



SUPPLY CHAIN MANAGEMENT

AIRBUS CASE STUDY

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Company Overview

Airbus was founded in 1970 as a consortium of European aerospace companies from France, West Germany and Britain, to produce what would become the world's first twin-engine wide-body aircraft, the A300, introduced in 1974.



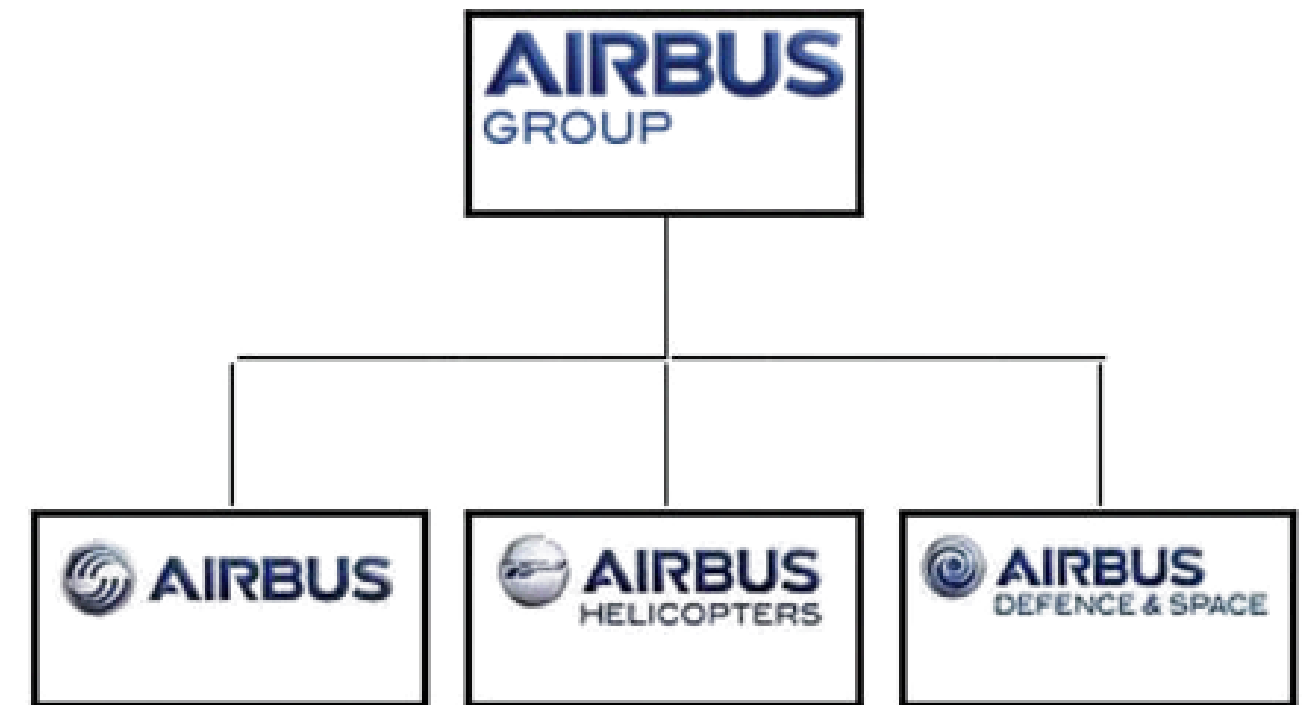
At the time the market was dominated almost exclusively by American-built alternatives, from established companies such as Boeing, McDonnell Douglas and Lockheed, which had recently introduced their own wide-body aircraft.

