

Challenge towards a New Skyway

The Strategic Vision for Airlines in UAM Ecosystem Establishment

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Operations Control Division · UAM Biz TF

Korea's No.1 LCC, JEJU AIR

[Mission]

Sharing a Delightful Travel Experience with Many People



Aircrafts
42



Destinations
40



Daily operating hours
13.5H+



Routes
55



Flights per day
217.5+



 Korea ↔  Vietnam
 **47,000 Flights** **731,768 Passengers (9.4%)**
※ In the year of 2023

The Key Drivers of Change for the Airlines

**YES,
YOU CAN FLY**

What are the key drivers of change that airlines should consider for the future preparation?



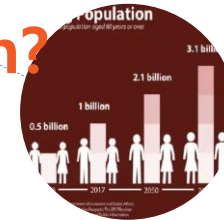
Hyper-Individualism



Global Warming



Climate Changes



Aging Society



Social Networks



Disease Outbreak



Artificial Intelligence



Cyber Warfare



Loss of Natural Resources

Global Environmental Challenges and Net-Zero Policy

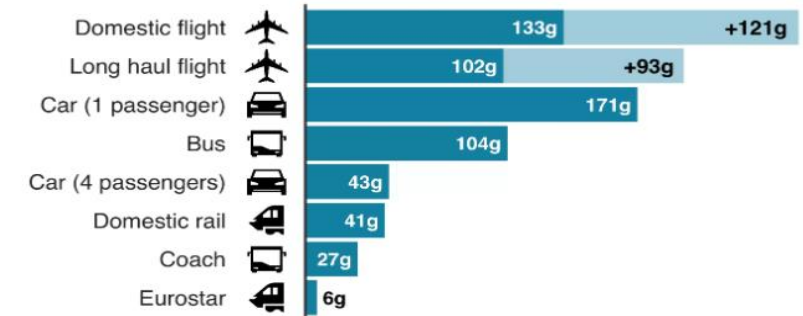
**YES,
YOU CAN FLY**



Emissions from different modes of transport

Emissions per passenger per km travelled

■ CO2 emissions ■ Secondary effects from high altitude, non-CO2 emissions



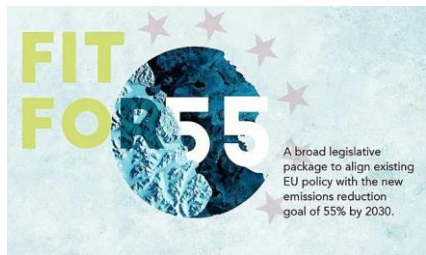
Note: Car refers to average diesel car

Source: BEIS/Defra Greenhouse Gas Conversion Factors 2019

BBC

"Unacceptable, shame on you, climate sinners!"

Short-haul ban: These European countries could soon see the end of domestic flights

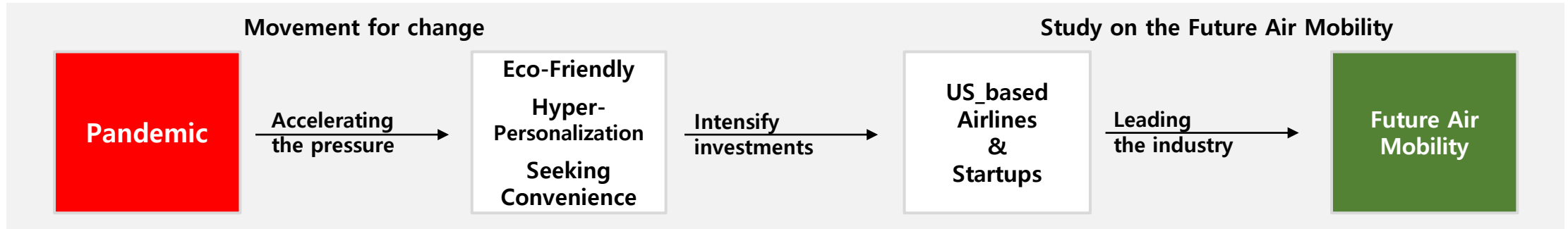


By Euronews Green
Published on 01/06/2023 - 08:00

The Pressure for Change in the Aviation Industry

**YES,
YOU CAN FLY**

- Post-Pandemic shifts are exerting pressure on the aviation industry to implement changes



New Keywords in Travel after Covid-19

New Travel Experience : Workcation



Source: Cbmpress

Local-Driven Tourism

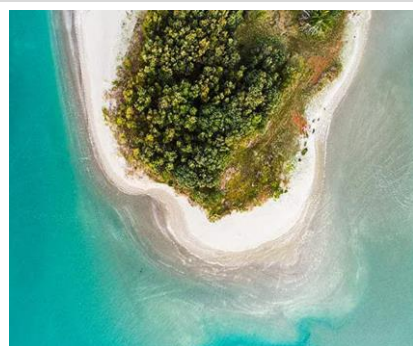
Towards Digital Transformation



Source: ICAO

Recovering from a Crisis : Wellness

Net-zero Tourism



Source: Accenture

Interaction between Tourism and Daily Life

Extremely-Personalized Travel



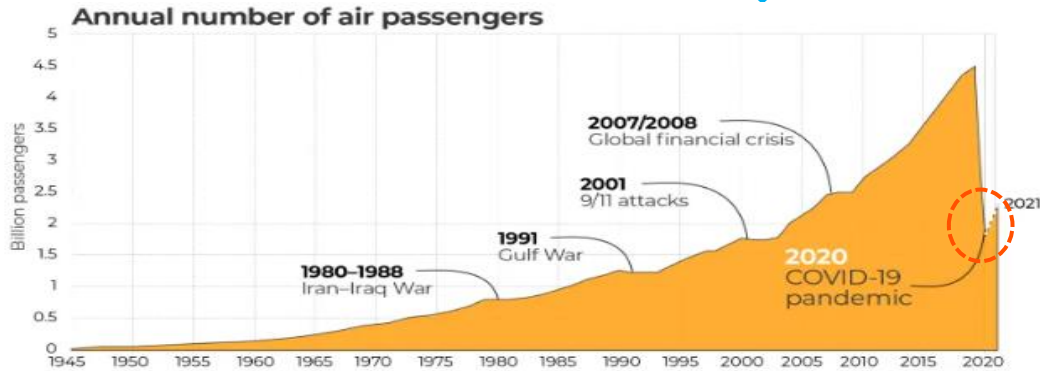
Source: Express Computer

The Aviation Industry is in Need of the Next Step

**YES,
YOU CAN FLY**

“The Aviation Industry also needs the **Next Step**”

