ФЕДЕРАЛЬНОЕ АГЕНТСТВО ВОЗДУШНОГО ТРАНСПОРТА

**ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ
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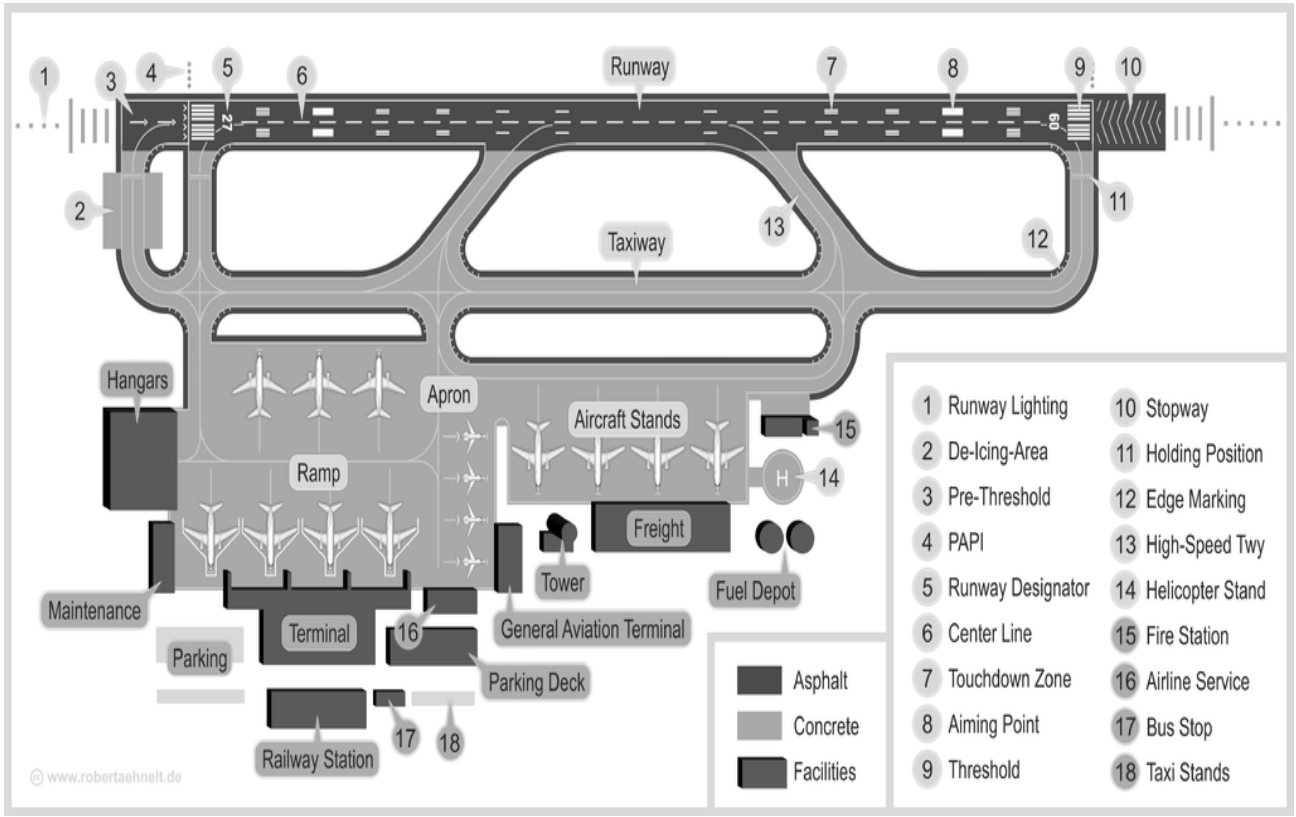
PART 1
AIRPORTS' INFRASRACTURE

An **airport** is a location where **aircraft** and helicopters **take off** and **land**. Aircraft may be **stored** or **maintained** at an airport. An airport consists of at least one surface such as a **runway** for a plane to take off and land and often includes buildings such as **control towers, hangars** and **terminal buildings**.
Larger airports may have **fixed base operator services**, seaplane **docks** and **ramps**, **air traffic control**, passenger **facilities** such as restaurants and **lounges**, and **emergency services**.

Airport structures

Airports are divided into **landside** and **airside** areas. Landside areas include **parking lots**, public transportation train stations and **access roads**. Airside areas include all areas accessible to aircraft, including runways, **taxiways** and ramps. Access from landside areas to airside areas is tightly controlled at most airports. Passengers on commercial flights access airside areas through terminals, where they can purchase tickets, **clear security check**, or **claim luggage** and **board aircraft** through **gates**. The waiting areas which provide passenger access to aircraft are typically called **concourses**.

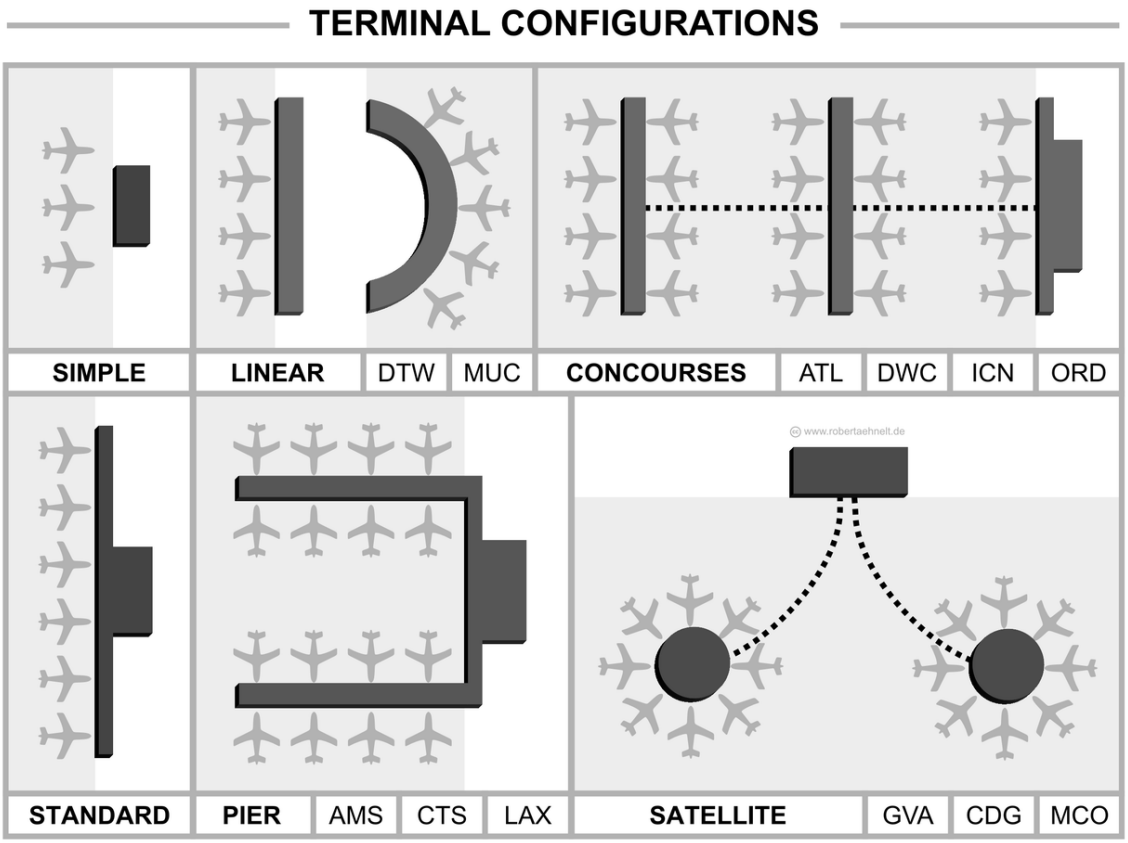
SAMPLE INFRASTRUCTURE OF AN AIRPORT



Ex. 1. Answer the following questions:

1. Which two areas is subdivided an airport?
2. What is de-icing area for?
3. Why does every hub have a fuel depot?
4. Why are emergency services absolutely essential for any airport?
5. How much does commercial potential of an airport depends on access roads?

taxiway |'taksɪweɪ| – рулёжная дорожка (*для свободного маневрирования самолётов*)
ramp |ramp| – 1) аппарель, 2) пандус, 3) перрон аэропорта
concourse ['kɔŋkɔːs] – 1) вестибюль (*напр. вокзала*); общий зал
aiming point – прицельная точка посадки, точка касания колёс
stopway – концевая полоса торможения (на ВПП)
apron – бетонированная площадка (*перед терминалом или ангаром*)
control tower – диспетчерская вышка
all-service runway – ВПП для эксплуатации любых типов воздушных судов



Ex. 2. Hub-and-spoke is the name for a system of air transportation in which local airports offer flights to a central airport where international or long-distance flights

are available.

Which of these terminal configuration is better for a hub? For a small local airport?

READING 1

SITUATION TERMINAL

Can anyone design a nice airport?

Airports are essentially machines for *processing* people, airplanes, automobiles, cargo, and luggage—all of which move in different ways, and which need *to be connected* at certain points and separated by *rigid security* at others. Just getting all the parts to work together seems *overwhelming*—indeed, it did overwhelm British Airways last month at Heathrow, outside London, when Terminal 5, an eight-billion-dollar structure that was supposed to transform Heathrow from a *congested tangle* into a place that would thrill passengers with the joy of air travel, all but shut down on its opening day, when a *computerized baggage system malfunctioned*.

Airports, in short, are a *logistical nightmare*, and this is surely the reason that most of them today are such *depersonalized* wastelands. With all those moving parts to organize, the last thing that *cash-starved* airlines and airport authorities want to think about is aesthetic appeal. Most airports built in the last generation, at least in the United States, have followed a simple, established pattern, along the lines of the huge ones in Atlanta and Denver. Gates, arranged in long, boxy concourses set way out in the field, are *linked to central terminals* by underground trains. Driverless trains enhance the sense that the whole thing is less a piece of architecture than one big machine. Within the concourse, you walk, sometimes as much as a half mile, or ten city blocks, between gates. It is an efficient layout for airport operations, as long as you don't consider passenger pleasure to be a part of airport operations.

Architects trying to reinvent the airport have done so at their *peril*. Paul Andreu designed the first terminal at Charles de Gaulle, north of Paris, as a doughnut-shaped structure with glass tubes crossing through the middle, but when it came time *to expand* the airport, in the nineteen-eighties, only a few years after the first part was finished, his futuristic form seemed more like a cartoon than like a functional building, and more conventional terminals were *ordered* up.

But recently Asian countries, and some European ones, have been *approaching the problem* with a bit more imagination. The best new airports in the world right now are in Beijing, where Norman Foster's Terminal 3 has just opened, and on the outskirts of Madrid, where Terminal 4 at Barajas, designed by Richard Rogers Partnership, has been in operation since 2006. Foster has *achieved* what no other architect has been able to: he has *rethought* the airport from *scratch* and made it work. Foster has done for airports what the architects Reed & Stem did for train stations with their design for Grand Central, a building whose greatest achievement is not its sumptuous main concourse but its orchestration of an *intricate* web of people, trains, taxis, and passing automobiles into a system that

feels *straightforward* and logical, as if the building itself were guiding you from the entrance to your train. Foster, likewise, has *established* a pattern so clear that your natural instinct to walk straight ahead from the front door takes you where you need to go. The sheer legibility of the place would be achievement enough, given its size. Foster's office claims it is the largest building in the world: it has a hundred and twenty-six aircraft stands, and it had to include separate sections, with their own security stations and travel-document-control areas, for *domestic* and *international travel*; a train station for a new *rapid-transit* line to downtown Beijing; an *array* of *luxury* shops; and even a Burger King. Even more remarkable than this organizational feat, however, is the fact that Terminal 3 is also an aesthetically exhilarating place to be.

In layout, the airport is roughly like a pair of triangles whose points face each other and are connected by a long line. Foster has *likened its shape to* that of a dragon. Besides, one of the main strengths of the building is that you're not really *aware* of its layout, even as it subtly directs you.

Foster placed the *gates* for *domestic travel* along two sides of the front triangle, which means that some of the planes, instead of being on a faraway concourse, nestle right up to the building. That's one part of his *reinvention*.

The Beijing terminal cost $3.65 billion to build, which in China bought a structure bigger than all five terminals at Heathrow put together, for less than half the cost of the new Terminal 5. The project was *conceived*, *designed*, *constructed*, and opened in four years, whereas the Heathrow terminal, from conception to *completion*, took twenty years. (That building, by Richard Rogers, is a somewhat compromised version of his original design—far better than the rest of Heathrow, but much less interesting than Rogers meant it to be.)

(by Paul Golberg. "The Economist", April, 2008)

Ex. 3. Answer the following questions:

1. What is the main function of an airport?
2. What do airports process?
3. What happened in Heathrow on its open day? What was the cause for that?
4. Why are airports called a logistical nightmare?
5. What pattern do the airports built in the last generation follow? Explain this.
6. What was the problem with Charles de Gaulle airport expansion?
7. How are Asian countries approaching the problem of airport constriction?
8. What are the vest new airports?
9. What was so special and innovative for Reed & Stem design for Grand Central?
10. How many aircraft stands does Beijing Terminal 3 by Norman Forster have?

GRAMMAR

Forming comparative adjectives and adverbs

one-syllable adjectives and adverbs	add *-er*	*cheap ~ cheaper* *fast ~ faster*
adjectives and adverbs of two or more syllables	*more ...*	*expensive ~ more expensive* *often ~ more often*
two-syllable adjectives ending in -y	drop -y and add *-ier*	*happy ~ happier*
adverbs ending in *-Iy*	*more ...*	*easily ~ more easily* –

Some adjectives and adverbs have irregular comparative forms.
good/well ~ better bad/badly ~ worse
far/far ~ further farther is possible but less frequent

Some two-syllable adjectives have two comparative forms (e.g. *friendlier* / *more friendly).* **One form is usually more frequent. The more frequent forms are**: *cleverer, easier, quieter, simpler; more likely, more costly, more friendly.*

Using comparative adjectives and adverbs
Comparative adjectives and adverbs compare two people or things. Use *than* before the second one if you mention it.
Smaller companies can often change more quickly (than large corporations).

When you compare two different people or things with the same quality, or doing the same activity, you can use an object pronoun or a verb phrase after *than.*
*Do they supply orders more quickly **than us? / than we do?***
With possessives, a pronoun is normally used, not a verb phrase.
*Last year their prices were higher **than ours**.*

AS… AS

You can use as .. as with an adjective or adverb to say things are equal.
We try to keep our fees as low as our competitors.

***Not as (as)* and *less ... (than)* are the opposite of *more ... than*.**
***Not as ... as* is much more frequent than *less* in spoken English. *Less* is not common before *-Iy* adverbs or one-syllable adjectives.**
This year's sales aren't as good as last year's. Clients are ordering less often.

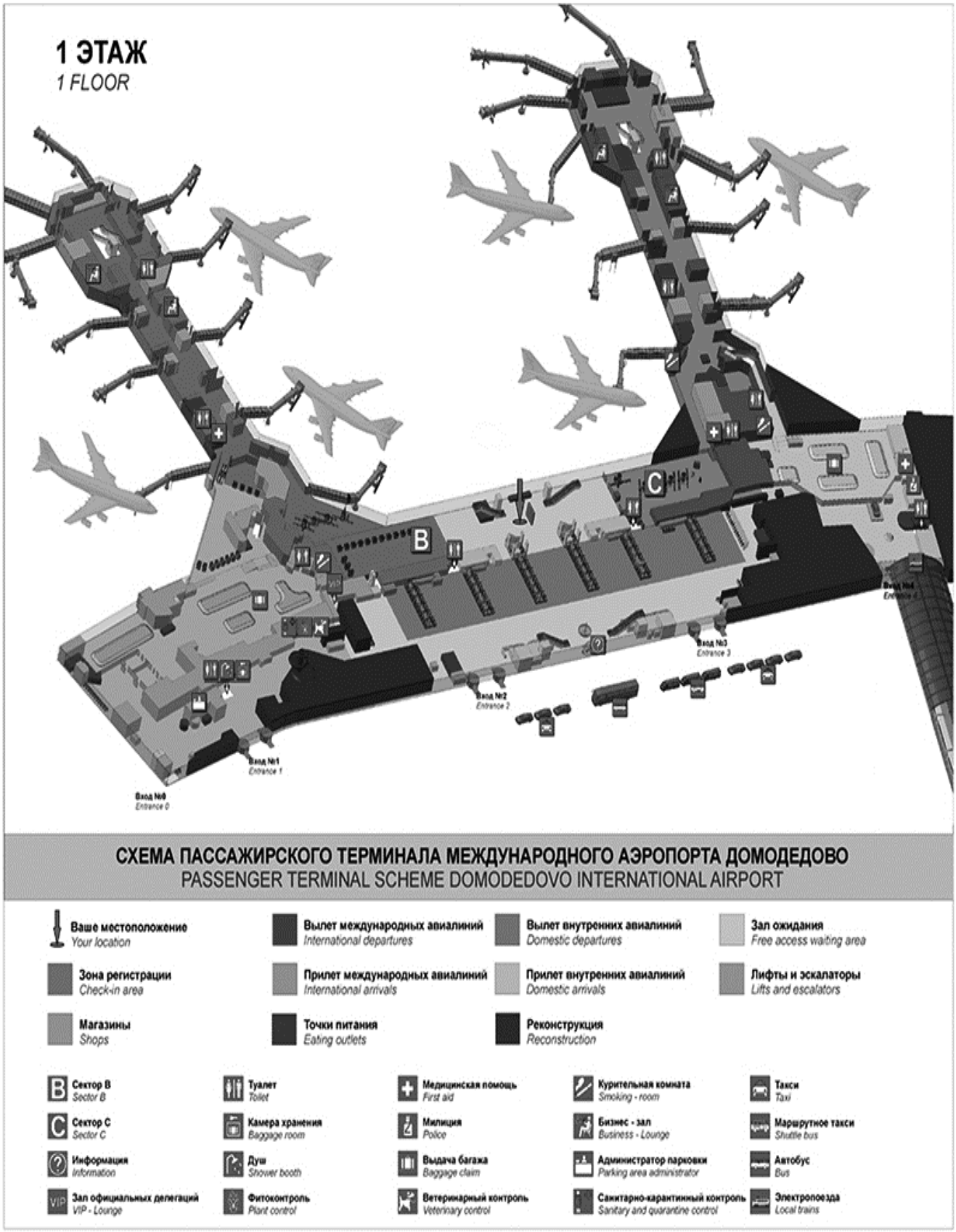
You can compare measures with *twice* / *three times* as ... *as,* and *three/four times more/-er*
My *new laptop was twice as expensive as my old one, but it's four times faster.*
You can compare percentages with *more/-er.*
Growth this year is 12% *higher than last year.*

Ex. 4. Complete this magazine article about changes in business travel using the comparative form of the adjectives and adverbs in brackets.

Business travel is growing **1** ***faster*** *(fast)* than ever, as we travel **2** _____ *(far)* to do business. But in many ways air travel is becoming increasingly difficult for the executive traveller. Long security checks mean we have to get to the airport **3** _____ *(early)* than before. As a result, airports are **4** _____ *(busy)*, with 5 _____ *(long)* queues and **6** _____ *(frequent)* delays. With the arrival of budget air travel, the departure lounges are **7** _____ *(crowded)*. Things will only get **8** _____ *(bad)*, as now they are introducing **9** _____ *(large)* aircraft with over 800 passengers. Travel will be **10** _____ *(stressful)*. Airlines should take business travellers **11** _____ *(seriously)* and work **12** _____ *(hard)* to keep us happy.

Ex. 4. This is a photo of Charles de Gaulle airport, Paris. Describe the function of buildings and areas.

Ex. 5. Compare Charles de Gaulle airport with Domodedovo airport:



PART 2
AIROPORT'S PROFITABILITY

FLIGHT PATHS FOR A CLOUDY FUTURE

Feel the economic benefit

WHEN an Avro Lancastrian—a *modified* bomber with no gun turrets and a *small amount of room for passengers*—became the first *scheduled flight* to *take off* from Heathrow in 1946, the airport's *passenger terminal* was just a row of tents. But it had plenty of room to grow. Within a year, it saw 63,000 passengers. Within five years that had grown to 796,000.

Now, with five terminal buildings (one closed at present) and 193 *destinations*, Heathrow welcomes 70m passengers a year. It is the world's third-busiest airport; only Atlanta and Beijing see more people come and go. And room to grow is hard to find. Limits on how, and at what time of day, its two runways can be used mean they can take no more flights. The London suburbs press up against the perimeter.

The company that owns Heathrow has long wanted to build a third runway to the north of the existing two. The most ambitious form of such a plan, the company says, would *increase* the number of flights the *airport could handle* by 46%. But the idea *is fiercely opposed* by many who live near the airport. Under European Union (EU) law, big airports have *to draw up action* plans to manage, and seek ways to curb, the *impact* of aircraft noise, particularly for those people *suffering* *average noise levels* above 55 decibels (dB)—with an extra weighting for the din of night-time flights. In 2006 a government survey found there were about 725,000 such sufferers in west London. A 2003 study by ANOTEC Consulting found that Heathrow *imposed* excessive noise on far more people than any other European airport.

Predict and provide

The case for expansion, whether at Heathrow or elsewhere, is based on the belief that more and more people are going to want to fly in and out of London, and that *thwarting* that desire will hurt the British economy. *According to figures* released by Britain's Department for Transport (DfT) in January, *potential demand for flights* out of Britain in 2030 will be 320m passengers a year, and in 2050 480m passengers a year. Without new capacity, the department now *reckons*, London's five airports—as well as Heathrow, Gatwick and Stansted there is Luton airport to the north and City airport nestled in London's Docklands—may be losing almost 13m potential passengers a year by 2030. Some of these will fly from other British airports, but across Britain as a whole, the *forecasts predict* that rising congestion and costs will deter 5m flights a year. By 2050 it sees London's airports losing

92m potential flights, with 35m not picked up by airports elsewhere. That is a lot of inbound tourism and business travel for an economy to lose.

These predictions are not *set in stone*. Before the financial crisis, the department expected a lot more *growth*. But there are grounds for thinking that the *estimates may now be on the low side*. The department's projections see demand for flights growing at only 1-3% a year between now and 2050—meaning that the British average of one foreign flight per person per year would rise to only 1.24 by 2030. That *compares with* 5% average annual growth over the past 40 years. Time and again airline traffic has *bounced back* from what looked like lasting declines, such as in the mid-1970s oil crisis and the early 1990s *recession*. This recession may be no different.

On top of the *overall figures* there come the concerns about Britain needing a major international *hub airport*—one at which a lot of incoming passengers transfer to planes bound for airports that *are not served directly* from their original *point of departure*. Airlines like hubs because they make their operations considerably more efficient. Airports like being hubs because hubs have more flights. Local users like hubs because they *serve more destinations;* pooling passengers from many different points of departure makes it possible for airlines *to offer flights* to places that would otherwise be uneconomic.

Today Europe's largest hubs are Heathrow, Frankfurt, Paris's Charles de Gaulle and Amsterdam's Schiphol (see chart 2). The continental hubs all have *significantly* more capacity than Heathrow; where Heathrow has two runways working flat-out, Frankfurt and Charles de Gaulle have four and Schiphol has six. This makes it easier for them to clear backlogs (a bit of snow can cause chaos at Heathrow as *problems pile up*), and it lets them schedule their incoming and outgoing planes in waves to make *flight connections* easier. Frankfurt, Charles de Gaulle and Schiphol already offer more direct flights to many of the big *emerging markets* than Heathrow does.

To Heathrow's owners, the need to maintain their airport's appeal as a hub in the face of this continental *competition* provides a strong reason for London and Britain to welcome their plans for expansion. Others, such as Mr Johnson, see the hub argument instead as a reason to start afresh—only a new four-runway airport designed with such capacity in mind will *lure* airlines from Frankfurt and Schiphol.

(From "The Economist", March 2013)

Ex. 1. Match the words in the left with the proper definitions in the right

option	to predict or estimate (a future event or trend)
to modify	the desire of consumers, clients, employers, etc. for a particular commodity, service, or other item
destination	the maximum amount that something can contain
to handle	a marked effect or influence
to forecast	a thing that may be chosen
impact	to manage or control
demand	the place to which someone or something is going
capacity	to make partial or minor changes

Ex. 2. Answer the following questions:

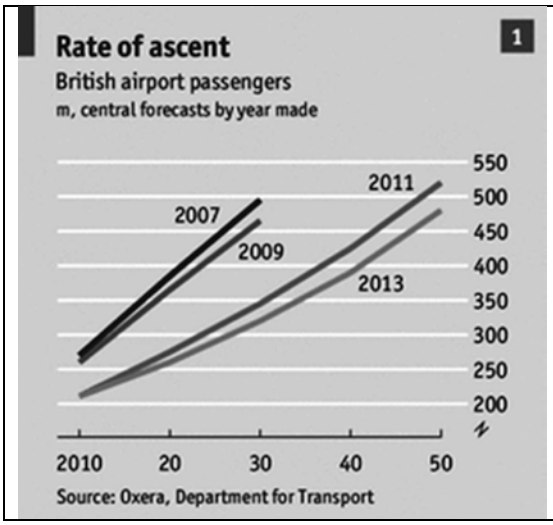
1. What was the first aircraft to become the first scheduled flight to take off from Heathrow?
2. How did it look Heathrow passenger terminal in 1946?
3. How many destinations does Heathrow offer?
4. Does Heathrow have enough runways to take more flights?
5. Why do local people oppose the idea of Heathrow expansion?
6. What's the case for such expansion?
7. How many potential flights could London's airports lose in 2050?
8. How much demand for flights could grow between now and 2050?
9. Why do airlines like hubs?
10. What's a hub?
11. Why is a hub more efficient than an airport?
12. What are Europe's largest hubs?
13. Why do these continental hubs have significantly more capacity than Heathrow?
14. How many runways doe each of the hubs have?
15. What are the problems to pile up at Heathrow?
16. What makes flight connections easier?
17. What do Frankfurt, Charles de Gaulle and Schiphol offer more than Heathrow?

