



ICAO

INTERNATIONAL CIVIL AVIATION ORGANIZATION

## Twenty-Fifth Meeting of the AFI Planning and Implementation Regional Group (APIRG/25)

7 - 11 November 2022

### Agenda Item 3: Implementation of air navigation goals, targets and indicators, including the priorities set in the regional air navigation plan

#### 3.6 Other Air Navigation Initiatives

##### Incorporate Research, Development and Innovation (RDI) in the APIRG Work Programme

*(Presented by South Africa)*

| SUMMARY  |   |
|--|---|
| This working paper provides an update on how South Africa has been incorporating RDI activities to address the implementation of operational requirements and ASBU elements by embracing the emerging technologies to enhance service provision in aviation. |   |
| The action by the Meeting as in paragraph 3.   |   |
| <i>Strategic Objectives</i>  | <ul style="list-style-type: none"> <li>• Safety</li> <li>• Air Navigation Capacity and Efficiency</li> <li>• Economic Development of Air Transport</li> </ul> |

## 1 INTRODUCTION

- 1.1 APIRG/24 took a decision in order to assist AFI States in addressing the implementation of operational requirements and ASBU modules elements, Decision 24/32 which states: “Incorporation of Research, Development and Innovation (RDI) in the APIRG Work Programme

That, in order to assist AFI States with addressing the implementation of operational requirements and ASBU elements, the work programmes of APIRG and its auxiliary bodies be amended to include activities related to Research, Development and Innovation (RDI).”

- 1.2 Research, Development, and Innovation are crucial for the AFI aviation industry because they provide insightful knowledge and encourage improvements to current aviation technologies and operational procedures that can enhance efficiency and reduce safety incidents while potentially increasing revenue generation. Additionally, they will enable the AFI aviation industry to develop new systems/technologies to enhance service provision.
- 1.3 Collaboration and innovation to adopt new technologies as well as improve existing processes are crucial for AFI States to succeed in the long run. Furthermore, it is important for the AFI region to invest relevant resources (human time and money) in the RDI to ensure that the aviation industry in the AFI region is sustained.

2. DISCUSSION

2.1 RDI activities in South Africa

2.1.1. The incorporation of RDI in the South African activities is guided by global and national aviation trends/requests in alignment with the hype cycles for emerging technologies as illustrated below in figure 1. It is further guided by the identified need/opportunity in operations.

2.1.2. As depicted below in figure 1, it is highly imperative that the AFI aviation industry embraces fourth industrial revolution technologies (4IR) which has been the approach taken by South Africa when incorporating RDI activities.

