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For a country with a population of only 5.1 million, Finland has a large airline industry. There's a reason for this: much of the country is bordered by the Baltic Sea and the rest by inhospitable terrain in Russia and Sweden. Finns have such a long way to travel to get to most countries that it is effectively like an island in northern Europe.

It's not just the borders that make air travel important in Finland. Its amazing 'interior' geography has an impact too. The country's 188,000 lakes, its long winters (almost all of Finnish Lapland lies above the Arctic Circle) and its low population density often make road and rail travel impractical. So air travel has a long-established history in Finland and plays a fundamental role in its domestic and international transport links.

Helsinki-Vantaa, with IATA code 'HEL', is operated by Finavia, a state-controlled company that runs 25 of Finland's 27 civilian airports. It now markets the facility as 'Helsinki Airport' and four Finnish airlines dominate its aircraft movements. Aircraft belonging to charter carrier Air Finland, SAS subsidiary Blue1 and regional operator Fincomm Airlines all operate from here.

But it is Finnair that dominates HEL, which is by far the country's busiest airport. Finnair is 56%-owned by the government of Finland and regarded as one of three strategically vital companies whose ownership must not pass out of Finnish hands. It handles 60% of all aircraft operations at HEL.

Finnair's Fleet

By the end of 2010, Finnair will have a 65-aircraft fleet that is among the most modern and fuel-efficient in Europe. For short- and medium-haul operations to 12 domestic and 40 European destinations, it flies eight Embraer 170s (having just sold two to regional partner Fincomm Airlines) and 10 Embraer 190s; 11 Airbus A319s; 12 A320s; and six A321-200s. On charter flights – including long-haul non-stops and one-stops to Asia and the Caribbean – Finnair operates four leased Boeing 757s and one leased MD-11 (used also for scheduled services until February 22).

For scheduled long-haul flights, Finnair operates five A340-300s and it will have eight new A330-300s in service by the end of the year. Seven will be in service by the end of March. Finnair operates the A330s on its nine Asia routes and its year-round transatlantic route to New York JFK, as well as on other seasonal long-haul routes such as the Helsinki-

Toronto schedule it will operate this summer. Its A330s also operate charter flights to sunny tourist destinations such as Phuket in Thailand.

The 757s are likely to leave the fleet by

Northern Flights

Finland's northern location and small population have led Finnair, the country's state-controlled flag carrier, to adopt innovative strategies in these hard times for the airline industry. Chris Kjelgaard reports.

Finnair A350-300 OH-LGD departs Toulouse, France during a check flight from Airbus. Stephen Beikard/AirTeamImages





2012 and the airline could replace them and position itself to enter some new markets by ordering extended-range A321s. These aircraft would have two extra center-fuselage fuel tanks and possibly other benefits resulting from a prospective mid-life upgrade that Airbus is considering, says Pärivi Koolomaa, Finnair's Vice President of Network Operations and Strategy Resource Management, noting that Finnair is likely to make a decision within a year.

Finnair also has two more A330-300s on order, but won't take them before 2012. Additionally, the airline was an early customer for the A350, ordering 11 aircraft and optioning four even before ILC decided to buy to replace the A330 completely. So early did Finnair order its A350, says Koolomaa, that the airline has worked up with a bargain—it got the A350-900 for the same price it agreed with Airbus for the original A330.

Koolomaa says that although "we're not dependent on the type aircraft," Finnair's A350-900s allow for delivery next 2014, will carry

10% more passengers the same distance as its A340-300s and will burn 20% less fuel—or will carry more than 4 tonnes more cargo. "It's got the payload characteristics of the MD-11, but will burn 30% less fuel," he says.

An Asia-driven Business Strategy

Although 86-year-old Finnair, like every other airline, is finding today's economic conditions very challenging and has seen big changes—particularly a stagnation of traffic on Finnish domestic routes—in the past decade, it has developed an innovative business strategy to survive.

Finnair's strategy is based on the three foundations of governmental leadership, Finland's unique geographical situation and a passenger-friendly route base. Incorporating these factors in the marketing campaign "We'll Helsinki" and other programs used as the tagline for people to say when flying Finnair cost

Europe—and even North America—to East and South Asia, Finnair's Asia routes represent its key network asset.