Air Passenger Traffic ↓



2019
Passengers: **4.5 billion**
Flights: **42 million**

2020
Passengers: **1.8 billion** ▼ 60% compared to 2019
Flights: **24 million**

2021
Passengers: **2.3 billion*** ▼ 49% compared to 2019
Flights: **28 million***

Source: Al Jazeera

↑ New Business Ideas



Source: jtf Aviation Blog

Overcome
Crisis

New Business
Ideas

Opportunity
Recognition

Discover New Business
Linked to Main Business

**New Business
and Strategy**

The Emergence of Urban Air Mobility (UAM)

**YES,
YOU CAN FLY**

“The Rise of Urban Air Mobility”

Green New Deal



Source: KOFST

Mega City – Traffic Congestions



Source: Maeil Business Newspaper

Technology Advancement



Source: Asia Times

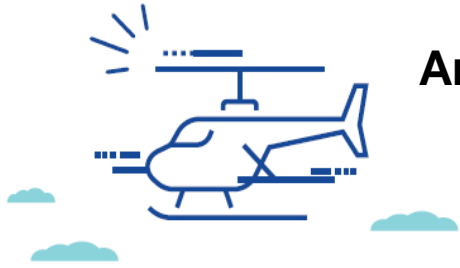
The Necessity for
New Mode of Transportation



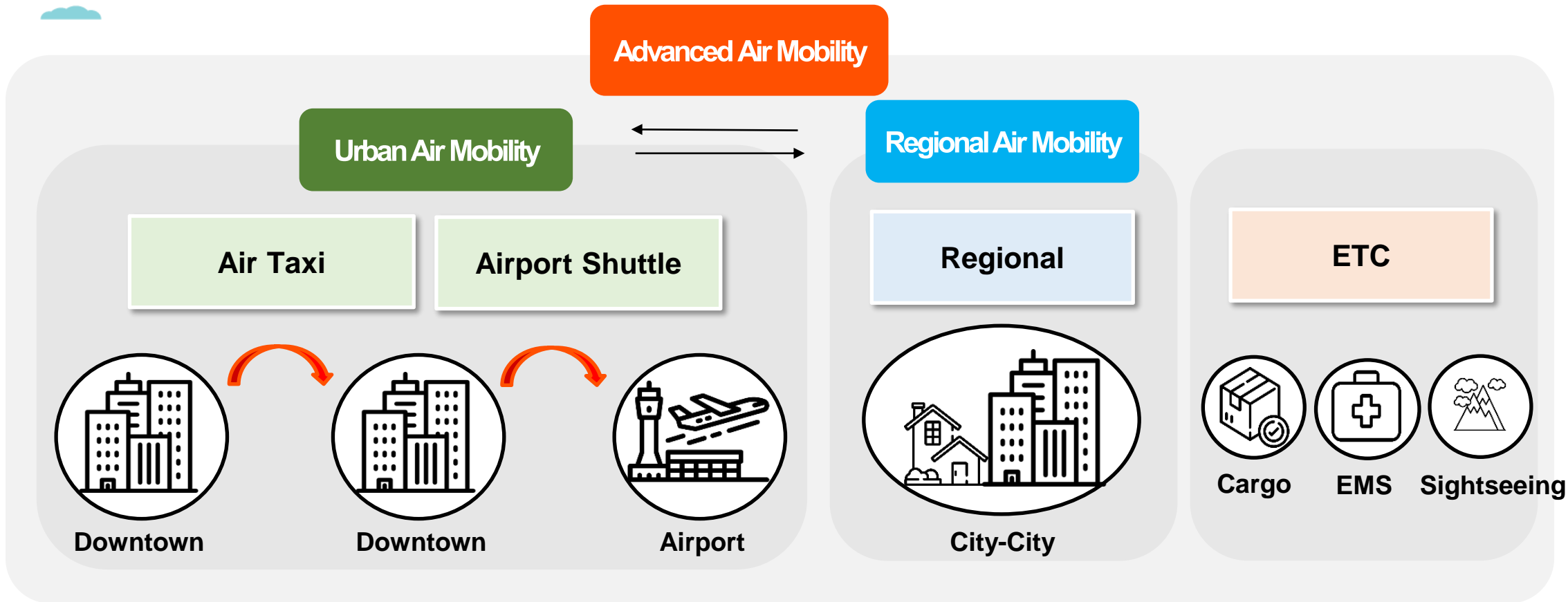
Opening a new era of **UAM(Urban Air Mobility)**

