

Game Changer A321XLR?

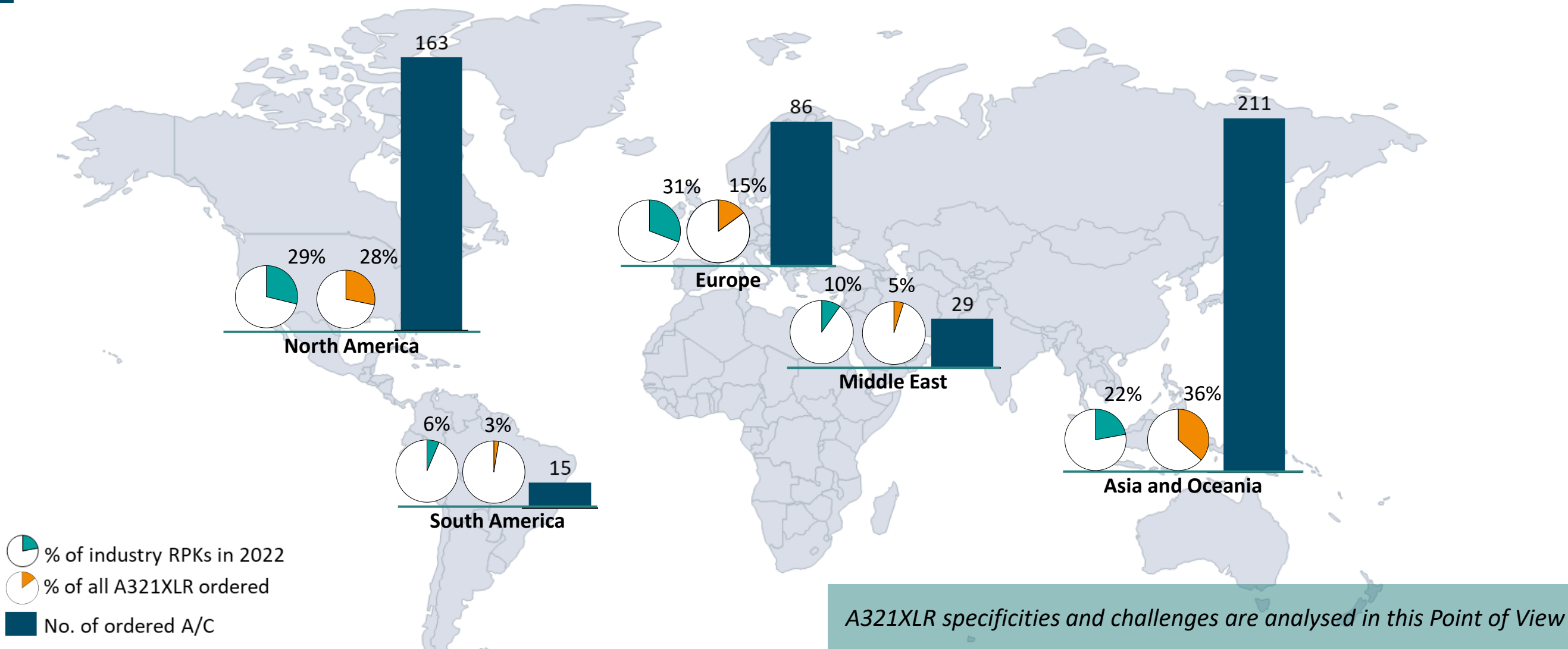
Archery Strategy Consulting Impact Study

Frankfurt am Main, March 2024



Before 1st delivery A321XLR has attracted more than 550 orders¹ mostly from airlines in Asia/Oceania and North America

Analysis of A321XLR order book



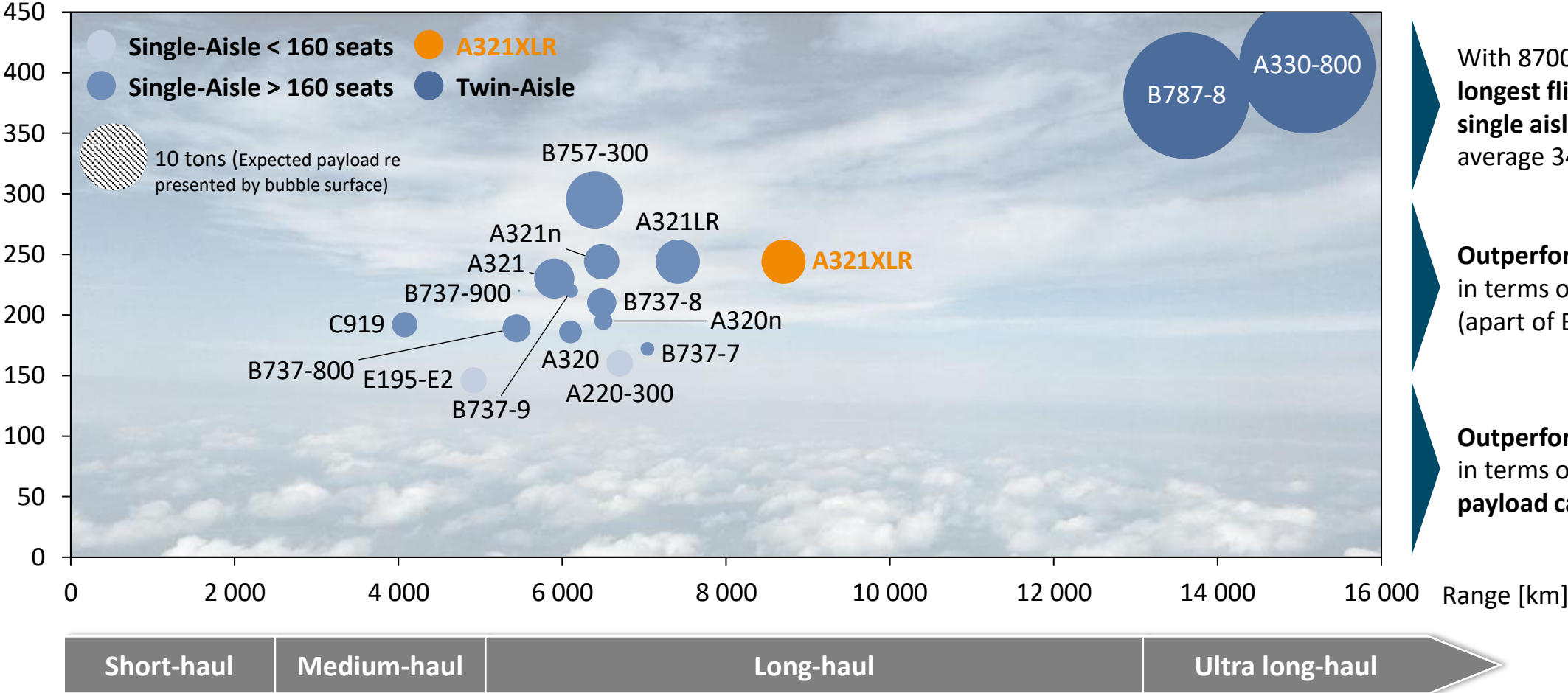
A321XLR specificities and challenges are analysed in this Point of View

