

HOW VR & AR TECHNOLOGY AFFECT AIRCRAFT MAINTENANCE TRAINING

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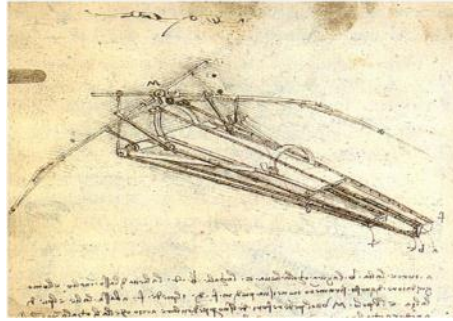
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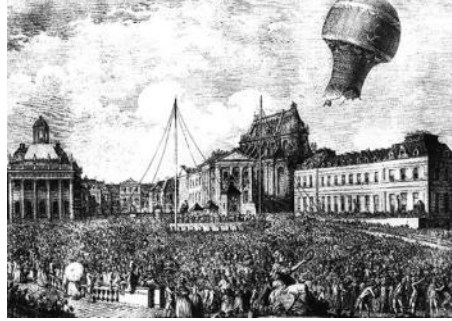




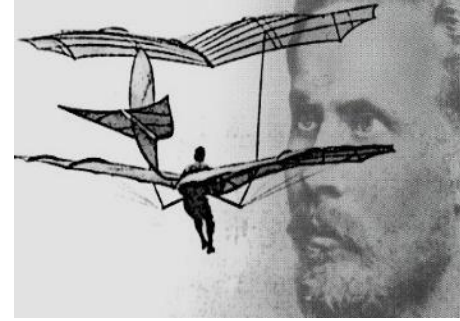
Greek Mythology
'Icarus'



Leonardo da Vinci
'Flying Machine'
1485



Montgolfier Brothers
'Hot Air Balloon'
1783



Otto Lilienthal
'Biplane Glider'
1895

Everything that can be invented has been invented.

-Charles H. Duell, Commissioner, the U.S. Patent Office, 1899-

January 3rd: First use of the word 'automobile' in the New York Times

February 14th: US Congress began to use 'voting machine'

March 14th: German Ferdinand von Zeppelin receives US Patent for 'navigable balloon'

A WHOLE NEW WORLD



WHAT IS VR & AR TECHNOLOGY?



Virtual Reality

- Human-Computer Interface (Interaction & Motion Recognition)
- Used in Games and Skill-training where Immersion is Important




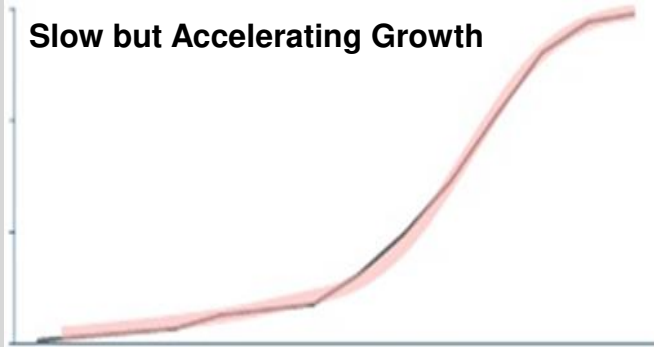
Augmented Reality

- Detection, Tracking, Marking, Scanning, Composing
- Used in a Wide Range of Industries and Daily Routine
- Provides Information by Combining Virtual Content into the Real World and Physical Objects

VR Sources: Immersive Training Services

AR Sources: Dynamic 365 Guide for Microsoft HoloLens2

COMPARISON OF VR & AR

	Virtual Reality	Augmented Reality
Expected Growth Pattern	<p>Rapid but Limited Growth</p> 	<p>Slow but Accelerating Growth</p> 
Presumptive Basis	<p>Some issues exist for contents expansion</p> <p>Need to develop a new virtual world from zero</p> <p>Developed with content focused on interest (entertainment such as games)</p>	<p>Ready to expand when ecosystem is ready</p> <p>Combine diverse information into existing reality</p> <p>Extensive potential with information integration</p>

Sources: VR & AR Industry Outlook, Techworld News

	Virtual Reality	Augmented Reality
HMD Price (Head-mounted Display)	USD \$200	USD \$1,500
Space Range	Closed	Open
Viewing Angle	N/A	Narrow
Supporting Devices	Abundance	Increasing
Standard Specification	None	None
Cause of Rising Costs	Graphic Quality	Image Composing Skills
Images	Virtual Images	Real-life Representation Images
Technical Maturity	Gradually Growing	Highly Growing
Equipment Technology		
Software Technology		
Level of User Satisfaction	Gradually Growing	Highly Growing

Sources: UBS Soft, Reconfigured by Speaker

APPLYING VR & AR TO MAINTENANCE TRAINING



The best way to check the cockpit with 20 students?