The Concept of UAM, RAM, and AAM

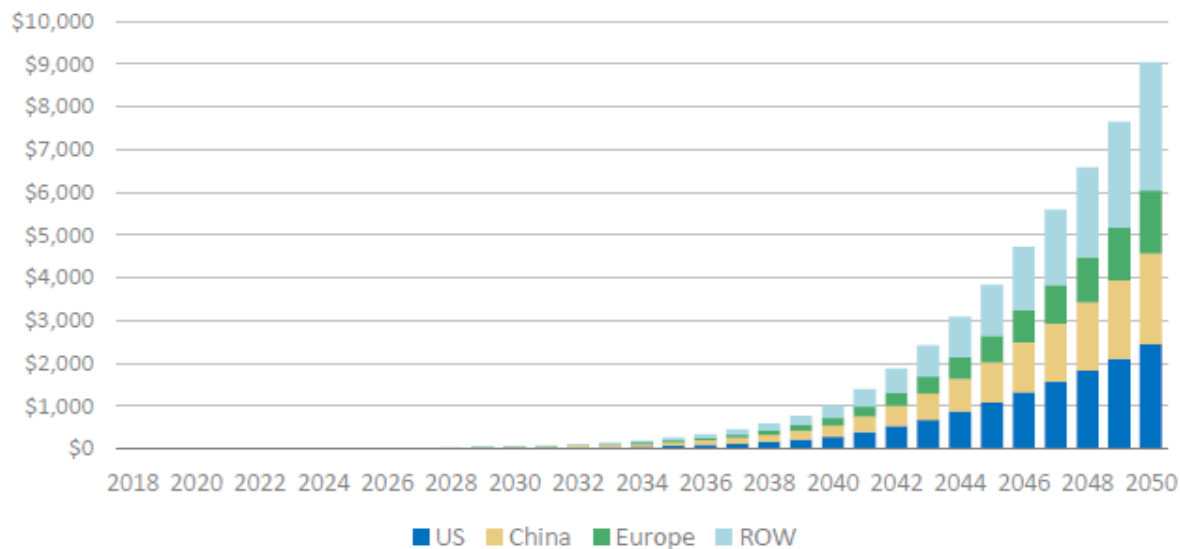
**YES,
YOU CAN FLY**



An Urban Transportation System utilizing **Vertical Takeoff and Landing(VTOL)**
Powered by **Sustainable Green Energy (electricity/hydrogen)**



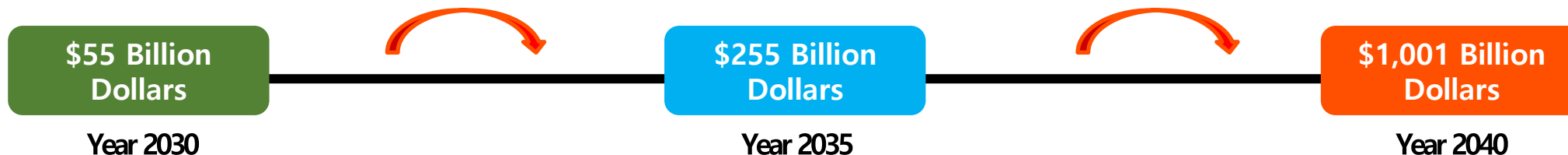
Global eVTOL/UAM Total Addressable Market(\$bn)



Source: Morgan Stanley Research Estimates(2021)

Model Summary	2020	2025	2030	2035	2040	2045	2050
US (Revenue \$bn)							
Base	\$1	\$2	\$12	\$66	\$279	\$1,081	\$2,450
Bull	\$1	\$6	\$86	\$446	\$1,228	\$2,661	\$5,134
Bear	\$1	\$1	\$5	\$24	\$96	\$336	\$626
China (Revenue \$bn)							
Base	\$1	\$6	\$26	\$89	\$268	\$941	\$2,120
Bull	\$1	\$20	\$188	\$605	\$1,178	\$2,316	\$4,442
Bear	\$1	\$5	\$11	\$33	\$92	\$293	\$542
Global Total Addressable Market (\$bn)							
Base	\$8	\$10	\$55	\$255	\$1,001	\$3,833	\$9,042
Bull	\$8	\$37	\$407	\$1,733	\$4,397	\$9,439	\$18,946
Bear	\$8	\$9	\$24	\$94	\$343	\$1,193	\$2,310

Source: Morgan Stanley Research Estimates(2021)



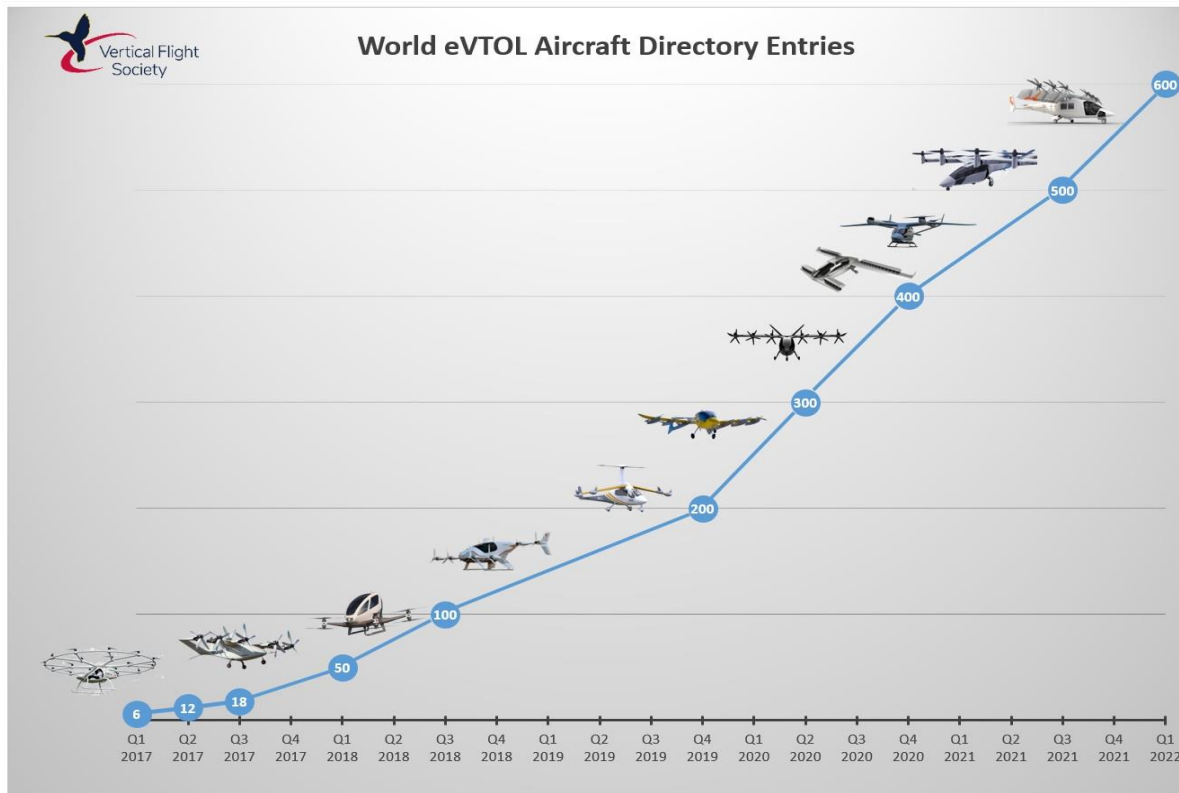
Global Initiatives for the Commercialization