Ex. 3. Complete the gaps with the following words: *amount, destination, impact, modified, impose, demand, competitor, average , luring, forecast, drew up, scheduled, capacity, handle, fierce, reckon, offered,* schedule

1) Airbus A350 is a direct competitor to Boeing's 787 Dreamliner range launched in 2009. 2) The capacity of the Boeing's 717 jetliner is 106 seats. 3) The Airbus A300-600ST (Super Transporter) or Beluga, is a version of the standard A300-600 wide-body airliner modified to carry aircraft parts and oversized cargo. 4) They

have spent a colossal amount rebuilding the airport. 5) The flying tests are scheduled for April. 6) Paris is an ideal destination for a relaxing weekend. 7) He was going too fast and couldn't handle the car. 8) There was fierce local opposition to the plans. 9) They drew up a new schedule. 10) These regional measures have had a significant impact on unemployment. 11) The average temperature in May was 4°C below normal. 12) The Government is going to impose a few new taxes. 13) I reckon I can manage that. 14) The demand for such specialists is growing. 15) The product is offered at a very competitive price. 16) They forecast a significant increase in sales. 17) Cheese is very good for luring a mouse into a trap.

Ex. 2. Describe the difference between the four forecasts for airport passangers in Britain.



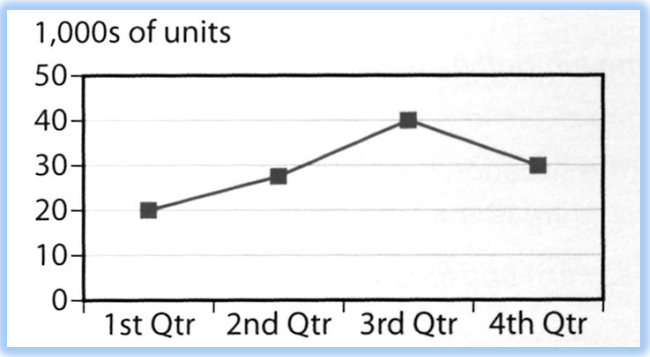
Meaning	ADJ/ADV
small change	steady(ily) slight(ly) gradual(ly)
large change	considerable (ly) sharp(ly) dramatic(ally) significant(ly) substantial(ly)

GRAMMAR: Describing change

You can use prepositions to describe change in terms of numbers. For example, you can use prepositions with words like *rise, fall, increase, decrease* to say if numbers (e.g. sales, profits) went up or down.
With noun phrases, use *in* to say what has changed and *of* to say how much it has changed.
*There has been **a rise in** sales **of** 5%. (not ~~by 5%~~)*
In verb phrases, use *by* to say how much something has changed.
*Last night on Wall Street the Dow Jones **fell by** 48 points.*
You can use *from* and *to* to give the starting and final numbers in a series or period.
*Pre-tax profits climbed **from** £8.6m **to** £20.2m in the year to 7 April.*

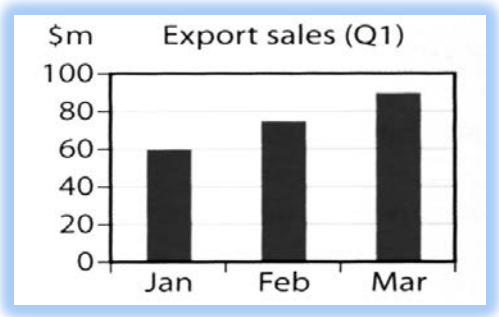
Ex. 4. Fill the gaps

1 Revenues climbed ... ***from*** .... $175 million ***to*** ..... $273 million in the final quarter of the year. 2 The company said its poor results reflected a sharp rise ____natural gas and oil prices. 3 Last year GDP grew _____ about 7%, which is not high by China's standards. 4 The USA trade deficit with Japan fell _____ more than $6 billion for September, a decrease _____ 0.3%. 5 International business was heavily affected by the decrease _____ sales of software products, down 18% _____ the same quarter last year.



Ex. 2. Complete the descriptions of these two graphs with suitable prepositions.

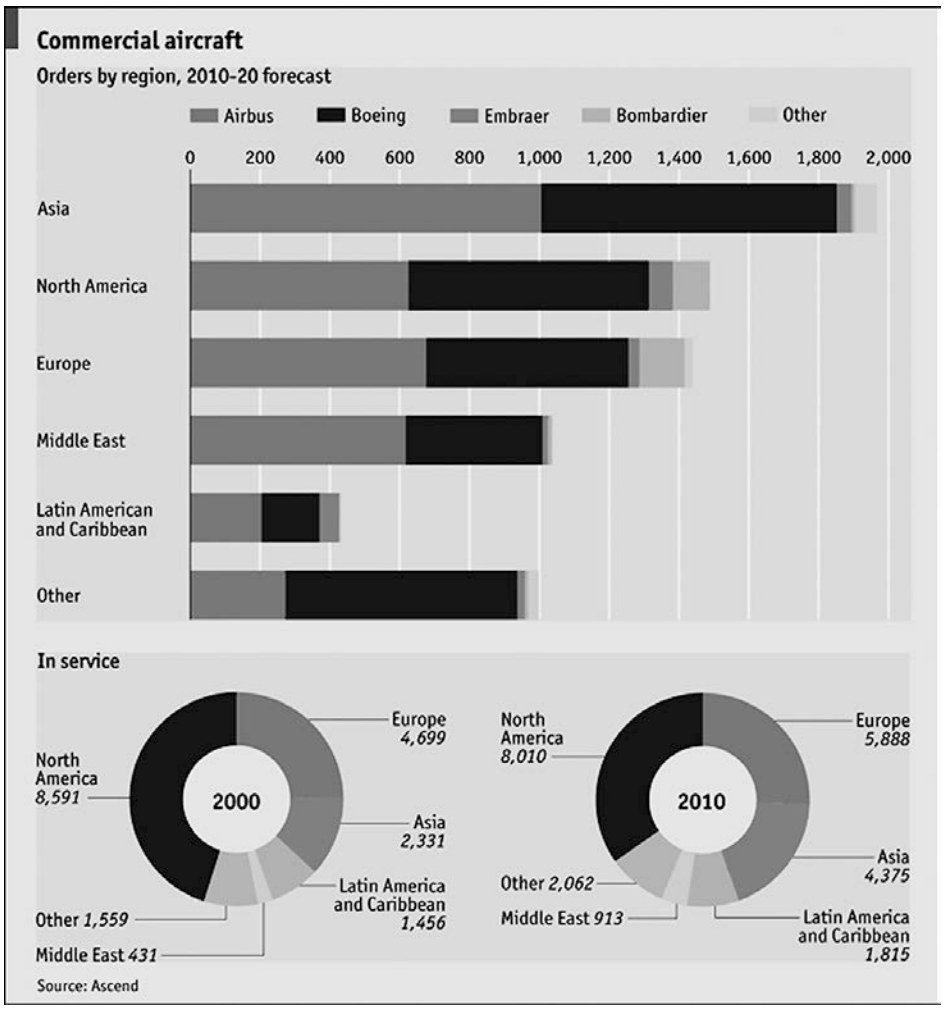
There was a steady rise 1 ***in*** productivity, 2 _____ 20,000 units 3 _____ the first quarter 4 _____ a peak 5 _____ 40,000 6 _____ the third quarter. Productivity then fell 710,000 units 8 _____ the fourth quarter.



Export sales rose 9 _____ $15m in February, 10 _____ $60m 11 _____ the start of the year. This was due to a favourable exchange rate. In March we benefited from further decreases 12 _____ the exchange rate, which resulted in a further rise 13 _____ sales 14 _____ $10m. Since the beginning of the year, sales have risen 15 _____ $25m, a year-on-year increase 16 _____10%.

Ex. 5. Descripe the changes in the aircraft park of commercial airlines in the regions, according to the diagram on the next page:

BY THE third day of the Farnborough Airshow on Wednesday July 21st, aircraft-makers had announced new orders worth around $25 billion. A whopping $9 billion order for 40 Boeing 777s from Emirates highlighted the ambitious expansion plans of the Gulf's airlines. Analysis by Ascend, an aerospace consultancy, shows that the Middle Eastern airlines' fleets have more than doubled in the past ten years. They have placed orders for over 1,000 new aircraft for delivery by 2020—or 14% of the industry's entire order book. Even so, the Asian airlines, especially China's, will be the planemakers' biggest customers in the coming decade. By 2020, the North American and European airlines will no longer dominate the skies to the extent they do now.



Ex. Explain the changes in traffic through these airports:

Ex. 4. Translate into English:

1. Ту-214 (Ту-204-200) – среднемагистральный самолет, модифицированная версия Ту-204-100 с увеличенным подъемным весом и дальностью полета. 2. Первые регулярные пассажирские рейсы из Хитроу начались в 1946 г. 3. Большинство авиалайнеров 1950 гг. были разработаны на базе бомбардировщиков и в их салонах было мало мест для пассажиров. 4. Амстердамский аэропорт Схипхол обслуживает более 150 направлений. 5. Стыковка транзитных рейсов гораздо легче в крупных аэропортах. 5. Владельцы Хитроу хотят значительно повысить количество рейсов, которые может обслуживать аэропот. 6. Планы расширения Хитроу встретили ожесточенное сопротивление местных жителей. 7. Мотивацией для расширения аэропорта служит предположение, что все больше и больше людей будут путешествовать по воздуху. 8. Прогнозы предсказывают существенное увеличение пассажиропотока. 9. Пропускная способность крупнейших европейских аэропортов выше, чем у Хитроу. 10. Пропускная способность этого аэропорта ограничена двумя ВПП. 11. Потенциальный спрос на авиаперевозки будет возрастать.

mid-range – средней дальности, среднемагистральный; **take-off weight** – подъемный вес; **flight range** – дальность полета: **to design** – разрабатывать **traffic capacity** – пропускная способность

Comparative structures

In contrast (to *B*), In comparison (with *B*),	*A* is	larger smaller	**by a narrow margin. by *x*.**
A is **just/well**	**under/ over**	*x*	(larger smaller) **than** *B*.
A is **approximately**			
A is	**(over)**	**twice two/three/four times**	**as** large/great/high **as** *B*.
	(under)		
A uses/produces	**more/ less**	+ (noun U)	**than** *B*.
	more/ fewer	+ (noun C)	
A	**is**	**considerably marginally**	greater/higher/ smaller **than** *B*.
A is	**almost**	**as** (large/high) **as that in**	*B*.

Superlative structures

A	is	**the** (second/third) largest/smallest	+ (noun C).
	has	**the** greatest/widest/ most significant	+ (noun U & C).
A	uses produces consumes	**the** largest/highest/ smallest/lowest	**proportion of** + (noun U). **number of** + (noun C). **amount of** + (noun U) **quantity of** + (noun U & C).

PART 3 . PRICES AND FARES

READING 1.

STUDY SHOWS MASSIVE MARKUPS ON IN-FLIGHT FOOD

According to a new study by the travel comparison site, TravelSupermarket, passengers are being **ripped off** –in a very big way - when it comes to buying in-flight snacks.

Selling food aboard flights has become a real moneymaker for the airlines.

According to the study, markups on the prices of food items **ranged** from an **average** 241 percent for baked goods to a whopping 2,601 percent for hot drinks.

"Airlines realize they have a captive **audience** of potentially hungry mouths to feed once they close the aircraft's doors," said Bob Atkinson, travel expert at TravelSupermarket, which carried out the research.

Here are some examples of items with large **markups**:

--A cup of tea on Ryanair: $4.00. Made at home with tea bag: $.30

--Budweiser on Thomas Cook: $ 6.14. In-store: $1.33

-- Kit Kat on Aer Lingus: $2. In store: $.64

--A bottle of water on Jet2.com: $2.76. In store: $.06

(Published July, 2013. FoxNews.com)

Ex. 1. Answer the questions:

1. Why does author say that passengers are ripped off as they are to buy in-flight snaks?
2. How much could an average markup range?
3. Why does author call the passengers "captive audience"?

READING 2.

Markup is when a company **produces** or **purchases** a good at one price and then sells the good for a higher price. By having markup on goods, a company is able to **earn profits**. If the company sold goods for what they cost, then the company **revenues** would **match expenses**, thereby not earning any profit. As an example, a company pays $5 for widgets. The company wants a 10 percent profit on the goods.

Step 1

Determine the markup the company wants and the **cost** of the good. In the example, the cost is $5 and the **markup rate** is 10 percent.

Step 2

Subtract 1 from the markup rate. In the example, 1 minus 10 percent equals 90 percent or 0.9.

Step 3

Divide the cost of the product by the number calculated in Step 2. In the example, $5 divided by 0.9 equals $5.56. So if the company uses a 10 percent markup, it will sell the product for $5.56.

Ex. 2. Answer the questions:

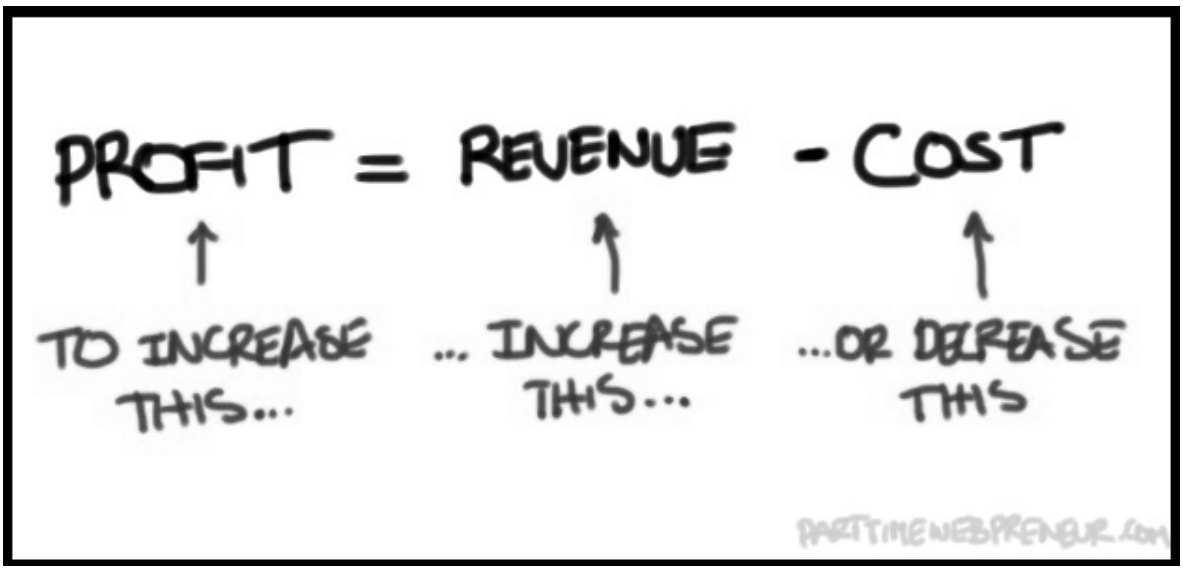
1. What is a markup?
2. What happens if revenues match expenses?
3. What is necessary for a company to earn any profit?

READING 3.

Revenue is the money the company receives for selling their product or service. It is calculated by taking the selling price and multiplying it by the number of units sold.

Profit is the amount of money left over after costs have been covered. Profits or net income generally imply total revenue minus total expenses in a given period. Profit can be used as a measure of the businesses success, attracting investors and reinvesting back into the business. The quality of profit can also be measured. Low quality profit is gaining money from an event which is unlikely to occur again in the future but high quality profit is from normal trading activities which should continue to occur in the future. It is important when told a company's profit, that it is clear what type of profit it is (gross, operating, pre-tax or after tax).

Ex. 3. Looking at the picture describe two ways to increase profit:



Ex. 3. Put the words *cost, price, profit, revenue* into the gaps:

1) Unless you provide very high priced, custom-to-each-client services, the worst way to price your products or service is cost-plus pricing. How cost-plus pricing works: You calculate your full _____, including overhead, and set a _____ where all of those ___ are covered and so is an acceptable (to you) amount of profit per sale. 2) You plan to sell t-shirts, so you add in your direct _____ (materials &

ink for the logos) of let's say $15, add in a piece of your overhead (salaries, rent, etc.) let's say $12, plus your desired _____ of $4 per shirt to arrive at a price of $31. 3) So, you may ask, if cost-plus pricing covers all my ____ and gives me a fixed amount of ____ per sale – what's not to like? There are some problems with it. 4) The _____ you establish may be so high that you will lose money through lost sales. 5) Consumers buy at a _____ that seems "right" to them.
6) Gross ____ is a measure of the firms sales revenues minus the costs of goods sold. 7) This is because the ultimate goal of a business is to create _____ for its owners. If, for example, a business increases its revenues without incurring additional _____, then the profits will increase with the _____ increase. 8) If, however, a firm gains additional revenue, but as a result incurs additional expenses that exceed this _____, then the increased revenues will actually cause a decline in _____. 9) Managers should, therefore, be cautious of focusing solely on increasing _____ as a means of increasing profits.
10) No one can guarantee a _____ on stocks and shares. 11) 15% of all _____ is generated by a single product.

Ex. 4. Match the words in the left with the proper definitions in the right

departue	the money paid for a journey on transport
destination	a timetabled journey made by an airline
connection	a way or course taken in getting from a starting point to a destination
ferry	the place to which someone or something is going
flight	an arrangement or opportunity for catching a connecting aircraft
fare	the action of leaving
itinerary	transport from one place to another
route	a planned route or journey

READING 4

HUBS AND SPOKES

Concentration of staff and aircraft at a *hub* often results in a *carrier* offering more *departures* to more *destinations* than carriers that *base their operations* elsewhere. Critics view this as behavior calculated to *eliminate competition*, and they charge that hub carriers have unreasonably high *operating costs*. Unlike other analyses, however, economist Pablo Spiller's study *differentiates* costs from markup, and the results show that at a given airport, a hub carrier enjoys 15-20 percent *operational savings* per passenger over a non-hub carrier at the same site. As its proponents argue, therefore, deregulation has *fostered* efficiency. "The critics," says Spiller, "are suggesting that the government tinker with the very structure that is allowing these savings to occur."

All's Fare: Modeling Airline Pricing

Part of the debate, says Spiller, represents an *unwillingness* to view airline prices like other *consumer products*. You cannot look at a ticket price and say, that's exorbitant, anymore than you can make the same claim of an automobile sticker price without considering the model, make, *options* offered, and demand for it at a given time. "You have to take into account what that fare represents -- for instance, coveted departure and return times during peak flying periods, whether or not you book at the last moment, whether or not you'll *earn frequent flyer* miles."

With these factors in mind, the airlines *compete* by offering *distinct products*, presented to consumers as *fares*. Each fare represents a different market -- a *route* connecting two cities -- and departure time. Unlike prior analyses of the industry, Spiller's model captures this labyrinthine system and the *buying behavior* it breeds. It *sorts* customers *into two groups*, business and tourist, comparing the *purchasing behavior* of both in choosing myriad products within the same market.

Focusing on data from 1985-93, the model shows travelers choosing from among 230,000 combinations of *itinerary*, fare and carrier in as many as 17,000 markets. Conceptually, says Carnall, the model "takes every product and *compares it against the other* products *in that market*, and tries *to figure out*, given the choices made, what people *value*. And it looks at these thousands of markets *separately in order* to make that *determination*."

The first *modeling effort* crunched data from the fourth quarter of 1985. During those three months, according to Spiller, tourists using a dominant hub carrier paid anywhere from 1-5 percent above passengers whose flights were booked with non-hub carriers. Business travelers flying hub carriers, however, paid nearly 20 percent more than their counterparts using non-hub carriers. "The problem with previous studies," says Spiller, "is they *implied* that all travelers who used a hub carrier were paying considerably higher prices. And we find that only the business traveler is paying premiums."

Good News for Consumers

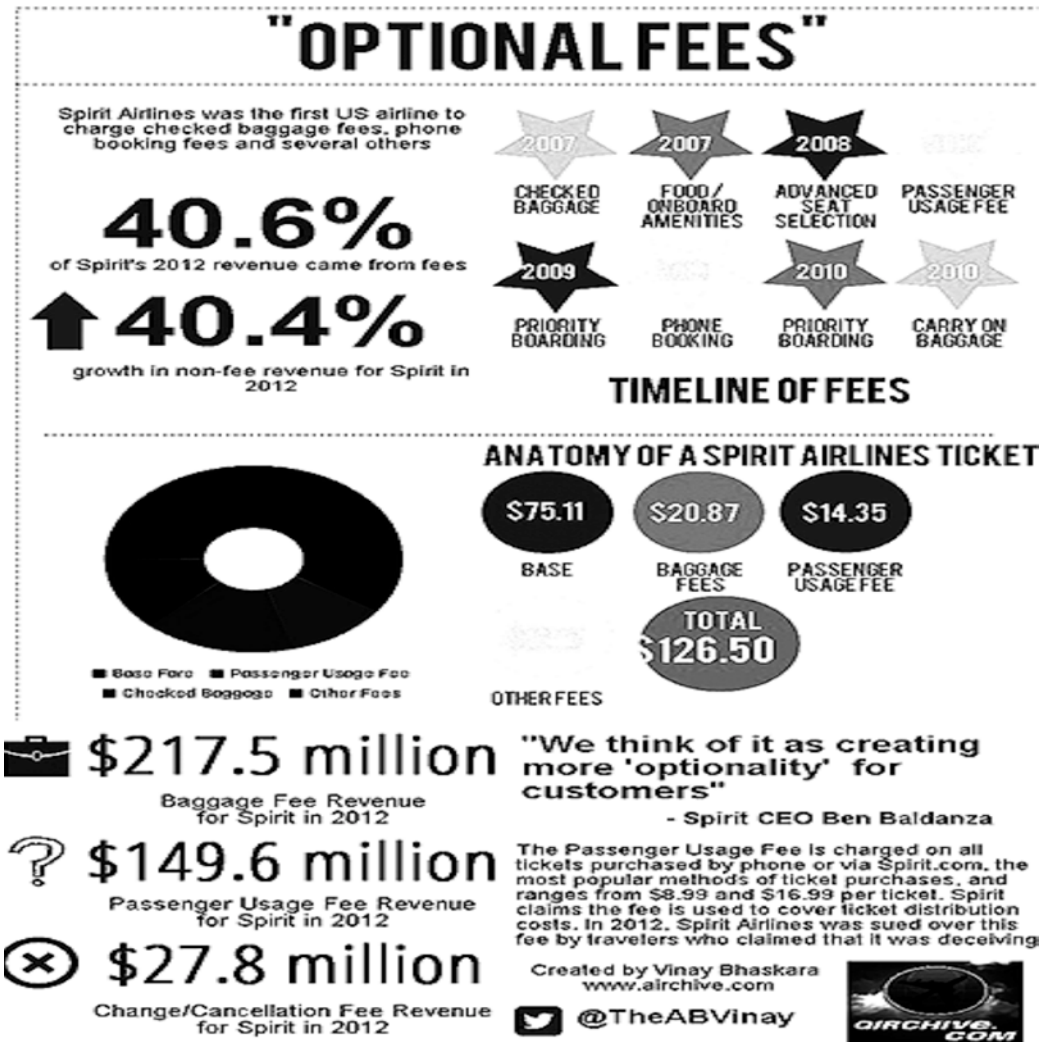
"As you develop a hub," says Spiller, "your products *become more attractive* -- more *direct flights*, more *frequent flights*, *more connections* -- and with that, you gain ability to mark up prices, because those are *product qualities* that, according to our data, customers are willing to pay for." If airlines are exploiting anything, says Spiller, it is "this *peculiar demand* for large networks that business travelers have." Consumers are doing well, says Carnall: "For a tourist, the cost of a flight has actually *come down a bit*." Business travelers are paying more, but are offered more frequent departures and other *perks*.

Ex. 5. Answer the following questions:

1. Which options does a hub offer to passengers?
2. What does concentration of staff and aircraft at a hub result in?

3. How much are operational savings per passenger of a hub carrier?
4. What does a frequent flyer earn?
5. What is buying behaviour?
6. What do the studies previous to Spiller's imply?
7. Why do hubs seem to be more attractive to business passengers?

Ex. 6. How do these extra optional fees help to get extra revenue for Spirit airlines?



Ex. 7. Translate into English:

1) Узловые аэропорты предлагают пассажирам больше стыковочных рейсов. 2) В любом тарифе заложен маршрут, соединяющий два города и время отправления. 3) Мы можем рассортировать пассажиров на несколько групп. 4) Тарифы авиаперевозчиков можно рассматривать как продукт, предлагаемый потребителю на рынке услуг. 5) Первая попытка моделирования использовала данные 2010 года. 6) Узловые аэропорты снижают конкуренцию, что провоцирует повышение тарифов.

