



SVSYSTEMS

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# An Airbus A321neo, from 9 branches across Europe to Sharjah

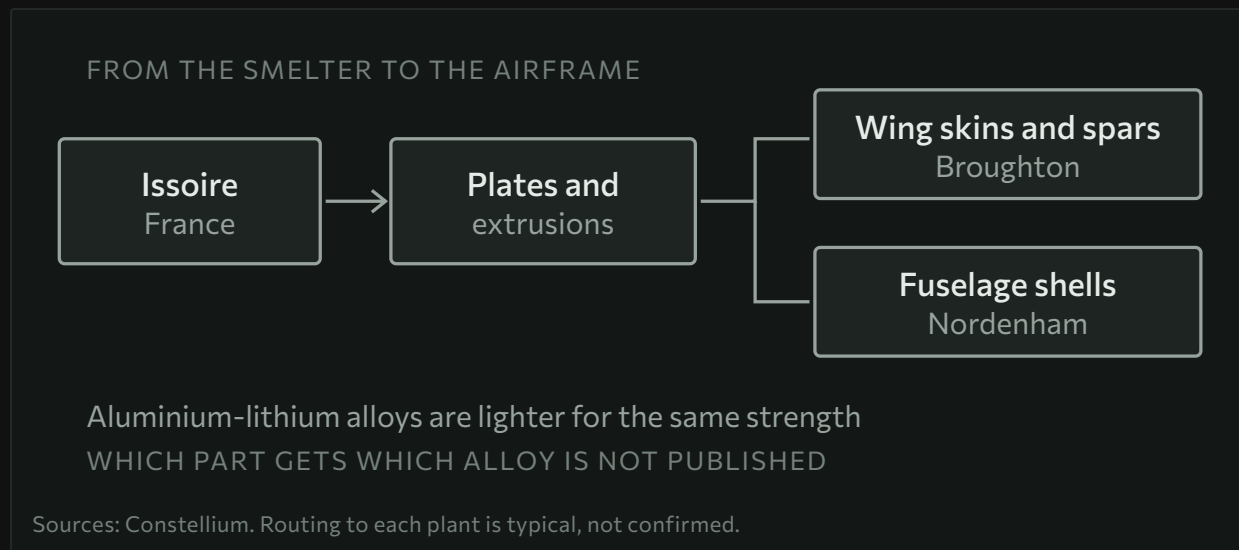
Aluminium from France, titanium from Kazakhstan, carbon fibre from the US, wings from Wales, fuselage sections from France and Germany, a tailplane from Spain, a tail fin floated down the Elbe, engines from near Paris and landing gear from the Pyrenees. 9 branches meet in Hamburg, and 1 jet flies to the Gulf.

Scroll to follow it. Figures are from public records, dated October 2026. An asterisk (\*) marks a claim that still needs a source; a dagger (†) marks a calculated figure.

# The aluminium

Issoire, France

Most of the airframe is aluminium. Constellium supplies Airbus with plates, extrusions and aluminium-lithium alloys under a multi-year contract, from mills such as Issoire in central France.



WHAT Plates, extrusions and aluminium-lithium alloy

WHO Constellium, among others

WHY HERE, WHAT IT COSTS, HOW IT MOVES ON

**WHY HERE** Issoire has rolled aluminium for aerospace for decades, and Constellium holds a multi-year contract to supply Airbus.

**COST** Aluminium plate prices for aerospace are not public

**NEXT LEG** Plates and extrusions go by road to the wing and fuselage plants\*

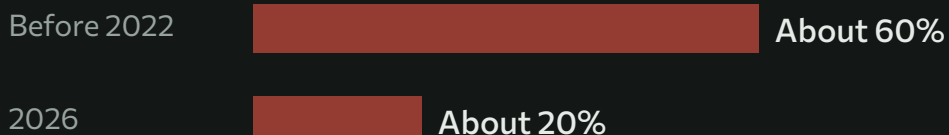
Sources: Constellium

# The titanium

Kazakhstan, Russia and others

Titanium goes into the engine pylons, the landing gear and the engines. Airbus once bought about 60% of its titanium from Russia; by 2026 it says about 20%. Kazakhstan's UKTMP is among the other suppliers.