**YES,
YOU CAN FLY**

Worldwide UAM Development Status

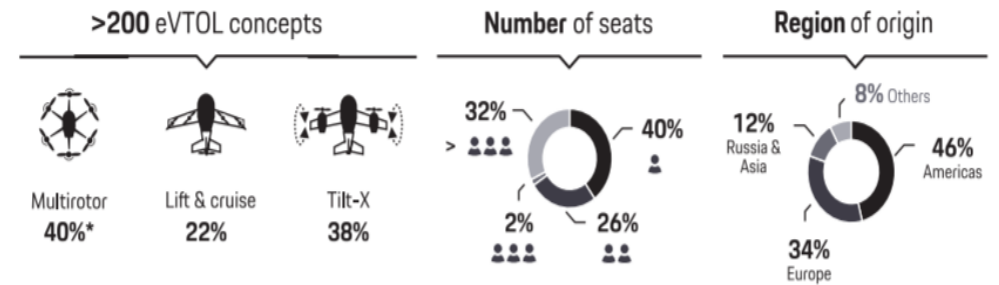
UAM is being developed in various concepts worldwide

Concepts are from **347 entities** **48 countries**



Source: Vertical Flight Society

eVTOL Classifications



Source: Porsche Consulting, The Economics of Vertical Mobility

The Three Basic Aerodynamic Concepts

	Single phase	Dual phase	Transition phase
	MULTIROTOR lift	LIFT AND CRUISE combination	TILT-X tilt-wing, tilt-rotor, tilt-duct
Time to market	Fastest certification	Slower certification	Slowest certification
Travel speed (indicative)	~70–120 km/h	~150–200 km/h	~150–300 km/h
Routes	Selected	All	All
Potential	~70% of intracity 0% of city-to-city	100% of intracity 100% of city-to-city	100% of intracity 100% of city-to-city

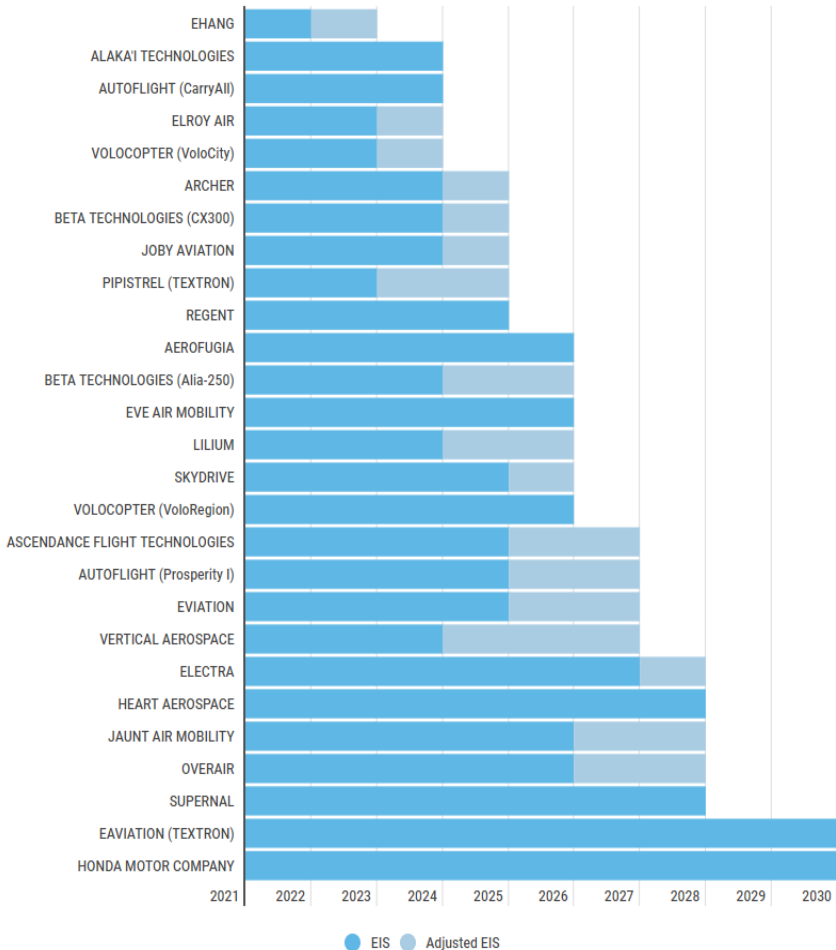
Source: Porsche Consulting, The Future of Vertical Mobility

AAM Reality Index (ARI)

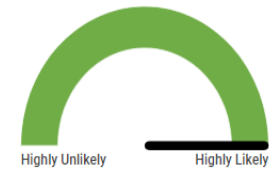
**YES,
YOU CAN FLY**

ARI (SMG Consulting)