Business Segmentation

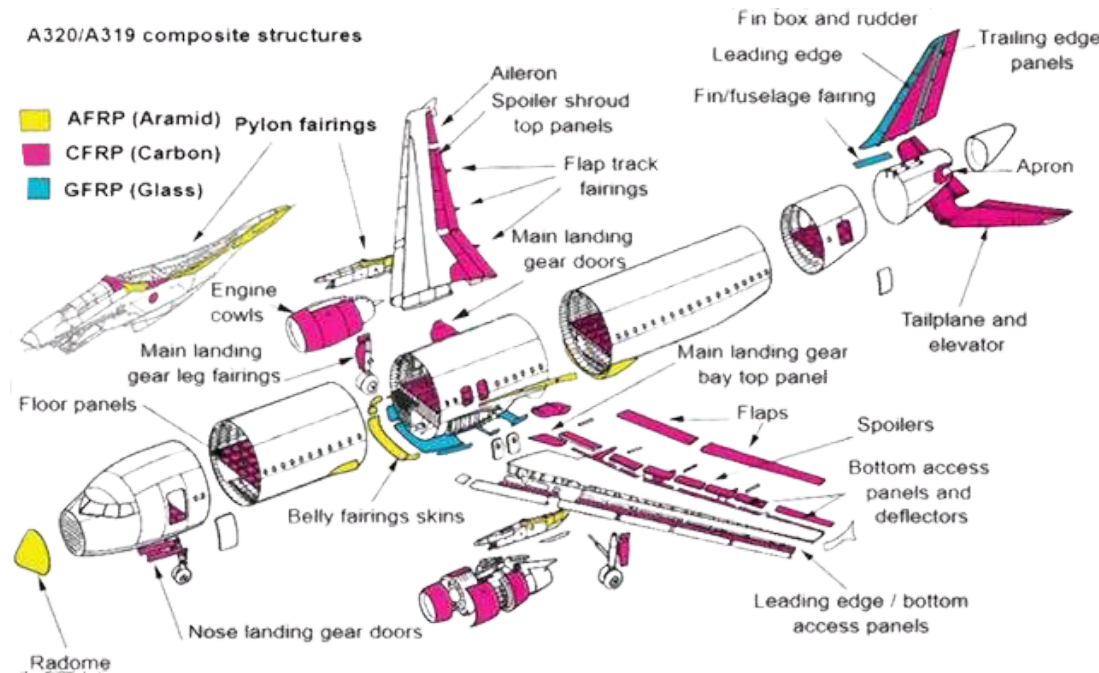
Airbus is active in multiple business segments, including:

- Commercial Aircraft
- Helicopters
- Defence
- Space
- Security & related services

This project focuses exclusively on the Commercial Aircraft division, and within it, the supply chain of the **A320** family.