Source: Archery Desktop Research, IATA 2022.
RPK = Revenue Passenger Kilometre
1) Unknown order ownership for ~75 units/ 15% of all orders

A321XLR outperforms other single-aisle aircraft in terms of range and seat capacity while closing the range gap to twin-aisle aircraft

Aircraft benchmark in relation to Airbus A321XLR

Single Class Capacity [Economy seats]



KEY TAKEAWAYS A321XLR

With 8700 km or 11 hours of longest flight range among single aisles (these have in average 34% less range)

Outperforming all single aisles in terms of **PAX capacity** by 40% (apart of B757-300)

Outperforming all single aisles in terms of **expected cargo payload capacity**

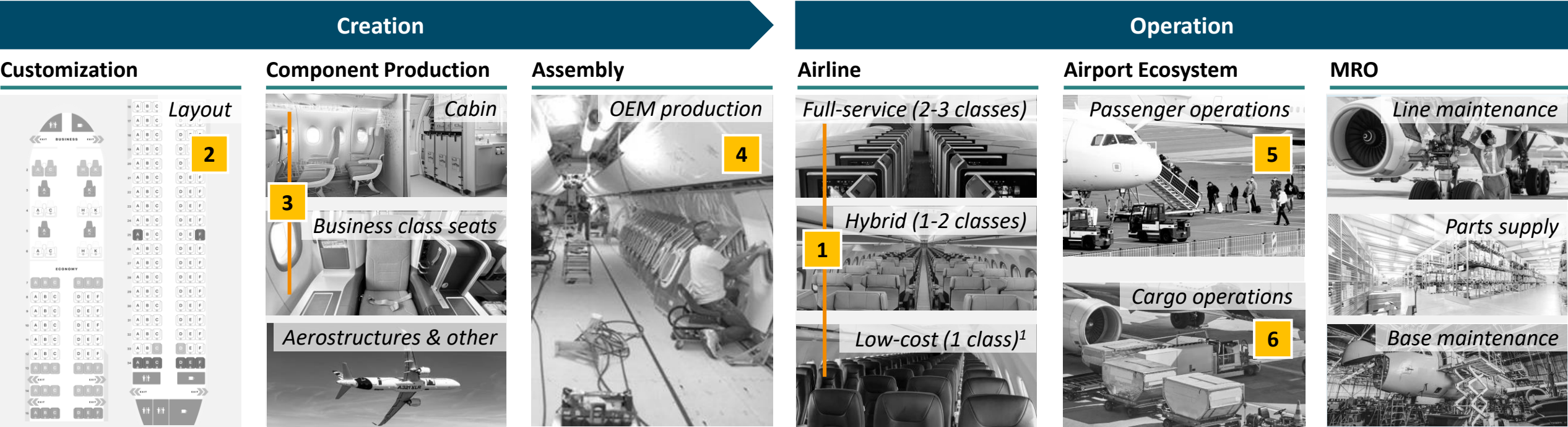
*) Expected payload of B737-7 and B737-9 unknown

Source: Archery Analysis; PAX = Passenger

Flight length: Short-haul (<3h); Medium-haul (3-6h); Long-haul (6-16h); Ultra long-haul (>16h) with A321XLR cruise speed

With A321 LR/XLR introduction at scale we see six key impact areas which are distributed over the whole aircraft value chain