Tracking the likelihood of an OEM certifying their aircraft, entering service and producing 1,000 unit per year



BETA TECHNOLOGIES



- GREEN Highly likely (75 - 100%)
- YELLOW Likely (50 - 75%)
- ORANGE Unlikely (25 - 50%)
- RED Highly unlikely (0 - 25%)

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Points	
Entities	Mostly Startup Company
Entry into Service	Mostly 2025 - 2028
Powered by	Electricity / Battery
Pilots	Mostly Piloted
Seaters	2 - 7 passengers
Range	150 ~ 250km

Evaluation Factors

Funding

Team Capacity

Technology Readiness

Certification Progress

Production Readiness

Source: SMG Consulting

UAM Aircraft (eVTOL) Certification

**YES,
YOU CAN FLY**

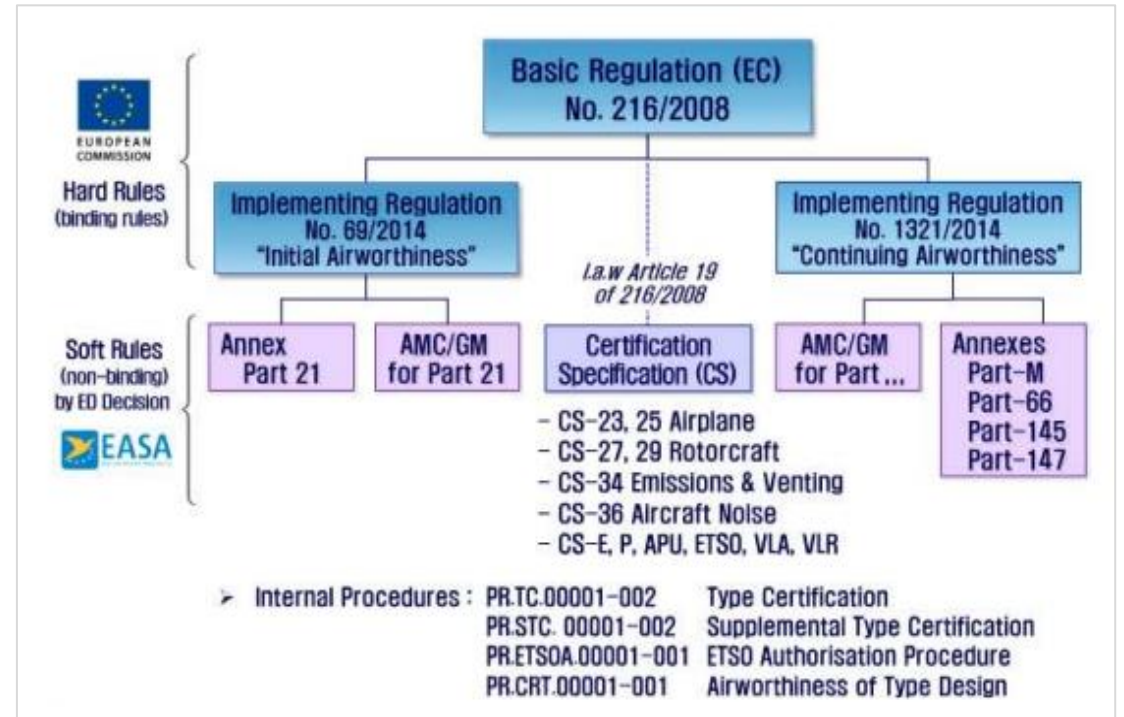
Federal Aviation Administration (FAA)



Source: FAA

The FAA Type Certificates **powered-lift** as special class aircraft under the procedure **14 CFR 21.17(b)**

European Aviation Safety Agency (EASA)



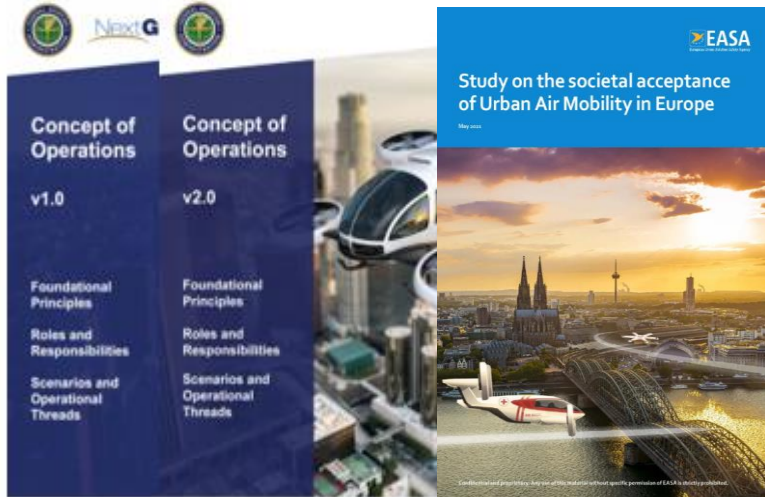
Source: EASA

The EASA Type Certificates UAM under regulator's **Special Condition for vertical takeoff and landing (SC-VTOL)**

Global Efforts for the Commercialization

**YES,
YOU CAN FLY**

Study on Urban Air Mobility



Test Flights – Social Acceptance



Source: Yonhap News



Source: Beta Technologies



Source: Joby Aviation

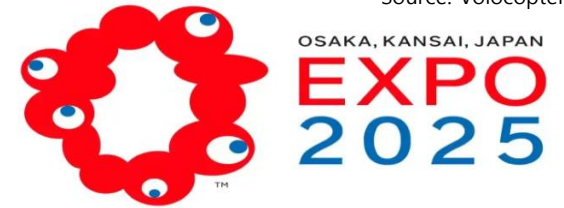


Source: KARI

International Events



Source: Volocopter



National Urban Air Mobility Project



K-UAM Grand Challenge



UK Future Flight



NASA National Campaign

Investment in Urban Air Mobility of Airlines

**YES,
YOU CAN FLY**

United Airlines



- Purchased 100 eVTOL aircrafts from Archer Aviation
- Agreed to buy 200 eVTOL aircrafts from Eve Air Mobility