AIRBUS

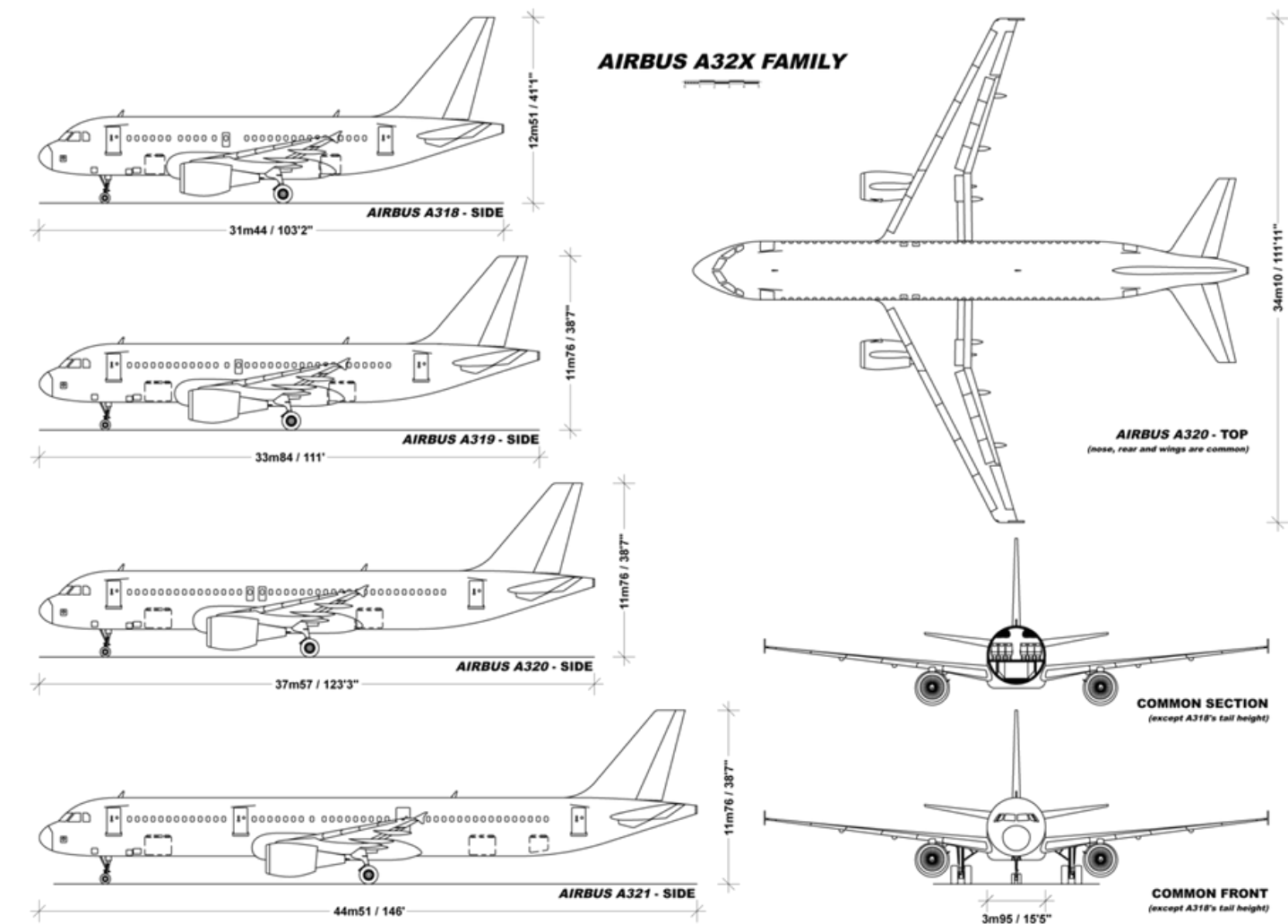


The AIRBUS A320 family

- Introduced in 1988 as Airbus' first narrow-body airplane
- To compete with successful and established Boeing 737
- The Boeing 737 would remain the most delivered commercial aircraft ever, until being surpassed by the A320 family in September of 2025

Initial **A320** was later complemented by:

- **A321**, longer version
- **A319**, shorter version
- **A318**, final, even shorter version
- High interchangeability of parts
- Main difference being fuselage length
- Same type rating for pilots for all models
- Attractive for airline fleets



Supply Chain Mapping

Global Scale & Supplier Footprint

The A320 family is supported by a global, multi-echelon supply chain. Airbus orchestrates a dense European manufacturing core, where most value is added, connected to thousands of suppliers on six continents and four final assembly hubs in Europe, Asia and North America.



01 Supplier Footprint

- Supplier Base includes over 8000 company.
- ~4,000 direct suppliers for A320 family.
- Supplier distribution: ~**59%** Europe, **27%** North America, ~**8–10%**, Asia, MEA & LA <**1%**
- **U.S.** has the most share of total spending value.
- Up to **20,000** goods arrive per day.
- Around **485 million** components annually.
- Almost **180,000** purchase orders weekly.

02 European Network & Hubs

- **Europe:** Industrial core of A320 family, with dense clusters in **UK, France, Germany, Spain**.
- Specialized **Focused Factories:** Build large, pre-equipped modules (wings, fuselage, tails).
- Air (Beluga/BelugaXL) and sea-freight consolidation hubs connect these plants to overseas final assembly lines.

03 Geographical Demand & Assembly

- **Final Assembly Lines (FALs):** Hamburg, Toulouse, Tianjin (China), Mobile (USA).
- **Deliveries:** ~**1/3** Europe, ~**1/3** Asia-Pacific, ~**1/4** Americas, remainder to Middle East & Africa.
- This footprint enables a “**local-for-local**” delivery. Aircraft are assembled near major customer regions while still drawing on the same global supply base.

Supplier Portfolio

Aircraft Manufacturing

Building an aircraft requires a wide variety of components, which can be grouped into three major categories:

- Engine and propulsion systems
- Aircraft structure and internal components
- Technology, entertainment, and connectivity systems

Category	Company	Country	Product/Part Supplied
Engine & Propulsion Systems	RTX Corporation	USA	Whitney engines
	Safran SA	FRA	LEAP engines
	Rolls Royce Holdings PLC	UK	TRENT engines
Other Systems	General Electric Co	USA	Electrical power systems
	Leonardo	ITA	Auxiliary power units, electric taxiing systems
	Honeywell	USA	Cabin power platforms and empennage components
	Hexcel Corporation	USA	Carbon fiber materials
Aircraft Structure & Internals	FACC AG	A	Wings and winglets
	Safran SA	FRA	Landing gear and nacelles
	Spirit AeroSystems Holding	USA	Wings and fuselage sections
	DuPont de Nemours Inc	USA	Acoustic insulation
	PPG Industries Inc	USA	Transparencies, coatings, sealants, adhesives, specialty materials
	Rio Tinto PLC	UK	Metals and minerals for various components
Technology, Entertainment & Connectivity	Safran SA	FRA	Electrical systems
	RTX Corporation	USA	Flight management systems
	Honeywell	USA	Flight controls, radar systems, cockpit displays
	Leonardo	ITA	Flight management systems, radar systems, cockpit
	Parker-Hannifin Corporation	USA	In-flight entertainment and connectivity systems; cabin management and avionics
	Panasonic Holdings Corporation	JPN	In-flight entertainment/IFEC systems and satellite communication services

Global Supply Chain Network: A320 Airliner Family



Tiered Supplier Structure & Sourcing Logic

The A320 supply chain is organized as a **3-tier inbound network**:

Tier-3/4 raw materials → Tier-2 sub-assemblies → Tier-1 integrated modules → Airbus FAL.

Tier-1

Integrated Modules & Major Systems

Airbus Plants

- Wings, fuselage, tails, large structures.

External Tier-1 partners

- Risk-sharing
- Mostly Single-Sourcing options
- Safran (FR): main and nose landing gear
- KAL-ASD (KR): Sharklet wingtip devices
- Latécoère / Tata Advanced Systems: passenger and cargo doors.
- CFM International & Pratt & Whitney: **Dual-sourced** engine options
- Others for avionics, cabin, structures.