PART 4. ECONOMICS OF AIRPORTS

TINY AIRPORTS: AHEAD IN THE CLOUDS
A surfeit of small airports is not a sign of health

A flying visit

FOR a small, crowded island, Britain is well served by airports: it has 54 active ones, half of which ferry under 300,000 people a year. One of those tiny airfields is now *revving up* for *expansion*. In the early 1960s more planes passed through Southend airport than any other apart from Heathrow. Largely dormant for a decade, on February 28th it will open a new terminal. EasyJet, a budget airline, will offer 70 flights a week to Europe, starting in April.

The rise of *no-frills carriers* in the 1990s was accompanied by a flurry of *investment* in such fallow airfields and a huge *upsurge* in travel. Around 90% of Britain's population now live within two hours' travel of two international airports and 70% within an hour of one, reports the UK Civil Aviation Authority, the regulator.

Such choice is good for passengers, and competition has *held down* ticket prices. But Tony Griffin of ASM, an airport consultancy, says *rivalry* is now so fierce that it can be hard for airports to make money. On February 21st Ryanair announced plans to pull some flights from Edinburgh airport because of *landing fees* there.

Even busy airports cannot *rely* on landing fees and other flight revenues. Gatwick, Heathrow and Stansted make half their money from “non-aeronauticals” like shops and car parks. That *figure* is higher for small airports, reckons Keith McMullan of Aviation Economics, a consultancy.

In a sign that small operators are becoming more *savvy*, Stobart Group, the logistics firm that bought Southend airport in 2008, will run most services there. It built a railway station 100 paces from its door and will take a cut of train tickets. The firm owns the car park, a 129-room on-site hotel and most retail outlets. It will even take a slice of taxi fares.

Despite the strong headwinds, Southend's offering could take off: a *wealthy* catchment of millions of people lies within an hour's train trip from London's Liverpool Street station. It is less clear that it will regenerate the town. Unemployment is high locally; *wages*, *skills* and *productivity* are low. The new terminal will create 500 jobs. Local estate agents report a rise in *inquiries* about office space—most from other parts of Southend, a few from beyond.

Yet unlike other regional towns that benefit from hosting an airport, Southend airport's boon—its *proximity* to London—could prove the town's loss. The airport and railway station are on the town's edge, so most people will take the train directly west to London, rather than head east to the seaside fun parks. Anita Thornberry of Southend Council hopes the airport will remind people that Southend “isn't a kiss-me-quick and candy floss place”. Few visitors may see even

the candy floss***. (The Economist, 2012)***

Ex. 1. Match the words in the left with the proper definitions in the right

expansion	competition for the same objective or for superiority in the same field
upsurge	nearness in space, time, or relationship
rivalry	the action of becoming larger or more extensive
proximity	a rapid rise or swell

READING 2
THE ECONOMICS OF AIRPORTS

On 29 November 2012, Angela Gittens, Director General, ***Airports Council International (ACI),*** *delivered the ninth annual RAeS Montreal Branch Assad Kotaite lecture at the* ***International Civil Aviation Organization (ICAO)*** *headquarters in Montreal.*

Dynamic airport markets

In early times, airports were '*administered* rather than *managed'* to serve State-owned airlines. Increased market agility began in the United States (US) with airline liberalisation in 1978. This led to the development of airports from simply necessary aviation infrastructure into outward-facing, business-oriented service *providers*.

Airports now *chase* airlines for their business and mega-hubs compete to become gateways to entire continents. Together with new concepts in airline and operations management impacting how airports are run, changes in the *volume* and *distribution* of traffic are having *profound effects* on the industry.

The global airport sector has since become more commercialised. Indeed, through economic cycles, airports tend to create more value than their airline customers.

Private sector involvement in airports has been encouraged either through outright ownership, long-term leases or commercial management contracts.
Airport ownership and the need for airports to market themselves efficiently, together with airline liberalisation, growth and congestion and investment needs, are closely related.

Both the need and the ability of airports to operate efficiently and market themselves effectively are driven by several factors set to increase pressures.

Economic and social impact

Airports have considerable economic and social *impact*, often extending far beyond their immediate surroundings.

ACI studies conclude that airports support, on average, 4,700 direct, indirect and induced jobs per million passengers. According to the Air Transport Action

Group (ATAG), of the 5.6 million direct jobs *generated* by the air transport industry worldwide in 2010, at least 63% (3.5 million) were on-airport jobs.

Clearly, airports *contribute* substantially to the economy of areas they serve.

Challenges and constraints

Runways are large *immovable assets* that have not *alternative use*.

At their most basic, airports *facilitate* bringing together airlines and their potential customers. However, airport management and planning are not *straightforward* tasks.

Airports as investment opportunities are unique in several respects. *Substantial capital sums* must be invested in large immovable assets that have no alternative use, *to satisfy demands over* which airport authorities have little *direct control*. It is airlines and not airports that decide where and how the demand for air travel or air freight will be met.

The challenge is to match *airport capacity* and demand while achieving and maintaining airport *profitability* and an adequate level of *customer satisfaction*.

Airport revenue

Airport 'cities' such as Singapore Changhai airport offer enormous potential.

Airport revenue *is categorised* as either aeronautical (those revenues arising directly from the operation and landing of aircraft, passengers and freight) or non-aeronautical (those arising from commercial activities in terminal buildings and on airport land).

Non-aeronautical revenues critically determine the financial *viability* of an airport, as they tend to generate higher *profit margins* than aeronautical activities, the latter frequently representing a zero sum game or producing a deficit.

Non-aeronautical revenues can significantly *reduce* airport operating *costs*. Profits from non-aeronautical revenues are reinvested in airport infrastructure, reducing capital needs and overall costs.

Globally, non-aeronautical revenue *stands* at 47%, although there are marked differences in both portion and sources reflecting *regional differences* in ownership models and socio-economic profiles. *Retail* and food and beverage revenues are commercial activities growing faster as a percentage of total airport revenue, a trend expected to continue.

Aeronautical revenues represent the most contentious aspect of the business and yet it is probably one of the least understood parts of the industry. Aeronautical revenues comprise *charges levied* on aircraft (mainly per landing and for parking) and charges levied on passengers (paid to the airport but usually *included in tickets* for convenience).

Charging on a per passenger basis rather than on an aircraft-related basis is a continuing trend in the industry. The crisis it seems has further *accelerated* the trend as airlines seek *lower fixed operating cost*. For the first time, passenger-based aeronautical revenues have exceeded 60% of total aeronautical revenue.

In 2010 every region generated the majority of its aeronautical revenues from passenger charges with the exception of North America. North America is a special case, as 36% of aeronautical revenues are generated through *terminal rental fees* and the *passenger facility charge* (PFC) is capped.
In Asia-Pacific the proportion of aeronautical revenues generated through passenger charges continues to rise while, in Europe, the proportion is now two thirds.

It is important to highlight the *shift* away from aircraft to *passenger-based charging*.

By applying this charging scheme, airports share the risk of decreasing traffic with the carriers as revenues are more dependent on the actual number of passengers departing from the airport and less on the number of aircraft movements or aircraft size.

The shift in this revenue ratio is also a result of the growth in the market share of low-cost carriers whose business model reduces aircraft-related charges to a minimum and transfers responsibility for charges to the passenger.

Airport expenditure

What do airports *spend their money on*? Unfortunately, *comparison* of airport costs is *tricky* because of the *wide variation* in operational models and one has *to get into the detail*.

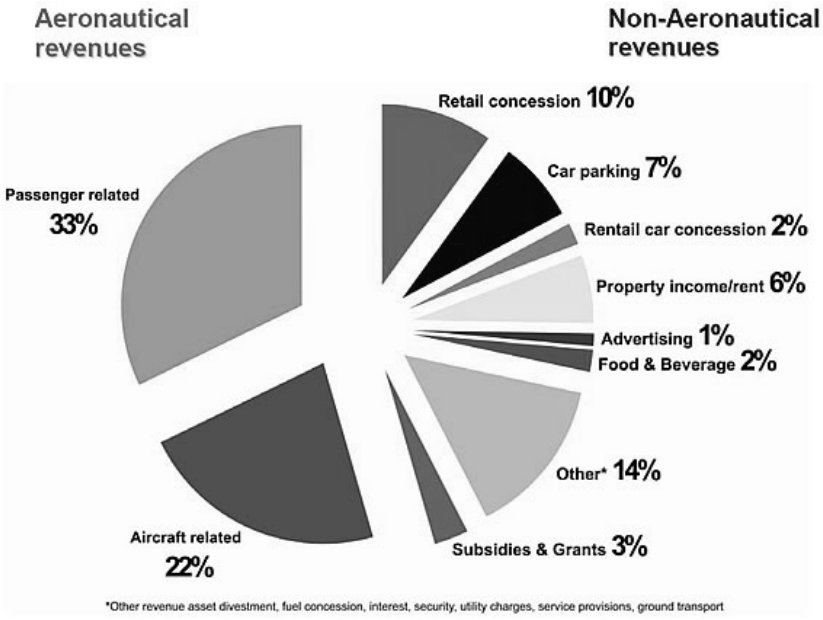
Well, about 30% of airports are *profitable*. The major passenger and freight traffic airports are *concentrated in a narrow band* at the top of the sector, with the top twenty cities in terms of passenger and *cargo activity* handling 25% of the total world passenger traffic and over 50% of the total world freight traffic respectively. However, 60% of the world's airports *handle* fewer than one million passengers and it is unusual for small airports to actually *turn a profit*.

Ex. 1. Answer the questions:

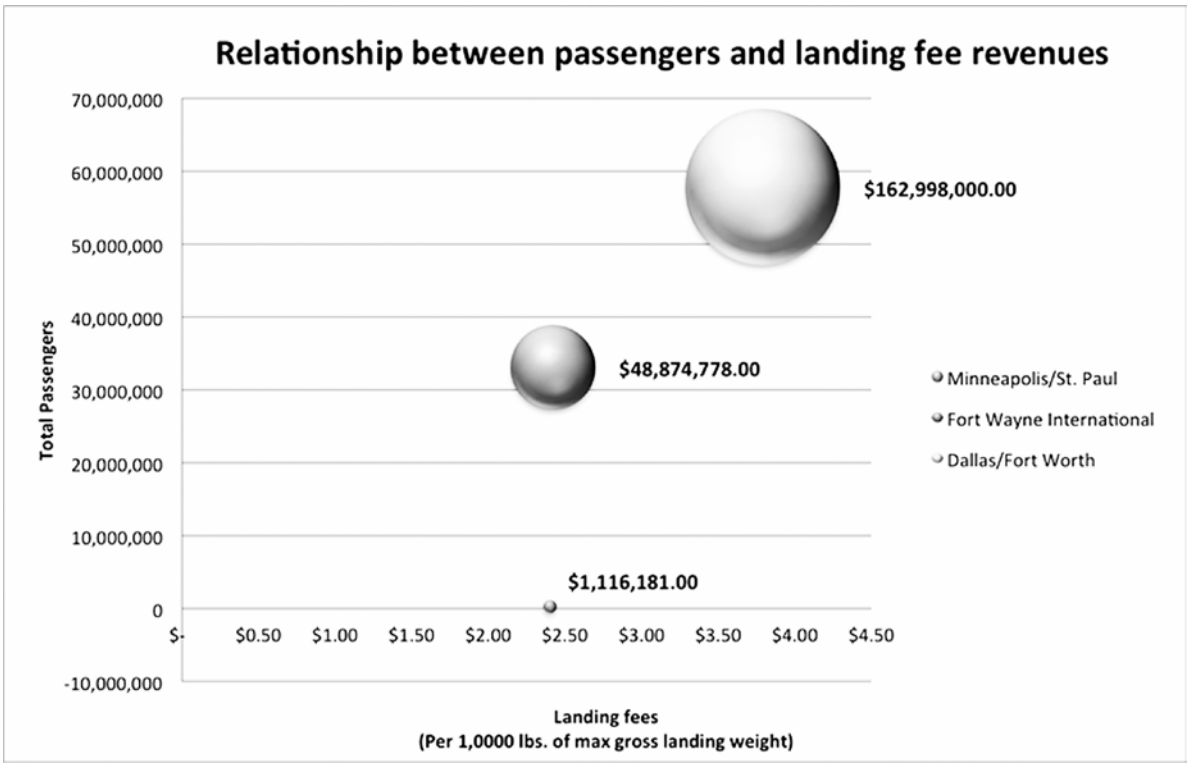
1. What can reduce airport operating costs?
2. How is airport revenue categorised?
3. What is non-aeronautical airport revenue?
4. Which activities of airports can generate higher profit margins?
5. How can non-aeronautical revenues reduce airport operating costs?
6. What is the current trend of growing of total airport revenue?
7. What are the main charges levied on aircraft?
8. What have airlines sought after the crisis?
9. What is so special with generating of aeronautical revenues in the USA?
10. How could the shift away from aircraft to passenger-based charging be explained?
11. Can a small airport turn a profit?

12. How much of the total world passenger traffic and the total world freight traffic are handled by top airports?

Ex.2 Describe and explain the distribution of non-aeronautical activities of airports as it is represented by the chart:



Ex.3. Explain the correlation represented by the following diagram



PART 5
COMPETITION

BUDGET AIRLINES

SINCE taking off in the mid-1990s, Europe's budget airlines have soared to account for a third of all air travel in the region. But their growth is slowing. Having introduced holidaymakers to once obscure places like Tallinn and Sharm el-Sheikh, the *low-cost carriers* are left with few new places to explore. National airlines such as British Airways and Lufthansa have tried to defend their business by offering stripped-down service and *cheaper fares* on more *short-haul routes*. "The low-cost carrier market used to be about *fast growth* and uncomplicated strategies," says Keith McMullan, of Aviation Economics, a consultancy. "Now it is about slow growth and *complicated strategies*."

The model for all the new *outfits* was Southwest Airlines, the original American budget carrier. Low-cost airlines held down *maintenance costs* by using just one kind of aircraft, bought in large numbers with *bulk discounts*. They *charged for*, or did away with, frills like meals and drinks. Aeroplanes flew back and forth along a single route, often between quiet, out-of-the-way airports, rather than using busy hubs. As a result the airlines could turn planes around in less than half an hour. Almost from the beginning, bookings took place online. Such *savings* were *passed on* to customers.

Ryanair, the market leader, *exemplifies* how the industry is changing. Its passenger growth is *expected* to slow from 14% in 2009-10 to 6% by 2013 and just 4% thereafter. Ryanair is still *committed* to cheap fares and secondary airports where *landing charges* are low or non-existent. But it plans to drop ultra-low fares on new routes and may move some flights to primary airports, which are wooing low-cost carriers to boost flagging growth. Ryanair has already moved into one in Barcelona. In future it will concentrate less on increasing traffic and more on extracting larger amounts of money from each passenger.

Its main *rival* is going further. EasyJet already offers greater frequency on its routes and makes more use of primary airports such as London Gatwick and Paris Charles de Gaulle. It is also *targeting cost-conscious* business travellers. The firm recently smartened up cabin service. Passengers can opt for priority boarding either by paying extra for their ticket (as with Ryanair) or by joining easyJet's *loyalty scheme*. There is an exception: easyJet's German operation aims at the sun-seeker market.

EasyJet certainly needs a new direction. It has struggled in recent years as cost-cutting ate into *reliability* (Ryanair, by contrast, has a good reputation for *punctuality* and *keeping* passengers *together* with their luggage). On January 20th easyJet's shares fell by 16% after a trading statement forecast losses of £160m ($254m) or so in the six months to the end of March. The listed airline has sparred with its founder and biggest shareholder, Sir Stelios Haji-Ioannou, who thinks it

has been buying too many aircraft and is losing too much money in winter.

Perhaps the most dramatic example of changes in the market is Air Berlin, which has *swallowed* several smaller carriers to emerge as Germany's second airline and the third-biggest budget carrier in Europe. Air Berlin now arranges its *timetables* to *encourage* transfers at its Berlin Tegel, Düsseldorf and Palma hubs, like a traditional network carrier. It also has a *frequent-flyer programme*. Through its Niki associate in Austria, the airline even offers a direct flight from Berlin to Dubai three times a week. It is discussing a *co-operation deal* with Emirates, so that passengers from the Gulf carrier can connect in Vienna to fly to other European cities. Air Berlin is also joining the oneworld alliance based around British Airways and American Airlines.

Like Air Berlin, Norwegian, the fourth-largest budget carrier, is spreading its wings by offering longer flights to the Middle East and north Africa—encroaching further into traditional airlines' territory. They will have to get used to such incursions. The European sky used to offer a *stark choice* between full-service and budget airlines. It is increasingly crowded with options of all shapes, sizes and costs. Take your pick, and hope your luggage arrives.

When easyJet was founded in 1995 it *accepted* only *direct bookings*. This *cut out* the fat fees charged by travel agents. Ingenious use of *yield-management systems*—which raise ticket prices when demand is high and reduce them during quiet periods—also increased efficiency.

Ryanair has taken the no-frills concept further. The airline is not known for its glamorous waiting-rooms, nor for dazzling *customer service*. And it has used fees to manage *passenger behaviour* more than other airlines. For example, to reduce ground-staff numbers, it is now prohibitively expensive to check in at the airport or to store luggage in the hold when travelling with Ryanair. Aggressive in-flight sales strategies have also *reduced* ticket prices through cross-subsidy. Such tactics may not make for a pleasant travel experience, but Ryanair remains popular.

(From "The Economist", January, 2011; October 2013)

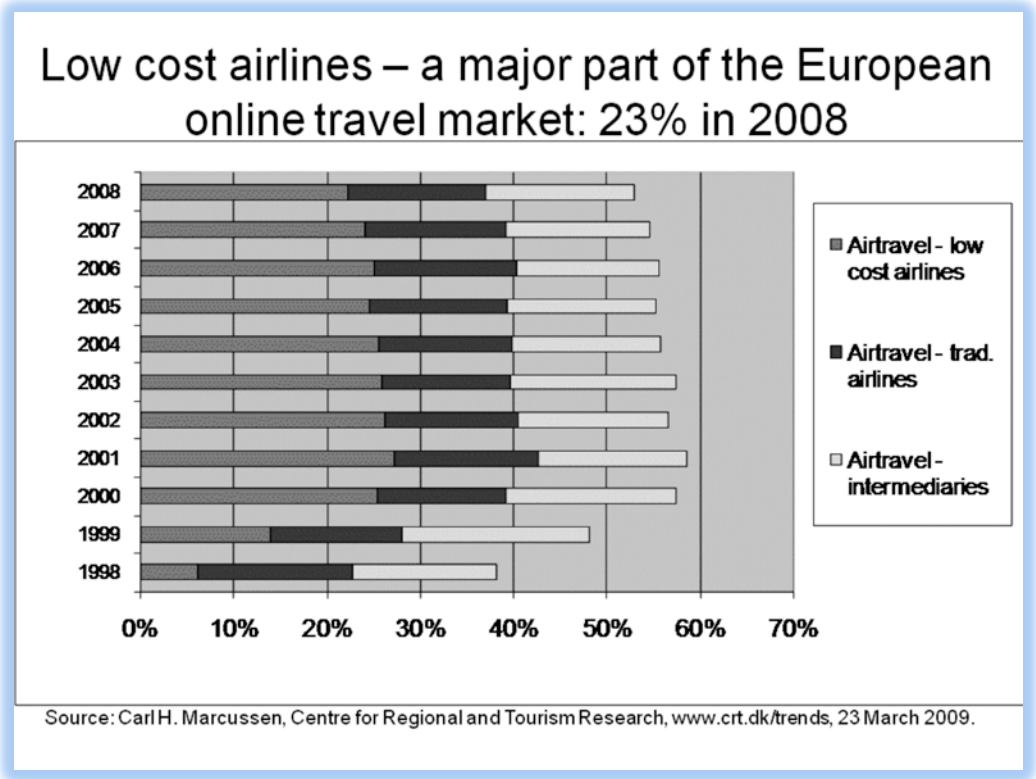
Ex. 1. Match the words in the left with the proper definitions in the right

maintenance	without unnecessary extras, especially ones for decoration or additional comfort: cheap fast food in no-frills surroundings
rival	the money paid for a journey on public transport
fare	the process of keeping something in good condition
charge	a person or thing competing with another for the same objective or for superiority in the same field of activity
no-frills	a price asked for goods or services
deal	an agreement entered into by two or more parties for their mutual benefit

Ex. 2. Fill the gaps with the words: *competition, to charge, no-frills, successs, to fly, fares, fuel costs, boarding pass, arriving.*

One of the main foundations of Ryanair's success was its decision, early on, to target second-tier airports. Smaller airports don't _____the same tariffs as large urban ones. In some cases, they even pay Ryanair to fly there.
Over the past dozen years, as other airlines have struggled to cope with high _____, pension obligations and new_____, Ryanair has thrived. Ryanair's *success* rests on two promises: cheap tickets, as low as a few dollars on some routes, and on-time flights. Buying a Ryanair ticket is a gamble; it's a bet between customer and company that the former can get through the flight without being too badly milked for extra fees for things like printing a _____, carrying an extra bag, or a cup of tea.
The European Union's "Open Skies" policy, which allowed Ryanair to compete in more markets; and the Internet, which gave passengers the ability to compare _____ in a comprehensive way.
Ryanair became less a _____ airline than an all-frills business. Fares are just a way of getting passengers through the door, where the real selling begins. Forget to print your boarding pass before _____ at the airport? That will be $64. Handbags don't fit? That's $64 more.

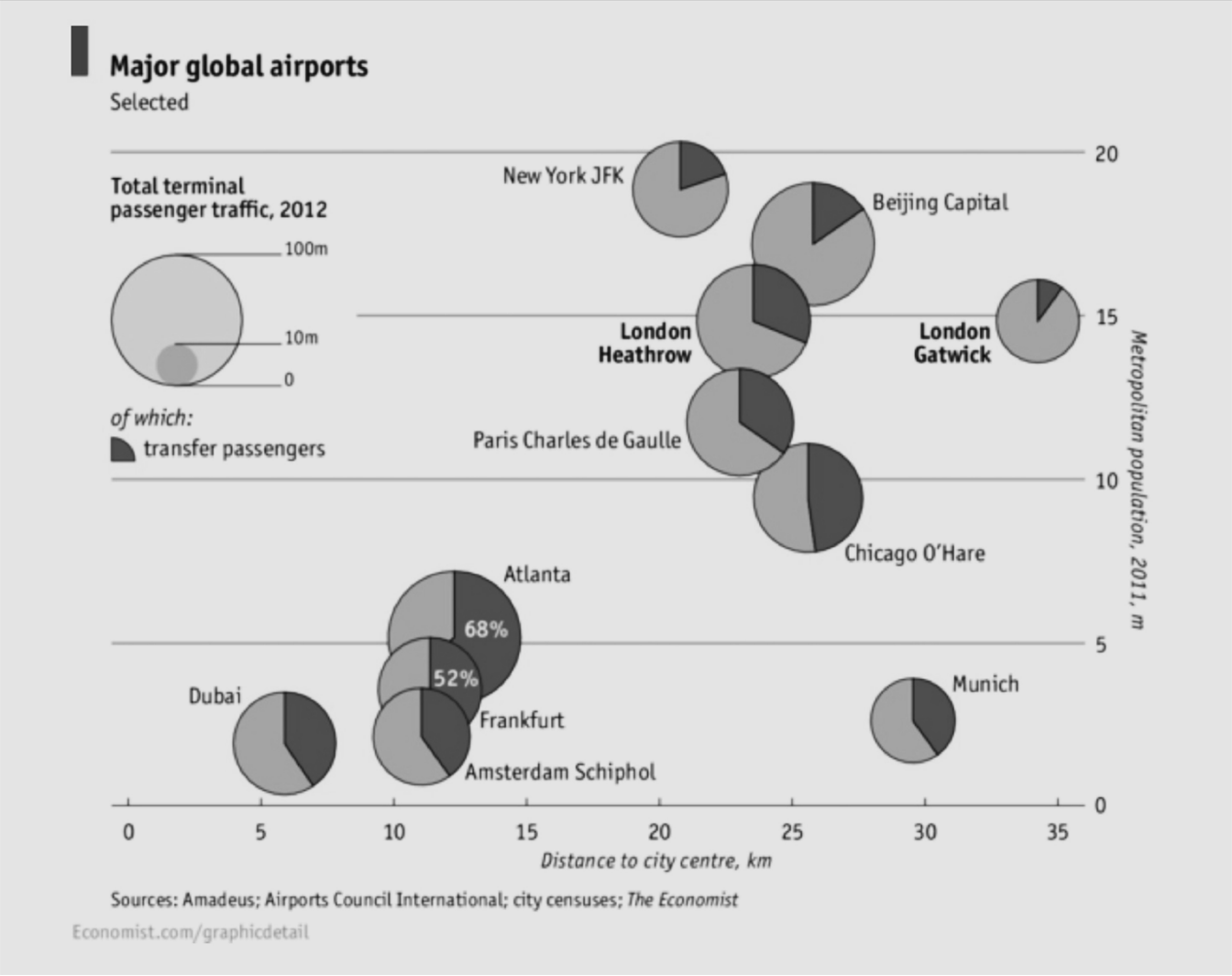
Ex. 3. Comment the growth of budget carries in Europe according to the chart:



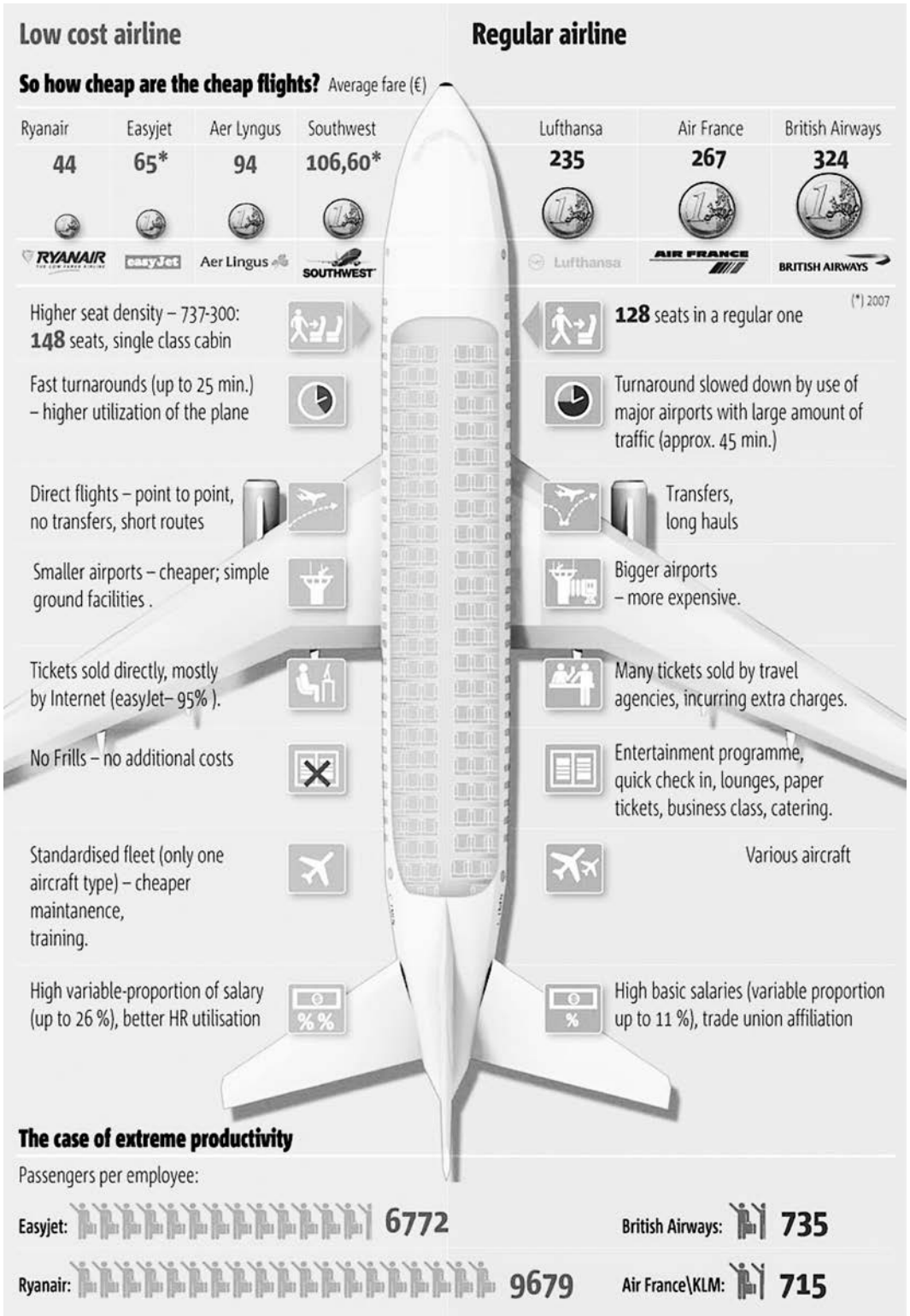
Ex. 3. Answer the following questions:

1. Why is the growth of budget airlines slowing?
2. What are the reasons for changing the low-cost airlines strategies?
3. How could low-cost airlines hold down maintenance costs?
4. Why do these companies prefer to commit to secondary airports?
5. How would you describe the difference in business politics of easyJet and Rayanair?
6. What do they do to increase their efficiency?
7. What is direct booking?
8. Why do the low-cost companies reduce ground-staff number?

Ex. 4. Comment this chart



Ex. 5. There are some factors that make the fares offered by the no-frills airlines cheaper. Compare the businesses of low-costers and regular airlines



PART 6. EFFICIENCY
READING 1
READY TO ROLL

ENGINES on airliners are highly *efficient* when they are in flight, but not when *operating* on the ground. When a plane is *taxiing* under its own power, the engines burn *vast* amounts of fuel. A Boeing 747 can *consume* a tonne of fuel and *emit* several tonnes of carbon dioxide during an average 17-minute taxi *to take-off*. And when the *aircraft* lands there is likely to be another long *drive* to the passenger gate. Which is why there are various methods being developed for aircraft to use other means of propulsion while moving around an airport.

Towing aircraft with a *tug*, similar to how they are pushed back from the gate, is one way. But constantly pulling on the front *landing gear* can lead to mechanical problems. Many pilots would also prefer to be in control of the driving once their aircraft is on the *taxiway*.

The TaxiBot also avoids having any complicated links to *connect* to the cockpit, yet still gives the pilots driving control. It does this by *accelerating* to the speed set for the taxiway, using its inbuilt GPS map system. The pilots then use their usual controls to *steer* with the nose wheel (which in turn steers the TaxiBot) and to brake with the main landing gear. A safety driver remains in the TaxiBot, and he also drives the vehicle to and from the aircraft.

With the high *price* of aviation fuel—a tonne can *cost* more than $1,000—the savings at a busy airport could be large. At some airports the passenger gates can be several miles from the runway. All told, the world's airlines spend $7 billion - 8 billion a year taxiing between passenger gates and the runway, says Yehoshua Eldar, who is in charge of business development at IAI. The TaxiBot, though, uses just 20-30 litres of fuel for a typical trip. It also *reduces* the risk of *debris* being *ingested* by the engines and causing *damage*. Germany's Lufthansa will trial the system at Frankfurt Airport from May 2013.

In the future some airliners may be driven to and from the runway with electric power. The German Aerospace Centre has tested this idea in an aircraft using a fuel cell to power two electric motors *built into* the hub of an aircraft nose wheel. The centre reckons that up to 19% of current airport emissions could be saved using such a system. And it would also please the neighbours: there would be hardly any noise during taxiing.

Ex. 1. Answer the following questions:

1. Why are engines of airliners are inefficient when they are operating on the ground?
2. What are advantages of the TaxiBot?
3. How much do airlines spend a year taxiing between passenger gates and the runway?
4. What is the idea by the German Aerospace Centre to be tested?

5. How much of current airport emission could be saved with using of the new system developed by the firm?

READING 2

At almost $1 million a square meter, big jets are the world's most expensive real estate, surpassing London's "Billionaire's Row."

After years of scrapping over smaller, short-haul aircraft, the world's dominant planemakers are turning their attention to one of the most profitable, but risky, parts of their business, as Boeing moves to defend its popular 777 "mini jumbo" from the largest version of Airbus's brand-new A350.

At stake is Boeing's continued dominance of orders worth hundreds of billions of dollars for the largest twin-engined jetliners, driving growth and connectivity between continents.

"It is the part of the market where the dollars are ... and where airlines are able to differentiate and get a price premium for their services," said Jerrold Lundquist, managing director at the Lundquist Group, an aerospace consultant for 30 years.

Boeing has controlled this piece of the industry chess board for a decade. Until recently its best-selling 365-seat 777-300ER had little direct competition and the successful niche has boosted Boeing margins and helped fund other projects.

After a slow start, Airbus is scoring key wins and building up a serious threat to Boeing's mini-jumbo franchise with a 350-seat version of its new carbon-fiber jet, the A350-1000. Boeing is now offering a revamped "777X" with new engines and a wingspan as wide as its original 747 jumbo is long. Both aim to offer airlines the most money-making jet in the 350-400 seat market, a cornerstone of future demand as global growth pushes up demand for long-haul trade and tourism.

Airbus says its A350-1000 will burn 25 percent less fuel per seat than the 777-300ER when it enters service in 2017. Boeing says its 406-seat 777-9X will burn 20 percent less fuel per seat than the 777-300ER, while giving airlines 41 more seats from around 2020, subject to board approval to build it. A longer-range 777-8X is expected to come with 355 seats.

Such promises have a powerful multiplier effect. The cost of operating a large jet over its 20-year life is several times its purchase price. For planes like the 777 or A350-1000, designed to fly 16 hours a day, every percentage point in fuel saved tomorrow is worth fighting for today. Both manufacturers will be chasing customers in coming weeks to validate their claims. Buoyed by an order from major Boeing customer British Airways, Airbus is aiming for a breakthrough at Japan Airlines, which says it is looking at both models.

According to sources familiar with confidential briefings, a new 777X engine should increase fuel efficiency per seat by 10 percent and its outsized carbon-fibre wings - designed to fold upwards at the tip when parked - will contribute 7 percent.

But engineers must pay back 4-5 percent of these savings because the larger jet's basic structure is expected to be at least 12 tons heavier. The net gain from the latest technology will be closer to 12-13 percent, according to these sources.

To achieve the 20 percent increase in efficiency needed to complete their case, Boeing's marketers are moving in two steps.

Firstly, a longer fuselage gives space for 2-3 more rows, which automatically lowers unit costs and opens the door to extra revenue if airlines have enough demand on their network. But to make it a slamdunk, Boeing is assuming airlines will adopt a denser layout by adding an extra seat to each row to make 10 seats across, instead of the standard nine on most 777s.To fend off any concerns about discomfort, Boeing is proposing to carve out an extra four inches in internal cabin space by "scalloping" the inside of the fuselage. It believes this will corner its opponent and show up the A350's narrower cabin, which will sit nine abreast.

"They (Airbus) are having to chase the 777 with a tube that is almost a foot narrower. Now you are competing with the comfort of the 777," said Ihssane Mounir, head of Boeing Commercial Airplanes sales for Northeast Asia, including China.

Airbus dismisses the plan, saying it found during earlier discarded designs that such ideas don't work. It accuses its rival of packing in seats to flatter the older 777's economics. "There is some sleight of hand going on here," said Leahy in an interview. "Nobody asked them for these extra seats. They are doing it to print lower seat-mile costs."

Boeing executives say it is Airbus that scores well in the industry's long-established game of toying with configurations.

Airbus's claim of a 25 percent per seat fuel advantage for the A350-1000 assumes a layout of 369 seats, rather than 350, and 360 seats for the 777-300ER, five fewer than advertised.

(*Reuters/Pascal Rossignol*)

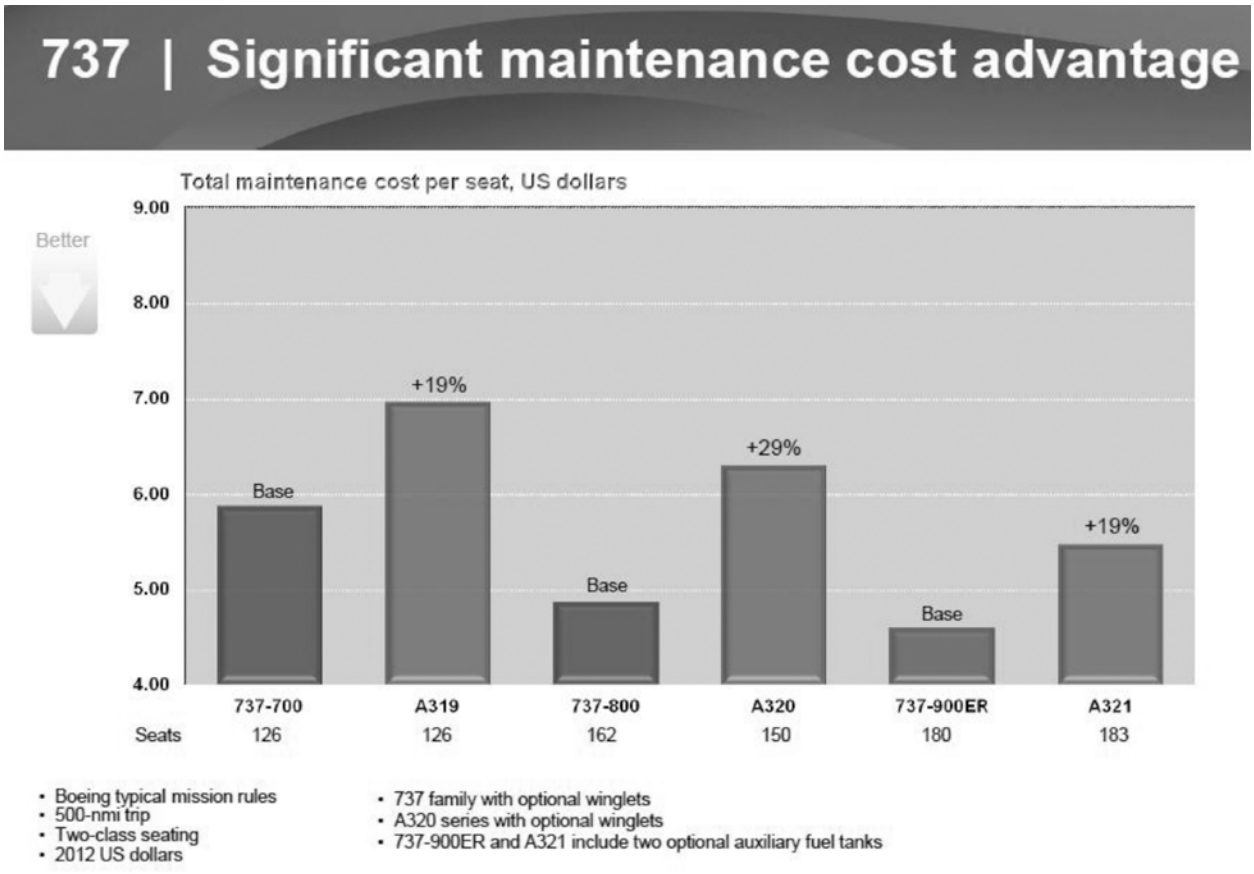
Ex. 1. Match the words in the left with the proper definitions in the right

consume	finish making or doing
reduce	claim that (someone) has done something wrong
revamp	give (something, especially money) in order to help achieve or provide something
contribute	make smaller or less in amount, degree, or size
complete	use up (a resource)
dismiss	demonstrate or support the truth or value of
accuse	give new and improved form, structure, or appearance to
validate	treat as unworthy of serious consideration

Ex. 2. Answer the following questions:

1. Why does Boeing revamp 777 with new engines?
2. What is fuel efficiency?
3. Why is this factor so actual for long-haul liners?
4. How does Boeing increase fuel efficiency of 777-300ER?
5. What is fuel efficiency per seat?
6. Which significant maintenance cost advantage are proposed for the new 777 liner?
7. What do Boeing and Airbus offer to chase customers?

Ex. 3. Comment the following chart:



READING 3

SKY-HIGH FUEL COSTS ARE EXCELLENT NEWS FOR THE RIVALS

In the past ten years, fuel costs for airlines have more than doubled as a percentage of revenues, and buying fuel now makes up for 58% of an airline's running costs.

That's good news for plane manufacturers, who benefit from the resulting demand for new, more fuel-efficient aircraft, according to a new blue paper from analysts at Morgan Stanley.

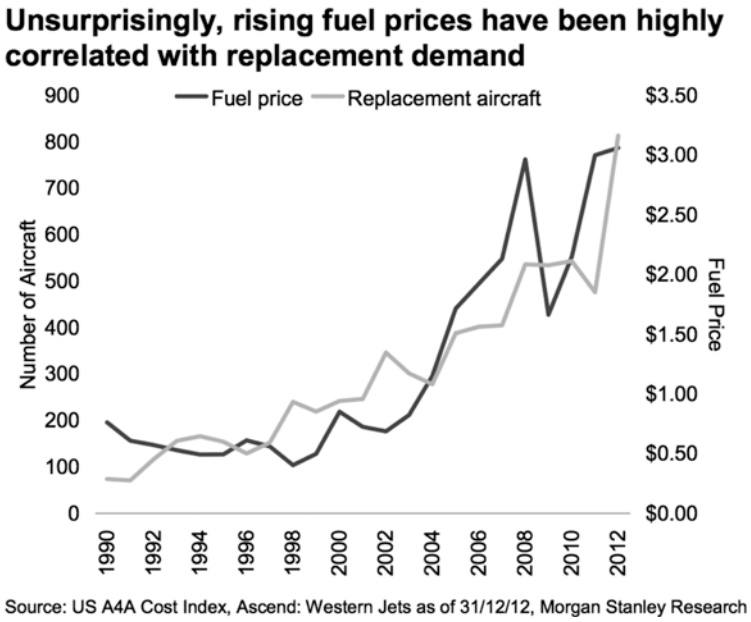
Plane maker backlogs are now at record levels, according to the paper. Between them, Boeing and Airbus (the two biggest players in the market) have 14,000 planes on order. That's enough to last them more than seven years of production.

The blue paper, "Commercial Aviation: A Renewed Lease of Life," was written by Morgan Stanley analysts Rupinder Vig, Penny Butcher, John Godyn, and Nigel Coe.

Morgan Stanley does warn "rising fuel prices can be a negative for new aircraft if fuel prices rise so quickly that they put a number of airlines at a liquidity squeeze," but calls the high prices as "very much a tailwind" for OEMs (original equipment manufacturers).

As proof, they offer this chart, which makes it easy to see how over the past two decades, high fuel prices have lined up closely with high demand for replacement aircraft. Both are sky high at the moment:

Ex. Explain the correlation between fuel prices and demand for replacement of aircraft on the previous diagram.



READING 4

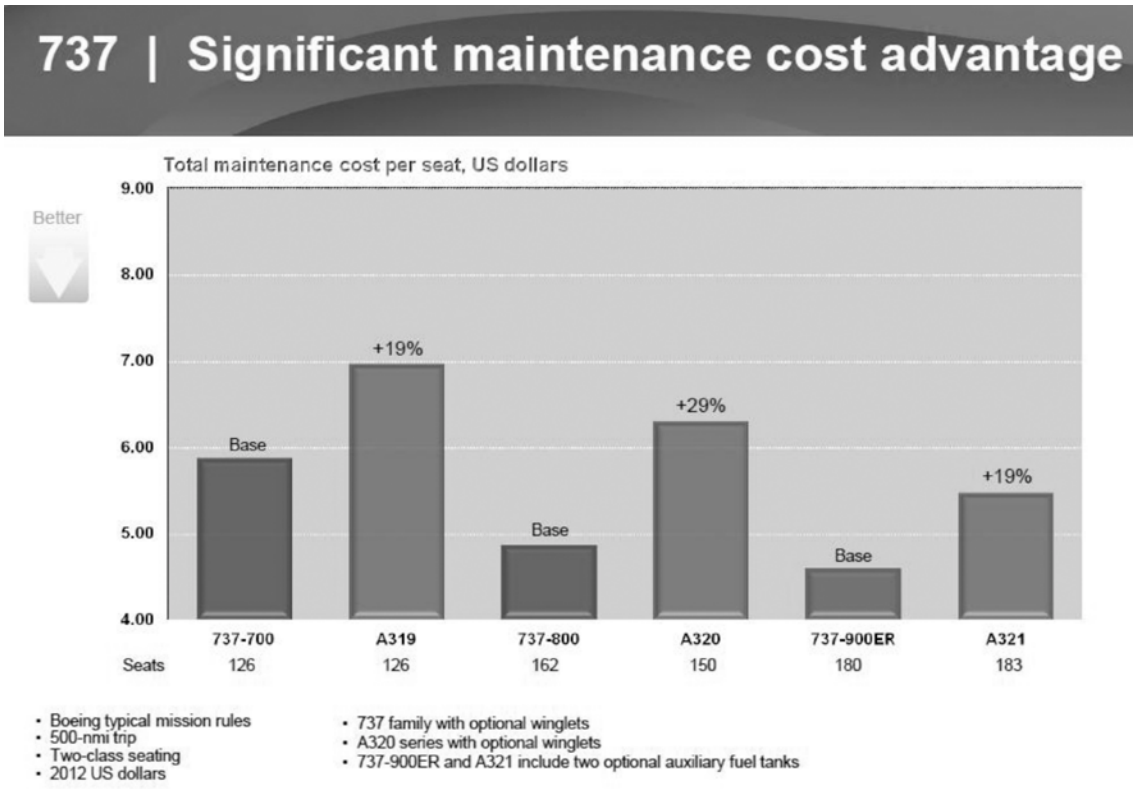
Two new single-aisle jets from China and Russia, both expected to enter service in 2016, are aimed even more directly at the two aviation giants. The Commercial Aircraft Corporation of China's 170-190 seat C919 has opted for CFM's Leap-X, which will be assembled locally; United Aircraft Corporation, the agglomeration of all Russia's state-owned planemakers, is backing the GTF for its 150-212 seat Irkut MS-21. There are big uncertainties about both projects—in particular about the two companies' ability to deliver the service and backup customers expect. But both claim their planes will consume at least 15% less fuel than the current A320 and 737. They will also be much cheaper. If the Chinese government pressures the

country's big airlines, which are state-owned, to buy the C919, it will be especially bad news for Airbus, which is pinning more of its hopes for future growth on Asia than Boeing is, and has established a production line for the A320 in Tianjin.

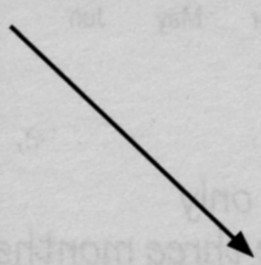
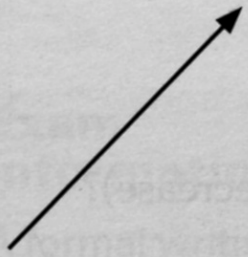
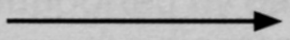
Ex. 4. Translate into English:

1) Airbas 320 с новым поколением экономичных двигателей снизит потребление топлива на 15 %. 2) Новые технологии улучшат эффективность на 40 %. 3) Издержки на модернизацию намного меньше, чем на разработку новой модели. 4) Корпорация «Иркут» утверждает, что разрабатываемый сейчас среднемагистральный лайнер МС21 (ЯК-242) будет потреблять на 15 % меньше топлива, чем находящиеся в эксплуатации Airbus 320 и Boeing 737. 5) Новый двигатель GTF (geared turbo fun) корпорации Pratt & Whitney, успешно опробованный Airbus, на 10 – 15 % эффективней обычных реактивных двигателей. 6) Современные дальнемагистральные лайнеры разработаны с рассчетом на то, что они могут проводить в полете 16 часов в день. 7) За последние 10 лет издержки авиакомпаний на топливо возросли вдвое.

Ex. 5. Comment this chart:



Useful language: describing trends

Meaning	VERB	NOUN
go down 	decrease fall drop decline plunge (big change) plummet (big change)	*same* *same* *same* *same*
go up 	increase rise grow double treble rocket (big change)	*same* *same* growth doubling in + n trebling in + n
no change 	level off remain the same remain stable stabilize	a levelling off at /
constant change 	fluctuate	fluctuation in + n
position 	reach a high / peak of reach a low of stood at	a high of a low of

PART 7
FLIGHT SAFETY

KLM FLIGHT 4805 AND PAN AM FLIGHT 1736, MARCH 27, 1977

This crash remains the deadliest ever, claiming the lives of 583 people when two 747s collided on a foggy runway on the island of Tenerife in the Canary Islands. It occurred after a series of miscommunications between the two flight crews and Air Traffic Control. The KLM plane initiated takeoff while the Pan Am plane, unseen in the fog, was taxiing midway down the same runway. As the KLM plane began to lift off the tarmac, the lower part of its fuselage struck the upper fuselage of the Pan Am plane, which was in the process of turning off the runway. After Tenerife, officials made sweeping changes to international airline regulations, requiring that all control towers and flight crews worldwide use standardized English phrases. Also, cockpit procedures were modified so that the hierarchy among crew members was deemphasized and decision-making by mutual agreement was the rule. Known in the industry as "crew resource management," this modus operandi is now standard worldwide.

Ex. 1. Answer the questions:

1. What was the cause of the accident?
2. What was modified in standard procedures after the investigation?

AMERICAN EAGLE FLIGHT 4184 | OCTOBER 31, 1994

Heavy air traffic and poor weather postponed the arrival of this flight at Chicago's O'Hare International Airport, where it was to have landed en route from Indianapolis, Indiana. The ATR-72, a twin-engine turboprop carrying 68 people, entered a holding pattern 65 miles southeast of O'Hare, which it maintained for over an hour in freezing rain. As the plane circled, a ridge of ice formed on the upper surface of its wings, eventually causing the aircraft's autopilot to suddenly disconnect and the pilots to lose control. The ATR disintegrated on impact with a field below, killing everyone aboard. Following an NTSB investigation, the FAA required that all ATR aircraft be fitted with expanded de-icing equipment. It also issued 18 "airworthiness directives" for all pilots operating small commuter aircraft, instructing them on how to recognize and respond to dangerous icing conditions.

Ex. 2. Answer the questions:

1. What provoked this accident?
2. What did FAA require to improve safety?

USAIR FLIGHT 427 | SEPTEMBER 8, 1994

It took one of the longest air crash investigations in U.S. history to determine what happened (if not why) to cause this accident near Pittsburgh, Pennsylvania, which killed all 132 people aboard. En route from Chicago, the Boeing 737 went down in a wooded area 10 miles north of its destination at Greater Pittsburgh International

Airport just seconds after the captain declared an emergency. In its final report released five years after the crash, the NTSB concluded that the aircraft's rudder, a moveable control surface hinged to the tail fin, became jammed for still unknown reasons, forcing the plane into an almost vertical roll at about 3,600 feet. NTSB recommendations prompted Boeing to completely redesign the 737's rudder control system and revise the aircraft's flight manual to include a procedural checklist for pilots faced with rudder-control problems.