## RUSSIAN SHARE OF AIRBUS TITANIUM



The rest comes from other producers, such as UKTMP in Kazakhstan, which supplies Airbus, Safran and others

Sources: TitaniumSeller; The Astana Times.

SHARE Russian titanium: about 60% before 2022, about 20% in 2026

WHO VSMPO-AVISMA, UKTMP and others

WHY HERE, WHAT IT COSTS, HOW IT MOVES ON

**WHY HERE** Titanium sponge comes from few places: Russia, Kazakhstan, Japan, China and the US. Airbus has moved most of its buying away from Russia since 2022.

**COST** Not public per aircraft

**NEXT LEG** Bar and forgings go to the engine and landing-gear makers\*

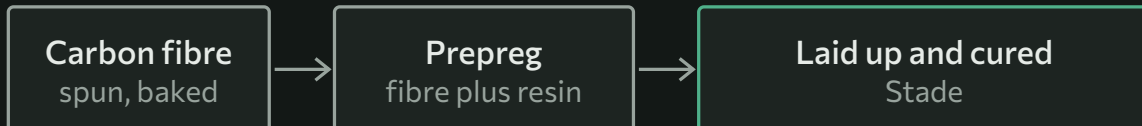
Sources: [TitaniumSeller](#), [The Astana Times](#), [AirInsight](#)

# The carbon fibre

The US, France and Japan

The tail fin is carbon fibre, not aluminium. Fibre is spun and baked, then impregnated with resin as prepreg and shipped to Stade.

## FROM FIBRE TO FIN



Hexcel and Toray are Airbus's main carbon fibre suppliers. Which plant supplies this fin is not published

Sources: Hexcel; Toray; Airbus.

**WHO** Hexcel and Toray, Airbus's main carbon fibre suppliers

**PLANTS** Which plants supply this fin is not published\*

WHY HERE, WHAT IT COSTS, HOW IT MOVES ON

**WHY HERE** Aerospace carbon fibre comes from a handful of firms, so the fin depends on 2 main suppliers.

**COST** Not public

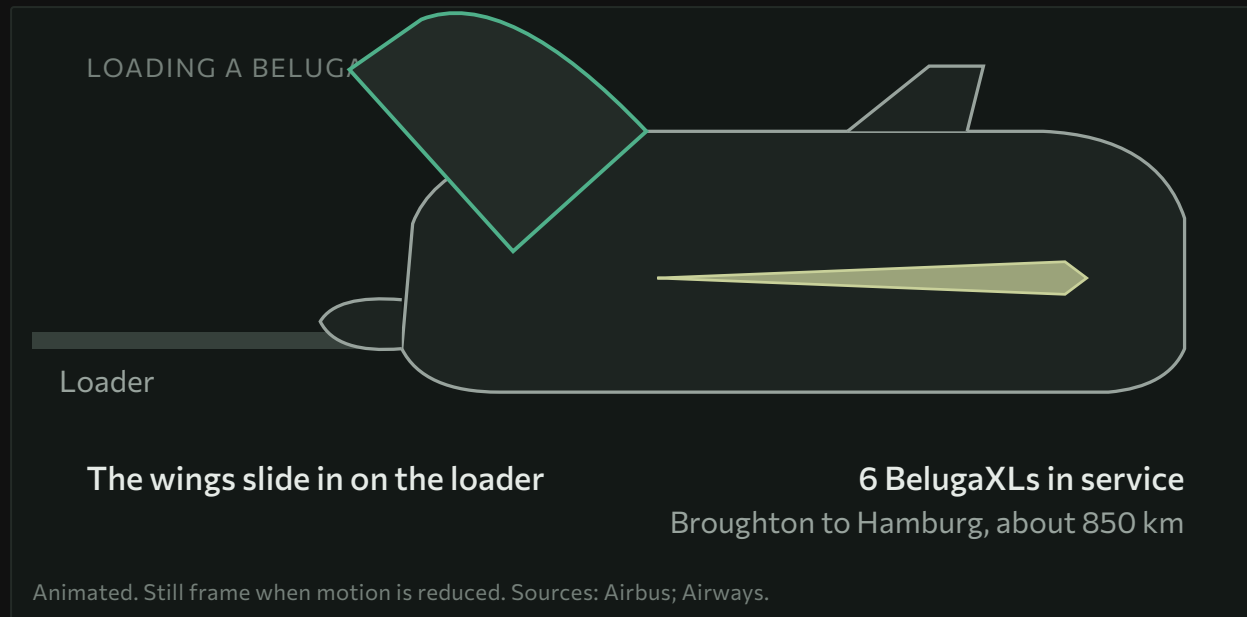
**NEXT LEG** Prepreg rolls travel cold to Stade, where they are cured\*