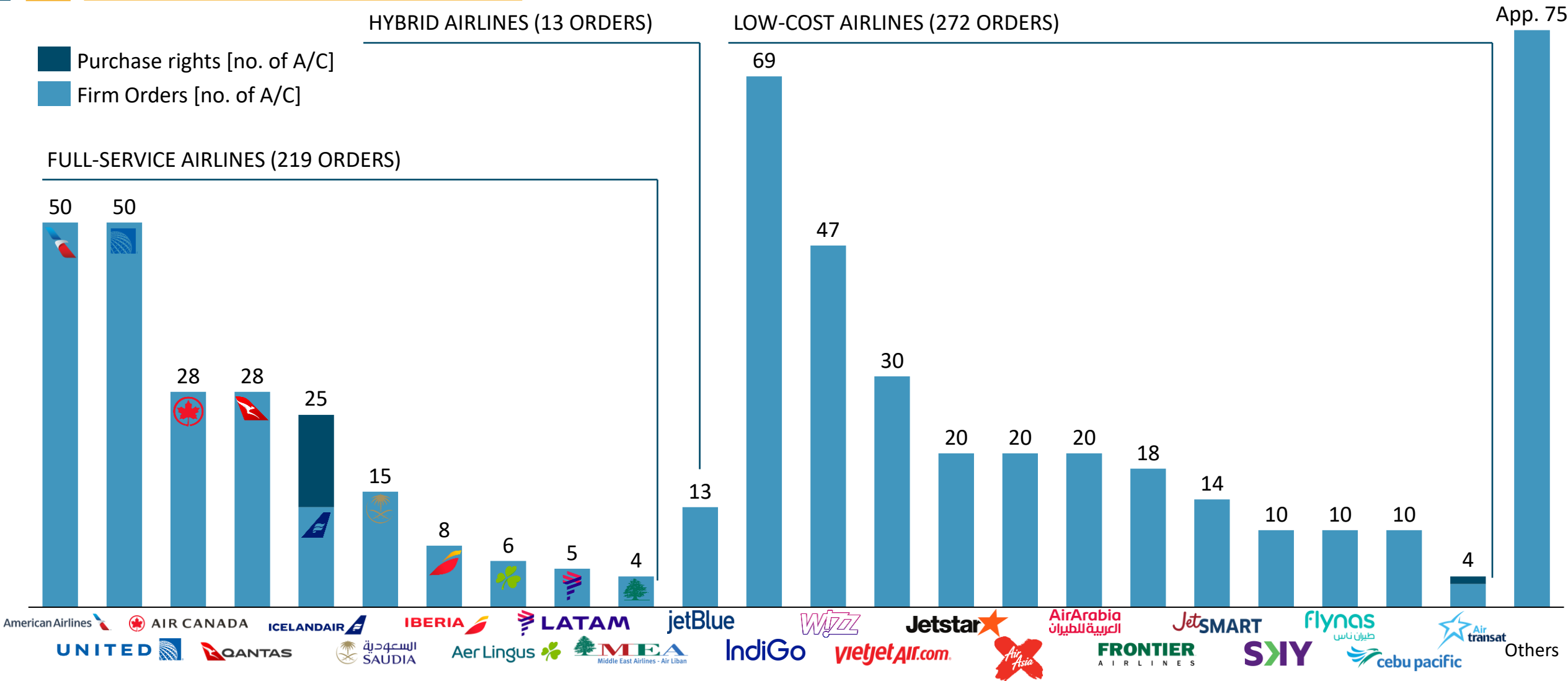
Impact of A321 LR/XLR introduction on the Aerospace and Aviation value chain



The majority of A321XLR orders come from low-cost airlines marking the simplified long-haul market entry and increased competition operating models

1

Impact on airline operations



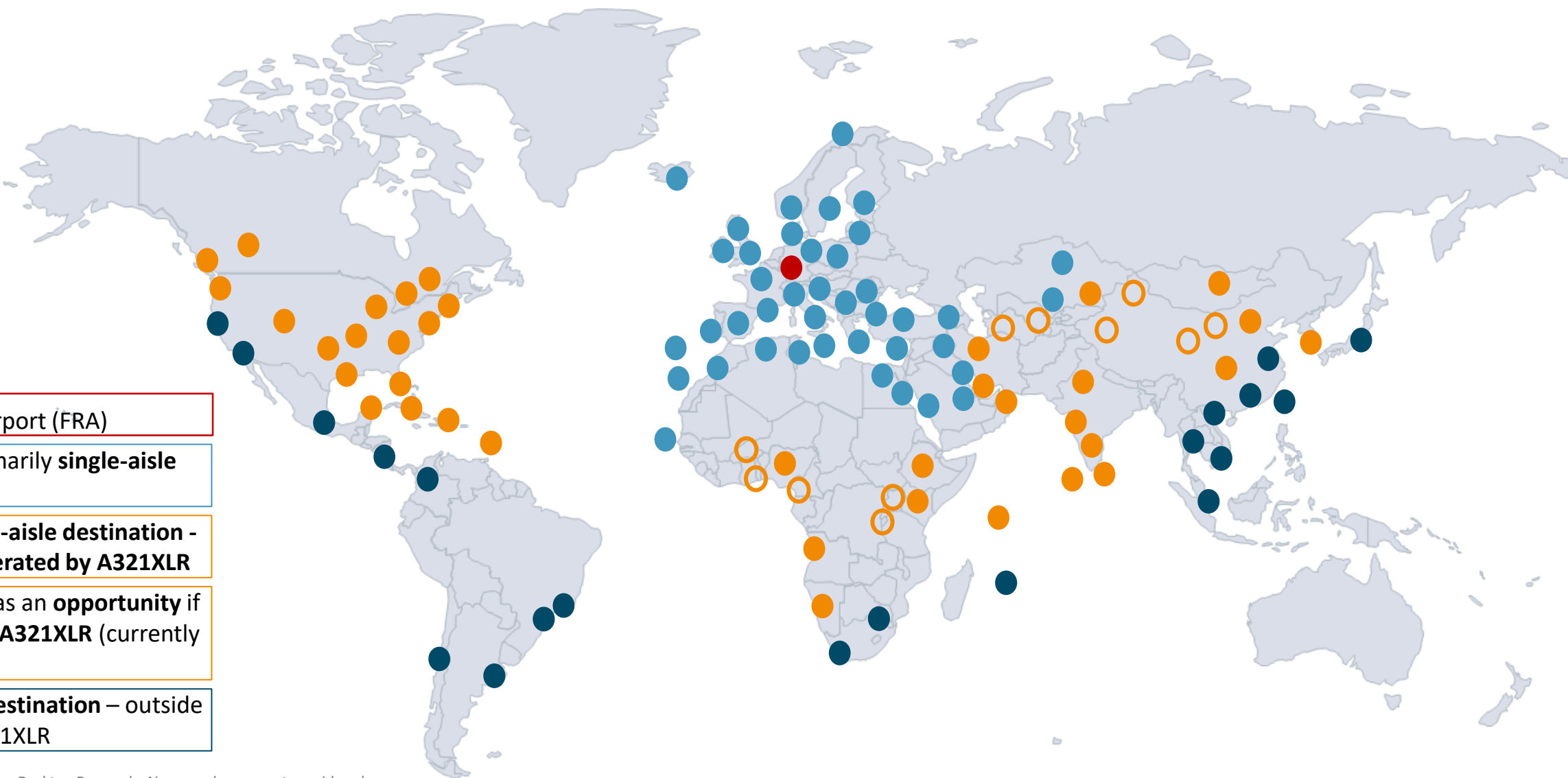
Source: Archery Desktop Research; Order data as of February 2024
 The exact number of purchase rights for Qantas and Saudia is unknown

