

LETTER TO EDITOR

CURRENT TRENDS AND CHALLENGES IN THE GLOBAL AVIATION INDUSTRY

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ABSTRACT

This paper is based on Slovak Space Tech Day 2 & Slovak Aviation Industry Day keynote speech from Hironobu Kondo and Martin Hegedůš. It shortly described All Nippon Airways (ANA) as a company and the trends and issues of the aviation industry from ANA perspective, furthermore future projects and prospects. It gave insights into the efforts of ANA to battle the carbon footprint of the company, social aspects of the globalized world, and cooperation of multiple elements to achieve a better and more sustainable future for all of us, nonetheless measures taken to fight against the spreading of the Covid-19. Information was obtained from official All Nippon Airways sources, statistics, and press releases. To conclude paper described the reason and significance of aviation and the need to adjust according to the new standards.

Keywords: innovation; aviation; aerospace; travel; drone

ANA ORIGIN

Following the "Inspiration of Japan" high quality of service, ANA has been awarded the respected 5-Star rating every year since 2013 from SKYTRAX. Additionally, ANA has been recognized by Air Transport World as "Airline of the Year" three times in the past 10 years - 2007, 2013, and 2018, becoming one of the few airlines winning this prestigious award for multiple times.

ANA was founded in 1952 with two helicopters and 28 employees, and has become the largest airline in Japan, as well as one of the most significant airlines in Asia, operating 42 international routes and 52 domestic routes.

ANA has been a member of Star Alliance since 1999 and has joint venture partnerships with United Airlines, Lufthansa German Airlines, Swiss International Airlines, and Austrian Airlines. Besides the full service and award winner carrier ANA, the ANA Group has merged two LCCs, Vanilla Air Inc. and Peach Aviation Limited, into one consolidated subsidiary - Peach. The ANA Group carried 59.6 million passengers in FY2019, has approximately 45,000 employees, and a fleet of 260 aircraft. ANA is a proud launch customer and the biggest operator of the Boeing 787 Dreamliner.

ANA lives by the Japanese motto:

"Anshin, Attaka, Akaruku-Genki!" = "Trustworthy, Heart-warming, Energetic!" This motto represents ANA's way which consists of 5 elements:

Safety - This is our utmost priority, our promise to the public, and is the foundation of our business. It is enhanced through individual performance and dedication. Safety is the most important element of the aviation business.

Customer Orientation - We create the highest possible value for our customers by viewing our actions from their perspective. Right after the safety, the customer is priority #2, customers are the reason why we exist.

Social Responsibility - We are committed to contributing to a better, more sustainable society with honesty and integrity. Pilots, technicians, administrative or ground staff, we all work as one team, we coordinate and use our resources in the most efficient way to make our customers happy towards a sustainable future.

Team Spirit - We respect the diversity of our colleagues and come together as one team by engaging in direct, sincere, and honest dialogue. From Japan to India, Australia, Russia, Germany, or Slovakia our goals are the same but not our cultures. We respect our nature and differences and we bond to become a better, even more emphatic, and honest society.

Endeavor - We endeavor to take on any challenge in the global market through a bold initiative and innovative spirit. It will be 68 years, in December 2020, our company has been constantly adjusting, evolving, and overcoming any challenge in front of us. During these hard times, we are dedicated even more to be the global leading airline group by satisfying our customers and creating value.

ANA CARE PROMISE

To battle the increasing risk of spreading the virus and to reassure all the passengers traveling with us ANA has introduced a set of new requirements and safety precautions called "ANA Care Promise".

At ANA, we promise to create a safe, comfortable, and enjoyable experience for all passengers. Safety and peace of mind is our number one priority and is considered at every stage of the journey. In the following 5 areas we took numerous measures to demonstrate we will do all in our powers to adapt during such a troubling time and show to our customers their safety and feeling of security is our highest priority:

- Before departure
- Security area
- Lounges

- Gate area
- In-flight

Of course, there are some special services and measures taken to respective areas but in general, we can speak about following measures: All the staff wearing Facial Covering and Face Shield, Installation of vinyl curtains and transparent acrylic panels, Installation of disinfectants and hand sanitizers, Securing Social Distance, Disinfection of equipment, Temperature measurement, Improved Lounge Services, Precautions on busses, Improved Boarding Procedure, Cleaning and Disinfection of Aircraft, Cleansing Wipes, In-flight Service, Ensuring air circulation in the cabin

Current situation and the New Normality

The whole aviation industry was hit exceptionally hard by the Covid-19 pandemic resulting in a decrease in passenger and cargo transportation. On average since April 2020 in our case, the decrease in passenger transportation is around 96% on international routes and 84% domestic, that said in other words there are only 4% operable international passenger flights and 16% domestic. We estimate to close FY2020 with a 5 billion USD deficit.