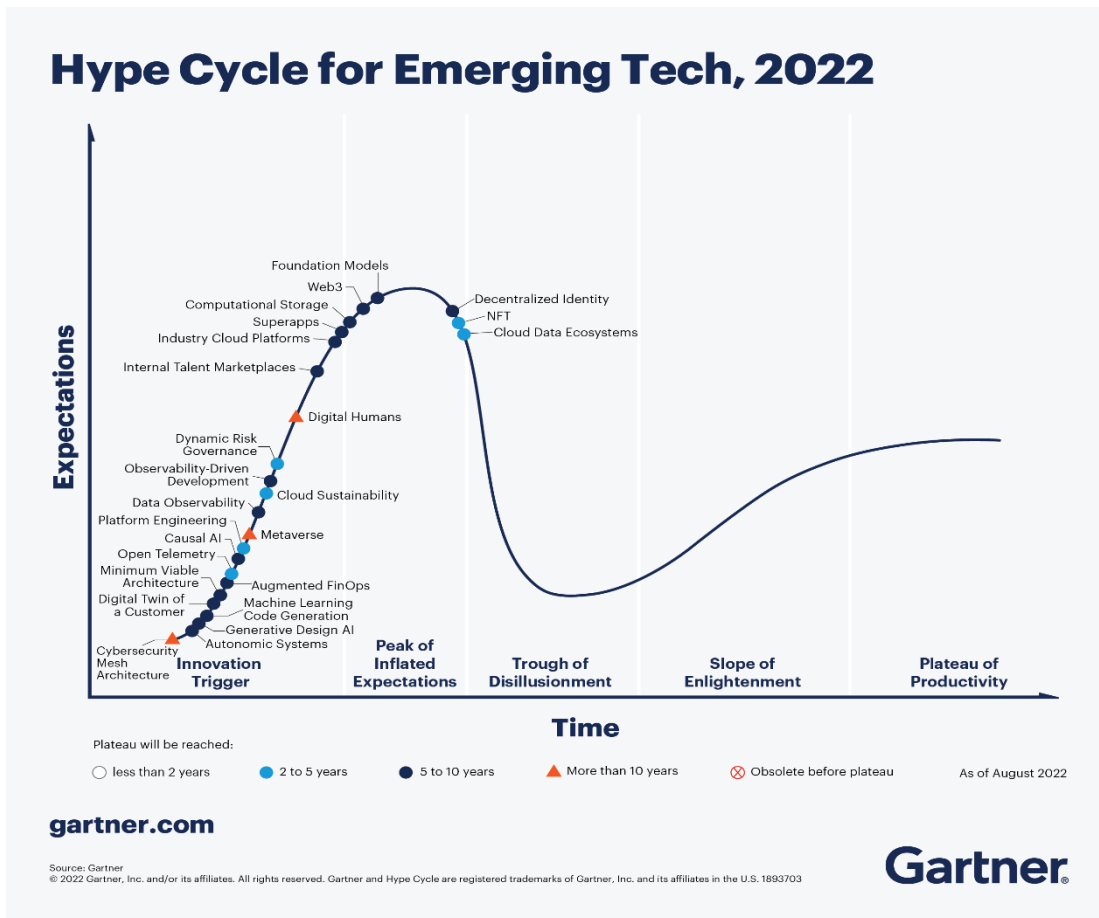
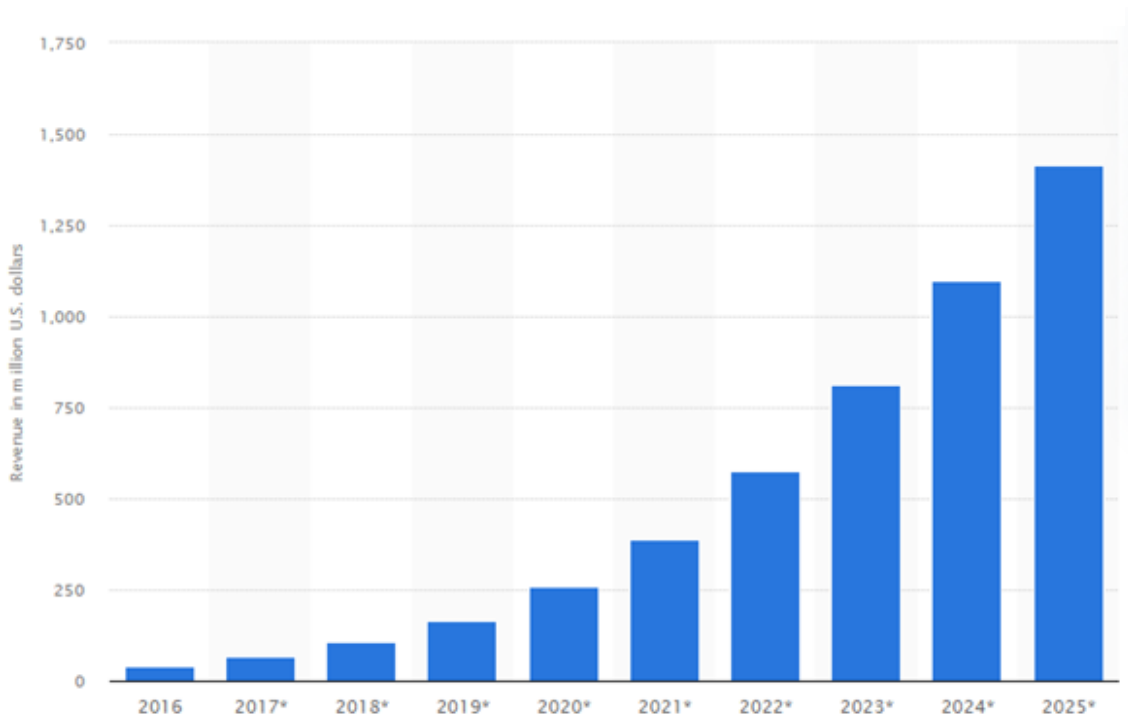


