Introduction

Published by

Croshier, Rose.
Handbook for Space Capability Development.
Center for Global Development, 2023.
Project MUSE.   https://muse.jhu.edu/book/112011.

➡ For additional information about this book

Introduction

People use human-made satellites to navigate, understand our environment on Earth and beyond, and communicate across land and ocean, even to other planets. Satellites have come to underpin the global economy and activity through a set of very practical capabilities. Position, navigation, and timing data are used for banking, utilities, and transportation; remote sensing data are used for weather prediction and forecasting, research, and intelligence; and the "space segment" (i.e., satellites) of telecommunications infrastructure extends telephony and the internet beyond the reach of terrestrial networks (wire, microwave relay, optical fiber).

In 2021, United Nations (UN)–issued resolution "Space 2030 Agenda: Space as a Driver of Sustainable Development" formally recognized that "space science and technology and their applications are contributing immeasurably to economic growth and improvements in the quality of life worldwide." Despite such a clear connection of space applications to development, there persists a common misconception that building domestic space capabilities is a luxury reserved only for rich and powerful nations and that all space-related development is a herculean, cost-prohibitive task. On the contrary, while the degree of space investment and activity varies, even a modest national space program can provide an outsized return that enables every UN Sustainable Development Goal (SDG).

THE GOALS OF THIS BOOK

The intent of the *Handbook for Space Capability Development* is to establish an inclusive, pragmatic, and open-access resource focused on space capability development. Its intended audience is the planner or planning team charged with drafting a national space strategy and building a national space program. Among its goals are to make a case for *why* all governments should establish a foundational space capability, to discuss *what* such a program might look like in real terms, and to suggest an approach for *how* to conduct early program design. It aspires to ensure that the resulting program, office, and strategy are sustainable in scale, scope, and growth; contribute tangibly to national priorities; and enable full national participation in the regional and global space ecosystem.

The first step in this endeavor is to understand existing national dependencies on space and consider how space applications could be used to support economic growth, security, and other national priorities. A national space program can then structure methodical development of foundational space capabilities that, in turn, enable a country to

- ▶ Protect existing dependencies on space.
- ▶ More fully leverage existing space capabilities and applications.
- ▶ Encourage the growth of a local data and space ecosystem.
- ▶ Attract international and public-private collaboration and investment.
- ▶ Contribute to the development of norms and laws governing space.

HOW TO USE THIS BOOK AND OTHER KEY REFERENCES

The *Handbook for Space Capability Development* will focus on the why, what, and how of developing an early space program. It is best used in concert with other open-source references that focus more deeply on space and data-related terms,

concepts, physics, law, norms, and management. This virtual, free "bookshelf" includes

- *Handbook for New Actors in Space*, Secure World Foundation (SWF) (www.swfound.org). Provides an authoritative overview of legal, regulatory, political, technical, and administrative issues in space (Johnson 2017).
- "New Space Law for New Space Actors" (in development), United Nations Office for Outer Space Affairs (www.unoosa.org). Describes the treaties, principles, and guidelines that, collectively, constitute the normative framework governing activities in outer space (UNOOSA, forthcoming).
- *Digital Regulation Handbook 2020*, International Telecommunications Union (ITU)/World Bank (WB) (www.itu.int). Guide to assist regulatory authorities and policymakers in deciding on appropriate digital regulations, to include radio-spectrum management, and evaluating the effectiveness of those regulations.
- "Broadband Strategies Toolkit" (ITU/WB) (https://lnkd.in/g8dz2FEX). This online toolkit is in a modular format, making it easy to move directly to topics of interest. It demonstrates how broadband enables economic and social development and provides policymakers and regulators with tools to create strategies, design policies, and implement programs that expand the reach and that increase the use of broadband information and communications technology (ICT).
- "Guidelines for the Long-term Sustainability of Outer Space Activities" by the Committee on the Peaceful Uses of Outer Space, United Nations Office of Outer Space Affairs (UNOOSA) (www.unoosa.org). The document (UNOOSA 2018) describes norms for safe space operations. It explicitly encourages international cooperation,

capacity building, and scientific and technical research and development.

- "Newcomers Earth Observation Guide," European Space Agency (ESA) (www.business.esa.int). Provides an overview of different types of remote sensing imagery and example applications (ESA 2020).
- *European Global Navigation Satellite System and Copernicus: Supporting the Sustainable Development Goals* (UNOOSA, ESA) (www.unoosa.org). Joint UN/ESA exploration of space remote sensing and position, navigation, and timing data applicability to the SDGs. An excellent way to explore possibilities via a theme, like water management or health (UNOOSA and ESA 2018).
- International GNSS Service (IGS) (www.igs.org). Voluntary federation of two hundred agencies, universities, and research institutions in more than one hundred countries, providing, on an openly available basis, global navigation satellite systems (GNSS) data, products, and services in support of the terrestrial reference frame, Earth observation and research; positioning, navigation, and timing; and other applications that benefit science and society.
- Global Positioning System (GPS), www.gps.gov. Overview of global navigation satellite systems, specifically the US GPS system. Includes information about, and links to, Chinese, European, Russian, Indian, and Japanese GNSS.
- US Cybersecurity and Infrastructure Security Agency, "Position Navigation Timing" (www.cisa.gov/pnt). United States' guidelines to prevent, respond to, and recover from GNSS interference, whatever the cause.

Additional references and resources are listed at the end of this Handbook, organized by topic section.