Tier-2

Sub-Assemblies

Firms **machining** ribs and beams, **assembling** actuators, valves and pumps, **building** wiring harnesses and minor structural panels.

- Dynamatic Technologies (IN) assembles flap track beam, feeding Airbus's Broughton line.
- Wiring harness clusters in Morocco and Tunisia, plus Chinese AVIC subsidiaries and European SMEs, supply assemblies parts into Tier-1.

Tier-3

Raw materials & standard parts

Aluminium and **Titanium** producers in Germany, France, Canada, U.S.

Carbon-fiber suppliers in Japan and U.S.

Fastener and **electronics** suppliers across Europe and North America.

Multiple sources for standard parts, plus **buffer stock** agreements for critical materials to avoid stoppages.

End-to-End Supply Chain Flows

1

Inbound Module Flows Hub-and-Spoke

- **Raw materials** are transformed by Tier-3 and Tier-2 suppliers into components and sub-assemblies.
- Aerostructures in Europe move via Beluga/BelugaXL freight in a **hub-and-spoke** network (Hamburg, Toulouse).
- For Tianjin and Mobile, complete wings, fuselage and tails are consolidated (often in Hamburg) and shipped by **roll-on/roll-off** sea freight (**≈3–5 weeks**).
- High-value, time-critical items like engines and avionics are shipped **separately**, usually by **air**, and arrive late in the assembly sequence.

2

Final Assembly & Outbound Delivery

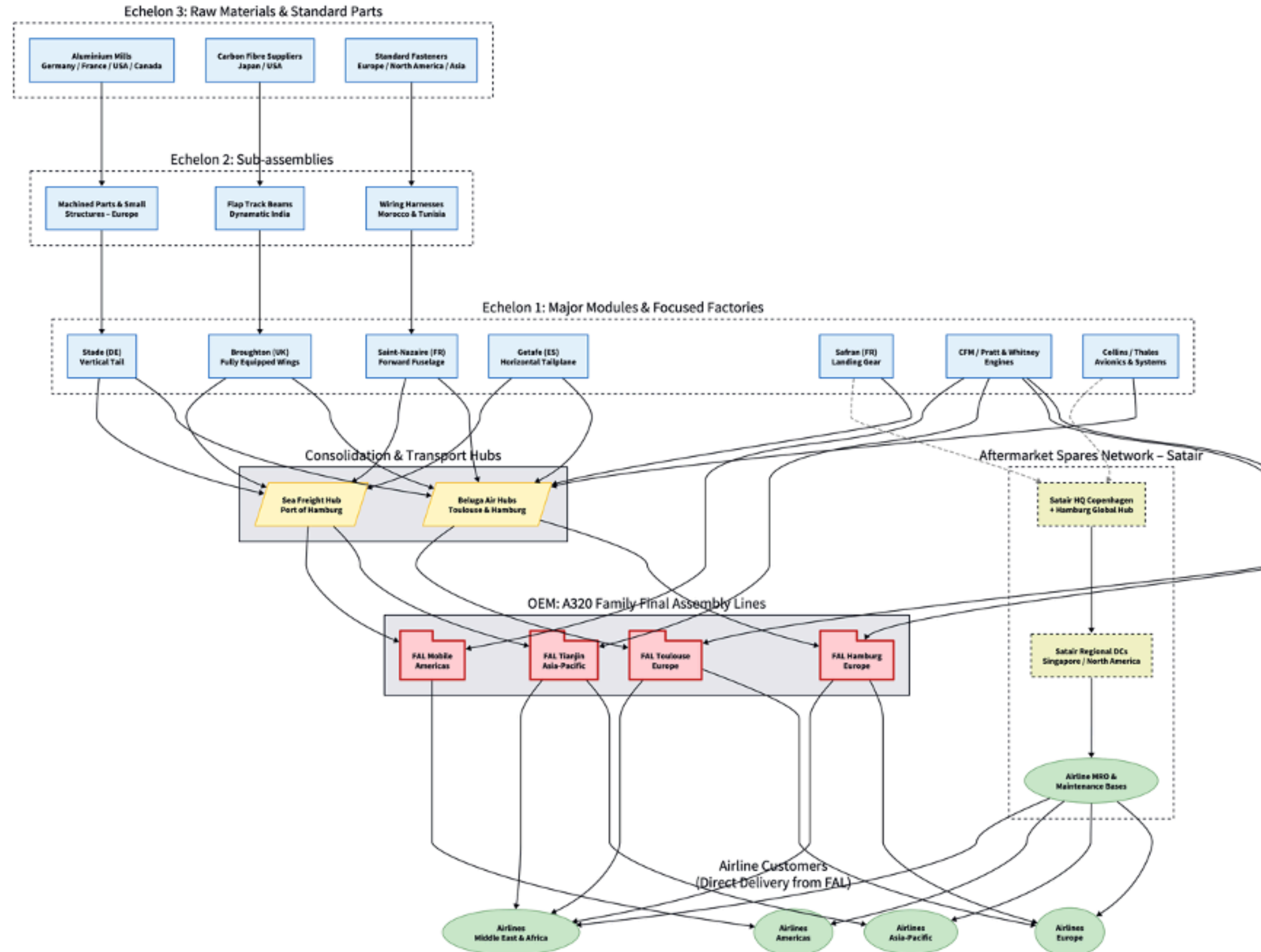
- At FALs, modules follow **station-based, JIT** assembly.
- **Buffers** at the lines are minimal.
- Modules are scheduled to arrive close to their installation slot to avoid storing large parts.
- Completed aircraft are handed over at regional delivery centers and fly directly to customers.
- Outbound chain is **0/1-echelon** (No WH or intermediaries).