Sources: [Hexcel](#), [Innovation in Textiles](#)

# The wings

Broughton, Wales

Every A320 family wing is built at Broughton, in north Wales, by a workforce of about 6,000. In 2026 Airbus turned the old A380 wing hall into a second A321 line. The finished wings are flown to Hamburg in a BelugaXL.



**WORKFORCE** About 6,000, plus 480 jobs added in 2026

**TRANSPORT** BelugaXL, 6 in service; the last old Beluga retired in 2026

**DISTANCE** About 850 km to Hamburg<sup>†</sup>

**WHY HERE, WHAT IT COSTS, HOW IT MOVES ON**

**WHY HERE** Broughton has built wings since 1948, when de Havilland took over the factory; it joined Airbus through British Aerospace, a partner since 1979.

**COST** Not published per wing set

**NEXT LEG** A pair of wings on the BelugaXL, about 850 km to Hamburg<sup>†</sup>

Sources: [Airbus](#), [Airbus](#), [Airways](#), [Wikipedia](#), [Wikipedia](#)

# The fuselage

Nordenham, Saint-Nazaire and Hamburg

The fuselage comes in sections. Saint-Nazaire, on the Loire estuary, builds and equips the nose, forward and centre sections. Nordenham makes the shells for the rear, which Hamburg joins into sections on an automated line.

## WHERE THE FUSELAGE SECTIONS ARE MADE

|               |               |               |         |           |
|---------------|---------------|---------------|---------|-----------|
| Nose          | Forward       | Centre        | Rear    | Tail cone |
| Saint-Nazaire | Saint-Nazaire | Saint-Nazaire | Hamburg | Hamburg   |

Rear shells come from Nordenham, about 5,000 a year, and are joined in Hamburg

Sources: Saint-Nazaire tourism office; Airbus Aerostructures.

|          |                                                                            |
|----------|----------------------------------------------------------------------------|
| SHELLS   | About 5,000 a year from Nordenham                                          |
| SECTIONS | Nose, forward and centre from Saint-Nazaire; rear and tail cone in Hamburg |
| DISTANCE | Saint-Nazaire to Hamburg, about 1,100 km <sup>+</sup>                      |

## WHY HERE, WHAT IT COSTS, HOW IT MOVES ON

|          |                                                                                                                                     |
|----------|-------------------------------------------------------------------------------------------------------------------------------------|
| WHY HERE | Airbus spreads work across its founding countries. Saint-Nazaire has equipped forward and centre fuselages for every Airbus family. |
| COST     | Not published                                                                                                                       |
| NEXT LEG | Sections fly on the Beluga, or go by road from Nordenham, to Hamburg*                                                               |

