

ENHANCING INNOVATION IN AVIATION

(Interview with Juan Carlos Salazar, Secretary General, ICAO)

1. What are the key short term and longer-term innovations that need to take place in the aviation industry?

In the short term, we need innovation that will allow aviation to evolve into something that is more safe, more secure, and more sustainable. That includes new materials, more fuel-efficient operations, and enhanced diagnostics for preventative maintenance.

In the long term we need revolutionary innovation that will get us to zero fatalities and zero net CO2 emissions while continuing to expand connectivity and affordability.

When I refer to revolutionary innovation, that may include blended-wing body aircraft, hydrogen powered engines, and new processes that leverage high levels of automation to assist humans in aviation operations.

However, the paths to near-term and long-term innovations are parallel, using some of the same underlying enablers.

For example, Artificial Intelligence is a disruptive technology that may help improve the design of a wing in the near term, but in the long term, AI can help develop an entirely new aircraft design.

Moreover, innovation is key to the international aviation sector's ability to attain its two emissions reductions goals: the long-term global aspirational goal (LTAG) of net-zero carbon emissions by 2050 and the goal of reducing CO2 emissions in international aviation by 5 percent by 2030 through the use of Sustainable Aviation Fuels (SAF), Lower Carbon Aviation Fuels (LCAF) and other aviation cleaner energies, compared to zero cleaner energy use. That second goal was recently adopted at the Third ICAO Conference on Aviation and Alternative Fuels (CAAF/3).

The series of ICAO Stocktaking events unlocked and showcased many novel technologies and solutions supporting these goals. ICAO is closely working with our aviation industry partners on this innovation and its safe and effective implementation, steadily working to ensure that the new Standards and Recommended Practices are embracing these new technologies so that no country is left behind.

Please allow me to focus on the particularly pressing need to scale up the development and deployment of SAF.

As a drop-in fuel option, SAF enables the sector to realise significant life cycle emissions reductions, without changes to existing infrastructure. Crucial innovation includes increasing the existing blend limits, approving new SAF conversion processes, and lowering SAF production costs. The development and commercialization of synthetic SAF, produced using renewable energy, is widely regarded as an important longer-term innovation as we move ahead in the global energy transition.

As far as aircraft technology is concerned, the fleet development of advanced tube and wing and other aircraft concept designs can bring about progressive improvements in carbon intensity.

In the long run, the option of non-drop-in fuels (hydrogen and battery electric) come into play, but they will require major infrastructural changes.

In the area of operations, we are considering both ground and airborne systems and technologies. Measures such as horizontal/vertical flight efficiencies and ground operations efficiencies need to be adopted in the short-term. Others, like formation flying, are largely regarded as longer-term innovations.

Having given some concrete examples here, I would nonetheless like to affirm that the aviation community's focus at this time needs to be on fostering and developing an innovation ecosystem rather than trying to predict the single winning ticket!

2. How can these innovations be developed? Specifically, what projects, programs and initiatives should be undertaken to develop these key initiatives?

The key driver to innovation is quite basic. It relies on a simple premise that the more people there are who are trying to solve a problem, the sooner and better it will be solved.

Accordingly, a key element is to try to engage as many creative minds as we can to focus on the evolution and the revolution that we need.

The innovation revolution has taken care of much of the “enabling” part. With more and more people having access to computing power, they are able to develop affordable prototypes and access innovation in financial investments mechanisms to crowdfund their ideas.

That is why ICAO has initiatives that are focused on the “engagement” aspect. We have delivered events in multiple formats, from gathering hundreds of people at our innovation fairs to holding dozens of online webinars.

These fora go beyond the traditional attendance at ICAO and reach out to the youth (including through competitions), the non aviation sectors, and they touch on social acceptance and governance issues that are key to making sure we innovate in a responsible manner.