Ex. 3. Answer the questions:

1. What happened to cause this accident?
2. What was recommended by NTSB to prevent further accidents of such type?

AMERICAN AIRLINES FLIGHT 587 | NOVEMBER 12, 2001

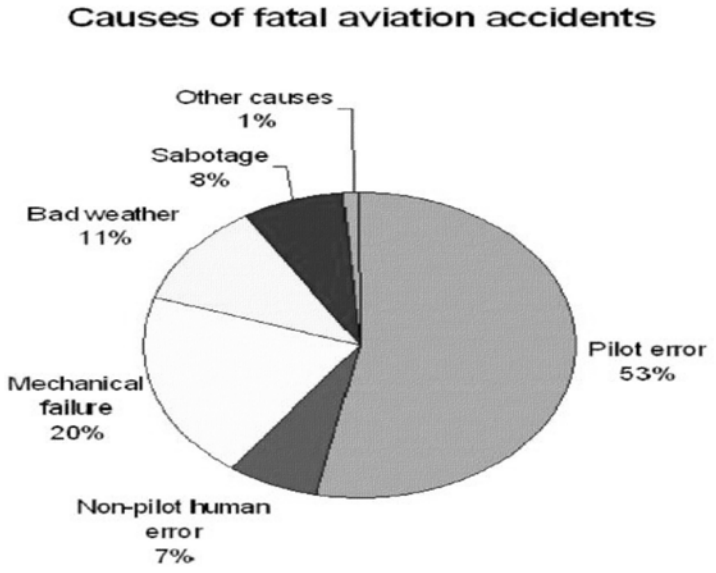
Just two months after the four airplane disasters of September 11, 2001, an Airbus A-300 taking off from New York's JFK International Airport for Santo Domingo, Dominican Republic, crashed into a neighborhood in Belle Harbor, Queens, immediately raising fears of another terrorist attack. Five people on the ground and all 260 people aboard the plane were killed. The NTSB ruled out terrorism, focusing instead on the plane's vertical tail stabilizer and rudder, which snapped off as the plane fell from the sky. Several months after the accident, the NTSB issued two safety recommendations involving the A-300's vertical stabilizer and rudder, pointing out that some maneuvers can lead to structural failure. As a result of the warnings, Airbus is addressing these issues and American Airlines has implemented regular inspections of the tail sections on all its A-300s.

Ex. 4. Answer the questions:

1. What happened to American Airlines Flight 587?

Which safety recommendation did NTSB issue?

Ex. 5: Classify every of the accidents mentioned above according to the diagram.



PILOT ROOM FOR ERROR

Even as automation has made flying easier for pilots and safer for passengers—to the point that the chance that a flight taking off today in the U.S. or much of Europe will crash is less than one in two million—mistakes can and do still happen. "Human error is alive and well," one aviation safety expert told me. As another put it, automation has changed the nature but not the existence of error.

GREAT LEAPS FORWARD

Commercial airline flight has come a long way since the Tenerife accident in 1977, the worst disaster in aviation history. In that tragedy, two 747s collided on a runway in the Canary Islands, killing 583 people.

While several advances grew directly out of that catastrophe, the greatest advances in the intervening decades have come on the technological front. The air traffic controllers at Tenerife could only guess where planes were on the runway that day because of thick fog. Today, most large airports have sophisticated radar equipment that pinpoints and identifies every plane in the air nearby and on the ground in real time.

And pilots today fly very different planes. Rather than a steering wheel and column connected to cables and pulleys that move wing flaps and tail elevators, jetliners today feature a "glass cockpit" with advanced computer displays. Pilots fly the plane electronically, or "fly-by-wire," rather than manually, and they have all manner of high-tech systems at their disposal, from autopilot to ground-proximity warning systems.

In theory, planes today can take off, navigate along a course, approach an airport, land, and roll to a stop all automatically.

WHO'S IN CHARGE?

While automation has improved many aspects of flight, some aviation safety experts worry that we may be putting too much trust in it. "Some people have a messianic view of software, meaning that it will save us from all our problems," says Michael Holloway, an aviation safety expert at NASA Langley Research Center. "And that's not rational, or at least it's not supported by existing evidence".

Holloway is one of a growing number of experts who suspect that pilots may be becoming overreliant on computers. Such overreliance can manifest itself in several ways. For one, it can cause complacency, particularly during the cruise portion of flight, when pilots have little or nothing to do. With nonstop, long-haul flights like Houston to Tokyo becoming more common, this risk is increasing, experts say.

Only six percent of errors occur during cruising, however, while 42 percent happen during descent and landing, says Robert Helmreich, who runs the University of Texas Human Factors Research Project. And here, in the most dangerous phase of

flight, automation can paradoxically magnify the workload of a pilot, who often has to enter new commands from Air Traffic Control into the flight computer. "We've seen accidents where people were actually too busy trying to reprogram the computer when they should have been looking out the window or doing other things," Helmreich says.

Pilots and experts also fear that pilots are losing basic stick-and-rudder flying skills.

As Helmreich told me, "Who do you want to make the ultimate decision, a very well-trained [pilot] or maybe a computer programmer who's sitting home having a beer?"

Humans remain far better than computers at rapidly assessing unexpected developments and improvising. In 1989, a DC-10 cruising at 37,000 feet had a catastrophic engine failure that incapacitated all hydraulics, making the aircraft almost uncontrollable. To steer the plane, the flight crew cleverly varied thrust on the remaining engines and were able to crash-land at a municipal airport in Sioux City, Iowa. While 112 people on board died in the crash, 184 survived, due in large measure to the flight crew's ingenuity—something a computer, however advanced, does not possess.

POWER TO THE PILOT

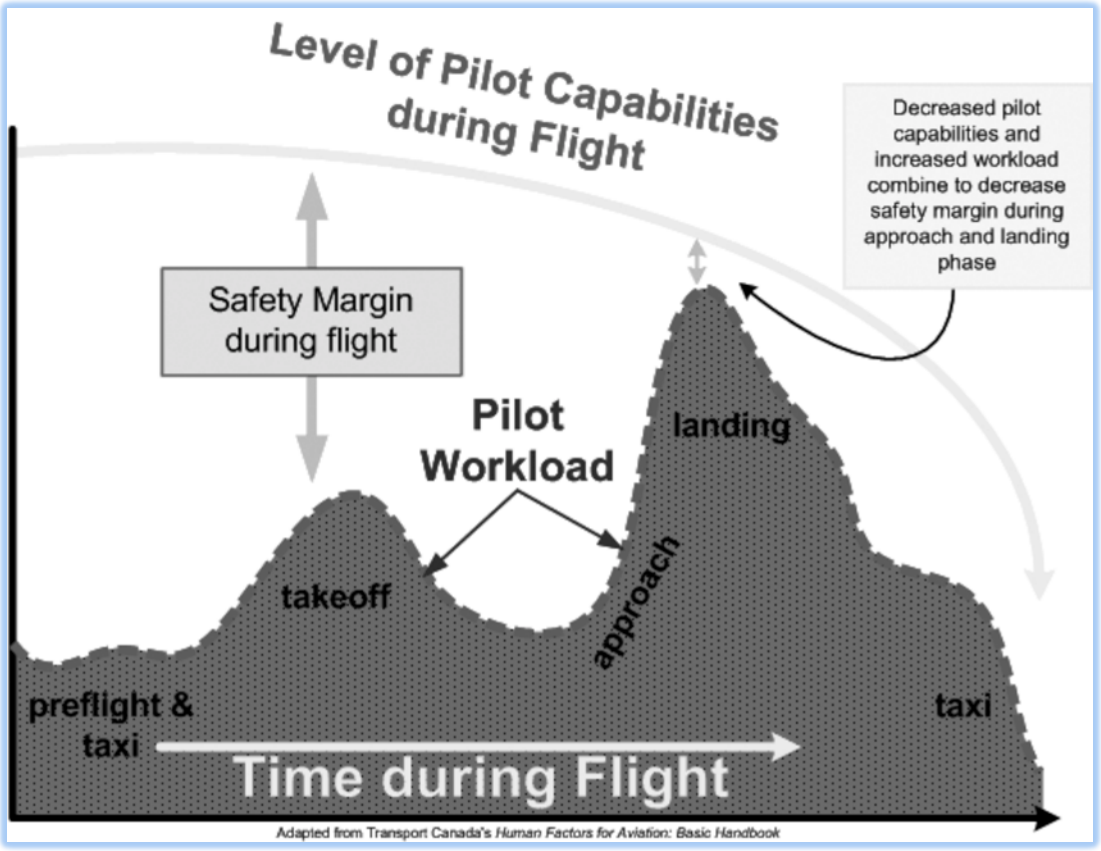
In the meantime, the airlines, safety experts, and pilots themselves are working hard to ensure that pilots remain confidently in charge. For one thing, pilots are trained more extensively than they have ever been in the past. "We're doing scenarios that require some out-of-the-box thinking," says retired pilot Bruce Tesmer, Manager of Cockpit Safety at Continental Airlines. "We try to teach our pilots the advantages of having a high attitude of vulnerability, letting yourself know that it can happen to you as well as to the next guy." With this in mind, pilots today often deliberately turn off parts of the automation to challenge themselves, just to keep those hard-earned skills in place.

(By Peter Tyson)

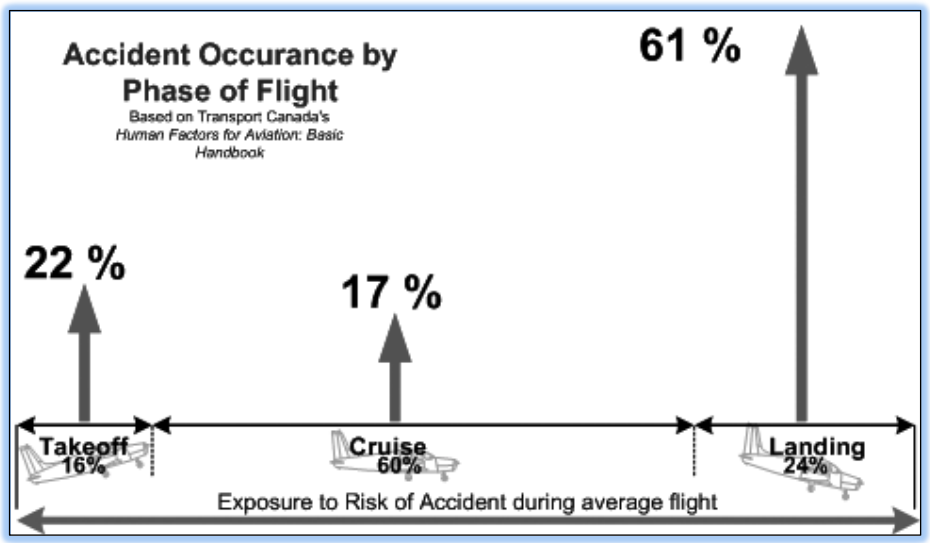
Exposure to Accident Risk

There are two obvious but significant observations here—accidents are most likely to occur during approaches and landings, and it is the landing phase—at the end of the flight—where the workload and fatigue factor are at their maximum.

Consider the depiction below showing what may be described as the normal decrease in safety margin during the course of an average flight.



Ex. 6. Comment the correlation represented by the diagram above.



Ex. 7. Using the previous information, explain the fact of such disproportional distribution of real risks during a flight.

PART 8

AIRCRAFT TESTING AND SERTIFICATION

A TEAM EFFORT

The effective testing and validation of Airbus aircraft is a highly collaborative process that leverages the individual capabilities of engineers, test pilots and various technicians – all of whom work together to assess an airplane's performance and ensure it meets the highest quality and safety standards.

Every new Airbus jetliner programme undergoes multiple phases of testing, which determine its individual operational parameters and reflect the aircraft's compliance with official regulations.

These evaluations include structural and static tests to establish how the wings and fuselage behave with normal and exceptional loads; and fatigue tests – examining how the main structure responds to operational loading over an extended period of time, along with a variety of additional checks.

DISTRIBUTION OF RESPONSIBILITIES

Two types of engineers play important – yet very different – roles during an Airbus aircraft's in-flight evaluations: the test flight engineer and the flight test engineer, both of which perform key tasks on the ground and aloft.

Responsible for an entire development aircraft, the test flight engineer sits behind the pilots during a test flight, and helps them conduct operations – with an emphasis on its systems. From in the cockpit, this team member keeps a clear overview of events during each stage of the flight while the pilots complete various manoeuvres. If the aircraft is being flown on the edge of its operational limits, it is their duty to ensure the correct system configuration setting is obtained.

On the ground, the test flight engineer also makes sure the post-flight maintenance activities are coordinated, and confirms that the aircraft is put into the correct configuration in advance of its next test.

SETTING THE TABLE

The flight test engineer, on the other hand, specializes in one particular aircraft component, and supports the in-flight evaluations by making sure the test goals are understood; building the flight order; ensuring adequate safety is provided and interacting with all involved with preparations.

During the evaluations, the flight test engineer acts as the flight director and confirms that the tests are performed properly, according to the established programme and to the agreed test procedures. From a large observer station with several data screens in the aircraft's cabin, this engineer makes rapid and detailed notes on the area of responsibility in-flight.

Afterwards, this engineer will compile the flight crew report using detailed logs kept during testing, which will be analyzed to establish where – if at all – it differs from anticipated findings.

AN INVALUABLE COMPONENT

An Airbus test pilot plays a number of crucial roles during development and testing of new aircraft, beginning with key support in the cockpit's design and followed by many hours in a series of simulators – first with a research version, and then performing a "virtual flight campaign" in the systems integration test bench (also known as the "Iron Bird.")

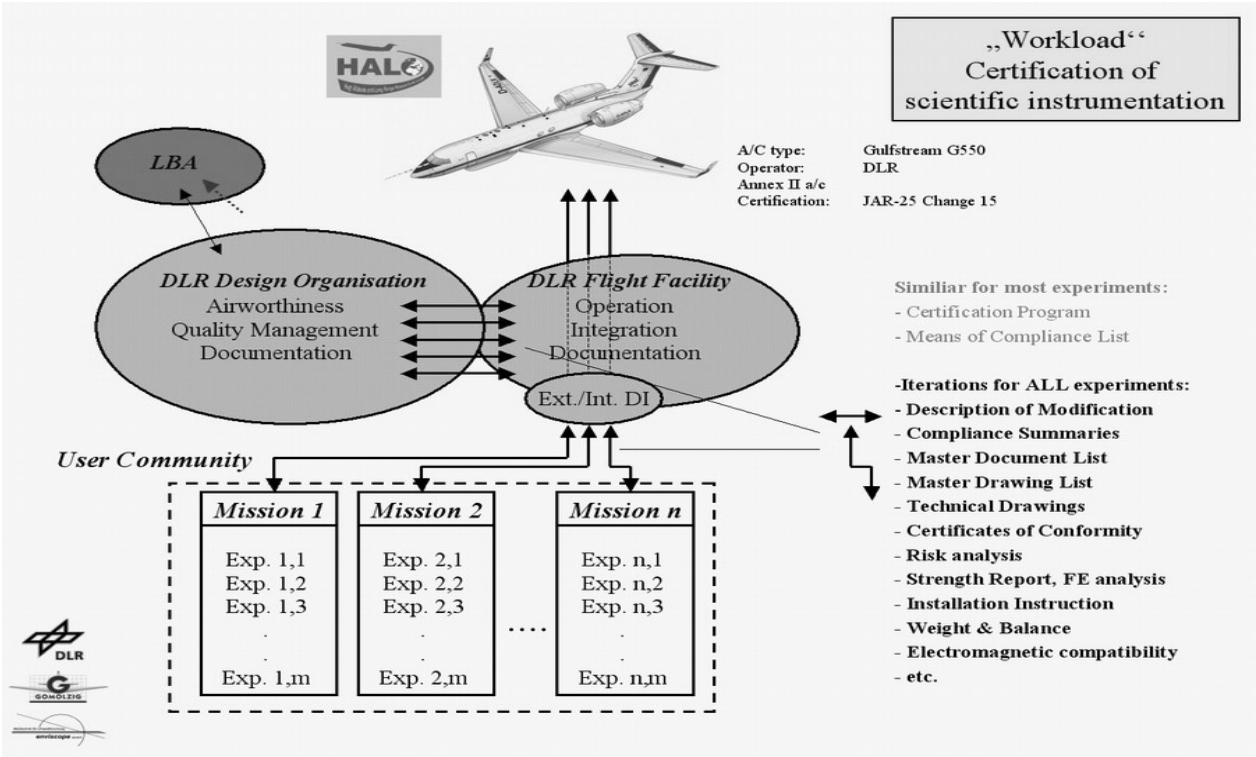
For an aircraft's first flight, the aim is to validate the aircraft's basic handling qualities, and begin measuring performance – including its fuel consumption and cruise efficiency. The test pilots provide vital operational insight so that any differences in handling between the computer model, simulators and actual aircraft can be identified for fine-tuning of the controls. During future evaluations, the pilots will validate the aircraft throughout its normal flight envelope, and to the operational limits.

Even after an Airbus aircraft achieves its certification, a test pilot's job is not complete. When each jetliner rolls off an Airbus production line, it is they who will conduct its first flight, as well as the customer acceptance flight for handover to its new owner.

Ex. 1. Answer the questions:

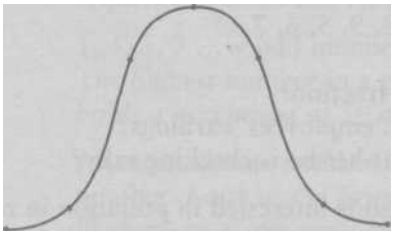
1. What does aircraft testing determine?
2. What are fatigue tests?
3. What is cruise efficiency?
4. What are operational limits of an aircraft?

Ex. 2. Describe the testing procedure as it represented here:



Ex. 3. What tests has TsAGI performed for components of Irkut MC-21? What are the goals of these tests?

Basic statistical terms



Six children are 7, 8, 8, 8, 11 and 12 years old. Their **average** age is 9 years old (the **sum** of their ages divided by six). The **mode** (the most frequent value) is 8. The **median** is 9.5 (the **halfway point** between the two extremes of the **range).**

A **normal distribution** of data means that most of the examples in a **set of data** are close to the average, while relatively few examples tend to one extreme or the other. Normally distributed data shown on a chart will typically show a **bell curve.** It will often be necessary to work out the extent to which individuals **deviate[1] from the norm[2]** and to calculate the figure that represents **standard deviation[3].**

Statisticians are often concerned with working out **correlations[4]** - the extent to which, say, left-handedness **correlates with** intelligence. They must ensure that any data they collect is **valid,** i.e. that it is measuring what it claims to measure - all the subjects in the **sample[5]** must be appropriately and accurately assessed as left- or right-handed, for example. The figures must also be **reliable,** i.e. they would ' be **consistent[6]** if the measurements were repeated. Usually, statisticians hope that their calculations will **show/indicate' a tendency,** e.g. that left-handed people will be shown to be **significantly[7]** more intelligent than right-handed people.

[1]differ [2] the average [3] average difference from the norm [4] connections, often as cause and effect [5] the subjects of the experiment or group representing the total population measured [6] the same [7] noticeably

A probability[1] problem

Notice the vocabulary in this problem from a statistics textbook.

Sue picks a card **at random**[2] from an ordinary pack of 52 cards. If the card is a king, she stops. If not, she continues to pick cards at random, without replacing them, until either a king is picked or six cards have been picked. The random **variable**[3]**,** C, is the total number of cards picked. Construct a diagram to illustrate the possible **outcomes**[4] of the experiment, and use it to calculate the **probability distribution**[5] of C

---

[1] likelihood of something happening [2] by chance [3] number or element of a situation that can change [4] results [5] assessment of probabilities for each possible value of C

Other useful nouns for talking about statistics

In a class of 8 women and 4 men, what proportion[1] are male? Answer: one third
In the same class what is the female to male ratio[2]? Answer: 2:1
The figures show a trend[3] towards healthier eating habits.
The study investigates the increase in the **volume**[4] of traffic on the roads.

[1] number compared with another number [2] relationship between two numbers showing how much bigger one is [3] change in a particular direction [4] amount, quantity

> *We say 10 **per cent** (NOT ~~the~~ 10 ~~per cent~~ or 10 ~~percentage~~) of students got an A for their exam but the **percentage** of students achieving an A has increased.*

Ex. 3. Use the correct form of the words in the box to complete this text:

distribute trend significant probable random correlation outcome vary

Life insurance companies base their calculations on the laws of..... , that is they assess the likely ..... , given the different ..... such as age, sex, lifestyle and medical history of their clients.The premiums are therefore not chosen at…… but are carefully calculated.The of ages at which death occurs and causes of death are studied to see if they ……. with other factors to be taken into account in setting the premiums. Naturally, the companies also monitor social …….. and react to any changes which might ... …...affect mortality rates.

Ex. 4. Answer the questions:

1 There are 12 male students and 6 female students in the class. What is the ratio of males to females? And what proportion of the class is male?
2 If I am collecting data on course choices among second-year undergraduates and

my sample is too small, what exactly do I need to do?

3 If 20 out of 200 students fail an exam, what proportion, in percentage terms, failed?

4 If the average score in a test is 56, and Barbara scores 38, by how many points has she deviated from the norm?

5 What does standard deviation tell us? (a) What the standard of something is, (b) what the norm is, or (c) what the average difference from the norm is?

6 If a general survey of teenage eating habits asks questions about what teenagers eat for breakfast and lunch, is the survey likely to be valid?

READING 2

Antonov-158 hot-and-high testing complete

At the end of November 2013, the Antonov design house issued a statement that its specialists were preparing documents that would later be submitted to the aviation authorities with request for complementary certificates uplifting current operational limitations for the An-158. The effort is aimed at winning permits for commercial operations out of hot-and-high airports for this hundred-seat jetliner. Russia's leasing company Ilyushin Finance Co. (IFC) holds larger orders for the Antonov An-148/158 large regional aircraft family.

According to the contract deliverable examples of the An-158 going to Cuba, must be able to operate from airports with elevation above the mean sea level of no less than 3,000 meters. In order to confirm the airplane's compliance with this customer requirement, the sides agreed to carry out proof testing on the third deliverable example of the An-158.

During preparation phase engine developer Ivchenko Progress and engine manufacturer Motor-Sich conducted a joint study into hot-and-high capabilities of the airplane. Jointly they come up with a suggestion to break the flight test campaign into two phases. First is to conduct ground runs at an airport with the elevation of 3,000 meters, and – should those come to expectations – to proceed with tests at another airport, with elevation of 4,000 meters. The Cuban side accepted the plan.

The first phase of trials took place in Ecuador in the period of November 8-14, 2013. A number of tests were done at the airport of Latacunga. This place had been previously used to conduct similar testing on the Ilyushin-96 and Tupolev-204 jetliners. The airport of Latacunga has elevation over the sea level of 2,806 meters. During testing ambient air temperatures fluctuated between +11 and +21 degree Celsius. Deviation from the International Standard Atmosphere (ISA) varied between +8 and +18 degrees.

The work at Latacunga was to get the engines and auxiliary power units (APU) starting, and doing so with a large variety of settings and adjustments. Various models of aerodrome power units were tried to get the engine starting. A total of 28

successful engine starts were achieved. In the process, a thorough assessment was done on all aircraft systems.

During testing, the industry team and the inspectors watched closely parameters of the engines running at normal modes and going through interim regimes, as well as parameters of the lubrication and other onboard systems. At this stage of trials, no deviation from normal functioning was registered, as far as avionics, air conditioning and other onboard systems are concerned. The inspectors present at Latacunga were able to make sure that all onboard systems of the airplane functioned as per description in the manufacturer's manuals.

The airplane showed itself very well, for it operated in strict compliance to the manuals.

In the period of November 15 -22, the international airport of La Paz, serving the capital city of Bolivian Republic, provided testing grounds for the An-158. This airport has elevation above the mean sea level of 4,058 meters.

In addition to the higher elevation, the move to Bolivia brought about an increase in the ambient air temperature. The actual readings there varied between +10 and +18 degree Celsius, but after being adjusted to the International standard atmosphere (ISA), the temperature rose by +21… +29 degree Celsius and almost to the maximum advertized temperatures in the aircraft guiding documents (ISA+30). All this created a much more demanding environment as compared to that in Latacunga. It is well known that the thrust of dual-flow turbofans with high-bypass ratio – and the D-436 is one of those – depends on altitude and ambient temperature, with its factual readings going down as the former and latter grow.

Again, the work on the airplane commenced with some ground testing. The engines proved their merit by switching on and off smoothly in all cases, for a total of 52 starts done at La Paz. Together with those done at Latacunga, the grand total comes to 80. Hot and cold engines were started, with poor and rich settings of the fuel mixture.

When the temperature of hot gases inside the motor was in the region of 150 degree Celsius (a practice equivalent to "starting a hot engine"), the power plant sometimes failed to start. This made Antonov, Ivchenko Progress and Motor-Sich to issue a note for the airlines operating the type. The doc notifies them that in the conditions similar to those observed at La Paz, the D-436 engines, after being switched off, need to cool down to 110-120 degrees Celsius in order to get sufficiently cool for a reliable starting.