A321XLR range increases market competition on established routes from hubs (i.e., FRA) and on point-to-point long-haul flights from smaller airports

1 Impact on airline operations

LEGEND:

- Frankfurt Airport (FRA)
- Current, primarily single-aisle destination
- Current twin-aisle destination - could be operated by A321XLR
- Destination as an opportunity if operated by A321XLR (currently not served)
- Twin-aisle destination – outside range of A321XLR



Source: Archery Desktop Research; Airspace closures not considered
Actual range may vary on the cabin configuration and load factor

Twin-aisle low-cost long-haul not a successful business model for European airlines - can A321XLR change what history has proven impossible?

1

Impact on airline operations

BENCHMARK

			OTHER LCCs WITH LONG-HAUL DIFFICULTIES:  NORSE  WOW air  LEVEL  Air Europa  Eurowings
BUSINESS MODEL	Full-service model – serving O&D and P2P markets – offering 3 cabin classes	LCC model – primarily P2P market – with Eco and Eco+ classes	
LONG HAUL OPREATIONS STATUS	Ongoing, serving ~35 destinations	Stopped in January 2021, served up to 30 destinations	
NUMBER OF BASES	2 (LHR and MAN)	0 (previously up to 7)	
COLLABORATION WITH OTHER AIRLINES	13 codeshare agreements 19 interline agreements Broad joint venture with AF, KL and DL: - O&D traffic to 350+ destinations - Common use of ff programs and 100+ lounges	Connection deal with easyJet and WestJet and GatwickConnects service.	
FLEET	10x A330-300 4x A330-900 (12 on order) 10x A350-1000 (4 on order) 17x B787-9	(Former long-haul fleet) 8x B787-8 29x B787-9	
TRANSPORT OF CARGO	Cargo transported	Cargo was not transported	

LESSONS LEARNED FROM LONG-HAUL LCC

MAIN TWIN-AISLE LCC CHALLENGES:

- Twin-aisle long-haul LCC making a loss because cargo is not transported
- Limited market size for P2P long-haul
- O&D feed required to fill twin-aisle aircraft
- Twin-aisle aircraft with limited flexibility to operate different flight scenarios (short/medium/long-haul mix)

A321XLR is more suitable for low-cost long-haul operations

A321XLR operates with competitive operating costs on long-haul flights, allows higher route connectivity and pax yields in comparison to wide body aircraft

1

Impact on airline operations

A321XLR with competitive relative operating costs



- A321XLR has approximately (over) **50% lower relative trip costs** [EUR/KM] in comparison to twin-aisle aircraft
- **Has comparable relative unit costs** [CASK]
- Offers lower **route-opening risk and investment**

Competitive unit costs allows increased route connectivity and attractiveness



- A321XLR can offer **higher flight connectivity** on a route because of lower trip cost than twin-aisle aircraft. This **leads to an increase in attractiveness** for passengers and **reduces crew costs** (shorter layovers)