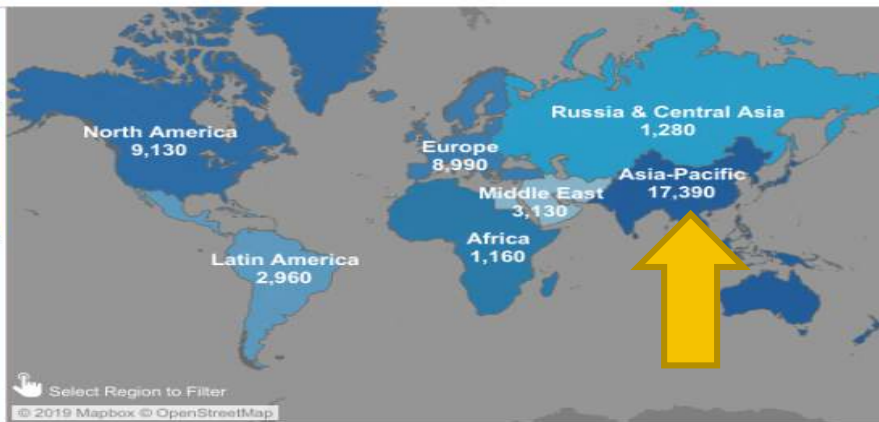
APPLYING VR & AR TO MAINTENANCE TRAINING



APPLYING VR & AR TO MAINTENANCE TRAINING



Global	
44,040 Deliveries	
3.4% Fleet Growth	4.6% Traffic Growth
2.7% GDP Growth	\$6,810B Market Value
4.1% Services Market Growth Rate	\$9,100B Services Market Value

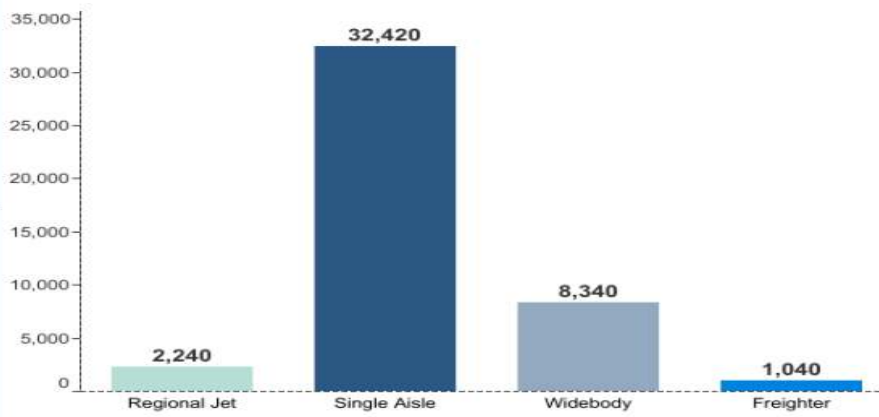


Global Overview
Air travel today remains a vibrant market following the trend of the last several decades. Robust demand is expected the next 20 years as strong economic growth, growing middle classes, increasing consumer spending on services, and evolving airline business models bring more value to passengers and support the long-term outlook. Widebody passenger airplane and freighter deliveries make up over 43% of the market value as the passenger market continues to see fragmentation and the freighter market benefits from improvements in world trade.

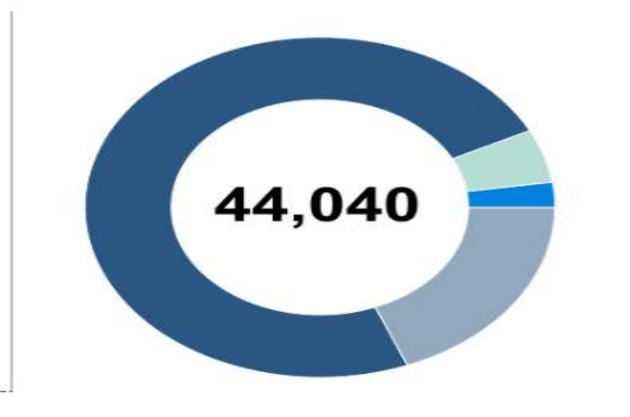
The industry has now recorded nine straight years of steady and above-trend growth. Operational efficiency has improved as load factors climbed to a record high of 81 percent last year. Airlines are delivering strong financial results, generating at least \$30 billion of net profits per year over the last several years.