Figure 1:Hype Cycle for emerging technologies

2.1.3. Figure 2 illustrates the growth in revenue associated with Artificial Intelligence in Africa and Middle East. This aligns to the advantages that the technologies present in the AFI aviation industry and hence an urgent need to incorporate RDI activities.

Figure 2: Revenue Projections from the Artificial Intelligence Market in Africa and Middle East from 2016 to 2025



## 2.2 Computer Vision

2.2.1. An internal study conducted by ATNS South Africa in year 2020 identified the computer vision as one of fourth industrial revolution technologies which can be potentially implemented to enhance service provision in aviation.

2.2.2. The study found that amongst many other areas of our operations computer vision can be researched and developed for:

- [a] Aeroplanes and Helicopters.
- [b] Baggage Handling.
- [c] Airport Security
- [d] Runway Inspection
- [e] Counter Drone Sensing
- [f] Visual Aviation Aircraft Identification

## 2.3 Reimagined Reality (Argument Reality, Virtual Reality and Extended Reality)

2.3.1. In light of embracing 4IR technologies, South Africa has investigated the use of Reimagined Reality (Augmented Reality, Virtual Reality and Extended Reality) tools/systems in operations and training environment.

2.3.2. Augmented reality (AR) let us see the real-life environment right in front of us—trees swaying in the park, dogs chasing balls, kids playing soccer—with a digital augmentation overlaid on it. For example, a pterodactyl might be seen landing in the trees, the dogs could be mingling with their cartoon counterparts, and the kids could be seen kicking past an alien spacecraft on their way to score a goal.

2.3.3. Virtual reality (VR) replaces reality with a completely new 3D digital environment. This implies a

complete immersion experience that shuts out the physical world.

2.3.4. Mixed/Extended Reality is a medium consisting of immersive computer-generated environments in which elements of a physical and virtual environments are combined.



Figure 3 - Reimagining Reality In Air Traffic Services Operations



Figure 4 - Reimagining Reality Tool for Maintenance and Other Technical Services

2.4 Incorporating RDI into AFI activities will enable states not to be left behind.

2.5 Therefore, there's a need for APIRG, its auxiliary body and the ATM community subject matter experts to establish a Task Force and consider the following:

2.5.1 Develop the AFI RDI Strategy and Framework;

2.5.2 Monitor RDI in aviation;

2.5.3 Identify AFI strategic RDI programmes aligned with AFI State operational requirements;

2.5.4 Foster innovation and extend participation to other technological disruptors in other industries;

- 2.5.5 Facilitate the sharing of information and RDI by the AFI State aviation community;
- 2.5.6 Intellectual Property (IP) Management;
- 2.5.7 Translate ideas into commercialization and ensure commercialization is achieved;
- 2.5.8 Source RDI funding; and
- 2.5.9 Conduct cost benefit analysis of new RDI technologies aligned with user/operational requirements.

### **3 ACTION BY THE MEETING**

The meeting is invited to:

- Take note of how South Africa has been incorporating RDI activities; and
- Establish AFI RDI Task Force with the main objective as per Par 2.5.

#### **3.1 Draft Conclusion /Decision 3/xx : Title of Conclusion/Decision**

##### **Incorporation of Research, Development and Innovation (RDI) in APIRG work programme**

###### **That**

- PIRG establish the AFI RDI Task Force by 30 June 2023; and
- States to share how RDI has been incorporated to address the implementation of operational requirements and ASBU elements.