3

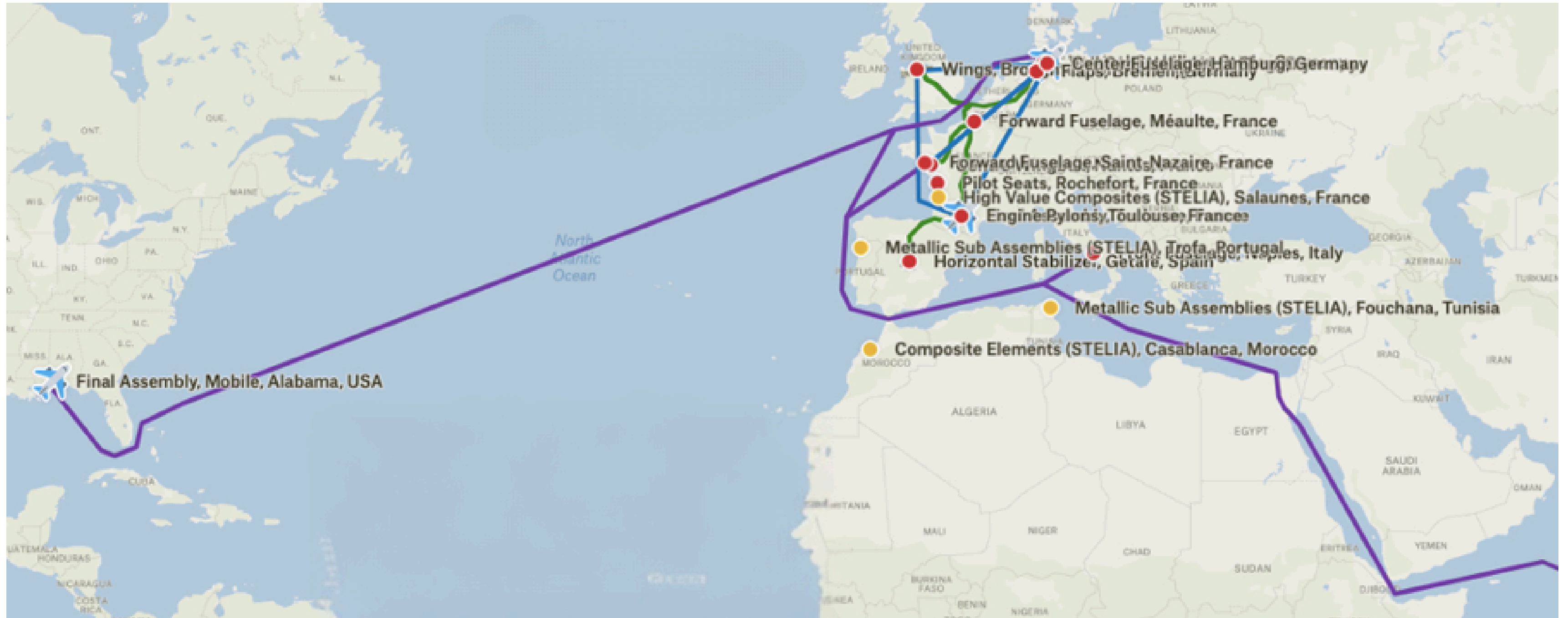
Aftermarket Spares Network

- Satair subsidiary runs a 1/2-echelon spare network:
 - **Global hubs** hold slow-moving strategic items.(Hamburg, Singapore)
 - **Regional Distribution Center** replenish airline maintenance bases and MRO providers.
- This network is integral to the A320 SC, sustaining **fleet uptime** and **long-term service contracts** far beyond the initial aircraft delivery.