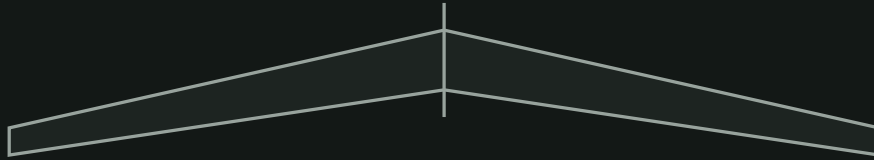
Sources: [Saint-Nazaire tourism](#), [Airbus Aerostructures](#), [Airbus](#), [Wikipedia](#)

# The tailplane

Getafe, Madrid

The horizontal tailplanes for every A320 family jet are assembled at Getafe, on the edge of Madrid, where the Spanish part of Airbus began in 1923. Large parts leave Getafe for Hamburg on the Beluga.

## THE HORIZONTAL TAILPLANE



**Assembled in Getafe, flown to Hamburg on the Beluga**  
About 1,800 km

Calculated straight-line distance. Sources: Airbus.

|           |                                        |
|-----------|----------------------------------------|
| FOUNDED   | 1923, as CASA                          |
| DISTANCE  | About 1,800 km to Hamburg <sup>†</sup> |
| TRANSPORT | Beluga <sup>*</sup>                    |

## WHY HERE, WHAT IT COSTS, HOW IT MOVES ON

|          |                                                                                      |
|----------|--------------------------------------------------------------------------------------|
| WHY HERE | Spain joined Airbus through CASA in 1971, and Getafe specialises in tail structures. |
| COST     | Not published                                                                        |
| NEXT LEG | A tailplane on the Beluga, about 1,800 km <sup>†</sup>                               |

Sources: [Airbus](#), [Airbus](#), [Wikipedia](#)

# The tail fin

Stade, Germany

Stade made the first carbon fibre tail fin for an airliner in 1983, and now builds the fins for every A320 family jet. It has the world's biggest autoclave. The fins go down the Elbe to Hamburg on a pontoon.

## CURING THE TAIL FIN IN THE AUTOCLAVE



Curing

The world's biggest autoclave, Stade

Animated. Still frame when motion is reduced. Sources: Airbus; CompositesWorld.

|           |                                           |
|-----------|-------------------------------------------|
| FIRST     | The first carbon fibre airliner fin, 1983 |
| TRANSPORT | A pontoon on the Elbe to Finkenwerder     |
| DISTANCE  | About 25 km <sup>†</sup>                  |