"In the economic downturn, Finnair's Asian strategy has proved to be particularly important," said Jukka Heinonen, Finnair's then-president and CEO, in October in the company's nine-month interim financial report. Heinonen left Finnair at the end of January, being replaced by former Nokia Siemens Networks executive Mika Vehviläinen.)

"The domestic market suffered from weak demand and price levels," Heinonen wrote. "It is amusing to note that new corporate agreements in other markets have offset to some extent the decline in domestic demand. Europe/Asia traffic already accounts for over 50% of Finnair's scheduled take-off revenue."

The growth in corporate-account business came mainly in markets linking Central Europe and Scandinavia with Asia, according to Taneli Hassinen, Finnair's Vice President of Financial Communications and Investor Relations. "Companies in Finland have reduced their travel massively, but we're trying to offset this with deals in Central European markets," he says.

Key corporate accounts include deals with the governments of Sweden and Denmark for staff flying on long-haul flights to Asia, says Hassinen. Governments operate by "more strict rules" and the agreements they sign tend to be "more binding" than those signed with companies. Additionally, he says, "transatlantic traffic has been doing well, also in business class," because of the strength of the euro against the dollar.

Finnair serves Nagoya, Osaka and Tokyo in

1 Finnair Boeing 737-800 OH-LVW on a snowy apron at Helsinki-Vantaa Airport. Matti Kallonen. 2 De-icing in progress on Embraer 175 OH-LKH at Oslo Gardermoen Airport, Norway. Jorgen Svendsen/AviTeamImages. 3 A midline formation of Helsinki-Vantaa FSB 5001 self-propelled snow removal machines clear the main runway at Helsinki-Vantaa Airport. Jorgen Svendsen. 4 The snowblower units used by Finnair are capable of throwing 5 cubic metres of snow per second to a distance of 30m (114ft). Jorgen Svendsen. 5 A snowblower works on an area of the runway at Helsinki. Finnair has implemented "demand driven scheduling" which matches an aircraft type to the passenger load. The smallest type in the fleet is Embraer 175, which Finnair has configured to carry 76 passengers. Jorgen Svendsen/AviTeamImages.





Japan, Beijing, Hong Kong and Shanghai in China; Bangkok, Seoul, and Delhi. Most are served daily, except Seoul to which Finnair flies five times a week) and Tokyo, though Finnair's six most weekly services will become daily in April when a new gateway opens in Sydney at Narita.

The carrier served Mumbai until recently, when capacity added there by Middle East carriers grew so great that several European carriers pulled out. However, "I have not lost my belief in India," says Peheri Koskimaa, and hopes Finnair eventually will return to Mumbai and notes it also holds rights to serve Chennai.



Finnair's Connecting Strategy

Finnair's "Via Helsinki" connecting route on the far from Helsinki has directly on the thickest great circle route from western and central Europe to Asia. "It's an advantage that cannot easily be taken away from us," says Koskimaa — noting that, originally, Helsinki is the only major European city from which an airline can operate a Europe-East Asia round-trip within 24 hours.

As a result, says Koskimaa, Finnair's Vice President of Sustainable Development, it makes compelling environmental sense and hard business sense to connect at Helsinki

when traveling from any secondary European city to any Asian city that Finnair serves. That point is emphasized in a marketing slogan: "With Finnair, you're always moving in the right direction."

This wouldn't be true if Finnair couldn't guarantee good connections at HEL. However, because HEL has three long runways but is much less busy than the biggest European hubs (HEL saw 13 million passengers in 2009 and 12 million in 2008), it rarely experiences any hold delays. In winter, because of Finnair's long experience with extreme-weather operations, the airport virtually never closes.

These factors, along with Finnair's near-90% on-time record and the compact design of HEL's Terminal 2 — from which Finnair now operates all its Helsinki flights — allows the airline to offer connecting times of just 35 minutes between its European and Asian flights. This is far better than the connection times possible at any major European hub.

Finnair's Extreme-weather Winter Operations

Finnair likes to boast it's "one of Europe's most punctual network airlines," regularly achieving an annual on-time arrival rate between 80% and 90% and an even higher rate for its scheduled flights. Although Finnair's on-time arrival rate in December 2009 was just 50%, the airline says this was mainly due to poor weather at airports elsewhere in Europe and to a strike by baggage handlers

COMMERCIAL FINNAIR

at Helsinki. Finnair achieved an overall 87% on-time-arrival rate for the full year.

