common means of substituting for yield erosion on long-haul routes. It also seems that there is no short-term substitute for human brain-power as a means of airlines remaining competitive. [AC](#)

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