United Airlines



- Committed to pre payment for 50 from Vertical Aerospace
- Conditional pre-order of up to 250 aircrafts (VX4)

United Airlines



- Purchase or lease up to 100 from VX4
- Placed reservations for 100 of Volocopter



Image Source: Porsche Consulting

Air Asia



- Lease 100 VX4 aircrafts from lessor Avolon

JetBlue Airways



- Made investment to Joby in Series B funding

Virgin Atlantic



- Acquire up to 150 eVTOL VX4

Data Source: SMG Consulting, AAM Index

Vision for Urban Air Mobility (UAM)

**YES,
YOU CAN FLY**

JEJUair

Laying the foundation for the <Total Air Mobility Service> toward a new skyway

UAM Passenger Service / Diversification

Passenger



B737-8
Next generation



UAM



TOTAL AIR MOBILITY SERVICE

Cargo



Ground Operations



Biz Lite



Cargo



Cargo – Exploring the possibility of logistic delivery Services

UAM Business Model

**YES,
YOU CAN FLY**

Development of Various UAM Services

AOC HOLDER
(Air Operator
Certificate)

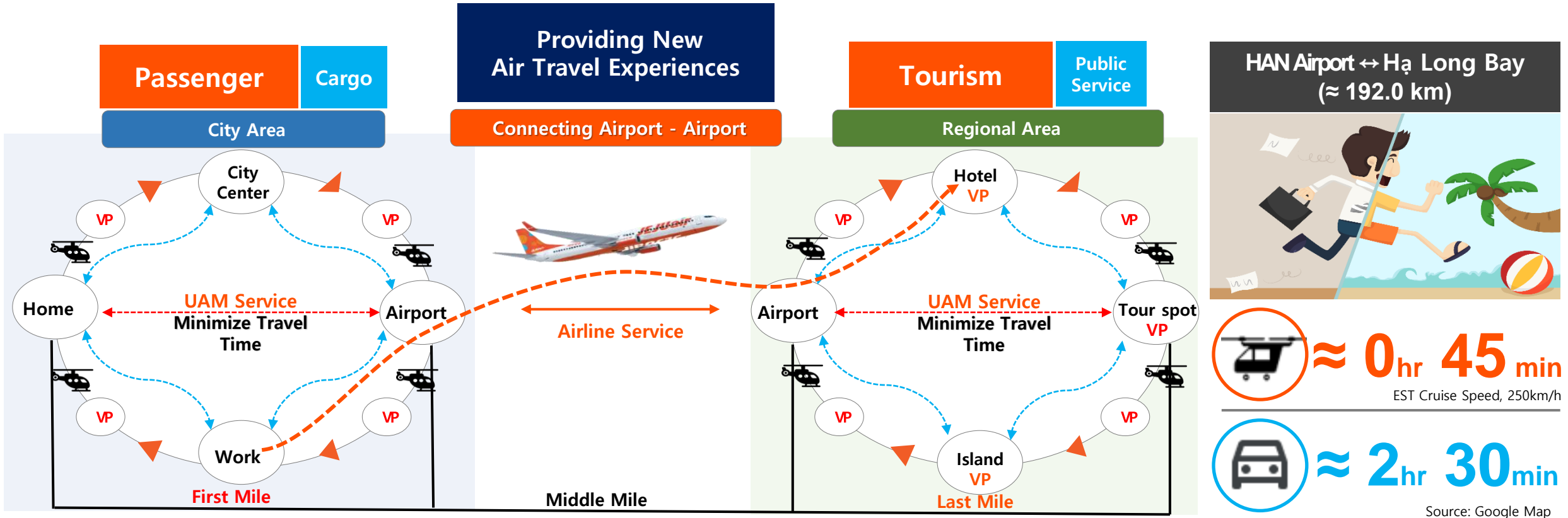


Passenger
Transportation
(MaaS)