The airline's strong punctuality record is remarkable considering it is based at Helsinki-Vantaa, an airport that in the winter of 2006-2007 officially had 970mm (39 inches) of snow. Unofficially, the airport actually saw about 1,400mm (55 inches), as measured by the airfield maintenance department of Finavia, which operates HEL and is responsible for clearing the snow from all the airport's airside and landside facilities.

Finnair accounts for 60% of the operations at HEL and its domestic network includes 12 of Finland's 25 commercial airports. At these airports, the airline experiences a wide variety of extreme weather/winter conditions, says Jari Pontinen, an A330 and A340 captain who is manager of the flight planning centre in Finnair's flight operations division.

Pontinen says conditions range from very moist, snow-contaminated, "difficult runway conditions" at airports in southern Finland such as HEL and coastal airports such as Turku and Oulu, to "the 'very different', extreme cold conditions found at airports in the middle of the country - particularly Lapland airports such

as Rovaniemi and Kittilä.

Heavy, wet snow, typically found at the southern Finnish and coastal airports rather than at the colder inland airports, creates the worst problems for runway clearing and runway contamination, according to Jyrki Pullikinen, Finavia's manager of airfield maintenance at Helsinki-Vantaa.

So how has Finnair managed for the past 86 years to stay mainly on time in severe winter weather?

"It's a must," says Pontinen. "For six months of the year, somewhere in Finland you have winter. You need to be familiar with weather and with contaminated runways. It's the same issue as how people have to be familiar with driving in winter."

That said, Finnair takes winter





operations very seriously. It holds regular meetings with Finnair, which operates 25 of Finland's 27 civilian airfields and all of the commercial airports and is responsible for snow-clearing and runway maintenance at each. That way,

each party remains fully conversant with the other's requirements and procedures. This communication has worked so well, says Pontinno, that delegations from other airport operators – the Port Authority of New York and New Jersey being one – often visit HEL to learn how to operate in severe winter conditions. In turn, these visits create "very valuable" communication with other airports and airlines, whereby Pontinno can then visit JFK (for instance) to learn its best practices and apply them in-house where applicable.

Vitaly, too, Finnair's pilot training emphasizes winter operations. The airline's theoretical training courses, manuals and notices provide "very precise instructions for calculations for performance limits, cross-wind components and runway length" for given



1



2



3



4



5

runway-friction-coefficient measurements, says Fortinon. Every year, Finnair's pilots receive recurrent theoretical training on winter operations and they are informed of any new developments in de-icing and anti-icing practices.

"In our training module, winter is covered very clearly," says Fortinon. Finnair's computer training for winter operations includes video, still photographs and text and is so good the airline often sells it to other airlines. Recurrent training includes findings on why de-icing and anti-icing procedures are so important and why pilots must de-ice again if, after the original de-icing, their aircraft exceed specified wait times while holding before take-off. At a certain time after application, de-icing fluid becomes incapable of absorbing any more powerplant oil.

In addition, Finnair includes winter operations training in all its pilots' line-flying training, which each first officer receives after completing basic type training from line-flying instructors. Winter ops training is taught both during winter and summer line flying. Each Finnair pilot also receives winter operations training at least once every three years during his or her regular simulator checks.

Most of Finnair's de-icing and ground anti-icing is performed by the airline's Helsinki ground service subsidiary, "but the technical department is responsible for buying it," says Fortinon. "The flight operations department is involved in that process and this to the end user's point of view is included."

Finnair's current fleet, which currently lacks an anti-icing system, is similar to operators in conditions regarding de-icing and ground anti-icing than the McDonnell Douglas threshold fleet it used to fly, says Fortinon. The airline joined the Association of European Airlines' de-icing and anti-icing working group back in the early 1980s because its DC-9s and MD-80s – which had rain repellent-treated equipment – "very easily got into the wingroot areas close to the fuselage on ground stops, and there was a risk of ice separation on take-off and ingesting in the engines."

While this isn't a problem for Finnair's current Airbus, Embraer and Boeing aircraft, the airline does sometimes need to warm up the engine intakes and fan blades of its aircraft with hot air before starting engines in very cold weather at some airports.