The air travel market is projected to be 2.5 times larger in 20 years and the global commercial jet fleet will grow to accommodate, doubling in size by 2038. Of all deliveries, 56% are needed to accommodate growth in the market. The remaining demand will replace more than three-quarters of the existing fleet with almost 19,000 commercial jet deliveries estimated as replacement over the next 20 years.

Deliveries



Share of Deliveries



CURRENT SITUATION IN KOREA

LCC

JEJUair t'way

AIRBUSAN EASTARJET



2017: 119

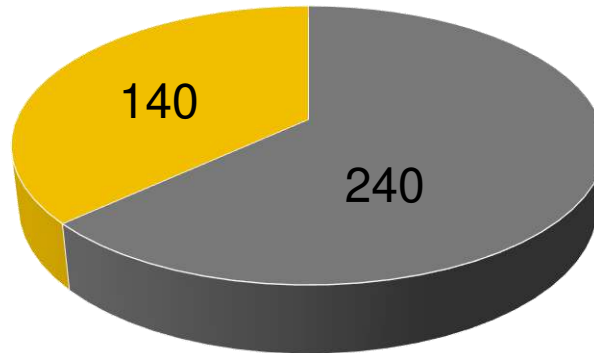
2018: 140

2020: 188

Annual increase of 16.2%

Number of Aircrafts

■ FSC ■ LCC



FSC



Korean Air: 166
Asiana Airlines: 74

Industrial companies ▾

LCC to eliminate pilots and mechanics

Chosun Biz | By Lee Chang-hwan



2

18



Input 2019.07.23 06:00



A low cost airline (LCC) plane stands at the gate at Incheon International Airport. / Reporter Lee Tae-kyung

As domestic low-cost airlines (LCCs) have grown from six to nine, the "out of manpower" of the aviation industry is becoming out to become a mechanic after the pilot. Skilled aviation mechanics take a long time to recruit and train, and are directly linked to aviation safety, making it a major headache for large airlines as well as LCCs.

According to the aviation industry on the 22nd, aviation mechanics who moved to LCC from large airlines, including [Korean Air](#) (KRW 22,050 won ▼ 50 -0.23%) and [Asiana Airlines](#) (KRW 5,450 won ▲ 60 1.11%), increased from 30 in 2017 to 75 last year. This year, 39 aviation mechanics were hired by the end of June, just over 2017. There are 144 aviation mechanics who have moved in the last two years and six months.

In fact, Jeju Air said earlier this year that it is hiring 100 mechanics to meet the mechanic standard. New recruits are mostly careers. Since there is a need for a mechanic that can be put into the field immediately, LCC is recruiting manpower by scouting career mechanics from existing airlines. The situation is not very different for other LCCs.

삼성화재의 모든 소식을 이곳에서 만나보세요
 삼성화재 NEWS ▶

Industry News

'Soup without meat' ... Ramen is also a vegan craze



[Good Morning!] Hyundai breaks down its name Remove the manager and chief of the rank, "responsible manager"



Korea GM's 5th year and Ssangyong 3rd year deficit... Whistling 'Small Trio'



"Hanjin Shipping's bankruptcy is due to immature management and lack of government strategy



920 billion deficits S & D spent 2.5 trillion in solar and wind power



Most viewed news

ACCORDING TO THE STUDY,



**MOLIT: Recommends 12 maintenance personnel
per an aircraft**

Training 4,000 maintenance professionals by 2020

Sources: Ministry of Land, Infrastructure and Transport



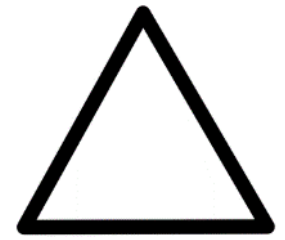
Authorized Training Organizations by MOLIT : 17 institutes – 2410 hours to apply the A&P license test

Training Period from Employment through OJT to Actual Maintenance: More than 3 months

During the 3 month: **Train workforces effectively for better performance with less time & costs**

A hands-on training combined with VR & AR training will bring satisfactory results.

STAY TOGETHER, FOR BETTER RESULT



International Aviation Organizations

- Continuous renewal & modification of regulations related AR & VR training
- Flexible handling of training regulation is required if airworthiness is maintained

Airlines & Training Organizations

- Constructing cooperative relationships between industry & training organizations
- Sustainable collaboration under aviation authorities of each nation

VR & AR Companies & Users

- Continuous research & development
- Proactive participation & understanding of the VR & AR system

A result is an increased number of qualified and safe maintenance personnel.

CONCLUSION

- **Changed Our Imagination Into Visualization**
- **High Level of Satisfaction via Various Experience**
- **Brings Better Result To Users**
- **Modern Problems Require Modern Solutions**
- **Modern Solutions Come from Modern Technology & Trainings**

Thank you for listening

REFERENCES

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