ICAO continuously consults with industry stakeholders, monitoring and promoting their latest developments and innovations. For example, an ASTM task force has been convened to facilitate the evaluation and approvals needed for 100% drop-in SAF. Boeing’s ecoDemonstrator program applies promising technologies in an operational environment, involving projects such as the use of sustainable wall panels in the cargo hold, as well as fuel quality sensors compatible with 100% SAF. Airbus’ ZEROe project aims to bring to market the world’s first hydrogen commercial aircraft by 2035, together with the ecosystem required to support it.

On the topic of specific innovations, I would like to highlight that ICAO has also adopted new methodologies to ensure that regulations do not lag behind and delay their use. This includes the

recent process approved by the Air Navigation Commission on “Direct Submission,” which allows for more efficient development of global Standards in some specific instances.

Finally, let me stress that the future of the air transport sector will rely, more than ever, on data-driven policy and decision-making.

In fact, direct access to reliable, accurate and comprehensive data is one of the key components for authorities worldwide to design flexible, scalable and forward-looking national and regional aviation strategies.

ICAO has been embracing data innovations through various projects and collaborations and has also developed advanced dashboards leveraging big data to monitor the evolution of aviation data in the post-COVID-19 pandemic era.

3. How can these key innovations be funded? How can the capital be generated to fund the development of the innovations?

Funding in innovation is contextual. It depends on a variety of factors ranging from the organisational mandates to prioritization of needs, resources and the dynamics of an ever-changing future world.

Funding mechanisms for innovation are diverse and the taxonomy of funding for innovation draws on a variety of motivating factors. These motivating factors range from the intrinsic satisfaction of innovation to the pursuit of economic development.

Thus, one needs to undertake a thorough analysis of the need, the feasibility, the future utility to identify projects that are deemed sustainable and beneficial to stakeholders.

In this regard, ICAO plays an important role in advocacy and outreach.

Following the adoption of LTAG, several ICAO Council high-level dialogues on the challenges and opportunities of aviation decarbonization were held. These dialogues involved financial institutions, banks and investors, and energy companies and aimed to highlight the sector’s net-zero ambitions and the role of financing critical to its decarbonization efforts.

Plans are also underway to operationalize the ‘ICAO Finvest Hub’, which intends to match aviation decarbonization projects with public funding and private investors, including for the scale-up in development and deployment of SAF, LCAF and other aviation cleaner energies.

This can be supported by the ongoing ICAO Assistance, Capacity-Building, and Training for SAF (ACT-SAF) programme, where the implementation of SAF feasibility studies and business implementation reports can lead to the development of SAF project proposals, facilitating financing and investment decisions. As the work in ACT-SAF extends to an ACT-LTAG programme, we also expect implementation support across technological and operational measures.

These are just some of the judicious ways of generating and sustaining interest in the continuous supply of supporting funds for innovation.

4. How can these innovations best be implemented? What is the role that your organization can take in enhancing the implementation of these innovations?

The implementation of innovation is a fully-fledged discipline. The optimum means of innovation implementation is specific to typical requirements.

ICAO is deeply invested in programs that enhance the implementation of innovation in the aviation ecosystem.

As a result of our mandate, ICAO's role covers a wide range of responsibilities as enablers, practitioners and enhancers of innovation implementation in aviation. To fulfil these multiple roles, we undertake a systematic and scientific approach that draws on foresight analysis, an ICAO Secretariat strategy on innovation, and an implementation mechanism.

It should be emphasized that our implementation is open, participative and collaborative. We work closely with all interested parties to share information, identify synergies, coordinate efforts and facilitate the implementation of innovation activities to achieve our objectives.

The aviation industry stands at an inflection point, urgently needing to embrace transformative innovations that will propel it towards unparalleled safety, sustainability, and connectivity. By cultivating an ecosystem that engages diverse minds, harnesses disruptive technologies like AI and sustainable aviation fuels, and aligns stakeholders through investment and supportive regulations, we can catalyze a renaissance - redefining boundaries with revolutionary designs, decarbonizing operations, and embodying a bold vision of environmental stewardship and operational excellence. We must be audacious and turn these concepts into reality, crafting a legacy that will echo through generations.

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