Structural Echelon Map of the Airbus A320 Production and Support



Airbus A320 Family Supply Chain Flows



Fisher's Model Analysis

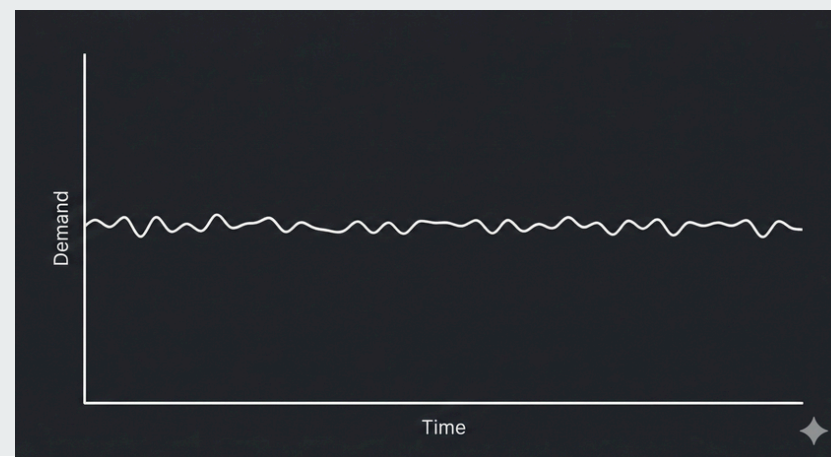


Fisher's Product Categories

Functional Products



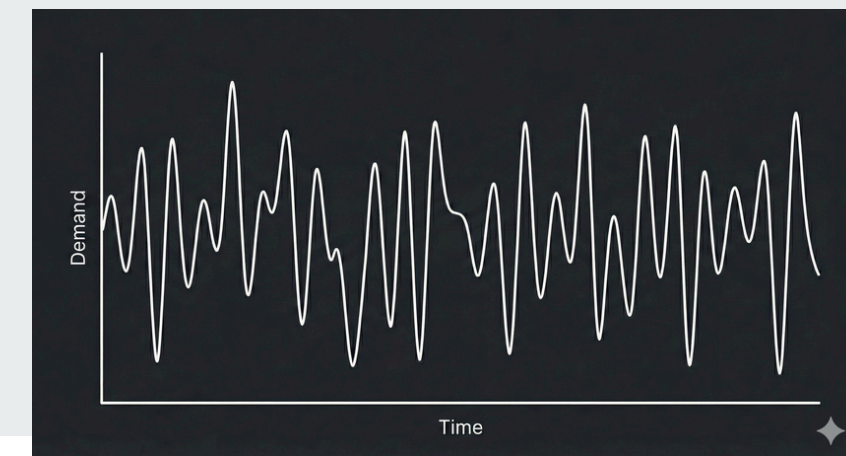
- Predictable demand
- Long lifecycle
- Low profit margins
- Basic clothing, food, oil and gas
- Minimize physical costs



Innovative Products



- Fashion or technology-driven
- Unpredictable demand
- Short lifecycle
- High margins
- Market responsiveness.



Fisher's Criteria vs. Airbus

Aspect	Functional Standard	Airbus
Product Lifecycle	> 2 years	High (30+ years since 1988)
Contribution Margin	5% - 20%	Low (~7.1% Operating Margin)
Demand Predictability	Low Error	Known (Sold out backlog)
Variety	Low	High
Stockout Rate	1% - 2%	N/A (Make-to-Order) – some delays

Verdict: Functional Product

Testing Alignment: Efficient Strategy?



Fisher's "Efficient" Goal

For functional minimizing physical costs throughout the chain.

This implies:

High utilization rates

Minimal inventory (JIT)

Low-cost suppliers



Airbus Reality

Utilization Rate: Aligns. Utilization is high as they ramp up to 75 aircraft/month.

Inventory: Misaligns. Airbus prioritizes reliability over cost. They keep buffer inventory (safety stock) to cope with disruptions.

Suppliers: They even support suppliers financially to ensure flow, which is opposite of cost saving.

Verdict: Strategy Mismatch

Hau Lee's Model Analysis



Lee's Process Categories



Stable Processes

- Stable and higher yields
- More supply sources
- Reliable suppliers
- Less capacity constraint
- Less breakdowns
- Less quality problems
- Dependable lead time
- Easier to changeover