WHY HERE, WHAT IT COSTS, HOW IT MOVES ON

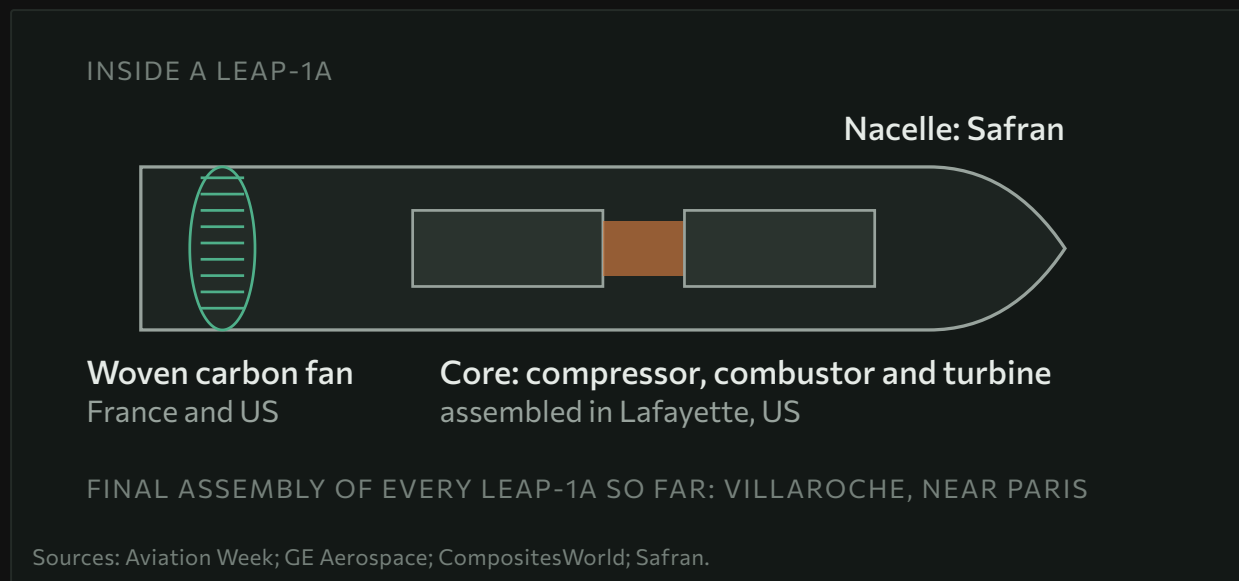
|          |                                                                                                                                     |
|----------|-------------------------------------------------------------------------------------------------------------------------------------|
| WHY HERE | Stade has 40 years of carbon fibre experience and an autoclave big enough for large structures, 25 km from the final assembly line. |
| COST     | Not published                                                                                                                       |
| NEXT LEG | A pontoon on the Elbe to Finkenwerder.                                                                                              |

Sources: [Airbus Aerostructures](#), [CompositesWorld](#), [DVZ](#)

# The engines

Villaroche, France

Air Arabia chose CFM's LEAP-1A for all 120 of its A320neo family jets. CFM is a joint venture of Safran and GE: the core is assembled in Lafayette, Indiana, the woven carbon fan blades come from France and the US, and every LEAP-1A so far has had its final assembly at Villaroche, near Paris.



ORDER 240 LEAP-1A engines for Air Arabia's 120 jets

PRICE About \$14.5 million each at list price

DISTANCE Villaroche to Hamburg, about 740 km<sup>†</sup>

WHY HERE, WHAT IT COSTS, HOW IT MOVES ON

**WHY HERE** Safran and GE split the engine between France and the US; CFM has built LEAP-1A final assembly at Villaroche.

**COST** About \$14.5 million each at list price; 2 engines are about \$29 million, close to a quarter of the list price<sup>†</sup>

**NEXT LEG** By road to Hamburg, about 740 km<sup>†</sup>

Sources: [Air Arabia](#), [Aviation Week](#), [GE Aerospace](#), [CompositesWorld](#), [Safran](#), [Financial Express](#), [Airbus](#)

# The landing gear

Bidos, France, and Gloucester, UK

Safran Landing Systems has made the A320 family's main and nose landing gear since the first jet entered service in 1988. Its plants at Bidos, in the Pyrenees, and Gloucester assemble landing gear.

## MAIN AND NOSE LANDING GEAR



**Main gear, 2 per aircraft**



**Nose gear**

Safran Landing Systems has supplied the A320 family gear since 1988

Sources: Safran.

SINCE 1988

PLANTS Bidos and Gloucester assemble gear; which plant builds this jet's gear is not published\*

WHY HERE, WHAT IT COSTS, HOW IT MOVES ON

WHY HERE Safran has supplied the family's gear since 1988; changing a qualified supplier takes years.

COST Not published

NEXT LEG By road to Hamburg\*

Sources: [Safran](#), [Safran](#), [Safran](#)

# The fuselage join

Hamburg-Finkenwerder

Every branch now converges on Hamburg. The sections are lined up, joined into 1 fuselage and filled with wiring and pipes before final assembly.

## JOINING THE FUSELAGE



Nose, forward and centre from Saint-Nazaire; rear and tail cone built in Hamburg

## Joined into 1 fuselage

Animated. Still frame when motion is reduced. Sources: Airbus; Saint-Nazaire tourism office.