For the first time in modern history, when we have the technology to travel daily from the Pacific to Europe and back in just 2 days, humankind is facing the global pandemic restricting us from traveling. We literally cannot travel, borders are closed, and quarantines are taken in place. The core of our business, moving people, disappeared in just a couple of months. Meetings, discussions even contracting is being held online. Visiting friends or relatives, exploring the world? Sometimes impossible. This is what we have to fight and overcome.

We are facing other issues as well. Aging population on the one side, and the booming population on the other. In Japan people aged 65 and older make up 1/4 of its population, by 2050 it's estimated to reach 1/3. In Europe in 2019 more than 1/5 (20.3%) were aged 65 and over. On the other hand, there is a booming population in India and Africa, people will want to travel, to explore, to visit friends and family and if there is a chance we will be there for them. Not just ANA, but the whole aviation industry will have to reflect the changes and evolve.

We became a partner of the United Nations Development Programme (UNDP) and integrated 17 sustainable development goals into our own goals.

To reduce the carbon footprint ANA flew with Boeing 777-300ER from Everett, Washington to Japan using LanzaTech's sustainable aviation fuel (SAF) produced from waste gas derived ethanol. Earlier in 2019 ANA already purchased 70 thousand US Gallons of SAF and used it on commercial flights from San Francisco to Tokyo. ANA signed Offtake Agreement for Sustainable Aviation Fuel allowing ANA to purchase SAF in the future and was also selected by the New Energy and Industrial Technology Development Organization (NEDO) - a prominent Japanese public research and development body - to develop integrated production technology for sustainable aviation fuel and bring it to market. ANA was chosen after a comprehensive review process to conduct studies on the production and commercialization of LanzaTech's sustainable aviation fuel and will work alongside Mitsui & Co., LTD., and JXTG Energy to achieve these goals. ANA and its partners will work together to construct a supply chain for sustainable aviation fuel as part of a process that is aiming to achieve large-scale commercial production of sustainable aviation fuel in Japan with ANA providing detailed research on the impact of fuels developed through this partnership.

Boeing B787 aircrafts and Airbus A320/A321neo aircrafts are the most efficient and effective aircrafts currently available,

therefore ANA is centering purchase of new aircraft on these advanced models.

We adopted next-generation coating to be even more efficient and we are lightening passenger seats in collaboration with Toyota Boshoku.

The ANA Group has developed its own dedicated vehicle to clean the engine compressor leading to a reduction of the fuel by 1% annually.

ANA tests self-driving electric bus at Haneda International Airport.

We have 2.5% employees with disabilities, as part of our diversity efforts, we increased the hiring of people with disabilities.

There are 14.6% women in management positions, we have 5 women in ANA's top executive positions and more than half of our employees are women. ANA ranked third place in Japan for 100 best companies for women in 2015.

At the end of September 2020, Japan Aerospace Exploration Agency (JAXA) and ANA Holdings Inc. announced Joint Research on Remote Sensing Observation of Atmospheric Components using Passenger Aircraft and Satellites. Since 2009, JAXA has been monitoring the increase of greenhouse gas on a global scale by Greenhouse Gases Observing Satellite "IBUKI" (GOSAT). The greenhouse gas emissions from city areas are estimated to account for approximately 70 - 80% of anthropogenic CO2 emissions. However, achieving both observations on the amount of greenhouse gas emissions associated with human activities in the city and on a global scale is difficult for satellites. In this joint research, the carry-on luggage sized the observation instrument developed by JAXA applying space technology will be placed in the cabin of passenger aircraft operated by ANA. This instrument observes the detailed concentration distribution of the atmospheric components such as carbon dioxide and nitrogen dioxide while flying over cities. The purpose of this research is to understand the emission distribution in city areas according to emission sources such as traffics and industries by combining the data obtained by aircraft and satellites such as "IBUKI". First, we start this observation experiment flight between Tokyo (Haneda) and Fukuoka.

Furthermore, this research aspires to contribute to the Paris Agreement by providing useful data for considering measures to reduce emissions from cities and for evaluating the effect of emission reduction efforts.