Evolving Processes

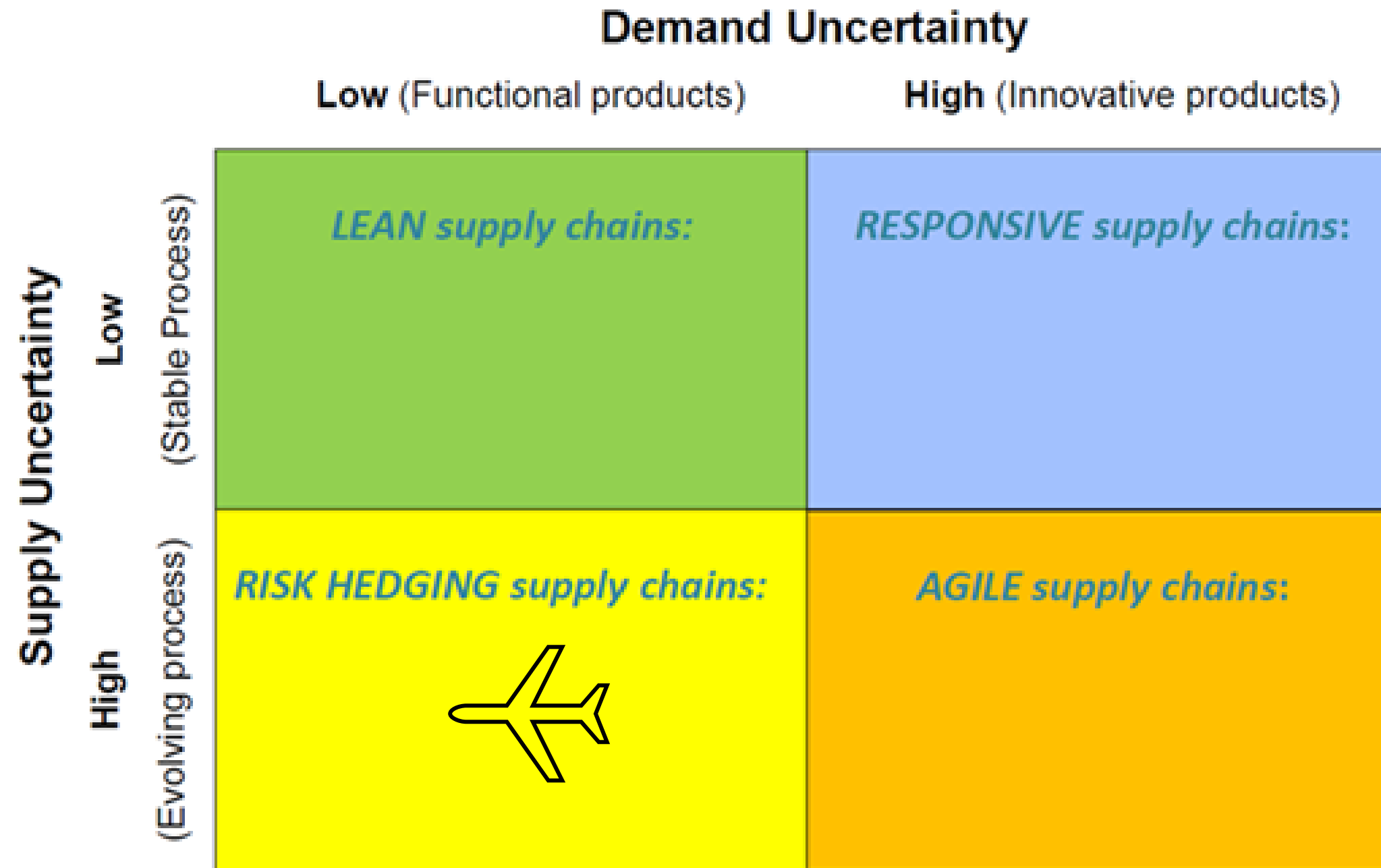
- Variable and lower yields
- Limited supply sources
- Unreliable suppliers
- Potential capacity constraint
- Vulnerable to breakdowns
- Potential quality problems
- Variable lead time
- Difficult to changeover

Fisher's Criteria vs. Airbus

Aspect	Evolving	Airbus
Breakdowns	Vulnerable to breakdowns	breakdown happen quite a lot
# of Sources	Limited supply sources.	many parts are single-source
Capacity	Potential capacity constraint	capacity constraint
Supplier Reliability	Unreliable suppliers	Reliability Issues
Yields	Variable and lower yields	efficiency and yields issues

Verdict: Evolving Process

Functional Demand + Evolving Supply = Risk Hedging Strategy



— Hau Lee's Matrix

Testing Alignment: Risk Hedging?



Lee's Risk Hedging Goal

Resource Sharing

Redundant Supplier

Safety Stocks

Visibility and Control



Airbus Reality

Resource Sharing: Aligns. Multiple FALs strategy

Redundant Supplier: Misaligns. Some components single-source and dual-source

Safety Stocks: Aligns. SS in Airbus and in suppliers' warehouse

Visibility and Control: Aligns. Airbus' Watchtower program

Verdict: Strategy Match

Supply Chain Risks & Resilience



Reintegration of Spirit AeroSystems

According to Airbus' 2024 Report of the Board of Directors, Spirit AeroSystems has created "specific supply chain challenges affecting the A350 and A220 ramp-up," leading to recurring delivery and quality issues that have constrained Airbus' industrial performance. In response, Airbus signed a binding term sheet in July 2024 to acquire the relevant Spirit work packages, stating that completing this integration is "a key priority over the coming year" in order to stabilise production and support the planned ramp-up.