A321XLR can generate higher passenger yield

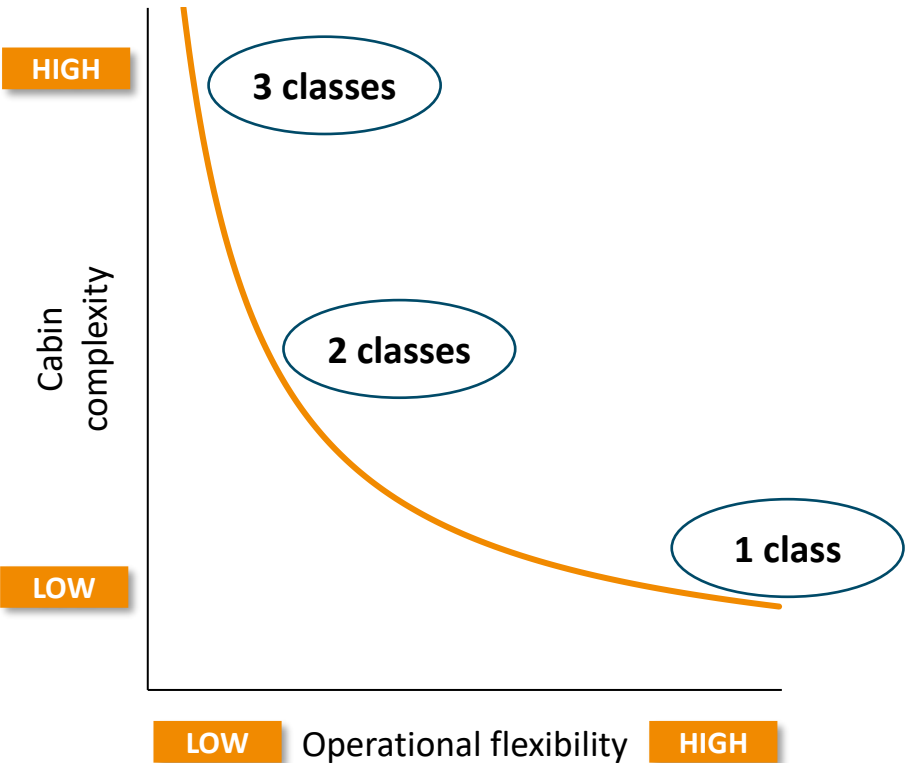


- **A321XLR has a higher passenger yield [RPK]** than twin-aisle aircraft benefitting from smaller tube size and higher route connectivity
- Very **limited cargo capacity**

Ability to choose different cabin layouts and complexities, leads to various deployment flexibility levels & competition between airline business models

1 Impact on airline operations

OBSERVATION



IMPLICATIONS

FULL-SERVICE AIRLINES (2-3 CLASSES) ¹	Reduced deployment feasibility on short & medium-haul expected	 Longer domestic flights		 Trans-Atlantic flights
				
HYBRID AIRLINES (1-2 CLASSES) ¹	Possibly compromised deployment feasibility (depending on the size of eventual business class) due to constraints caused by cabin complexity expected	jetBlue		
		LOW-COST AIRLINES (1 CLASS) ¹		
		High deployment feasibility without constraints caused by cabin complexity expected		
				

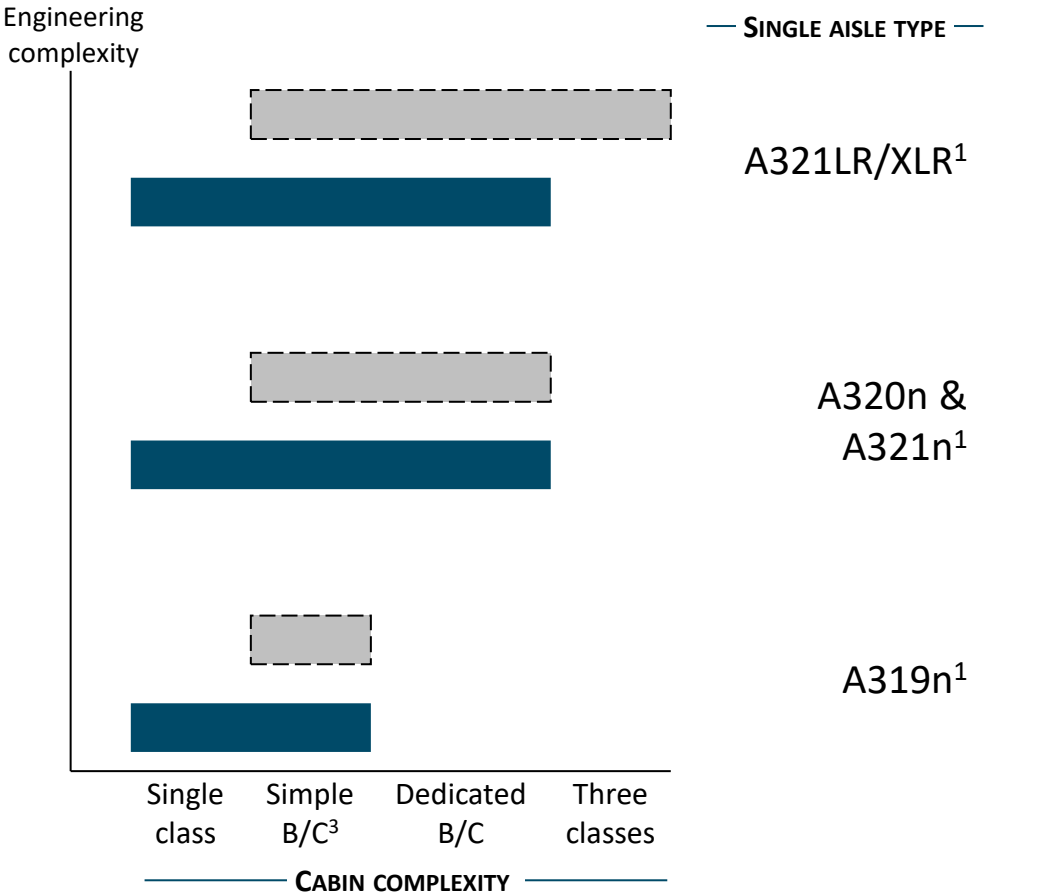
Cabin layouts with more than one class may enhance passenger experience but limit the A321XLR's deployment flexibility on shorter routes, particularly for European full-service airlines.