LINE An automated structure assembly line, opened 2019

WHO Airbus

WHY HERE, WHAT IT COSTS, HOW IT MOVES ON

**WHY HERE** Hamburg is Airbus's German home and has its biggest A320 family operation: structure assembly, 4 final assembly lines, paint and delivery in 1 place.

**COST** Not published

**NEXT LEG** Moved along the line to final assembly.

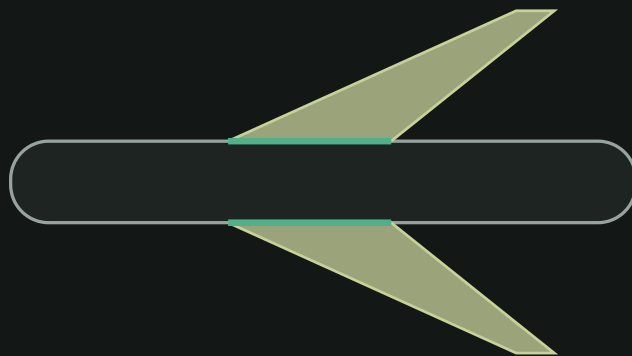
Sources: [Airbus](#), [Skytical](#)

# The final assembly

Hamburg-Finkenwerder

Hamburg has 4 of Airbus's 10 A320 family final assembly lines. The wings are joined to the body, then the tail, the landing gear and the engines go on. The A321neo makes up about 60 to 67% of the family's deliveries and backlog.

THE WINGS MEET THE BODY, SEEN FROM ABOVE



Bolted to the fuselage

Next come the tail, the landing gear and the engines

Animated. Still frame when motion is reduced. Source: Skytical.

HANGING AN ENGINE



Bolted to the pylon

2 LEAP-1A, about \$14.5 million each at list price

Animated. Still frame when motion is reduced. Sources: Financial Express; Air Arabia.

TIME About 3 weeks

LINES 4 in Hamburg, of 10 worldwide

RISK About 60 finished airframes were waiting for engines in 2026

**WHY HERE** Building the A321neo where its fuselage is joined saves moving whole fuselages between countries.

**COST** The engines alone are about \$29 million at list price<sup>†</sup>

**NEXT LEG** Towed to the paint shop.

Sources: [Skytical](#), [AFM](#), [AirDataNews](#), [Financial Express](#)

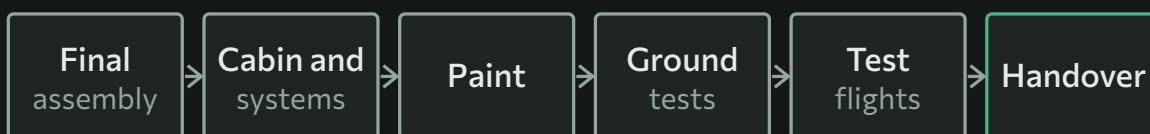
## STAGE 12 OF 13

# Paint, tests and handover

Hamburg-Finkenwerder

The jet is painted in Air Arabia's colours, ground-tested and flown. The airline's crew flies an acceptance flight, ownership passes and the jet is registered in the UAE.

### FROM THE LAST RIVET TO THE HANDOVER



Final assembly takes about 3 weeks. The customer flies its own acceptance flight before ownership passes

Sources: Skytical; Airbus.