Risk Identification

These problems can be classified as a **recurrent risk**, as the delays, quality issues, and production disruptions have occurred repeatedly over multiple years, following a consistent and predictable pattern rather than a one-off event.



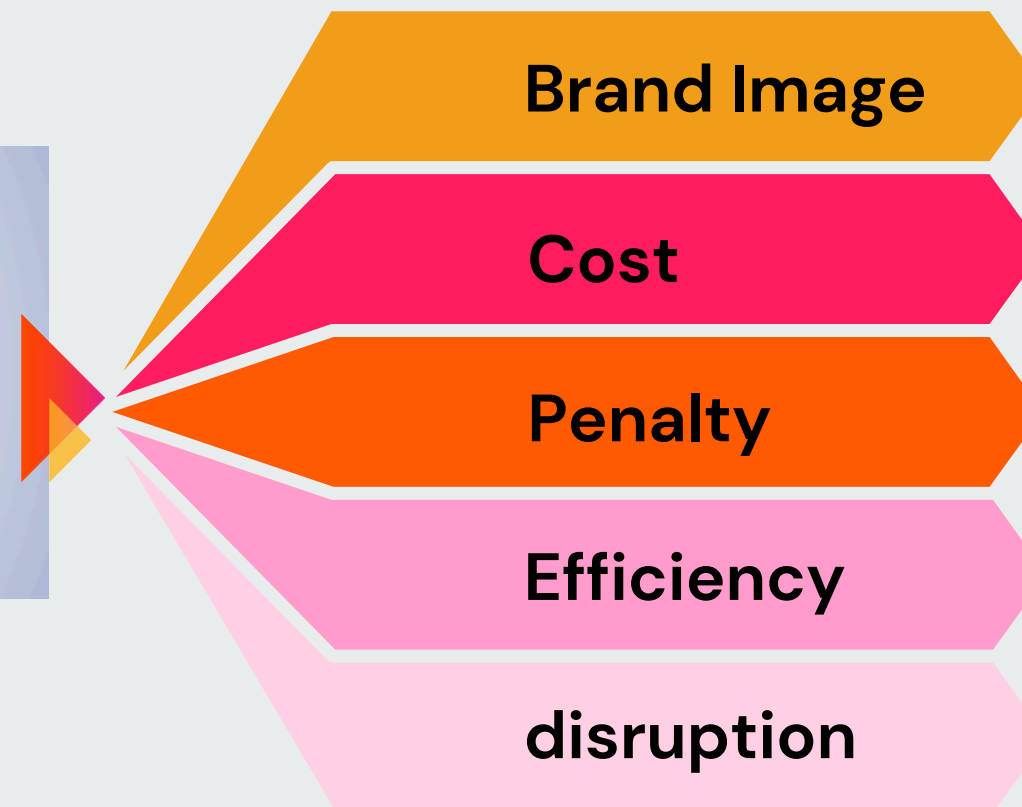
Risk Source

The risk originates from a **network risk source**, as the disruptions stem from the structural interdependence between Airbus and its external Tier-1 supplier Spirit AeroSystems, whose performance directly affects Airbus' production flow.



Risk Driver

Outsourcing critical fuselage sections to a single supplier increases dependency and reduces Airbus' ability to control or buffer disruptions at Spirit, while the **ramp-up pressure** driven by strong demand amplifies these disruptions by pushing the supplier to deliver more and faster than its stable capacity can support.



Sustainable Supply Chain Roadmap

The depth (comprising Tier-1 and Subtier suppliers) and breadth (global supply chain) of Airbus's supply chain contribute to the complexity of management. Airbus implements its **"Sustainable Supply Chain Roadmap"**, which is based on a cyclical process of: **supplier commitment, supplier assessment, supplier engagement and development**, which essentially formalizes an end-to-end risk management system for its commercial aircraft supply, thereby enhancing the overall resilience of the supply chain at a systemic level.



Risk Identification & Mapping

The **Supply base Risk Mapping** and **Annual Inherent Risk Mapping** by Procurement anticipate potential risks of disruption from suppliers rather than reacting passively after problems arise.

Global Diversification & Proximity

Regional procurement offices in **Hernton(US), Bangalore(India), Singapore(APAC) and Beijing(China)** reduce over-reliance on a single geography and allow Airbus to detect issues in local supplier ecosystems directly.

Performance & Compliance Surveillance

Regular supplier **assessments and audits**, plus **contractual requirements**, enhance supply chain predictability, enabling intervention before issues impact production.

Support for Industrial Ramp-up

Airbus says that scaling up commercial aircraft production to the targeted rates depends on the performance of the entire supply chain, which links this governance directly to resilience of the A320 ramp-up.

Case study: Russia-Ukraine conflict

