

IAF Committee Briefs

November 2021

IAF COMMITTEE ON INTEGRATED APPLICATIONS

1. Introduction

Space systems are more and more involved in the delivery of global utilitarian services to end-users. The concept of Integrated Applications encompasses the simultaneous use of basic space services and technologies. The IAF Committee on Integrated Applications focuses on various aspects of integrated applications, which combine different space systems (Earth observation, navigation, telecommunications, etc) with airborne and ground-based systems, in addition to other technologies as big data, analytics, IOT, 5G and others to deliver solutions responding to users' needs.

The applications exploit the synergies between different data sources to provide the right information at the right time to the right user in a cost-effective manner and deliver the data to users in a readily usable form. The objective of the Committee is to enable the development of end-to-end solutions by connecting the user communities that are driving toward end-to-end solutions with those that are developing enabling technologies for integrated applications. Other aspects pertinent to the committee are the commercial satellite applications including the commercial space and space culture, the commercial space model for public users and some case analysis of satellite commercial applications

2. Summary

Key topics addressed are the specific systems, tools and technologies in support of integrated applications solving the various issues associated with applications development, the kind of data to be collected, how are data collected and how the data are integrated and distributed to address key user needs.

3. Highlights

Emerging technologies, such as Machine Learning, Artificial Intelligence, Internet of Things, and other advanced technologies are rapidly revolutionizing and reshaping infrastructure and global-local economies. Leveraging these new transformative developments and understanding their disruptive potential with respect to technology, shifting demographics and global connectivity is essential for space technologies.

Possible topics include: ground-truthing of data collected from space platforms; innovative, low-cost tools for data distribution and access that focus on the space segment; new ways of distributing integrated data products; data fusion and visualization tools; managing integrated applications programmes and public outreach efforts to connect the public to these applications.

Examples of case studies of particular interest include end-to-end solutions, case studies, proof-of-concept applications and current projects that aim to provide innovative user-driven solutions and applications that combine ground- and space-based data sources with models to address specific user requirements.

These examples can cover a variety of domains, like disaster/crisis monitoring and management, energy, food security, space situational awareness, transportation, health, etc. The user needs, the structure of the user communities, the value chain, the business case and the sustainability of the solutions are among the many aspects that can be considered. Examples of projects with established partnerships and fluent working relationships between space and non-space stakeholders are also discussed.

4. Future Outlook

The concept of digitizing and connecting everything forms the basis of how the Fourth Industrial Revolution, Industry 4.0, is influencing and impacting the world. Emerging technologies, as Machine learning, Artificial Intelligence, Internet of Things, and other advanced technologies are rapidly revolutionizing and reshaping infrastructure and global-local economies. Leveraging these new transformations and understanding their disruption potential with respect to technology, shifting demographics and global connectivity is essential for the space technologies.

The ability of satellite technology to provide ubiquitous and increasingly fast connectivity to billions of people globally is at the core of the Fourth Industrial Revolution. Connectivity is not the only element in the Fourth Industrial Revolution that can be harnessed by the satellite industry. Innovative technologies will open the door to new opportunities incorporating multiple disciplines and industries to create new markets and growth. New business models (eg. the impact of AI on

satellite data processing) and the evolving economic/trade landscape, for example related to the autonomous technologies, will lower barriers to entrepreneurs with new ideas to access the markets. Space systems are more and more involved in the delivery of global utilitarian services to end-users.

5. Committee activities

The plan for spring next year is to undertake a global Air Quality project. The project has already started in Los Angeles funded by NASA. The aim is to integrate data from many other cities around the globe as part of a global effort to use satellite data and ground data to provide predictive analytics using machine learning. See more at <http://airquality.lacity.org>.

Next year's proposal from the Committee is to organize a special session workshop on "Space Applications for Social Justice". Environmental justice (air quality), food justice (food insecurity), and digital justice (cybersecurity), and educational justice (African school support).