Having completed the ground runs, the team proceeded to flight trials. In accordance with the original schedule, a total of five test sorties were made. The test pilots performed several passes over the runway during each flight, in order to attest aircraft performance in various flight configurations (clean, flaps down, flaps fully down) and conduct checks for proper functioning of onboard systems. Real-life assessment was given to various possible cases, including partial loss of thrust in a simulated engine failure. Takeoff performance of the aircraft was thoroughly accessed, including rejected (aborted) and continued takeoffs after a simulated failure

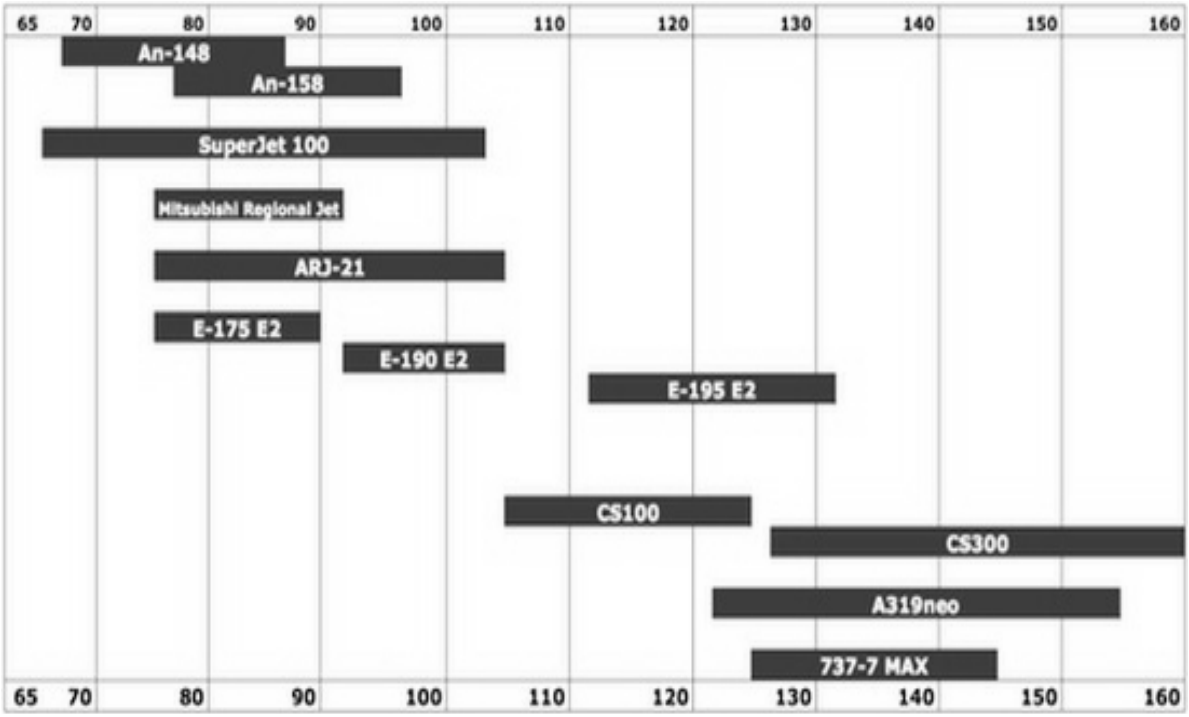
of the critical engine. In other words, the test pilots evaluated behavior of the aircraft in a number of situations that might be observed in everyday airline practice.

The data gathered during the test campaign provides sufficient ground to assert that the real [factual] field performance of the An-148/158 family aircraft comes fairly close to the figures given in the airplane's Flight Manual. In particular, the data collected provides proof to the manufacturer's early promise to the customer that the An-158 can safely operate out of the airport with elevation of 4,000 meters above sea level with the manufacturer-specified gross weight for the given atmospheric conditions.

Ex. 5. Answer the questions:

1. What is the market niche for Antonov-158?
2. Why is certification of aircraft supposed to be so significant?
3. Why did the producer want to get an additional certificate for the aircraft?
4. How did the airplane show itself at the tests?
5. Has the test proved that the real field performances of the aircraft are in accordance with the Flight Manual?
6. What are the advertised abilities of Antonov-158?
7. What aircraft producers are the rivals for Antonov-158?

Aircrafts according to their seat capasities:



READING 3

Aircraft fatigue
The Difference Engine: Old before their time
Apr 15th 2011, 16:15 by N.V. | LOS ANGELES

TAKE a paper-clip and straighten it out. Using just thumbs and fingers, bend it in the middle to form a right-angle. Then, at the same place, bend it back to form a right-angle in the opposite direction. Do that half a dozen times or so and the paper-clip will snap in two. The extraordinary thing about “metal fatigue” is that it takes only a few pounds of force applied repeatedly back and forth across the paper-clip’s thickness to break it. To snap a typical paper-clip in tension—by clamping one end and tugging on the other—would require a force of 50lbs or so.

The first to appreciate the catastrophic effects of stress-reversals were railway engineers in the 1840s. Broken axles caused countless accidents as railway lines crept across Europe and America. Being simply a rotating horizontal shaft with a heavy vertical load on it, early locomotive axles suffered severe stress reversals in their outer skins with every rotation. By the 1850s, the steam-engine pioneer James Braithwaite had coined the term “metal fatigue”.

The irony is that the lesson had to be relearned a century later. This time it was aircraft manufacturers who suffered the consequences. Their troubles began in the 1950s when they started flying higher and needed to pressurise the cabins of their passenger planes. Two de Havilland Comet aircraft—the world’s first commercial jet—broke up mysteriously in mid-air in 1954. Though it all but destroyed de Havilland, the disaster gave the industry crucial insights into how metal fatigue can rip an aircraft suddenly apart. It also taught them how to prevent stresses concentrating at certain points, thereby triggering a fatal tear in the aircraft’s skin.

Over the past few weeks, aircraft engineers have found they do not know quite as much about metal fatigue as they thought. The source of the problem that forced the Boeing 737-300 used on the Southwest Airlines flight 812 from Phoenix to Sacramento to make an emergency landing on April 1st, following a five-foot rent appearing in the upper-fuselage skin, has flummoxed engineers and safety officials alike.

By all accounts, it should not have happened.

The Boeing 737-300 in question was only 15 years old when its skin peeled open along a riveted lap-joint while flying above 34,000 feet (just over 10,000 metres) with 118 passengers on board. The failure caused the cabin to lose pressure instantly and the oxygen masks to deploy. Within minutes, the pilot had got the plane down to 11,000 feet, where the passengers could begin to breath normally again. Shortly thereafter, the plane landed at a military base without further mishap or serious injury.

Much has been made of the 737-300’s age. But a commercial aircraft that is 15 years old is still in its prime of life. The real issue is the way Southwest works its

fleet so aggressively, specialising in rapid turnarounds. As a result, the plane concerned had accumulated nearly 40,000 flight cycles. An aircraft of that type and age would normally be expected to have logged little more than 30,000 flights.

Over the years, Boeing has probably accumulated more data on the fatigue life of airframes than any other plane-maker. After modifying the lap-joints in the roof following some early failures, the company felt confident that its older 737s would be good for 60,000 cycles before they needed to be thoroughly tested for hairline cracks that could lead to fatigue failures. As an emergency precaution, the Federal Aviation Administration has now said that carriers operating 737s with the same lap-joint design along the roof should inspect the planes after no more than 30,000 cycles. Planes that have already logged 35,000 flights or more have to be inspected immediately.

What makes aircraft fatigue such an dark art is that, unlike standard tests done in a laboratory, an aircraft's structure has to endure a complex, mostly random, set of static as well as cyclical stresses when in service. Impurities in its material affect the fatigue life. So does the material’s hardness, and especially its surface condition. How the components were heat-treated in the factory is another factor. The operating temperature makes a difference, too. Worse still is the structural component’s shape: notches and sharp corners create concentrations of stress that can initiate cracks. The square windows on the original Comet jetliner were found to be the primary cause of its disintegration. Airliners have had windows with rounded corners ever since.

All things being equal, which they rarely are, the higher the cyclical stress level on an aircraft structure, the fewer the number of reversals it can withstand before breaking. As the stress level is gradually reduced, there comes a point where a structure can survive enough stress reversals to exceed the component’s expected life. By convention, the stress level that allows a component to survive 10m reversals is called its “endurance limit”. Unfortunately, the endurance limit is not some absolute—nor even repeatable—value. When tested, identical samples can give widely different results.

So what is an aircraft engineer to do? First, perform thousands of fatigue tests in the laboratory and then take a probabilistic view of things. Second, adjust the statistical results downward to account for differences between test conditions and the real world. Third, factor in all the known statistical variations of the material itself. The aim, as always, is to ensure that unpredictable factors do not reduce the fatigue life of a structure to less than that required.

PART 9

AIRCRAFT PRODUCERS' COMPETITION

Bombardier CSeries: How will Boeing/Airbus Duopoly Respond?

Curry W. Hilton
February 2013

The much-anticipated Bombardier CSeries commercial airplane line provides a uniquely positioned offering, **boasting** 20% fewer **CO2 emissions**, 20% fuel savings, and 15% less cash operating expenses than comparable alternatives. With expected fulfillment of initial CSeries orders occurring in mid-to-late 2013, Bombardier poses a significant threat to the once dominated duopoly market of passenger fleet 100 to 149 seat capacity aircrafts. Over the next decade, Bombardier's CSeries product line specifically targets Airbus' A320 and Boeing's 737 aircrafts with the intentions of capturing at least 50% of current market share enjoyed by the heavy hitters.

Airline manufacturing analysts predict a demand of approximately 34,000 new commercial aircraft over the next 20 years. The most fruitful subset (68%) of the entire commercial fleet market rests in the 100 to 149 seat capacity segment. With Bombardier inching at the heels of the big two and commercial airlines demanding more efficient airplanes, how will the market landscape adjust and distribute the market share up for grabs?

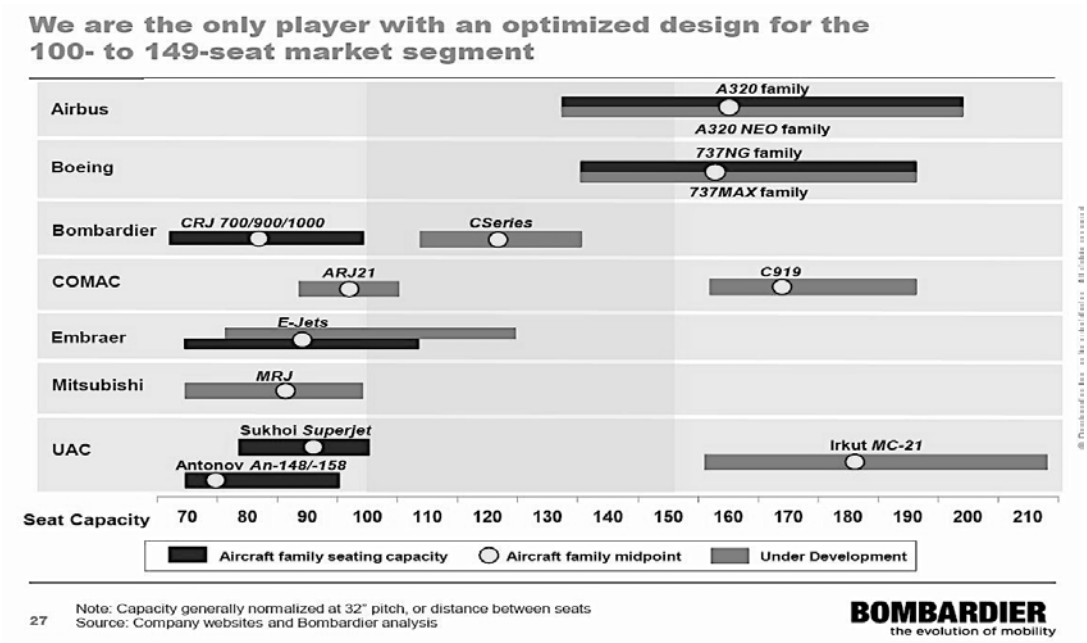
The Bombardier CS100 and CS300 are roughly priced at list around $65 and $75 million, respectively, which falls almost 18% below the list price of the Airbus A320 and 5% below the list price of the Boeing 737-800.

Bombardier CSeries aircraft is positioned as value advantaged in the commercial airplane manufacturing market space. Since the CSeries offerings deliver superior value to customers relative to competitors at lower list prices, Bombardier's go-to-market pricing strategy is consistent with a penetration pricing methodology. Bombardier's aggressive entry tactics for the CSeries aircraft offers a credible threat to existing Boeing and Airbus revenue.

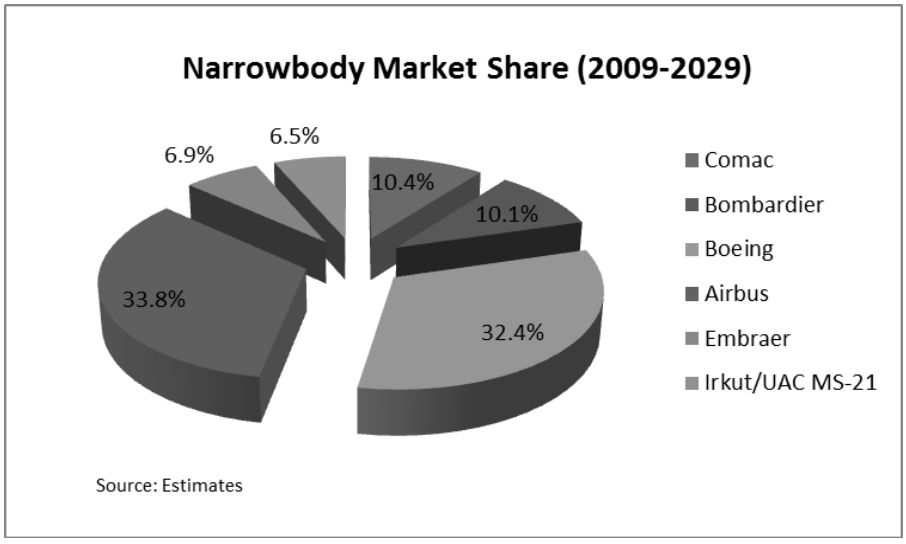
With over 382 commitments for CSeries aircraft from customers including Korean Air, Luxair, and airBaltic, Bombardier proves it is serious about delivering cost-effective airplanes to consumers seeking better margins. Rick Erickson, an independent aviation analyst, speaks of the Bombardier CSeries, "Once it's up in the air and they start proving the plane's cost-benefit — they're arguing, 20% fuel savings — I think we're going to see airlines fairly quickly start moving towards the aircraft." The resilience of the air transportation market even in economic downturns, estimated 5% annual growth in world passenger air travel for the next 20 years, and passenger airlines seeking operating cost cuts, yields promising futures for airline manufacturers.

The pertinent question at hand is this: how will the dominant market powers, Boeing and Airbus, respond to a fringe firm encroaching on their market share and revenue? Will the larger relative market cap companies, Boeing and Airbus, choose "predatory" tactics to combat such advances by Bombardier? And by what means will Boeing and Airbus approach this market invasion? Several countering techniques could be employed to mitigate market share loss including price concessions to meet the competition, volume and customer loyalty discounts, or other promotional incentives.

Ex. 1. Describe the situation in the narrowbody aircraft market and Bombardier's choice of the market segment. How would you evaluate the prospects for Irkur MC-21 and Suchoi Superjet in the market?



Ex. 2. How would you comment these market shares of aircraft producers?



COMPARISON AND CONTRUST

express/on	express/on
Problems in pain measurement: **a comparison between** verbal **and** visual rating scales.	Between is used when two different things are being compared. *Of* is used when different examples of the same thing are being compared.
A **comparison of** different methods and approaches to homeschooling.	
Mobility in the EU **in comparison with** the US.	*With* and *to* are both used nowadays with similar meanings in these expressions. American English generally prefers *compared with.*
The effects of risk on private investment: Africa **compared with** other developing areas.	
An exploration of the average driver's speed **compared to** driver safety and driving skill.	
Reduced rate of disease development after HIV-2 infection **as compared to** HIV-I.	This expression indicates that there is indeed a difference between the things which are compared.
Some psycho-physical **analogies between** speech and music.	Comparisons between things which have similar features; often used to help explain a principle or idea.
Differences and **similarities between** mothers and teachers as informants on child behaviour.	Between is used with *difference* when different groups of people or things are compared. *In* is used when different aspects of one thing are compared (here 'ethical perceptions').
Differences in ethical standards between male and female managers: myth or reality?	
Children's understanding of **the distinction between** real and apparent emotion.	A distinction is a difference between two similar things.
Is globalisation today really **different from** globalisation a hundred years ago?	*Different to* is also used in UK academic usage, but *different from* is much more frequent. *Different than* is often found in US English.

Useful linking expressions for comparison and contrast:

44% of the male subjects responded negatively. **Similarly**, 44% of the female subjects said they had never voted in any election, *[likewise* could also be used here].

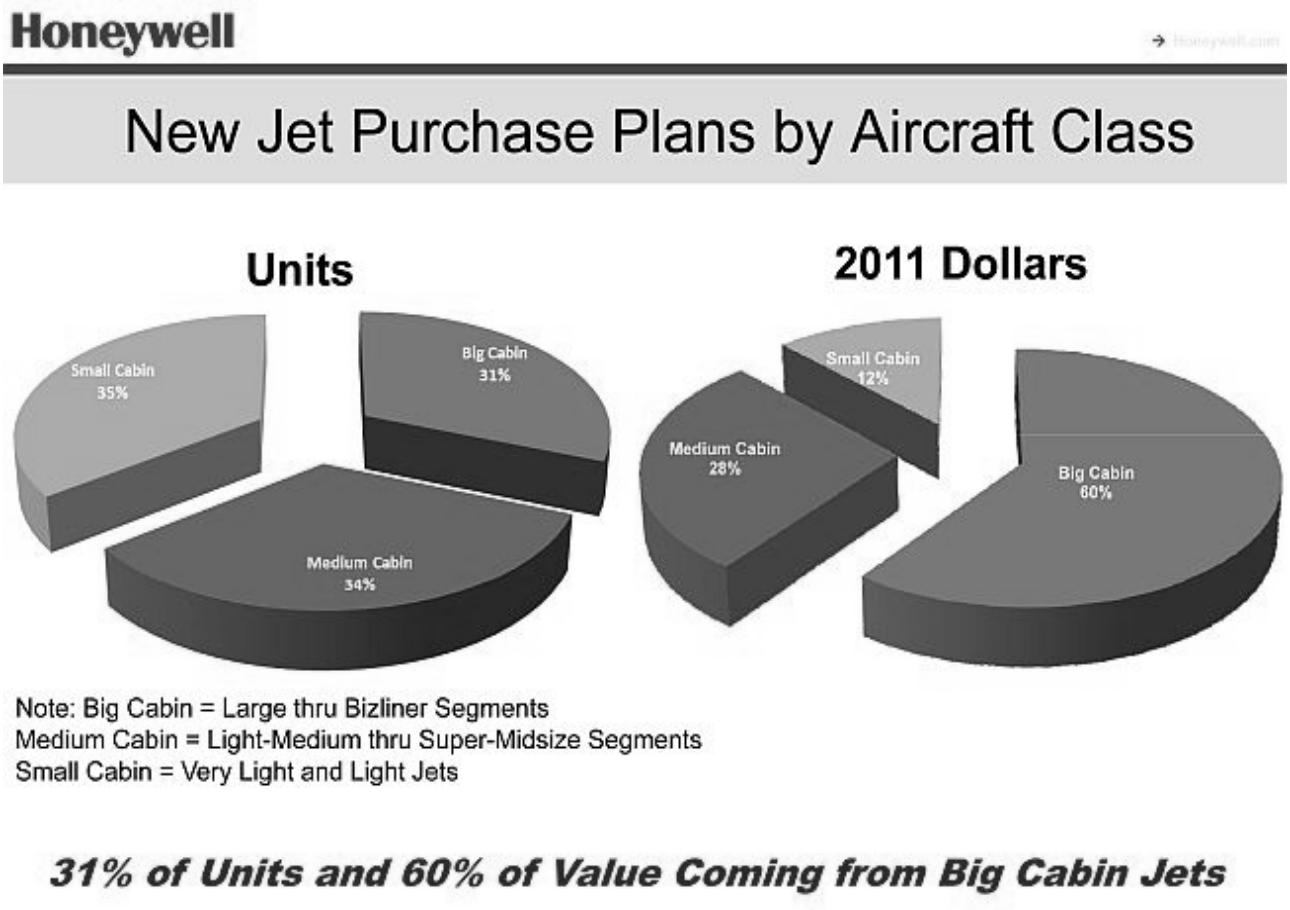
There is a **contrast between** fiction and reality.

Older teenagers were found to be more likely than younger teenagers to purchase music CDs.
Conversely, younger teenagers purchased more video games, [in an opposite way]
Unlike Scotland, Irish mortality rates were relatively low for such a poor country.
Verb endings in some languages can show present, past or future tense, **whereas** in English, verb endings can only show present or past, *[while* could also be used here; note the comma].
A recent study suggested that building a network of good friends, **rather than** maintaining close family ties, helps people live longer into old age.
On the one hand, critics accuse the police of not protecting the public from crime.
On the other hand, people also complained that the police were too oppressive, [used to compare two different facts or two opposite ways of thinking about a situation]
In the north, the rains are plentiful. In the south **the reverse is true** and drought is common.

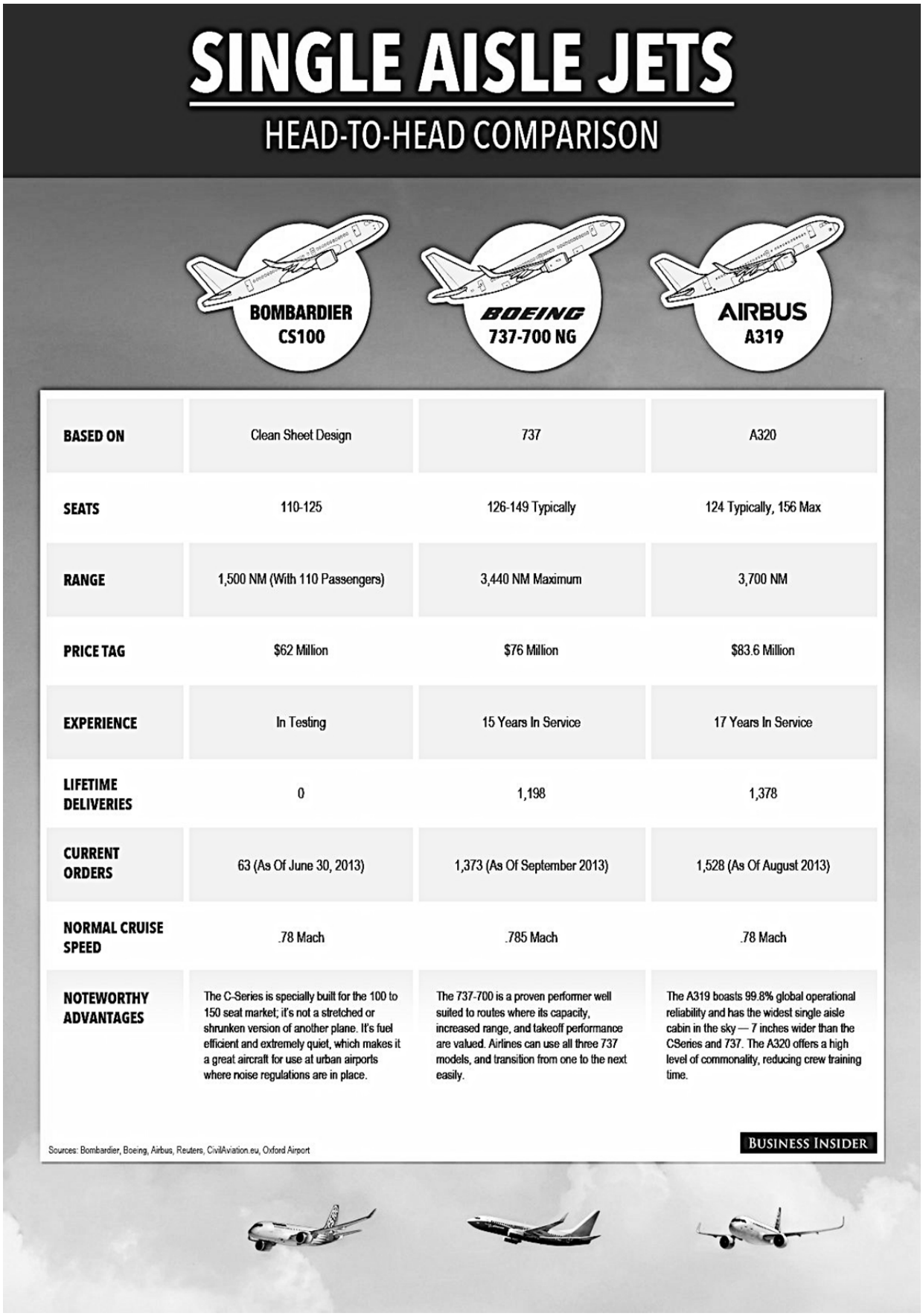
Ex. 3. Complete these sentences about comparing and contrasting.