Finnair has been operating continuous descent approaches to 1,500ft (457m) at HEL since 2001, but the airport's instrument landing system (ILS) at present are rated for Category 2 ILS approaches rather than Category 3A or 3B. However, this isn't a problem in winter, says Fortinon. Finnair is able to operate at HEL with just a 75m (246ft) runway visual range, "the lowest in the world" for a Category 2 airport, and has an maximum descent height. For winter operations "visibility is not so much of a problem" as low runway contamination and wind-related friction problems – particularly from the crosswind component. "Otto Gerdejanen is very difficult in this regard," says Fortinon.

Snow-clearing

Of course, Finnair could not maintain its winter operations performance without the help of Finavia. HEL's own boast is that "the airport



1 A320-200 OH-LXD on a freezing stand at Kittilä Airport in Lapland during the twilight hours of the day at 1:30PM. *Clinton Kjelgaard* 2 Landing of a Finnair A320 at Helsinki. Finnair pilots get thorough training on the winter operations. *Clinton Kjelgaard* 3 Landing an Embraer 170 at Helsinki. *Asmi Paswan* 4 For charter flying Finnair uses four Boeing 757s, one of which is pictured taking off from Corfu in Greece. *Steve Munn* /AirTeamImages 5 Finnair's first A320-300, OH-LTM, flew its first commercial service for the airline on April 6, 2009. *Finair* 6 A rare shot of A320 OH-LXC taking off from Innsbruck, Austria. *Florian Treier* /AirTeamImages 7 This A319 has been painted to highlight Finnair's membership of the oneworld airline alliance, which it joined in 1998. *Junjaya/AirTeamImages*

more direct flight" in severe winter weather. For instance, 422mm (16.5 inches) of snow fell in one ten-day period in November 2000 and the airport did not close at all. "There were delays, but it remained open," says Pulkkinen.

Finnair's snow-clearing and salt-spraying operation at HEL is impressive to watch. Pulkkinen's winter team—121 people, including three 11-person shifts for the taxi and runways, two or three eight-person shifts for the apron area and one eight-person team for the landside area—keep HEL open 24 hours a day, seven days a week. This involves keeping 2.5 million square metres of runway and taxiway and approximately 1 million square metres of apron area clear of snow, as well as roads, parking, 11,020 car park spaces and 231 hectares of barrier forest.

To clear snow away from one of HEL's three 60m-wide (197ft) runways, a chevron-shaped or parallel formation of 10 Hagie/Vanmar FS8 5500 self-propelled snow removal machines (made in Finland), capable of clearing a runway at a speed of 65km/h

(40mph), does the heavy work. Each FS8 5500 is 20.5m (67ft 9in) long, weighs 20 tonnes and has a plough 4.7m (12ft 6in) wide. Pulkkinen also operates four big snow-squirrels at Central immediately behind the line of snow-squirring machines come two snow blowers, each capable of throwing 5 cubic metres of snow per second to a distance of 35m (114ft). Those three far from the runway the piles of snow the FS8 5500s have pushed to its sides. Just behind the snowsquirrels come two 'ombiguierenders', which spray non-toxic potassium formate over the runway's entire surface area to prevent ice formation.

Right behind these machines travels the supervisor's vehicle, trailing a friction tester, to measure the runway's friction coefficient and relay this data to air traffic controllers to relay to aircraft for use in calculating take-off and landing distances.

Clearing an entire runway takes just 11 to 13 minutes, says Pulkkinen. (HEL's three runways measure 2,518m [2,700m], 10,639m [3,506m] and 11,266m [3,400m]) To clear all three runways

takes the 'snow print' operation around all the runways only one and a half to two hours. Pulkkinen takes 72 minutes, during which time at least one runway is kept partially closed.

Finnair's snow-clearing teams coordinate closely with air traffic control and the airport operator has 21 different runway/clearing plans for HEL, each being employed for a particular set of runway usage conditions. "Finnair has calculated how many minutes it takes for each plan, so ATC knows how long it will take for full clearance and can adjust traffic accordingly," says Pulkkinen.

In addition, Finnair operates lines of smaller snow-squirrels (mounted on trucks) to keep the apron clear of snow, as well as suction trucks to vacuum up excess propylene glycol and water, which flow into the apron after each aircraft spraying.