**PAINT** The Hamburg paint shop runs 365 days a year with about 270 staff

**PRICE** List price \$129.5 million (2018, the last published); new A321neo jets are valued at about \$64 million

**PAPERWORK** Export certificate of airworthiness; bill of sale; UAE registration; interests recorded on the international registry

**WHY HERE** Delivering where it is built lets the customer inspect and fly the jet before ownership passes.

**COST** List \$129.5 million; about \$64 million paid, about half the list price<sup>†</sup>

**NEXT LEG** Flown by the airline's crew to Sharjah.

Sources: [Hamburger Abendblatt](#), [Airbus](#), [Airbus](#), [Simple Flying](#), [UAE GCAA](#), [International Registry](#)

## The delivery flight

Hamburg to Sharjah

Air Arabia's own pilots fly the jet home to Sharjah, next to Dubai, where the airline started in 2003 as the first low-cost carrier in the region. It flies the A321neo with 215 seats.



|          |                                                                 |
|----------|-----------------------------------------------------------------|
| DISTANCE | About 4,900 km <sup>†</sup>                                     |
| ROUTE    | Depends on airspace closures in the region in 2026 <sup>*</sup> |
| SEATS    | 215, in 1 class                                                 |

Sources: [The National](#), [SeatMaps](#), [Wego](#), [Wikipedia](#)

### SUMMARY

## The whole chain

# 9 branches, 7 countries, 1 jet

|                |                                                                                       |
|----------------|---------------------------------------------------------------------------------------|
| PRICE          | List price \$129.5 million (2018); new A321neo jets are valued at about \$64 million  |
| ENGINES        | 2 LEAP-1A at about \$14.5 million each at list price, about \$29 million <sup>†</sup> |
| COUNTRIES      | 7: France, the UK, Germany, Spain, the US, Kazakhstan and the UAE                     |
| FINAL ASSEMBLY | About 3 weeks in Hamburg                                                              |

## LEGS

### How each piece reaches the next place

Every leg of the chain. Distances are straight lines between the points on the globe.

| LEG | FROM                 | TO                      | WHAT              | HOW                   | PACKED                | DISTANCE OR TIME                              | COST                      |
|-----|----------------------|-------------------------|-------------------|-----------------------|-----------------------|-----------------------------------------------|---------------------------|
| 1   | Issoire              | Broughton and Nordenham | Aluminium plate   | Road*                 | Plates and bars       | About 1,000 km to Hamburg region <sup>†</sup> | Not published             |
| 2   | Titanium mills       | Engine and gear plants  | Titanium          | Road and sea*         | Bar and forgings      | Varies                                        | Not published             |
| 3   | Carbon fibre plants  | Stade                   | Prepreg           | Refrigerated freight* | Cold rolls            | Not published                                 | Not published             |
| 4   | Broughton            | Hamburg                 | Wings             | BelugaXL              | A pair of wings       | About 850 km <sup>†</sup>                     | Not published             |
| 5   | Saint-Nazaire        | Hamburg                 | Fuselage sections | Beluga*               | Equipped sections     | About 1,100 km <sup>†</sup>                   | Not published             |
| 6   | Getafe               | Hamburg                 | Tailplane         | Beluga*               | 1 tailplane           | About 1,800 km <sup>†</sup>                   | Not published             |
| 7   | Stade                | Hamburg                 | Tail fin          | Pontoon on the Elbe   | 1 fin                 | About 25 km <sup>†</sup>                      | Not published             |
| 8   | Villaroche           | Hamburg                 | 2 engines         | Road                  | Engine stands         | About 740 km <sup>†</sup>                     | \$14.5 million each, list |
| 9   | Bidos and Gloucester | Hamburg                 | Landing gear      | Road*                 | Gear sets             | About 830 to 1,400 km <sup>†</sup>            | Not published             |
| 10  | Hamburg              | Sharjah                 | The finished jet  | Delivery flight       | Flown by its own crew | About 4,900 km <sup>†</sup>                   | About \$64 million paid   |

## CHOKEPOINTS

### Who controls each step

| STEP  | WHO       | IF IT STOPS                          |
|-------|-----------|--------------------------------------|
| Wings | Broughton | The only source of A320 family wings |

| STEP      | WHO             | IF IT STOPS                                                                                          |
|-----------|-----------------|------------------------------------------------------------------------------------------------------|
| Transport | 6 BelugaXLs     | Wings and sections move between countries on 6 aircraft                                              |
| Engines   | CFM, Villaroche | Every LEAP-1A so far has had its final assembly there; about 60 airframes waited for engines in 2026 |
| Tail fin  | Stade           | Builds the fin for every A320 family jet                                                             |
| Titanium  | A few producers | Russia still supplies about 20%                                                                      |