1. The study looked at the different life chances of working-class children_____ to those of middle-class children.
2. The results showed a marked _____ *(three possible answers)* between the two groups of plants being tested.
3 The title of her paper was: 'Retail price differences in large supermarkets: organic foods to non-organic foods'.
4 My project was a _____ of different styles of industrial architecture in the late 20' century.
5 The result of the second experiment was very different _____ that of the first.It would be interesting to do a _____ between the musical skills of teenage girls and those of teenage boys.
7. The physicist drew an_____ between the big bang and throwing a stone into a pond.
8. Gronsky believes cold fusion will soon be achieved in the laboratory _____, his colleague Ladrass believes cold fusion is simply theoretically impossible

Ex. 4. Compare the diagrams and explain the difference:



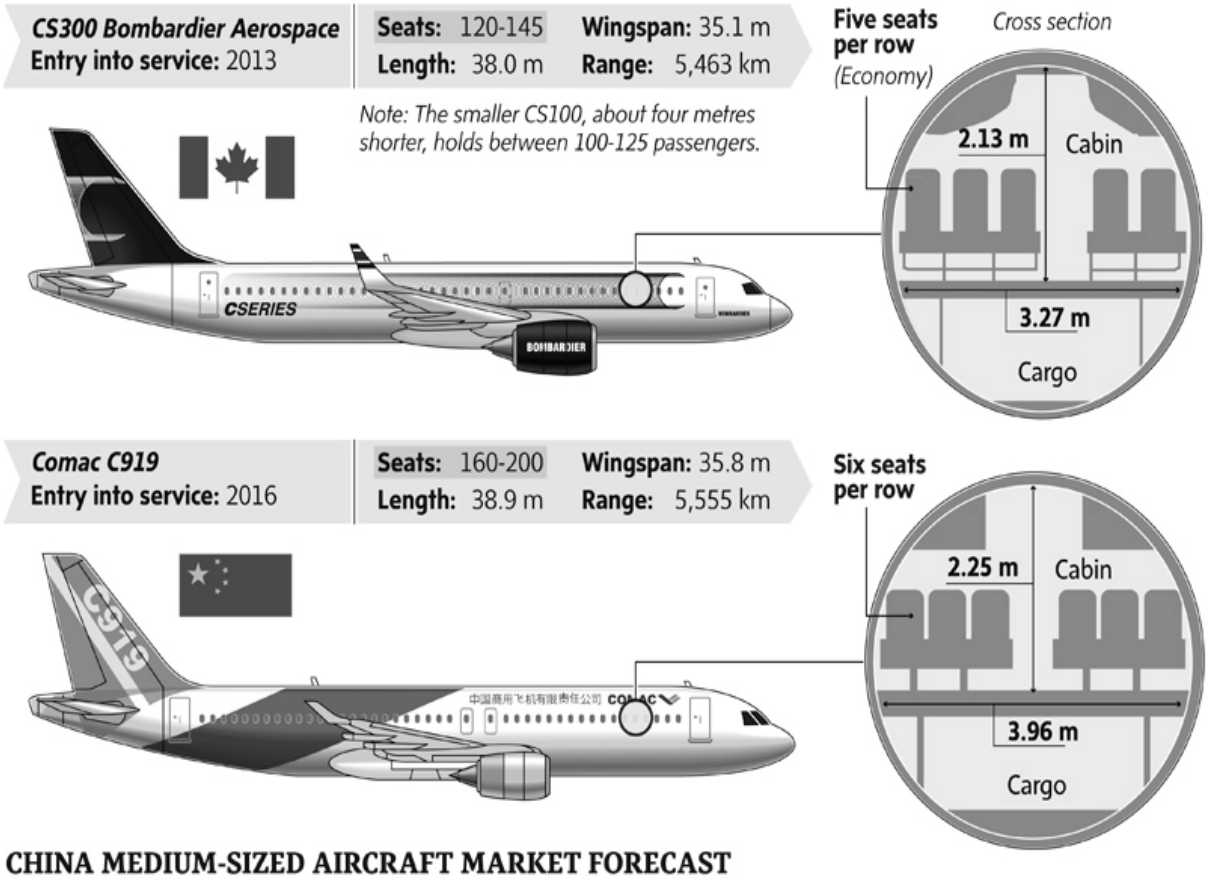
Ex. 3. Compare the advantages and disadvantages of the aircraft:



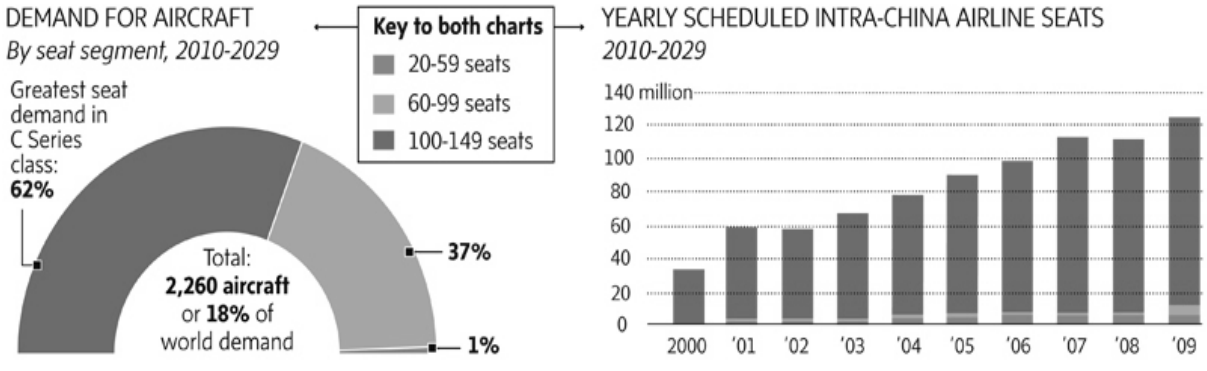
Ex. 5. Why does Comac C919 seem to be more attractive to China than Bombardier CS 100?

The friendly skies

Bombardier's deal with Comac is part of its larger strategy to find a foothold for its C Series aircraft in the Chinese market, where there are currently few planes in the 100-149 seat segment. China is expected to build 100 airports over the next 20 years.



CHINA MEDIUM-SIZED AIRCRAFT MARKET FORECAST



THE GLOBE AND MAIL » SOURCES: BOMBARDIER; COMAC; OAG AVIATION SOLUTIONS; GRAPHIC NEWS

READING 2
CSeries sales growth remains slow, small market size with fierce competition

Many industry observers and analysts have expressed disappointment in the relatively slow sales pace for the CSeries, with the aircraft adding around 50 new orders per annum which is often surpassed by Boeing and Airbus in a single orders). But this relatively slow sales growth trend belies an underlying point: that the entire narrowbody market between 100 and 150 seats is undoubtedly smaller than it was in the last round of narrowbody purchases, the one that begets the 737-700 and A319.

Comparing the orderbooks for the next generation of products from all four major manufacturers in the segment (Boeing, Airbus, Embraer, and Bombardier), with the Brazilian airframer not winning any firm orders for its E-190/E-195s, as well as for its re-engined E-Jets, Bombardier in fact has a sizeable orders lead over its 3 nearest competitors and many of the E-Jet sales occurred prior to the formal launch of the CSeries – since then the CSeries has outsold the E-Jets, including at Farnborough 2012 where Embraer won orders for just 5 E-190s from China's Heibei Airlines. While *Aspire Aviation* cautions that many of the orders that were placed for the 737 MAX and A320neo are easily convertible into different variants of the family, the fact that the CSeries has outsold its competitors is a very positive sign. At the same time, even though there are more than 2,500 737-700s and A319s in operation today, the cumulative size of the market for the next round of replacements is likely to be closer to 1,500 aircraft, as the new market reality of fuel prices above US$70 per barrel (West Texas Intermediate measure) has forced many airlines to elect for replacement aircraft in the 150-seat plus 737-800 and A320 range.

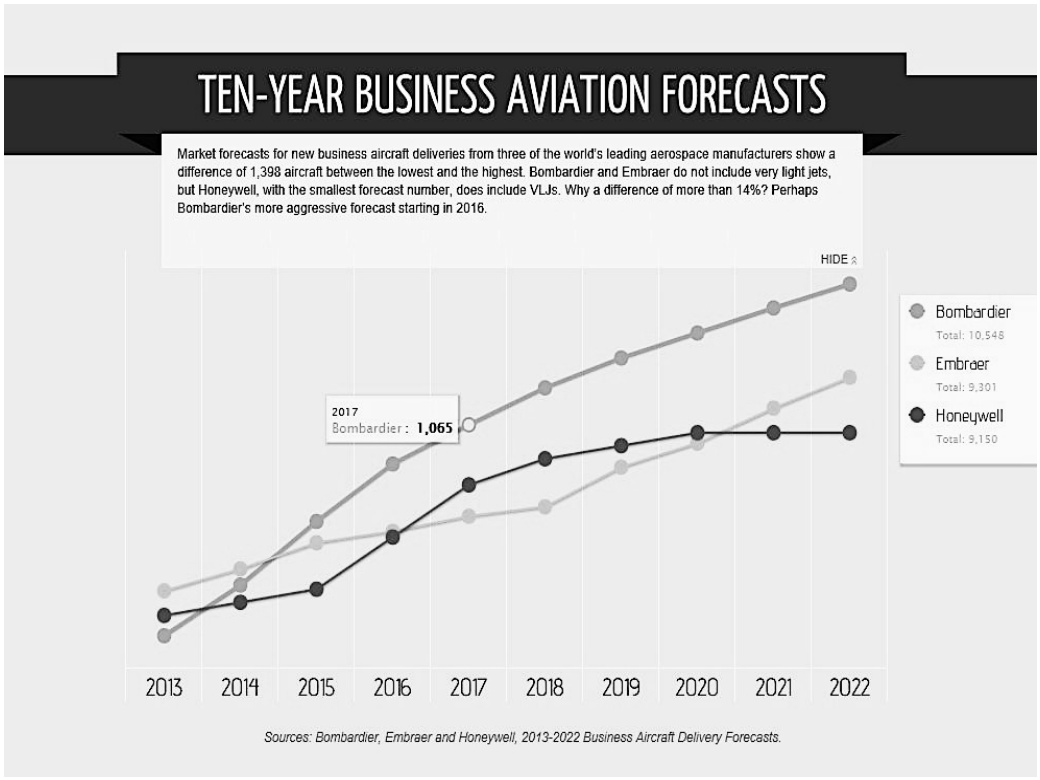
Given the CSeries' advantage over its less optimised competitors, there is little shock that it has outsold all competing types. Already, numerous airlines have expressed interest in the CSeries, which in addition to double-digit maintenance cost reductions, is also priced more cheaply by 10%-30% versus Boeing and Airbus' re-engined products.

The CS300 has a major advantage in fuel burn over both the Boeing 737 MAX and the Airbus A320neo while simultaneously possessing much lower maintenance costs and a roughly US$20 million cheaper price tag. Some of the advantage in operating cost is mitigated by Airbus and Boeing discounts and financing, and some of the fuel burn advantage will be negated as Airbus, Boeing, CFM, and Pratt & Whitney continue to refine their various products. But all indications are that the CSeries will have between a 3.5%-5% advantage in seat-mile costs (cost per available seat mile, CASM – subject to the variability of pricing on the part of Airbus and Boeing), which is right at the margin where the benefits of commonality are outweighed by the superior efficiency of the all-new product. Especially for smaller customers of the 737-700 and A319 such as those with less than 20 of the type in their fleets whose orders will likely not have enough critical mass with Airbus or Boeing to secure attractive enough pricing to overcome the CASM disadvantage, the

CSeries will be the frontrunner to win many of these orders.

At the lower end, the CSeries has an even more pronounced advantage, and between it and the CRJ1000, Bombardier has the two best products in the 90-110 seat market from an operating cost perspective. The CRJ1000 has become much more competitive in recent years, winning a recent head-to-head battle against the E-190 for an order for 18 frames from Garuda Indonesia. With current operators Brit Air and Air Nostrum both stating that CRJ1000 cost figures are coming in even better than Bombardier's promised numbers, of which the figures that *Aspire Aviation's* models are closest to given that *Aspire Aviation* is unable to substantiate the claims from Air Nostrum/Brit Air, Bombardier now has an opportunity to "tag-team" customers by offering them a limited number of CRJ1000s for interim lift, then selling them CS100s for 2016 and beyond. This would also allow Bombardier to maintain CRJ production as it waits on further orders from the coming round of 50-seat jet replacement at the major US airlines.

Ex.6. Comment this forecast:



PART 10
AIRPORT SECURITY

Let us start with the obvious: in the entire decade or so of airport security since the attacks on America on September 11th 2001, the Transportation Security Administration (TSA) has not foiled a single terrorist plot or caught a single terrorist. Its own "Top 10 Good Catches of 2011" does not have a single terrorist on the list. The "good catches" are forbidden items carried by mostly forgetful, and entirely innocent, people—the sorts of guns and knives that would have been just as easily caught by pre-9/11 screening procedures. Not that the TSA is expert at that; it regularly misses guns and bombs in tests and real life. Even its top "good catch"—a passenger with C4 explosives—was caught on his return flight; TSA agents missed it the first time through.

In previous years, the TSA has congratulated itself for confiscating home-made electronics, alerting the police to people with outstanding misdemeanour warrants and arresting people for wearing fake military uniforms. These are hardly the sorts of things we spend $8 billion annually for the TSA to keep us safe from.

Don't be fooled by claims that the plots it foils are secret. Stopping a terrorist attack is a political triumph. Witness the litany of half-baked and farcical plots that were paraded in front of the public to justify the Bush administration's anti-terrorism measures. If the TSA ever caught anything even remotely resembling a terrorist, it would be holding press conferences and petitioning Congress for a bigger budget.

The argument that the TSA, by its very existence, deters terrorist plots is equally spurious. There are two categories of terrorists. The first, and most common, is the amateurs, like the guy who crashed his plane into the Internal Revenue Service building in Austin. They are likely to be sloppy and stupid, and even pre-9/11 airplane security is going to catch them. The second is the well-briefed, well-financed and much rare plotters plotters. Do you really expect TSA screeners, who are busy confiscating water bottles and making people remove their belts and shoes, to stop the latter sort?

Of course not. Because the TSA's policies are based on looking backwards at previously tried tactics, it fails against professionals. Consider this century's history of aircraft terrorism. We screened for guns and bombs, so the terrorists used box cutters. We confiscated box cutters and corkscrews, so they put explosives in their sneakers. We screened footwear, so they tried to use liquids. We confiscated liquids, so they put PETN bombs in their underwear. We rolled out full-body scanners, even though they would not have caught the Underwear Bomber, so they put a bomb in a printer cartridge. We banned printer cartriges over 16 ounces—the level of magical thinking here is amazing—and surely in the future they will do something else.

This is a stupid game, and we should stop playing it. Overly specific security measures work only if we happen to guess both the target and the plot correctly. If we get either wrong—if the terrorists attack something other than aircraft, or use a tactic

we have not thought of yet—we have wasted our money and uselessly annoyed millions of travellers.

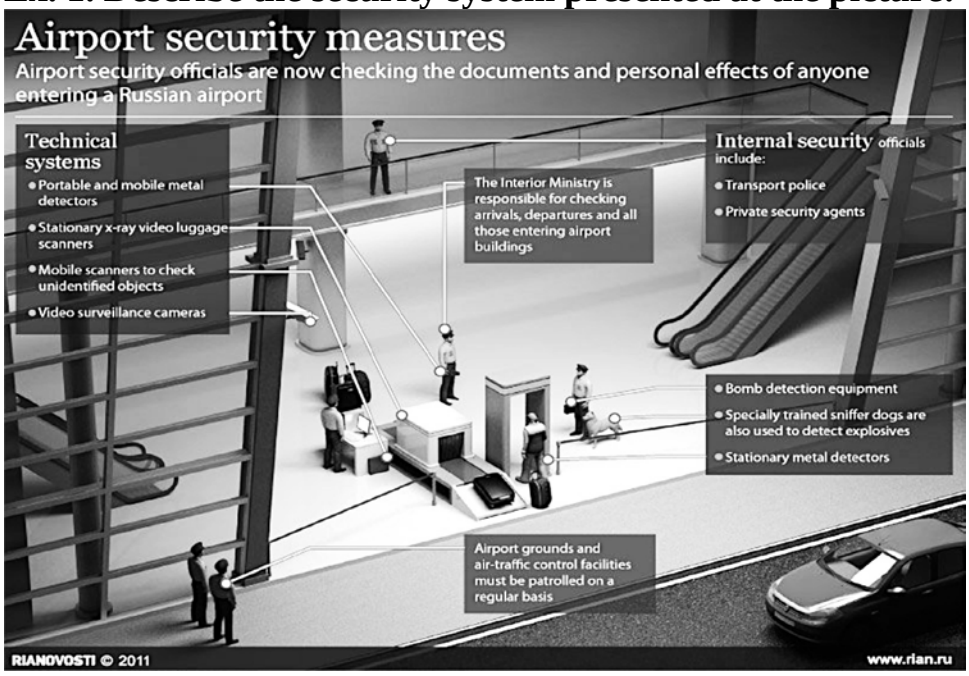
Airport security is the last line of defence, and it is not a very good one. If there were only a dozen potential terrorist tactics and a hundred possible targets, then protecting against particular plots might make us safer. But there are hundreds of possible tactics and millions of possible targets. Spending billions to force the terrorists to alter their plans in one particular way does not make us safer. It is far more cost-effective to concentrate our defences in ways that work regardless of tactic and target: intelligence, investigation and emergency response.

That being said, aircraft require a special level of security for several reasons: they are a favoured terrorist target; their failure characteristics mean more deaths than a comparable bomb on a bus or train; they tend to be national symbols; and they often fly to foreign countries where terrorists can operate with more impunity.

But all that can be handled with pre-9/11 security. Exactly two things have made air travel safer since 9/11: reinforcing the cockpit door, and convincing passengers that they need to fight back. Everything else has been a waste of money. Add screening of checked bags and airport workers and we are done. All the rest is security theatre. If we truly want to be safer, we should return airport security to pre-9/11 levels and spend the savings on intelligence, investigation and emergency response.

(**The Economist**, 20 March, 2012)

Ex. 1. Describe the security system presented at the picture:



Ex. 2. How have approaches to airport security changed through the years? How much is it efficient?


ALL JACKETS MUST BE REMOVED & X-RAYED.
SEPT 2004
New regulations required that passengers' jackets without metal in them still had to be removed and x-rayed, and passengers selected for secondary screening could be patted down.
VISITORS BANNED FROM PASSING SECURITY.
NO-FLY LIST BLUNDERS:
There is a No-Fly list, intended to prevent suspicious people from flying, but different people have the same name, so some high-profile individuals, including Senator Ted Kennedy, have found themselves blocked from boarding an aircraft at times.
In May 2005, a family was wrongfully removed from an overseas flight bound for Boston at Bangor, Maine, as one of the group's name turned up on a No-Fly list.
APPROVE
LIQUIDS MUST BE DUMPED.
2006
A plot to destroy airplanes using a combination of liquids is disrupted, prompting a ban on liquids over a certain volume on board airplanes. Passengers cannot carry liquids past security screening checkpoints or onto aircraft, this includes drinks, breast milk and even snow globes.
POLL: 3-1 FAVOR PROFILING.
If passengers fit a terrorist profile based on age, ethnicity and gender.

CHRISTMAS 2009

BOMB SMUGGLED ON PLANE IN UNDERPANTS.

Umar Farouk Abdulmutallab's attempted underwear bombing prompted many airports to began installing **full-body scanners**.

WHAT IS FULL-BODY IMAGING?

Invented in the 1990's, full-body scan image airport screening became a preferred way to provide security measures around the world. The technology is met with much criticism, however, since it essentially produces a nude image of passengers.

FULL-BODY SCANNERS MANDATORY!

2010

In a new attempt to curb terrorism on airplanes and in airports, the TSA announced that they plan on making full-body scanners mandatory. It's called "**full-body imaging**," and it's the latest indignity for air travelers.

THERE IS NOW ONE IN EVERY U.S. AIRPORT.

The total number of imaging machines is expected to near **1,000 by the end of 2011**, according to the TSA.

AGGRESSIVE NEW "PAT-DOWN" POLICY

for passengers who refuse the full-body scan. Screeners can use the front of their hands to touch passengers' **inner thighs**, **buttocks** and **breasts**.

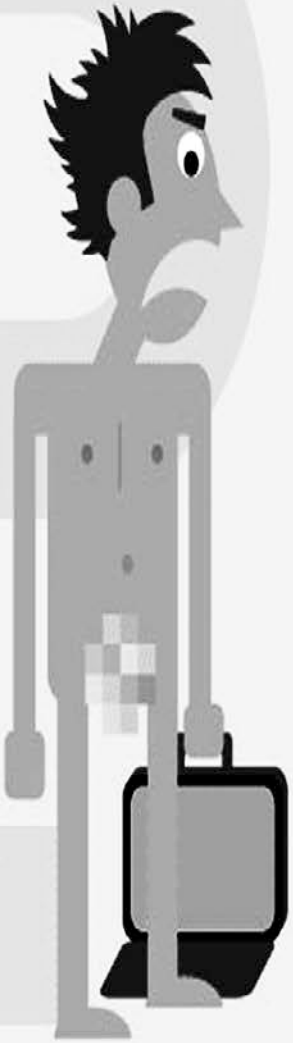
DO FULL-BODY SCANNERS CAUSE CANCER?

The TSA says the machines are safe, but backscatter technology raises concerns among some because it

NOV 16, 2010

100 IMAGES OF NAKED BODY SCANS LEAKED.

Technology blog **Gizmodo** released the images resulting in a huge uprising of the American public including a petition to stop the scanners and guy singing about it on YouTube. The images came from the **Electronic Privacy Information Center (EPIC)**, who obtained them from an Orlando courthouse scanner.



TAKE ACTION! NOV 24: NATIONAL OPT-OUT DAY.

NOV 24, 2010

Mark your calendar. Activists have spoken out and are designating Nov 24 as a National Opt-Out Day. Air travelers nationwide are encouraged to refuse the TSA's thorough pat-downs and body-scans in protest of their intrusive nature.

ARE WE SAFER NOW?

The TSA has spent roughly **$40 BILLION** dollars. Homeland Security's acting inspector general, Richard Skinner, says: **"The ability of TSA screeners to stop prohibited items from being carried through the sterile areas of the airports fared no better than the performance of screeners prior to Septmber 11, 2001."**

CLEAR ahead
Aug 8th 2011

CLEAR, the company specialises in biometric identity verification for airline passengers. At a time when "risk-based screening" (the use of intelligence and behaviour assessment to give each passenger a tailor-made security screening) is on the agenda after the decision of the Transportation Security Administration (TSA) to roll out a test programme in the autumn, CLEAR's modus operandi is worth an examination.

The biometric identification essentially replaces the role of the Transportation Security Officer (TSO). Bennet Waters, who spent four years working for the Department of Homeland Security, including one year with the TSA, is the president of CLEAR. He explained how the system works.

"The TSO uses a flashlight or some other means to attempt to verify the identification document [passport or driver's licence]," he said, "and then they make a subjective determination between you and the document: are you the person depicted? Thirdly they will compare the name on the boarding pass to the name on the identification document. We have automated that process and we have used biometrics to take the subjectivity out of it."

Mr Waters says that CLEAR membership, for an annual fee of $179, allows his customers to manage their time more effectively, since they don't have to allow for a potentially lengthy queue.

"In our experience the longest portion of the wait is not in the physical screening process, it's in the queue to get there," he says. By contrast, using CLEAR lanes takes 30-45 seconds from start to finish.

Verifying a passenger's identity is a core part of risk-based screening. After all it's no good using some fantastic piece of intelligence to put Joe Bloggs on the no-fly list if he's able to walk through security with a driver's licence that says he's John Doe. But Mr Waters reckons companies like CLEAR have another role to play in improving aviation security. The commercial data to which private companies have access, but which government entities like the TSA are not allowed to use in their risk assessments, can be vital—especially when dealing with individuals who have not previously attracted the government's interest ("clean skins").

"The clean-skin operator tends to live off the grid, in relative anonymity," Mr Waters says. "They tend not to use credit cards; they tend not to use the same cell phone for very long; they tend not to establish or maintain creditworthiness; they tend to pay cash, to move around a bit, etc. These are things that the private sector, using commercially available data, can assess about an individual. The government, at least in the US, cannot get into those data elements because of privacy restrictions."

An assessment combining commercially available data and government data would certainly provide the fullest picture of the level of security screening each

passenger needs. What will worry some people is how those two data sets are combined and who owns the process.

Mr Waters is confident it would work. “If you look at some combination of government data and commercially available data in a platform that keeps the data segregated and provides for the appropriate firewalls for privacy protection, you can begin to build a more fulsome picture of a traveller’s relative risk to aviation security.”

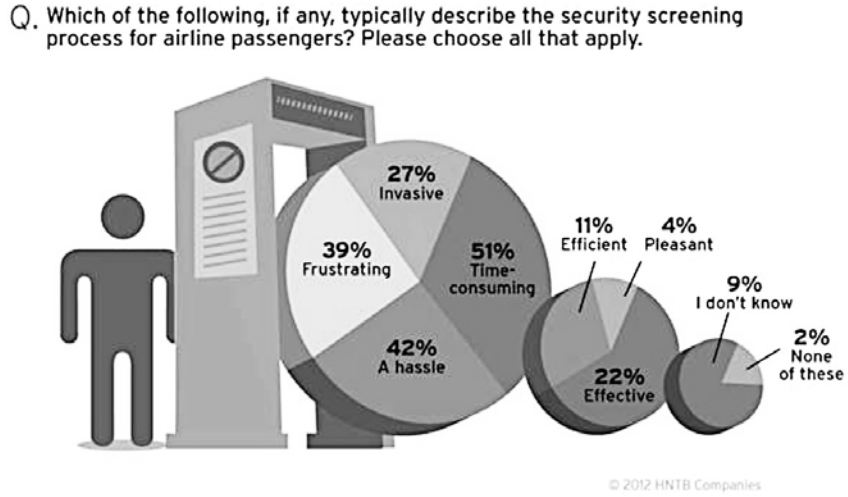
With such a system in place, a company like CLEAR could look at your "residential history, your work history, your credit-worthiness, how long you have been known to the commercial-data world" and then pass on to the TSA a judgment as to whether you are low-, medium- or high-risk. The TSA would use this assessment to work out how to screen you; it would not have access the original data itself.