Airport Linked
New Business

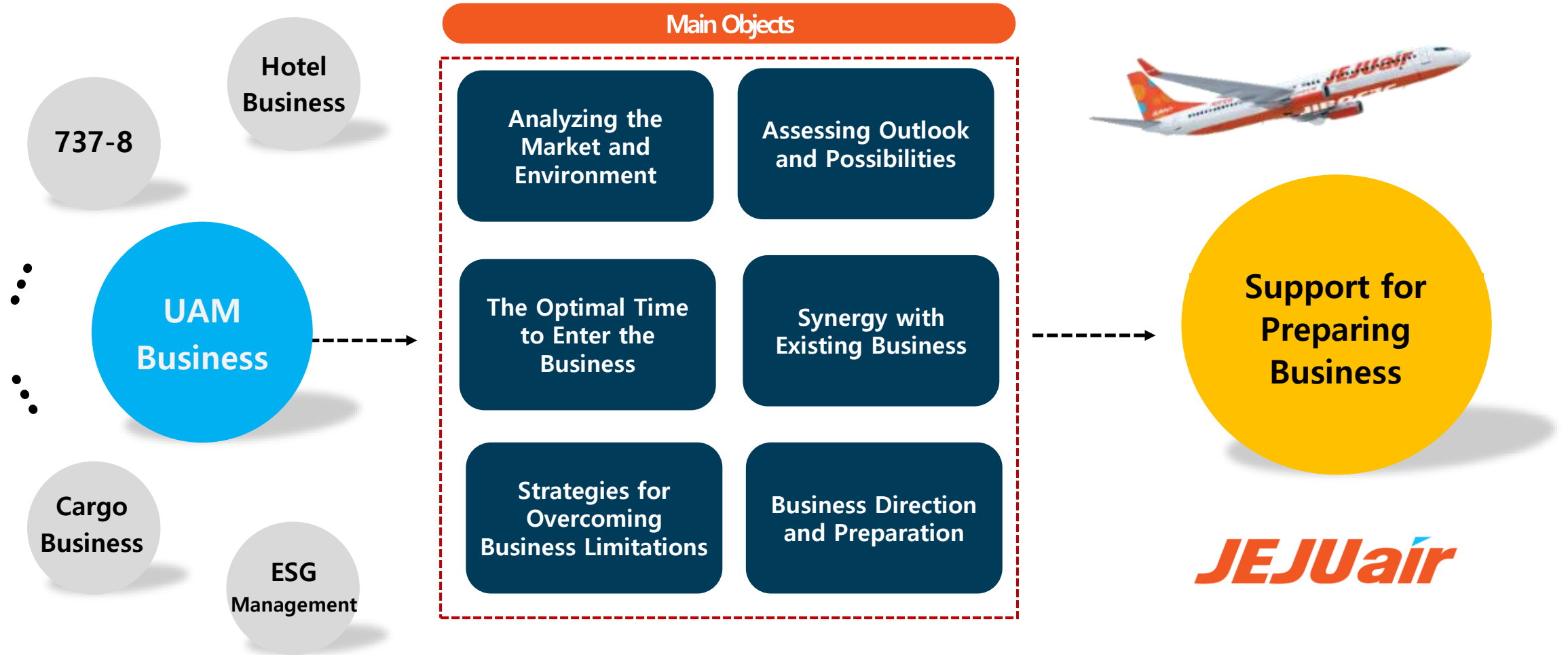
Aerial
Sightseeing

Public Service
(Emergency /
Offshore)



UAM Biz Task Force's Objectives

YES,
YOU CAN FLY

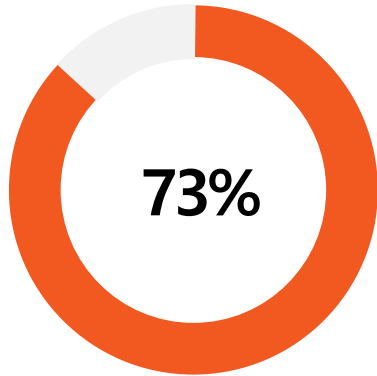


UAM Market Survey

**YES,
YOU CAN FLY**

Recognition of Urban Air Mobility(UAM)

Q. Do you know About Urban Air Mobility (UAM) ?



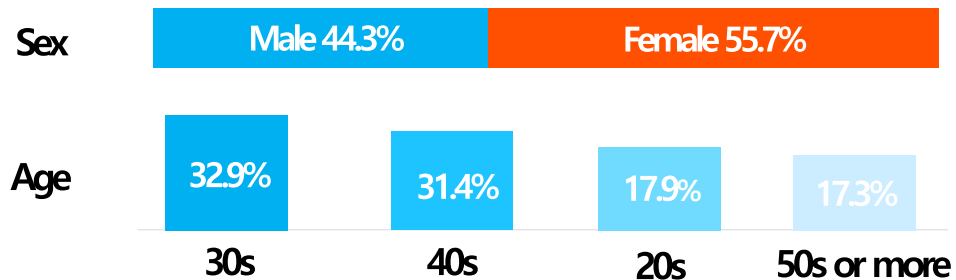
총 4,701명

I **do not** know about UAM. (73%)

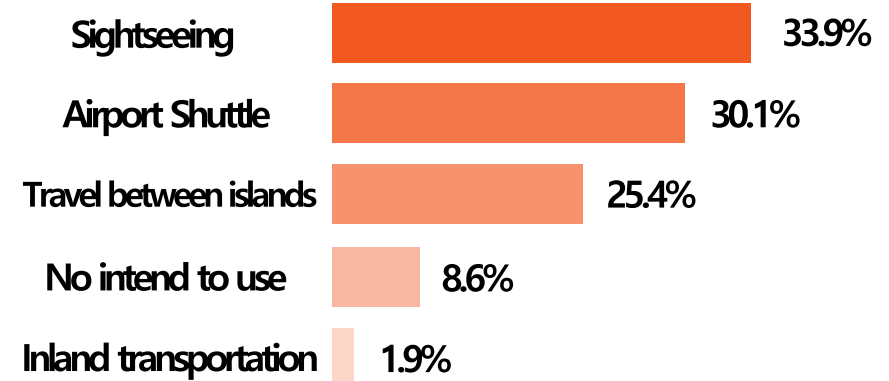
총 1,739명

I **know** about UAM (27%)

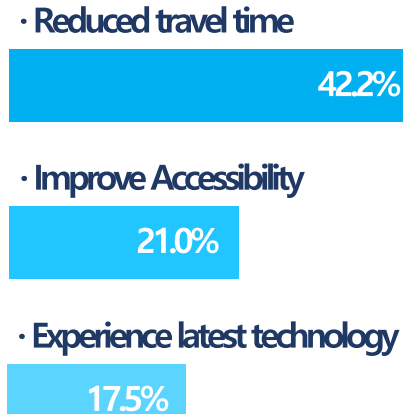
Q. Respondents



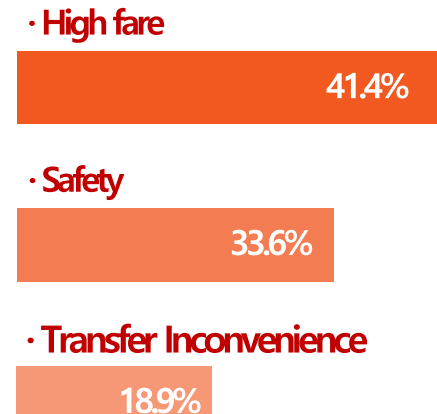
Q. Preferable UAM Services in Jeju Island?