As A321XLR customers have a wider range of requirements the volatility of configurations and engineering efforts increase

2

Impact on customization requirements

ENGINEERING COMPLEXITY ACCORDING TO CABIN CUSTOMIZATION



A321XLR CUSTOMIZATION IMPACT

Higher customer requirements

- More **advanced** new **catalogue options**
- More **outside-of-catalogue** requirements
- Higher effort and lead-time volatility in **customer guidance** to meet the requirements

Wider spread of requirements

- Higher volatility** of Head-of-Version efforts and lead time
- Different **engineering** schedule **lead-times**

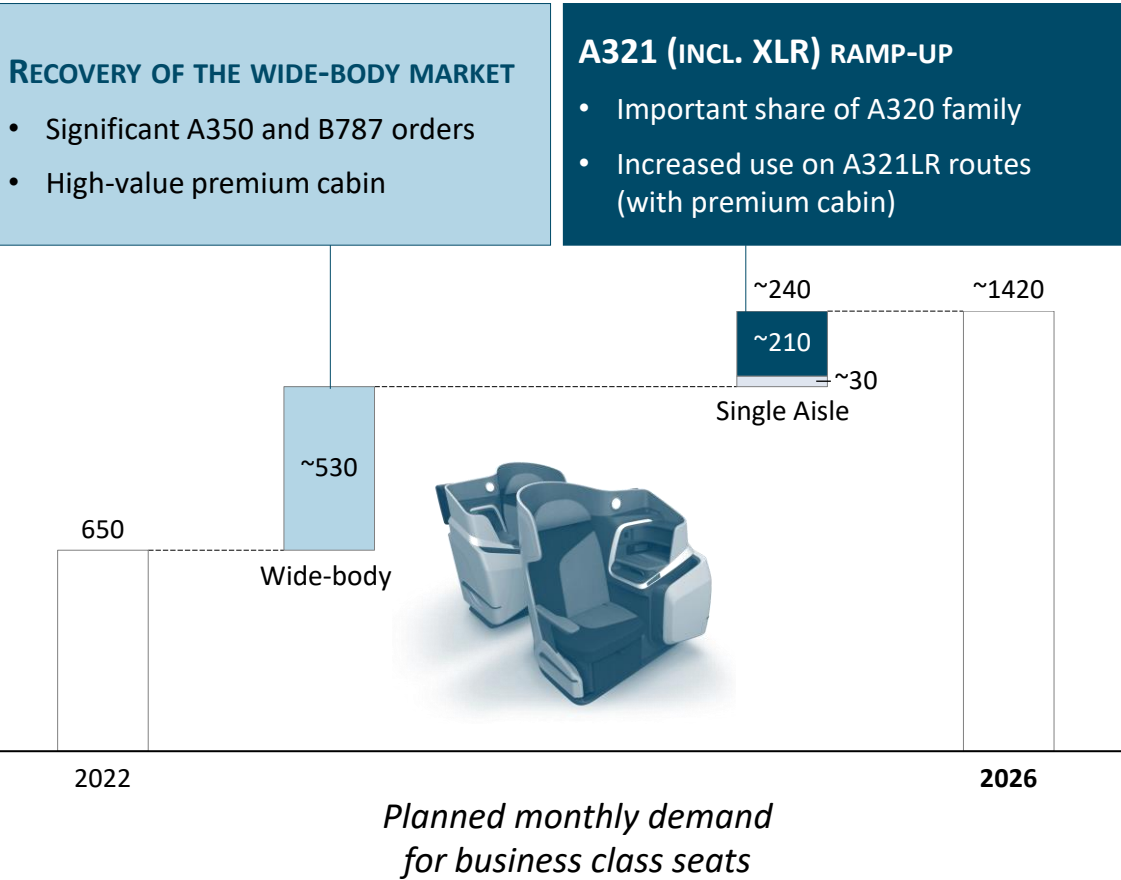
Engineering integration

- More **complex** (and consequently **error-prone**) engineering **integration** due to new and more frequent out-of-catalogue configurations
- Higher** engineering integration and certification **effort²**

A321XLR increases pressure on the Business Class seat industry which is already under the pressure due to twin-aisle market recovery

3 Impact on component production

A321 WILL INCREASE PRESSURE ON THE SEAT MARKET...



...WHICH MAY REQUIRE MORE OEM AND OPERATOR ATTENTION

- High level of customization:** each airline fleet is likely to require additional development and certification, with relatively small quantities for A321XLR
- Limited visibility on ramp-up:** B/C seats are BFE and as such, suppliers compete on each fleet and do not have a stabilized production plan
- Weak Supply Chain:** complex materials, very small lot sizes, challenging industrialization and long lead time, relying on small/medium enterprises