ANA's Future

Space project

In cooperation with PD Aerospace Co., Ltd. and H.I.S. Co., Ltd., and other shareholders, we are working on a fully reusable suborbital spacecraft that will be capable of alternating combustion methods between jet mode and rocket mode, and capable of take-off and landing like ordinary aircrafts. In outer space, we will be able to provide a microgravity environment during ballistic dives from high altitude for several minutes, allowing for filming and other experiments opportunities. It can be applied to the various fields of science, research, industry, and other services. On the earth, a multipurpose observation service is suitable for observations of dangerous areas that require a prompt response (Local weather observation, large scale disaster, etc.), **Fig. 1**.

In this project, our role will be to take care of the flight operation, daily maintenance, ground operation, and customer service, exactly as with our daily passenger or cargo flights. Currently, we are at the key elemental technology development phase for unmanned spaceplane. Unmanned flight was planned for 2020 but it seems due to pandemic it will be postponed for

2021. The manned commercial flight was planned for 2024 after certification in Japan.



Fig. 1 Fully reusable spacecraft by PD AeroSpace

Drone project

In Zambia, ANA is working with drone firm Aerosense Inc. and the National Center for Global Health and Medicine to build a sustainable drone transportation network for blood samples, **Fig. 2**. This will allow people to get proper healthcare in hardly accessible places where infrastructure is missing or is not developed yet.



Fig. 2 One of the drone prototypes being used for the logistics development

ANA will be also building drone infrastructure and with the partners will work together to establish a logistics network that uses drones to improve delivery between the remote islands of the Japanese Goto City.

Avatarin Inc.

Humanity has evolved over 6 million years. And in that process, discoveries and inventions were constantly being made.

With the mastery of fire, humans learned how to stay warm, to live in groups, to cook meat, and our physique grew stronger. With the domestication of livestock, in particular horses, humans started traveling to faraway lands, leading to the creation of empires, where cultures were born. With the invention of letterpress printing, the ability to store and communicate information increased dramatically. With the invention of the steam engine came the industrial revolution, which allowed humans to travel even farther. With the invention of the car, travel time was shortened even more. With the invention of the airplane, the distance traveled by humans increased

dramatically, thus becoming the cornerstone of a connected world. With the invention of the internet, humans were able to obtain information anytime, anywhere.

Humans have experienced tremendous progress. The shift from walking to flying has increased the distance we can travel dramatically at a fraction of the time. Yet, to go to the other side of the Earth, it takes more than half a day, no matter how fast the airplane.

But now - finally, humans will be unbound by the limitations of distance. Instant transportation will be possible, no matter how far. Avatars will make this possible. While sitting in bed at home, be instantly transported to a place far away, gaze at giant sea creatures at an aquarium, enjoy shopping, and even fish in the vast ocean. You may think, "but isn't that just in a virtual world?" But when vision, hearing, and sensations are completely synchronized, the human consciousness is in the same exact state as being there. These experiences are indeed, real. Yes, with Avatars, humans will no longer be bound to distance or to their bodies and will be able to move instantly to anywhere they desire, making it possible to experience everything the world has to offer. A new invention that accelerates humanity is right before your eyes. In the not so distant future, Avatars will be installed everywhere. People will "avatar-in", using smartphones and VR goggles going anywhere as they please and experiencing those unique moments that can only be experienced by being there. Building a lunar base and exploring the deep-sea, all the while staying on land. This too, will become commonplace. A world where everyone can "avatar-in" to experience the reality of all kinds. The door to a new world is now open.

AVATAR X

ANA and JAXA have partnered to create AVATAR X, a collaborative program for the advancement of space exploration and development using Avatar technology. The initiative is part of ANA's overarching ANA AVATAR Vision and JAXA's new research and development program, J-SPARC (JAXA Space Innovation through Partnership and Co-creation), which was created to encourage new innovative collaborations between JAXA and the private sector.

AVATAR X will bridge the gap of science fiction and non-fiction. We aim to bring scenes like those found in the popular Japanese comic series "Space Brothers" to life, by making remote operation of Avatar robots on the surface of the Moon and treatment of patients on space stations in Low Earth Orbit by doctors on Earth a reality.

But the AVATAR X movement will not end there. We will continue to push the limits of Avatars beyond the lunar surface to Mars, and further into deep space.

CONCLUSION

The significance of the aviation industry remains unchanged. We connect people and businesses, transport goods, and materials. We would like to make sure you meet the people you would like to meet when you would like to meet them. Go when and where you want to go. However, it is necessary to tune up according to changes in the environment. Nothing is going to be the same in our business after we beat the Covid-19 pandemic. But that's what the current life on earth is about, constantly changing, adapting to the new normality. This is what we do from the beginning and this is what we will always do.