Finnair's Environment-based Strategy

Another key component of Finnair's business model is its dedication to the environment, a trait that reflects Finnair's passion for preserving Finland's pristine forests, lakes and wildernesses. When people are travelling within Central and Western Europe and within Finland, Finnair prefers them actually to travel by train, says Ihamäki.

"In the sense of Europe, from city to city, it's not very easy to take a flight," she says. "You have to go through security, and usually the airports are outside the town. If you're flying in Central Europe, I would take more trains." But, "coming from Finland, you have to have connections. I think our strategy is that some is very effective, because as we show in the example of flying from New York to Delhi, if you make a stop you have less emissions," than if flying non-stop. "The same holds true



Another shot of A319 OH-LWE on the stand at Copenhagen - Kastrup, Denmark, one of 23 European Capital cities served by the airline. *Ernst/Warthington* • Finnair operates the A319, A320 and A321 with the same pilots able to fly all these types. *Woon Gregory/AirTeamreport* • To celebrate its 85th anniversary in 2008 Finnair painted A319 OH-LWE in this retro scheme from the 1950s. *Philippe Nover/AirTeamreport* • Finnair operates five Airbus A340-300s for many of its long-haul routes. *Finnair* • Finnair's last MD-11, which is used for charters, is due to be phased out on February 22 this year. *Woon Gregory/AirTeamreport* • As Finland's flag-carrier Finnair has an extensive fleet. Part of which are ten Embraer 175s. *Woon Gregory/AirTeamreport* grows leasing and aircraft operation at Helsinki is impressive and involves keeping 2.5 million square metres of runway and taxiway and approximately 1 million square metres of ramp area clear of snow. *Finnair*

using CDAs – and Finnair uses CDAs for almost all its arrivals at other Finnish airports.

Kusternia says Finnair has adopted two other measures to increase operational efficiency and reduce fuel burn. One, demand-driven scheduling, relies on the fact that Finnair's five different short-haul aircraft models belong to just two aircraft families. Each family offers a standardized flight deck, and cross training allows pilots to fly either of two Embraer types or any of three Airbus types at practically no notice.

As Finnair's experience of demand-driven scheduling grows, it can increasingly schedule at short notice the right-sized aircraft for a given passenger load. Today, this ability is aided by Finnair's decision to reduce the limitation of its short-haul fleet by the equivalent of two narrowbodies in response to the slowing of traffic demand in 2009.

The airline also employs a technique called cost-index flying, now becoming familiar in leading airlines. Basically cost index flying relies on the airline's flight operations department calculating the trade-off point between the monetary saving produced by flying at a slower cruise speed or using a particular altitude and making against the inevitable value of the time saving the flight would otherwise experience.

Technical Innovation

Finnair's subsidiary Finnair Technical Services also contributes significantly to the airline's environmental and operational efficiency. Following the banning of chlorinated hydrocarbons such as methylene chloride-based paint strippers, Finnair had to find a new way in respect of Airbus aircraft.

While Boeing's aircraft consumption reduction allows continued use of acid anhydride paint strippers (AAPS), AAPS can only be applied in Airbus wet-bay areas, according to Tuomo Karppinen of Finnair Engine Services Ltd (Karpunen, formerly in charge of Finnair's material technology office, is now manager of the repair engineering office at Finnair Engine Services, another subsidiary).

Rather than strip its Airbus jets down to bare metal each time they needed repainting, in 2006 Finnair decided to become one of the first airlines to convert from using a conventional painting system during heavy maintenance to using Airbus' new selective dry-strippable system (SSS). This system, which Karppinen says uses "approximately the same" amount of paint weight per A320-family aircraft as for an equivalent Boeing, employs benzyl alcohol-based, caustic paint strippers that are environmentally more friendly than AAPS and are better for the high-strength steels in Airbus jets.

Additionally, SSS doesn't remove either the primer coat that lies underneath the aircraft's topcoat and intermediate coat, or the primer's underlying sealant. This means that less painting and no sealant removal is required, saving labour time. Finnair first employed SSS repainting in August 2006 and by January 2010 had repainted 20 A320-family jets using SSS.