If the TSA decides to go down the risk-based-screening route, then it does sound reasonable, if somewhat complicated, for a private company to help by applying commercially available data to the task. After all, the aim of a modern aviation-security procedure is to locate bad people, rather than bad things. But it would certainly give privacy campaigners something to worry about.

Ex. 3. Answer the questions:

1. What kind of innovative approach is used for the security system proposed by CLEAR?
2. Could be there any risk of leaking personal data through the system? Why?
3. Does the system increase or decrease your privacy? Is it good or bad?

Ex. 4. Discribe the attitude of the passengers to the security procedure according to the picture:



Commenting on others' views

No one can be completely **objective**[1] in their point of view. Inevitably, we all see things to some extent **subjectively**[2]. It is impossible to be truly **impartial**[3]. We tend **to be biased in favour of**[4] things we're familiar with and **prejudiced against**[5] things we have little experience of. Of course, everyone believes their own views are totally **rational**[6].

[1]not influenced by personal beliefs or attitudes, based only on facts [2]influenced by personal beliefs or attitudes [3]uninfluenced by personal beliefs or attitudes [4]showing an unreasonable liking for something based on personal beliefs or opinions; opposite = **biased against** [5]showing an unreasonable dislike for, based on personal beliefs or opinions (stronger and more pejorative than *biased);* opposite = **prejudiced in favour of** [6]based only on reason; opposite = **irrational**

People's views tend to change as they grow older and begin looking at life from a different **standpoint**[7]. Young people are more likely to be **radical**[8] but then become more **reactionary**[9] or **conservative**[10] with age, considering their younger opinions **immature**[11].

[7]set of principles or beliefs on the basis of which opinions are formed [8]believing that there should be extreme political or social change [9](disapproving) opposed to political or social change or new ideas [10]not inclined to trust change, especially if it is sudden [11](disapproving) lacking in experience; opposite = **mature**

word combination	example	meaning
to hold views	My grandfather **holds** some surprisingly progressive **views**.	has opinions
to adopt/take a stance	It is important that the university should **adopt** a principled **stance** towards research	take a position
to change/shift your position	Luisa was initially totally opposed to the idea but she has slightly **shifted her position**.	changed her point of view a little
the principles underlying	'Treat others as you would like to be treated' is **a principle underlying** much religious teaching.	basic idea lying behind
to encounter prejudice	As one of the few female students of the 1920s, my grandmother **encountered** a certain amount of **prejudice**.	experienced unreasonable negative behaviour

Change the words in bold to words which mean the *opposite.*

1 The views she expressed were totally **rational**.
2 The committee seemed to be biased **against** applications from younger people.
3 The book is an **objective** account of life in a small town in the 1920s.
4 The club rules were prejudiced **in favour** of children.
5 The President's daughter was quite **mature** for her age.
6 He has rather **radical** views about marriage.
7 Her views on education are rather **radical**. (use a different word from 6)
8 Supreme Court judges always act in a **biased** way.

Use the words in the box in an appropriate form to complete the sentences.

root shift adopt encounter underlie philosophy hold ethical

1 The _____ principles of Asian and European _____ are very similar.
2 People tend _____ a more conservative stance as they get older.
3 She has always _____ the view that primary education should not start before the age of seven.
4 Many people have _____ objections to investing in companies which support corrupt regimes.
5 Some employers still have a deep- prejudice against employing older people, and many older people _____ such prejudice when they apply for jobs.
6 The government seems to have _____ its position recently.

READING 3
Read the text below and compare American and Israeli approaches to security using as much of "opinion words" as you can:

What Israeli Airport Security Can Teach the World

No country in the world faces more terrorist threats than Israel, and no airport in the world faces more such threats than Tel Aviv's Ben Gurion airport. The Israelis have of course been the gold standard for establishing and maintaining security in all its forms. Much of the airport's security protocol is achieved through a combination of comprehensive due diligence, common sense, and consistency -- which, one would think would be the objective of airport authorities throughout the world. Yet very few other airports have achieved the level of security that exists at Ben Gurion.

All vehicles that arrive at Ben Gurion must first pass through a preliminary security checkpoint where armed guards search the vehicle and exchange a few words with the driver and occupants to gauge their mood and intentions. Plain clothes officers patrol the area outside the terminal building, assisted by sophisticated hidden surveillance cameras which operate around the clock. Armed security personnel patrol the terminal and keep a close eye on people entering the terminal building. If

any persons seem suspicious or anxious, security personnel will approach them and engage them in conversation in an effort to gauge their intentions and mood. Vehicles are subject to a weight sensor, a trunk x-ray and an undercarriage scan.

Departing passengers are questioned by highly trained security agents before they reach the check-in counter. These interviews could last as little as one minute or as long as an hour, based on such factors as age, race, religion and destination. Unlike in many western airports, passengers are not required to remove their shoes while passing through physical screening processes. Furthermore, there are no sophisticated x-ray machines; rather, traditional metal detectors are still in operation.

Raphael Ron, a former director of security at Ben Gurion for 5 years, calls the passenger-oriented security system more focused on the 'human factor', based on the assumption that terrorist attacks are carried out by people who can be found and have been stopped through the use of this simple but effective security methodology. That said, there is a great array of equipment and technology available for the authorities to help combat any potential terrorist attacks. For example, checked baggage is put in a pressure chamber to trigger any possible explosive devices and robots patrol the airport grounds.

Ben Gurion airport does not sub-contract its security to private companies. Given their priority in ensuring safety and preventing terrorist attacks, the personnel on duty at Ben Gurion are highly trained army graduates who have specialist skills in detection and interrogation. They leave nothing to chance and are able to monitor the most minute details. Officials think of passenger security as a series of 'concentric' circles, with increasing scrutiny as individuals arrive closer to the plane.

Agents also pay close attention to the parts of the airport that passengers do not frequent, such as fences around the airport's perimeter, which are monitored with cameras at all times, and radar systems that check for intrusions when weather prevents cameras from effectively broadcasting.
Ben Gurion has of course experienced some lapses in security. In a November 2002 incident, a passenger slipped through airport security with a pocketknife and attempted to storm the cockpit of an El Al flight en route from Tel Aviv to Istanbul.

While no injuries were reported and the attacker was subdued by onboard flight marshals, the airport was closed for some time. Most people would imagine such an event may not have happened if the passenger had been passing through what is now standard technology at most western Europe airports. The Israelis' focus on the human factor is not of course infallible. Ben Gurion may be more vulnerable to an attack from a disillusioned Israeli citizen as a result. If a terrorist network were able to recruit and train Israeli citizens, they could of course potentially evade the strict security procedures in place at Ben Gurion.

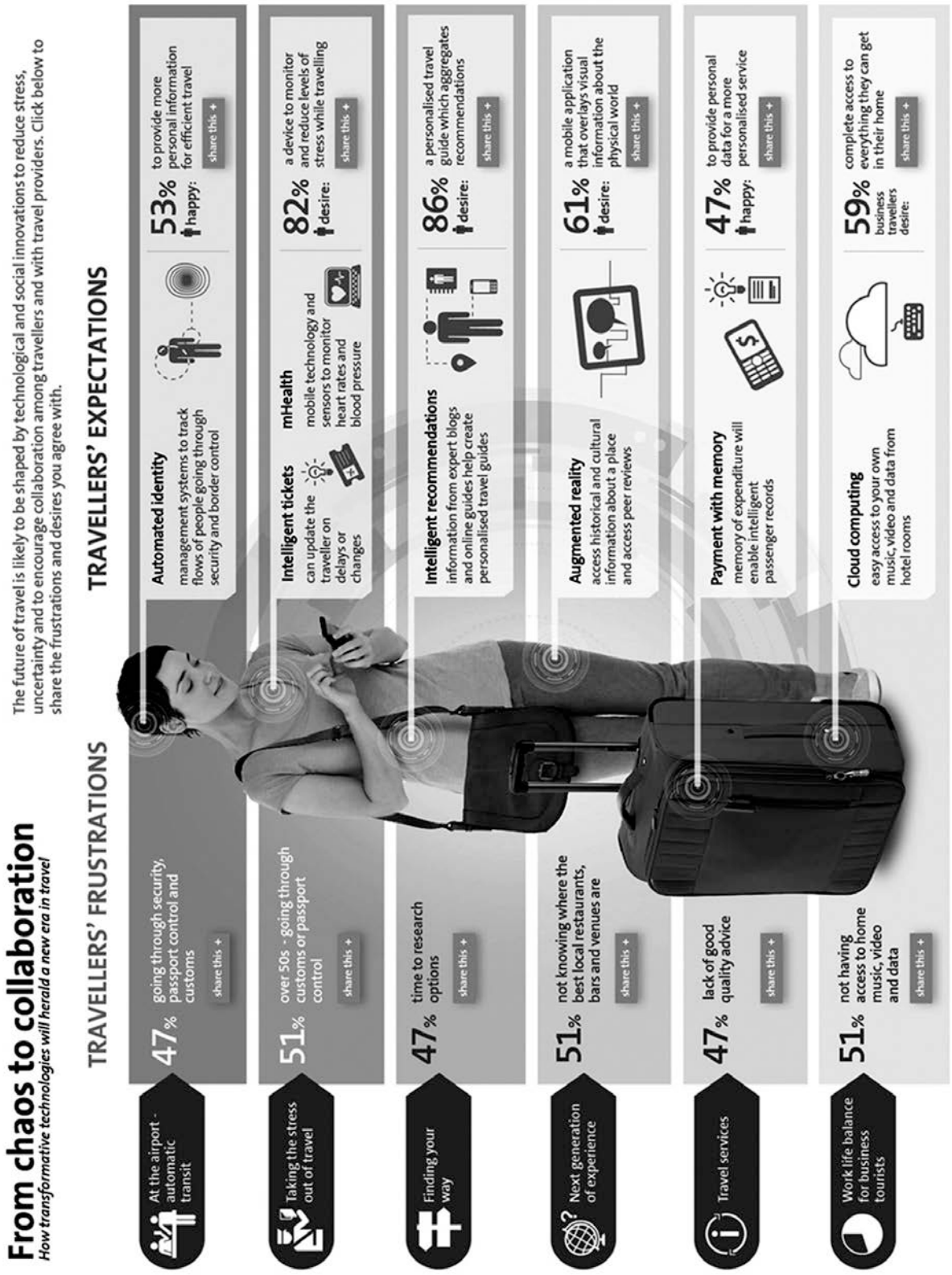
But the range of methods employed at Ben Gurion has proven to be extremely effective in preventing terrorist attacks, as its history demonstrates. Even so, many security and terrorist experts believe that, if this were always accompanied by the latest passenger-oriented security technology, Ben Gurion's security would be even more robust.

The Israelis have taken on board the concerns of civil liberties groups and researchers in developing technology that could ease concerns about racial profiling, through the use of innovative check-in kiosks, but this can never of course replace the intuition and gut instinct that accompanies human interaction. Many airport authorities around the world have sought to benefit from the Israelis' approach to airport security, though none use the entire range of tools at their disposal. In the end, limitations on financial and human resources, and preferred methodologies, determine just how thorough or inadequate security protocols can be.

If more airport authorities were to adopt Ben Gurion's approach, surely it would be more difficult for those intending to do harm to succeed. There is a lot to be said for emphasizing eye contact, behavioral cues, and instinct when addressing the subject of airport security.

Ex. 6. Does the cartoon demonstrate the current trend of security checking?

Ex. 7. Are your expectations and feelings the same as here? Comment this picture.



PART 11
PASSENGERS' PREFERENCES

What Do Air Travelers Want?
CTA Probes Preferences
By: George Dooley

What's the first thing travelers look for in an airline ticket? That's what the Consumer Travel Alliance (CTA) asked in a new survey of 800 air travelers.
"If you said, 'a low price,' you're absolutely right. 77 percent said they consider the fare first," according to the alliance. After digging deeper, CTA saw a wide variety of traveler concerns, including scheduling, non-stops and luggage fees.
CTA, a non profit group, noted in its study that airlines have used that low-price preference "to justify cutting customer service and "unbundling" prices — removing everything but a base fare — without asking the simple question: What else do you want?" The CTA survey of readers of Elliott.org and ConsumerTraveler.com showed consumers have many concerns and frustrations with air travel.
The results of the survey (Travelers were asked to name to three important elements of a ticket, so the percentages don't add up to 100):
• *Schedule – 48 percent*
• *Non-stop vs. connecting flight – 47 percent*
• *Luggage charges and other fees – 36 percent*
• *Frequent flier benefits – 21 percent*
Extra legroom – 20 percent
• *Airports served (which area airport is selected) – 19 percent*
• *Reputation of airline service – 15 percent*
• *Business class availability – 6 percent*
The survey also allowed readers to write in responses. Among the most popular answers:
• *An all-inclusive airfare.*
• *To be treated like a customer.*
• *Flexibility to change without fees.*
• *More overhead bin space.*
• *Enough seat width.*

Follow-up conversations with the survey respondents suggested passengers require more than a cheap ticket price, the CTA noted.

The alliance found air travelers were not necessarily looking for perks, but rather trying to avoid inconveniences such as extra fees for checked bags or ticket changes. The survey also found that passengers felt as if airlines can't or won't listen to them.

"Airlines do know what passengers want," said one respondent. "They just don't care. As long as they have people coming back in earnest, the shenanigans and schemes will continue."

Current recommendation for offered services

Faced with rising operating costs, evolving customer needs and global challenges, the Airline industry offers a great learning place for other industries. On and off the runway, customers are pushing airlines to think more like retailers and less like a mode of transportation. Expectations around seating packages, interactions with staff and priority treatment are some of the experiences that matter to customers.

Differences across customers go beyond the typical leisure and business divide. Behaviors, preferences and attitudes are shaping what customers want—and with emerging markets fueling travel growth, so too are cultural distinctions.

This text can help point the way to value–and profits–by uniquely identifying ways to better serve the ever-changing demands of air passengers. Airlines that can get to the core of who their customers are and what they value will be the winners.

1. Technology and automation are changing the ways customers interact with airlines. However, airline stuff are just as important as ever—especially at times of issue resolution. Keep customers cool before the heat rises.
2. Mobile devices are flyers' #1 travel companion—not only for travel-related activities but also for sharing experiences. Proactively listen to quell negative brand blasting, while encouraging positive brand building.
3. In-flight comfort isn't limited to seats. Flyers find comfort in food, entertainment and sitting next to travel companions. Give flyers the emotional and physical comfort they seek.
4. Travelers want to stay connected from the ground up—whether for work or entertainment. Match connectivity product offerings with customer needs and preferences.
5. Flyers expect to pay for add-ons. Make their lives easier by offering bundles that suit their travel needs without going overboard on their wallets.

Cater to culture

Food and entertainment content engage the travelers' senses and allow the airline to create experiences and build relationships in an intrinsically relevant context. Accommodate the differing tastes of international and domestic travelers. Offer culturally specific products/services such as ethnic meals and entertainment content.

Optimize space

Lean on customer preferences and market insights when planning routes and designing aircraft. Features like lighting, seat space and in-flight entertainment will be valued differently based on the market and customer segment. For example, BMI trends should factor into seat space for planes assigned to specific routes.

Charge by design

Travelers have adjusted to airline fees, but they still don't like the feeling of being nickel-and-dimed. Charge fliers thoughtfully. Be generous with low-cost amenities that increase goodwill and loyalty. Use higher-value upgrades not only to delight targeted segments but also to whet the appetite of flyers who are very likely to purchase upgrades in the future.

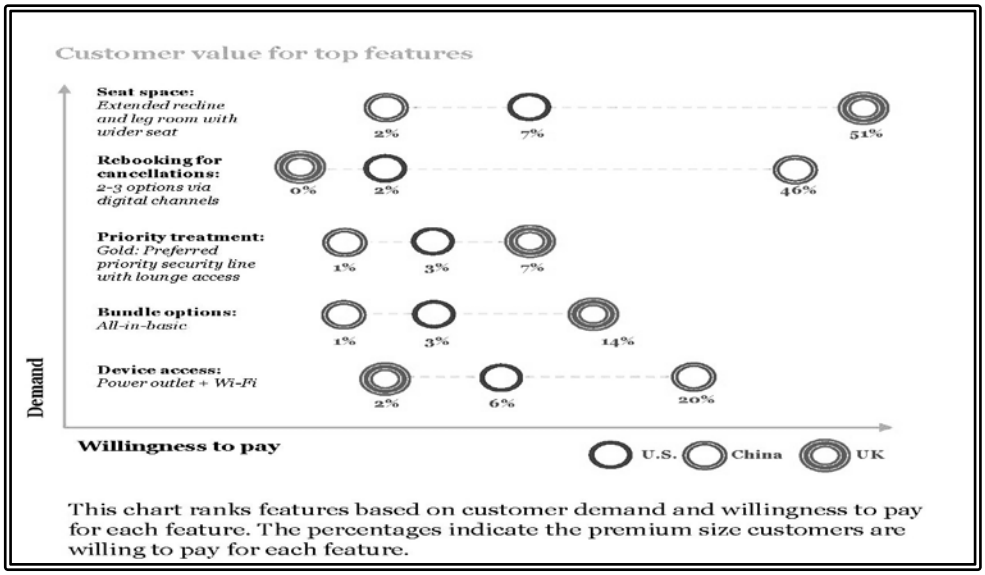
Deliver a data-driven experience

Build a data-driven product and promotions competency. Use available customer data and segmentation to learn what types of products, add-ons and upgrades your customers want and are likely to buy to personalize their flying experiences. Mine the same information to target customers at the right place and time—based on factors such as booking window, preferences and travel purpose.

Entertainment

Turn to tablets not only to reduce fuel costs, but to offer passengers access to entertainment beyond traditional seat back systems that are costly and maintenance intensive. While demand for tablet rentals in the UK is minimal, consider supplying rentals to passengers on routes originating from Brazil, since this market shows significant demand and willingness to pay for rental tablets. Passengers in China prefer and will pay a premium to access airline content on their personal devices, making the case for on-board streaming over seat back systems. Given operational complexities, study the in-flight infrastructure required to support customer devices (e.g., power outlets, right-sized tray tables) as well as connectivity (e.g., streaming Wi-Fi, airline hosted content).

Ex. 1. Comment these charts



Ex. 2. How are passengers' preferences varied from country to country?

Cultural dynamics surface in travel preferences. Collectivist cultures such as China and Brazil tend to identify among groups—and how airlines handle these relationships impacts flyers' comfort. Chinese and Brazilian flyers value the opportunity to sit together.

Travel companions

3 in 5

Chinese business travelers **fly with colleagues**.

Business travelers from **China** fly with colleagues **3.3x** as much as **U.S. business travelers** and **2.3x** as much compared to **UK flyers**.

Group seating

1 in 3

One-third of **Chinese business flyers** value **protective group seating** and use face time to build relationships while in transit compared to **4%** of **UK and U.S. business** counterparts.

A quarter of **Brazilians** show a **strong preference** for sitting together in flight.

Food and entertainment

Nearly **half** of flyers from **Brazil** and **China** want ethnic content and meals in-flight and they're willing to pay a **premium**:

China 9%

Brazil 3%

*"With **group seating**, I managed to **rest** and **move** as I wished without needing to bother anyone I did not know."*

- Brazilian leisure traveler

*"There was a great **entertainment** selection and the **menu** options were presented in **more than one language**."*

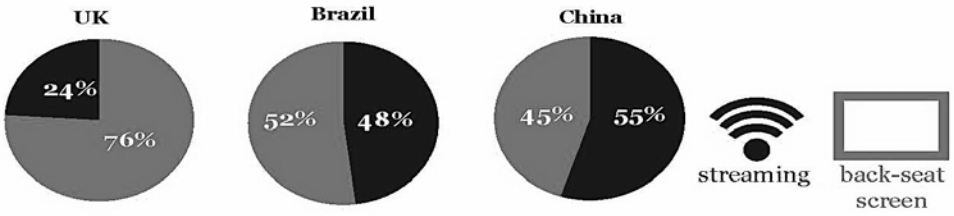
- Chinese business traveler

Ex. 3. How would explain these performances?

Seat-back screen or personal device? Flyers' preference for how they view entertainment content on long haul flights varies by market.

In the UK, nearly *4 in 5* flyers prefer viewing content via traditional means—on an airplane screen. But flyers from international developing* markets want to stream real-time on their own devices.

In-plane screening vs. streaming (Wi-Fi enabled)



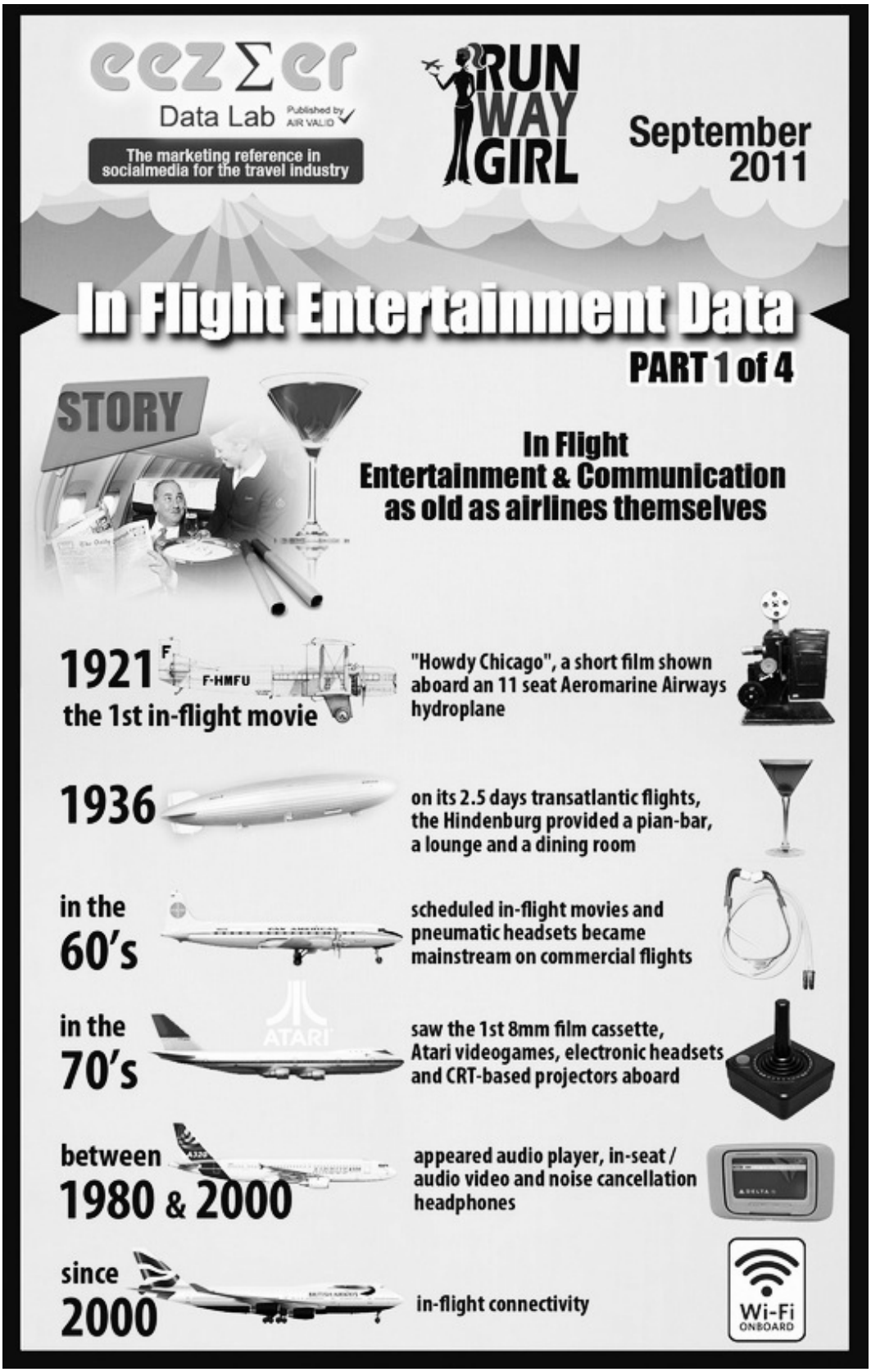
Brazilian and Chinese travellers surpass those from developed markets in tablet ownership—so the preference for streaming is no surprise.[24] But the markets do differ in the type of content flyers want to watch.

Chinese flyers are *5.5x* as likely to stream **airline vs. personal** content on their own device.

compared with

1/4 of **Brazilian flyers who** want to stream **personal** content on their own device.

Ex. 4. Comment these steps to keep passengers satisfied with airlines services and inflight entertainment. How much does the level of satisfaction cover the expenses in every case?



Ex. 6. How would you explain such distribution of passengers' preferences?