CAPITAL ALLOCATION
TECHNOLOGY SYSTEMS

INDEPENDENT ADVICE FOR AIRLINE PLANNERS

Industry Report

The planner's companion

Where to fly, what to fly it with, and who to trust with it in the hangar. The Industry Report is written by planners for planners: what we've found works, airport by airport, type by type and shop by shop.

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Our advice is just that

CATS is independent: no manufacturer, airport or shop pays to appear here. Things change between editions, so check anything that matters with the airport, the maker or the shop before you commit an aircraft to it.

SECTION 1

1 Airports

The busy ones, the awkward ones, and how long you'll spend taxiing.

1.1 The slot airports

Six airports are slot coordinated: you'll need a departure and an arrival slot for every flight, and the peak hours go first.

TABLE 1.1 **The slot airports**

Code	Airport
EDDF	Frankfurt Main
EGKK	London Gatwick
EGLL	London Heathrow
EHAM	Amsterdam Schiphol
KJFK	New York John F. Kennedy
LFPG	Paris Charles de Gaulle

> **OUR TIP**
> *Plan the slots before you sell the route. A good morning slot at Heathrow is worth building a whole rotation around, and once it's yours, it's yours to keep.*

1.2 A-CDM airports

These run Airport Collaborative Decision Making: give the tower a good TOBT and you'll be given a start-up time (TSAT) and a place in the queue. Ready early, you wait on stand with the doors shut, so there's no gain in rushing a turn.

EUROPE

Amsterdam, Barcelona, Bergamo, Berlin Brandenburg, Brussels, Copenhagen, Düsseldorf, Frankfurt, Hamburg, Helsinki, Lisbon, London Gatwick, London Heathrow, Lyon, Madrid, Málaga, Alicante, Milan Linate, Milan Malpensa, Munich, Naples, Nice, Oslo, Palma, Paris Charles de Gaulle, Paris Orly, Prague, Riga, Rome Fiumicino, Stuttgart, Venice, Vienna and Zürich.

ASIA

Ahmedabad, Beijing Capital, Bengaluru, Chennai, Delhi, Guiyang, Guwahati, Hong Kong, Jaipur, Kolkata, Kuala Lumpur, Kunming, Mumbai, Seoul Incheon, Shanghai Pudong, Singapore and Thiruvananthapuram.

AUSTRALIA AND NEW ZEALAND

Auckland, Brisbane, Melbourne, Perth, Sydney and Wellington.

THE AMERICAS

São Paulo Guarulhos and Toronto Pearson.

1.3 Steep approaches

London City (EGLC) sits among the Docklands towers and needs a 5.5° steep approach. Of today's types only the Norsora NS-90 is certified for it, so it's the NS-90 or nothing there. The airport keeps its own list of approved types, and pilots need simulator training for it every year.

Lugano (LSZA) is steeper still, at 6.65°, and a type cleared for London City isn't cleared for Lugano. Sion (LSGS) starts at about 6° and eases to about 4° well before the runway, so it isn't counted as steep, though operators read that differently. Chambéry, Tromsø and Innsbruck are demanding, but under 4.5°.

1.4 Taxiing

Budget for the taxi, as it comes out of every block time. By the size of the airport:

TABLE 1.2 **Taxiing**

Size	Out	In	For example
Small	5 min	3 min	Lerwick Tingwall, London City, Oban
Medium	8 min	5 min	Belfast City, Bournemouth, Southampton
Large	12 min	7 min	Copenhagen, Edinburgh, Lisbon, Munich
Major	17 min	9 min	Amsterdam, Frankfurt, Heathrow, Madrid, New York JFK, Paris Charles de Gaulle

> **OUR TIP**
> *A short hop between two majors loses nearly half an hour on the ground at either end. The same sector from a regional field can fit an extra rotation into the day.*

SECTION 2

2 Aircraft Manufacturers

Every type on the market, what it takes to fly and keep, and the families that share crews.

Every type on the market, at a glance. Seats are the most in any cabin the maker offers; range is with the longest-range tanks on offer. The **code** is the aerodrome reference code the wingspan puts it in, and the airfield has to take it.

2.1 Ventaire

Lyon. Steady and predictable: hangar work comes in close to the estimate and parts are rarely held up. The V40s share one rating, so a pilot or engineer on one flies or fixes all three.