Three years ago, Finnair Technical Services also became one of the first maintenance organisations in Europe confirmed to install blended winglets on Boeing 757s. The carrier has installed the winglets on all its own aircraft and now performs installations for other airlines, says Karppinen.

coming from Paris or Amsterdam, for instance, to Japan or China. You should make a stop in Helsinki and then continue."

Ilanaki's claim refers to calculations performed by Finnair network analysts using its official Airbus and Boeing performance data. These showed that an Airbus A330-300 flying from New York to Delhi via Helsinki would use 19 tons less of fuel and emit 60 tons less CO₂ than would an Airbus A340-300 flying non-stop with the same passenger load. It would also burn less fuel per seat than larger 777s operating non-stop. This counter-intuitive conclusion results from the fact that during the early part of the non-stop flight, the A340 would fly at a higher rate of fuel-burn simply because of the fuel load required to keep it aloft during the latter part of the flight.

Finnair's environmentally friendly ethos extends throughout its business. The airline is a major recycler of office and in-flight-service consumables, has long published an annual sustainability report and three years

ago began participating in the worldwide Carbon Disclosure Project (CDP). By 2009, Finnair's environmental index performance – as measured by CDP's Carbon Disclosure Leadership Index – had doubled to a figure of 61, making it "clearly the leading Nordic airline in terms of environmental measures," according to Ilanaki. Additionally, "Finnair was one of the first airlines to publish a Global Reporting Initiative Report," she says.

Operational Innovation

Its environmental sensitivity also stands on a foundation of technical and operational innovation. Although other carriers have published heavily their experiments with fuel-saving continuous descent approaches (CDAs) in the past three years, it is a remarkable fact that without publicity Finnair (in cooperation with Finavia) began using CDAs for 32% or more of its arrivals at HEL back in 2001. Now, says Finavia, around 60% of all arrivals at HEL are performed



Finnair's Corporate Restructuring and Finances

Nationally important though it is, Finnair is run as a business and is subject to all the commercial pressures other airlines have faced since the turn of the millennium. It isn't always able to sidestep them. After just about breaking even in 2005, Finnair saw revenues plummet by 18.3% for 2007 as passenger numbers, cargo traffic and yields dropped sharply. Its passenger traffic declined by 4% for the 12 months. The airline reported a €120m operating loss and a €102m after-tax loss for the year.

In late 2005 Finnair had already started to trim the fat by beginning a €250m cost-cutting programme. This led to a corporate restructuring exercise in 2009 that (among other things) combined Finnair's scheduled and leisure flight divisions into one division. One result, says Kuitmanen, is that Finnair's scheduled and charter operations now must compete on a revenue basis to win daily aircraft flying time.

About €120m of the restructuring was staff-related. By late 2009 it included retooling of pilots, lay-offs of about 200 back-office staff and other headcount measures, productivity negotiations with the pilots, transferring its baggage handling and cargo warehouse operations along with their staff to other existing employment contracts to third-party contractors. It also included the transfer of two Boeing 737s and their crews to Finncomm Airlines. Not surprisingly, the moves produced two strikes late in 2009: first a strike by Finnair's pilots, then an allegedly illegal action by its baggage handlers. In December these devastated Finnair's normally excellent on-time record.

Influenced by this combination, an online bookmaker that offers odds on airline collapses ranked Finnair in January as one of the six airlines most likely to file for bankruptcy. However, the bookie's analysis seems superficial. Even though Heston says 2010 will be another "hard year" for the airline because of continuing jet-fuel price and traffic demand, Finnair boasts a debt-to-equity ratio of 1 to 1. Most airlines would envy such a balance sheet (given its rate), but, more importantly, it enables Finnair to continue to raise financing if necessary – though Heston says Finnair has plenty of cash for any firm's needs to keep flying.

In September, Finnair successfully sold €120 million's worth of hybrid bonds. Officially, these securities, the hybrid bonds do not have a maturity date and international accounting standards treat them as equity. In addition, Finnair successfully obtained a 2009 two separate €162 million loans, one from the European Investment Bank and one from the export-credit agencies of Germany, France and the UK to support Finnair's A330 financing.

As a result, says Heston, the financing of all of Finnair's A330 deliveries through 2010 is guaranteed and the airline still has a cash pile big enough to support its goal of being able to operate for four months even if its revenues were coming in at all. That even quality appears credible, given Finnair's innovative marketing.