High risk on XLR ramp-up

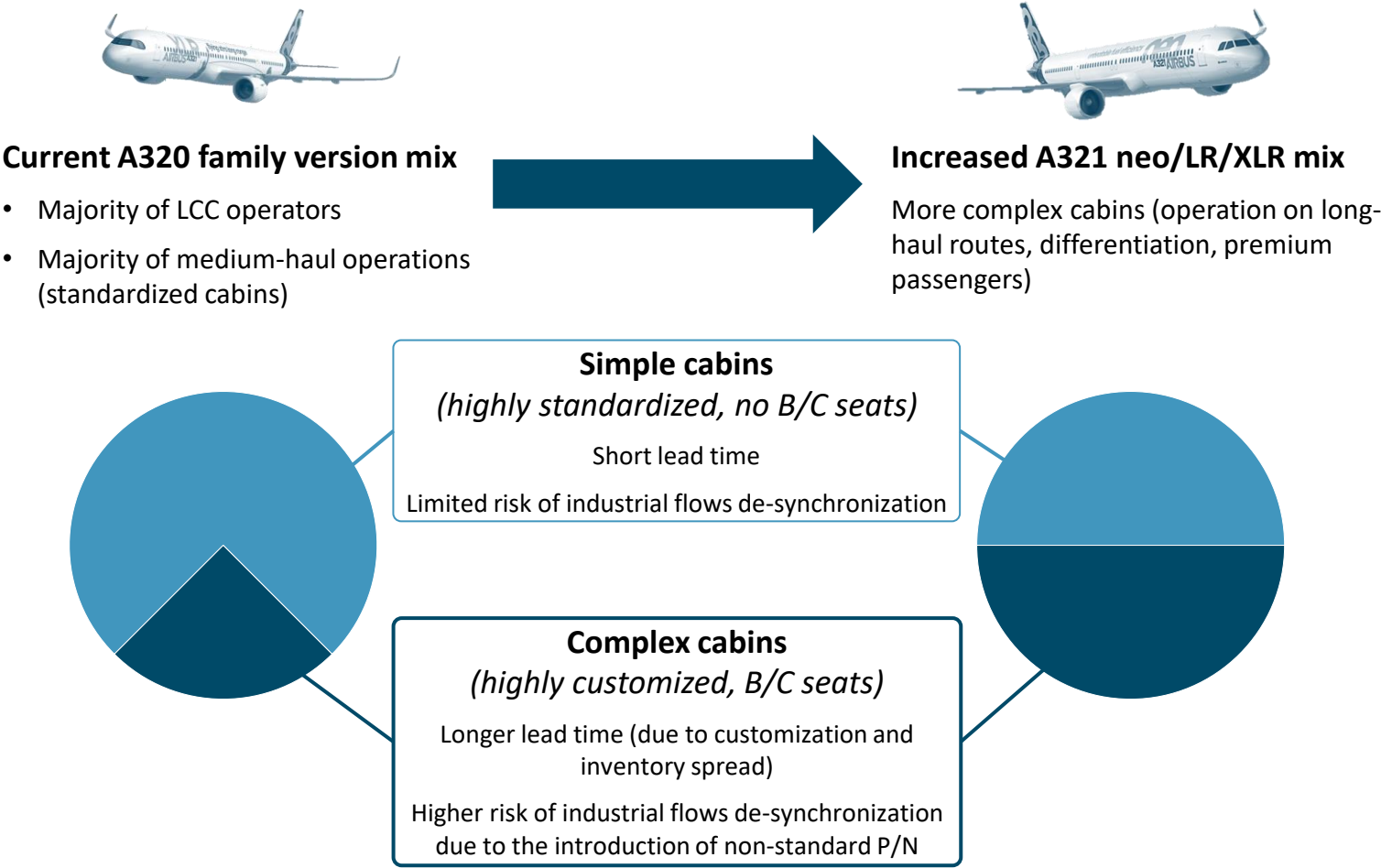
PRODUCTION DISRUPTION FOR OEMs
(keep synchronized flows between standardized & highly customized equipment)

PROJECT MANAGEMENT (ESP. RISK) FOR AIRLINES
(delivery & fleet development plan impacted by the selection of struggling suppliers or insufficient management)

A321XLR production ramp-up and its wide customisation options range will increase the final assembly complexity impacting the OEM and airlines

4 Impact on assembly complexity

A321XLR WILL INCREASE THE MIX OF “COMPLEX” A/C IN THE INDUSTRIAL FLOW



IMPACT FOR THE OEM AND AIRLINES

HIGHER NEED OF PROJECT MANAGEMENT PROFICIENCY

Management of the «flow» will not be sufficient, End-to-End steering & monitoring per Head-of-Version, perhaps per MSN, will be required to manage risks effectively

INCREASED CONTINGENCIES AND INDUSTRIAL BUFFERS

Streamlined industrial flows, optimized for simple cabin, are unlikely to be sustainable with a significant increase in «complex» cabin. Additional buffers will be required to preserve the industrial system, thus having an impact on OEM and airline (for BFE inventory)

POTENTIAL INDUSTRIAL SPECIALIZATION

When complex cabins represent a majority in the industrial flow, considering a specialization of industrial processes/footprint may become a necessity for the OEM

The A321XLR can be utilized in a multitude of manners, thereby contributing to a diverse range of objectives and strategic ambitions of an airline

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5

Impact on passenger operations

BUSINESS MODEL	A321XLR STRATEGIC GOALS – USE CASES			DESCRIPTION VALUE DRIVER	
Full Service (hub) Airlines	C			ROUTE OPENER	DUE TO LOWER CAPACITY Reduced risk through single-aisle capacity and lower route opening investment from the airline’s hub (applicable primarily to full-service airlines)
					DUE TO RANGE Ability to fly long-haul distances with competitive relative unit costs (applicable primarily to LCC and hybrid airlines)
Hybrid Airlines	R			FREQUENCY BOOSTER	With the smaller tube size but competitive relative unit cost long-haul routes could be serviced with the A321XLR with higher frequency leading to higher connectivity and attractiveness of the route.
Low-Cost Airlines	R			MARKET PENETRATION	The A321XLR could help airlines penetrate existing high-volume long-haul routes of established hub and spoke airlines (like New York – London).
				FLEXIBILITY BOOSTER	The A321XLR can optimize the load factor on volatile or seasonal routes . With its extended range, it can serve short-, medium-, and long-haul destinations, improving operational flexibility and network resilience in case of disruptions.