TABLE 2.1 Ventaire

Type	Seats	Range	Code	Runway	Rating	Engines
V24-500	70	850 nm	C	1,290 m	V24	PW127F (turboprop)
V40-100	150	3,700 nm	C	1,850 m	V40	CFM56-5B6 or V2524-A5
V40-200	180	3,000 nm	C	2,100 m	V40	CFM56-5B4 or V2527-A5
V40-300	220	2,650 nm	C	2,400 m	V40	CFM56-5B3 or V2533-A5
V70-200	350	6,400 nm	E	2,700 m	V70	Trent 772 or PW4168A
V90-800	800	8,000 nm	F	3,000 m	V90	Trent 970 or GP7270

2.2 Halcott

Kansas City. One specification for each type, so there's little to choose. Budget for heavy checks running well over: Halcott's estimates are the least reliable in the business. The 450-200 and 460-300ER share a rating.

TABLE 2.2 Halcott

Type	Seats	Range	Code	Runway	Rating	Engines
430-300	148	2,200 nm	C	1,940 m	H430	CFM56-3C1
450-200	235	3,900 nm	D	2,100 m	H450	RB211-535E4
460-300ER	290	5,900 nm	D	2,500 m	H450	CF6-80C2B6
470-200ER	349	7,700 nm	E	3,000 m	H470	GE90-85B
480-400	500	7,200 nm	E	3,300 m	H480	CF6-80C2B1F

2.3 Yunhai

Hangzhou. The widest choice of engines, cabins and tanks of any maker, but parts are often slow to arrive, and a wait of a day or more in the hangar isn't unusual. Each type has its own rating.

TABLE 2.3 **Yunhai**

Type	Seats	Range	Code	Runway	Rating	Engines
YH-090	96	2,100 nm	C	1,600 m	YH09	CF34-8C1 or BR715
YH-180	186	3,500 nm	C	2,050 m	YH18	CFM56-5B4, V2527-A5 or CFM56-7B26
YH-300	320	7,000 nm	E	2,600 m	YH30	Trent 772, CF6-80E1A4 or PW4168A

2.4 Norsora

NORSORA

Halifax and Sendai. Delivered complete and ready to fly, with parts shipped the same day. The NS-90 and NS-140 share a rating, but few pilots and engineers hold it, so expect to train your own.

TABLE 2.4 **Norsora**

Type	Seats	Range	Code	Runway	Rating	Engines
NS-90	88	1,300 nm	C	1,250 m	NS	CF34-8C1
NS-140	144	2,700 nm	C	1,900 m	NS	CFM56-7B26

The NS-90 is the only type certified for a steep approach, to 5.5°: see Airports (page 3).

2.5 Engines

Engineers are rated on the engine family as well as the airframe, and shops overhaul by family: the CFM56-5s are one, the V2500s another, and so on. Picking the same engines across your fleet keeps the number of ratings, and of shops you deal with, down. See Engineering (page 7) for who overhauls what.

SECTION 3

3 Engineering

The maintenance organisations and engine shops that take outside work, and what they're like to deal with.

Your own hangar can take one aircraft at a time for a heavy check. For more, or to keep your engineers on line work, these maintenance organisations take outside work. Price and pace are against doing the same check in your own hangar.

3.1 Heavy maintenance

TABLE 3.1 **Heavy maintenance**

Organisation	Where	Bays	Price	Pace	Takes
Atlantic Airframe Services	Shannon (EINN)	3	15% less	the same	C and D checks, any type
Tejo Aeronautical Engineering	Lisbon (LPPT)	2	25% less	slower	C and D checks, any type
Garonne Aéro Maintenance	Toulouse (LFBO)	2	10% more	quicker	C and D checks, Ventaire types only
Isar Flugzeugtechnik	Munich (EDDM)	2	5% more	quicker	C and D checks, any type; engine overhauls (below)
Sonoran Heavy Maintenance	Pinal Airpark, Arizona (KMZJ)	4	35% less	slower	C and D checks, any type

> **OUR TIP**
> *Sonoran is the cheapest by a distance, but it's a long way from Europe, and only aircraft with the range get there in one hop. For a European airline, Shannon is the safe choice: cheaper than home and no slower, with the most bays outside Arizona.*

3.2 Engine shops

An engine shop overhauls the engine families it's rated on. Price is against the engine maker's list price for an overhaul.

TABLE 3.2 **Engine shops**

Shop	Where	Price	Engine families
Isar Flugzeugtechnik	Munich (EDDM)	5% more	CFM56-3, CFM56-5, CFM56-7, V2500
Øresund Engine Services	Copenhagen (EKCH)	5% less	PW100, CF34, BR700, CFM56-3, PW4000
Forth Engine Overhaul	Edinburgh (EGPH)	the same	RB211, Trent, CF6-80, GE90, GP7200



CATS Industry Report

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