Q. Expecting Aspect?



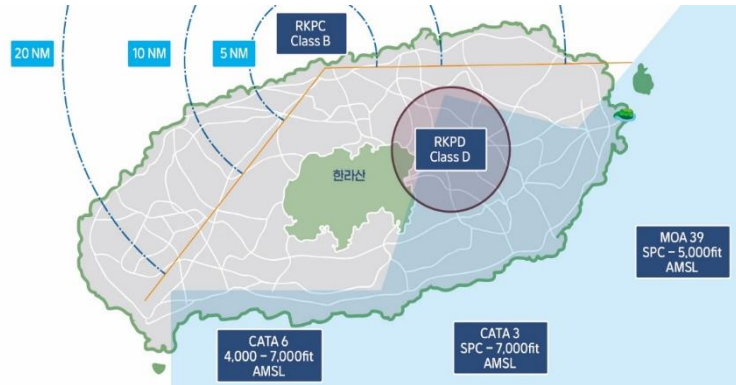
Q. Concerning Aspect?



UAM Operation Environment Study

**YES,
YOU CAN FLY**

Airspace & Route

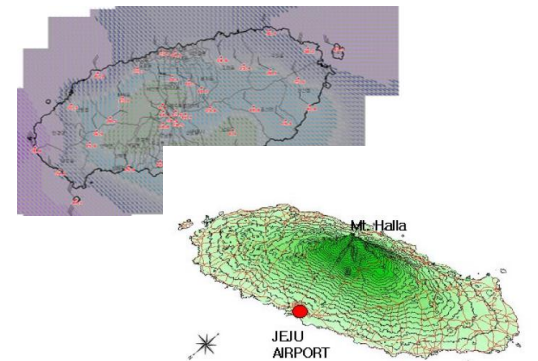


Weather

Average Weather of Jeju Int' Airport

Sources: Aviation Meteorological Office, AMO

Visibility (<5000m)	30%
Cloud(>5/8), Min Cld base(<1,500ft)	6.4%
Wind Speed	8 knots
Temperature	16 Celsius
Precipitation	588mm



Sources: Low-level Wind Shear(LLWS) Forecasts at Jeju International Airport using the KMAPP

Business Model



Step 1 : Tourism



Step 2 : Point to Point



Step 3 : Airport Shuttle

K-UAM Grand Challenge

**YES,
YOU CAN FLY**

Korea Urban Air Mobility (UAM) Demonstration Project



- **Project Organizer**

- 1) Ministry of Land and Infrastructure (MOLIT)
- 2) Korea Aerospace Research Institute (KARI)

- **Purpose**

1) Evaluation of UAM aircraft safety & demonstrate of integrated UAM operation in urban environments to support commercialization

- **Timeline**

- 1) GC Phase 1 : 2023.08 ~ 2024.12 (EST)
- 2) GC Phase 2-1, 2-2 : 2024.08 ~ 2025.12 (EST)



<Projection of UAM Airspace and Routes>

UAM Standard Operation Manual (USOM)

**YES,
YOU CAN FLY**

Aviation Manuals

Flight Operation Manual

Maintenance Manual

Operations Control Manual

Ground Operation Manual

Emergency Response Plan

Security Program

Government Publications

K-UAM
ConOps 1.0

Related
UAM
technology


UAM
ConOps



UAM Standard Operation Manual

문서번호	
표준번호	
관리부서	UAM사업추진단

제주항공 UAM 표준 운영 매뉴얼
(UAM Standard Operation Manual)



<p>목차</p> <p>1.1 목적</p> <p>1.2 범위</p> <p>1.3 적용 대상</p> <p>1.4 관련 문서</p> <p>1.5 약어</p> <p>1.6 참고 문헌</p> <p>1.7 승인</p> <p>1.8 개정 이력</p> <p>1.9 기타</p>	<p>2.1 목적</p> <p>2.2 범위</p> <p>2.3 적용 대상</p> <p>2.4 관련 문서</p> <p>2.5 약어</p> <p>2.6 참고 문헌</p> <p>2.7 승인</p> <p>2.8 개정 이력</p> <p>2.9 기타</p>	<p>3.1 목적</p> <p>3.2 범위</p> <p>3.3 적용 대상</p> <p>3.4 관련 문서</p> <p>3.5 약어</p> <p>3.6 참고 문헌</p> <p>3.7 승인</p> <p>3.8 개정 이력</p> <p>3.9 기타</p>
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UAM Operations Control Center

Schedule Management System



Flight Planning System



Flight Surveillance System



01

01. Study on the Business Model

Business Model considering social acceptance and economic viability



K-UAM Grand Challenge

02

02. Study on the eVTOL

Optimal Aircraft selection through a study on aircraft Characteristics



UAM Consortium

03

03. Study on the UAM Operation

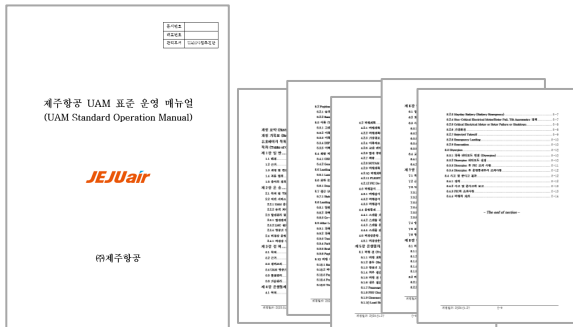
Operation Procedure and System research and development



Cooperation MOU



Building Partnership with OEMs



USOM Establishment



ConOps Establishment



UAM System R&D

Urban Air Mobility with JEJUair

**YES,
YOU CAN FLY**



**YES,
YOU CAN FLY**

**THANK
YOU**