A321XLR boasts a range of **unique capabilities** aligning with specific airline operating strategies. However, it is **effective for opening new routes and market reach extensions** regardless of an airline's business model.

Broad introduction of A321XLR comes with growth and declining factors for air cargo business

6

Impact on cargo operations

TWIN-AISLE FLEET GROWTH DESPITE A321XLR

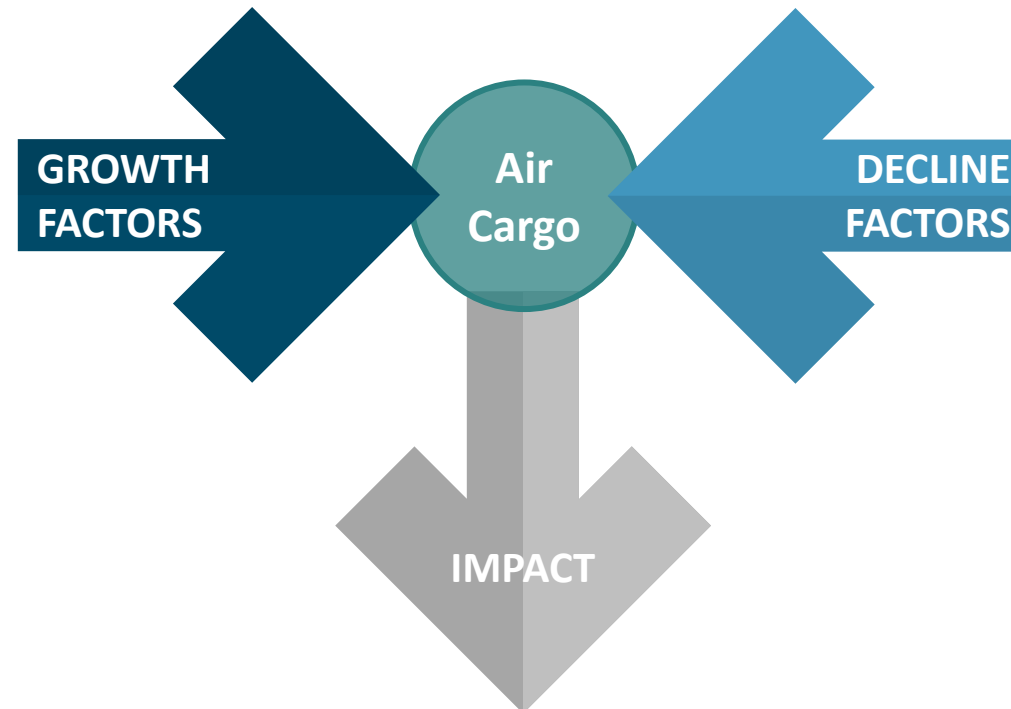
A321XLR is **not** expected to **jeopardize** the growing twin-aisle market and its cargo capacities

NEW CARGO CAPACITIES

A321XLR as a route opener might lead to **new routes** that otherwise would not be operated. That provides additional cargo capacities from new airports.

INCREASED CARGO CAPACITIES AT SMALLER AIRPORTS

As **long-haul flights** with A321XLR could be offered to **smaller airports**, their cargo capacity might have a **positive impact** on their **cargo handling levels**.



POSSIBLE REDUCTION OF TWIN-AISLE OPERATED ROUTES

As A321XLR may **replace twin-aisle aircraft on some routes** the cargo capacity will decrease despite frequency or/and passenger capacity increase

NEGLECTING CARGO CAPACITIES

Due to the limited A321XLR cargo capacity, the **cargo business on new routes** is limited

LOWER HUB CONNECTIVITY FOR CARGO TRAFFIC

As fewer flights from hubs might be offered the **cargo traffic connectivity may decrease**.

The A321XLR entry onto final assembly lines brings major challenges for the OEM and equipment suppliers

MAIN A321XLR ADVANTAGES

1

A321XLR technical and configuration changes from A321neo:

- *Aircraft structure:* additional fuel and water tanks, reinforced landing gear, inboard flap
- *Passenger comfort:* the latest generation of In-Flight Entertainment and connectivity services, bigger overhead compartments, Full-Flat seats or Suites in Business Class

2

Higher customer requirements and a wider spread of requirements for A321XLR cabins will increase **complexity and prolong the engineering integration** work process.

3

As A321XLR and other single-aisle aircraft's complex cabins could represent a majority in the industrial flow, considering a **specialization of industrial processes/footprint** may become a necessity for the OEM.

4

Streamlined industrial flows, optimized for simple cabin, are unlikely to be sustainable with a significant increase of complex cabins. This could lead to **increased contingencies and industrial buffers** in the A321XLR production.

5

With the introduction of **A321XLR production complexity**, management of the flow will not be sufficient, End-to-end steering & monitoring per Head-of-Version, perhaps per MSN, will be required to manage risks effectively resulting in the **increased need for project management proficiency**.

When commitment matters

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