## PAPERWORK

### The rules along the way

| RULE                                | SET BY                    | WHERE                     | WHAT IT DOES                                                            |
|-------------------------------------|---------------------------|---------------------------|-------------------------------------------------------------------------|
| Type certificate                    | EASA                      | The design                | Approves the A321neo design; every jet built must match it              |
| Export certificate of airworthiness | Country of manufacture    | Before the flight out     | Says the jet matches its approved design when it leaves                 |
| Bill of sale                        | Airbus and the buyer      | At handover               | Transfers ownership                                                     |
| Registration                        | UAE GCAA                  | Before entry into service | Registers the jet in the UAE, with an A6-mark                           |
| International Registry              | Cape Town Convention      | Online                    | Records ownership and any lender's interest in the airframe and engines |
| Overflight permits                  | Each country on the route | Delivery flight           | Clears the route, which depends on airspace open in 2026                |

## RISK

### What can go wrong, and where

| WHERE    | RISK      | WHAT HAPPENS                                            |
|----------|-----------|---------------------------------------------------------|
| Engines  | Supply    | Finished airframes wait as gliders until engines arrive |
| Titanium | Sanctions | About 20% still comes from Russia                       |
| Beluga   | Capacity  | 6 aircraft carry the big parts between 4 countries      |
| Gulf     | Airspace  | Closures in 2026 can lengthen the delivery flight       |

## What the public record does not show

- Which titanium, aluminium and carbon fibre plants supply this specific jet. The branches show the main suppliers, not confirmed links.
- The price Air Arabia paid. \$64 million is a market value for a new A321neo.
- Which Safran plant built this jet's landing gear, and how the tailplane and gear travel to Hamburg.
- The route flown to Sharjah.

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## SOURCES

## Where the figures come from

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2. [TitaniumSeller: Airbus cuts Russian titanium from 60% to 20%](#)
3. [The Astana Times: Kazakh titanium, 20% of the aerospace market](#)
4. [AirInsight: Airbus still sources some Russian titanium](#)
5. [Hexcel: materials for commercial aerospace](#)
6. [Innovation in Textiles: Toray to supply carbon fibre prepreg to Airbus](#)
7. [Airbus: Broughton A321 wing line and 480 new jobs, September 2026](#)
8. [Wikipedia: Broughton, de Havilland from 1948](#)
9. [Airbus: the 6th and last BelugaXL enters service](#)
10. [Airways: the last BelugaST makes its final flight](#)
11. [Saint-Nazaire tourism: the Airbus plant, forward and centre fuselages](#)
12. [Airbus Aerostructures: Nordenham, about 5,000 shells a year](#)
13. [Airbus: the Hamburg A320 structure assembly line](#)
14. [Airbus: Getafe, horizontal tailplanes, founded 1923](#)
15. [Airbus: a Getafe section flies to Hamburg on the Beluga](#)
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18. [DVZ: Airbus parts by pontoon on the Elbe from Stade](#)
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23. [Air Arabia: 240 LEAP-1A engines](#)
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32. [Airbus: delivery, transfer of ownership and the ferry flight](#)
33. [Airbus: 2018 list prices, A321neo \\$129.5 million](#)
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40. [The National: Air Arabia, the region's first low-cost airline, 2003](#)
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42. [Wikipedia: Airbus A321neo, range about 7,400 km](#)
43. [Wikipedia: history of Airbus and its partners](#)
44. [Airbus: A320 family facts and figures, June 2026](#)

Land and borders from Natural Earth. Branches are drawn between the main suppliers and are not confirmed shipping routes.