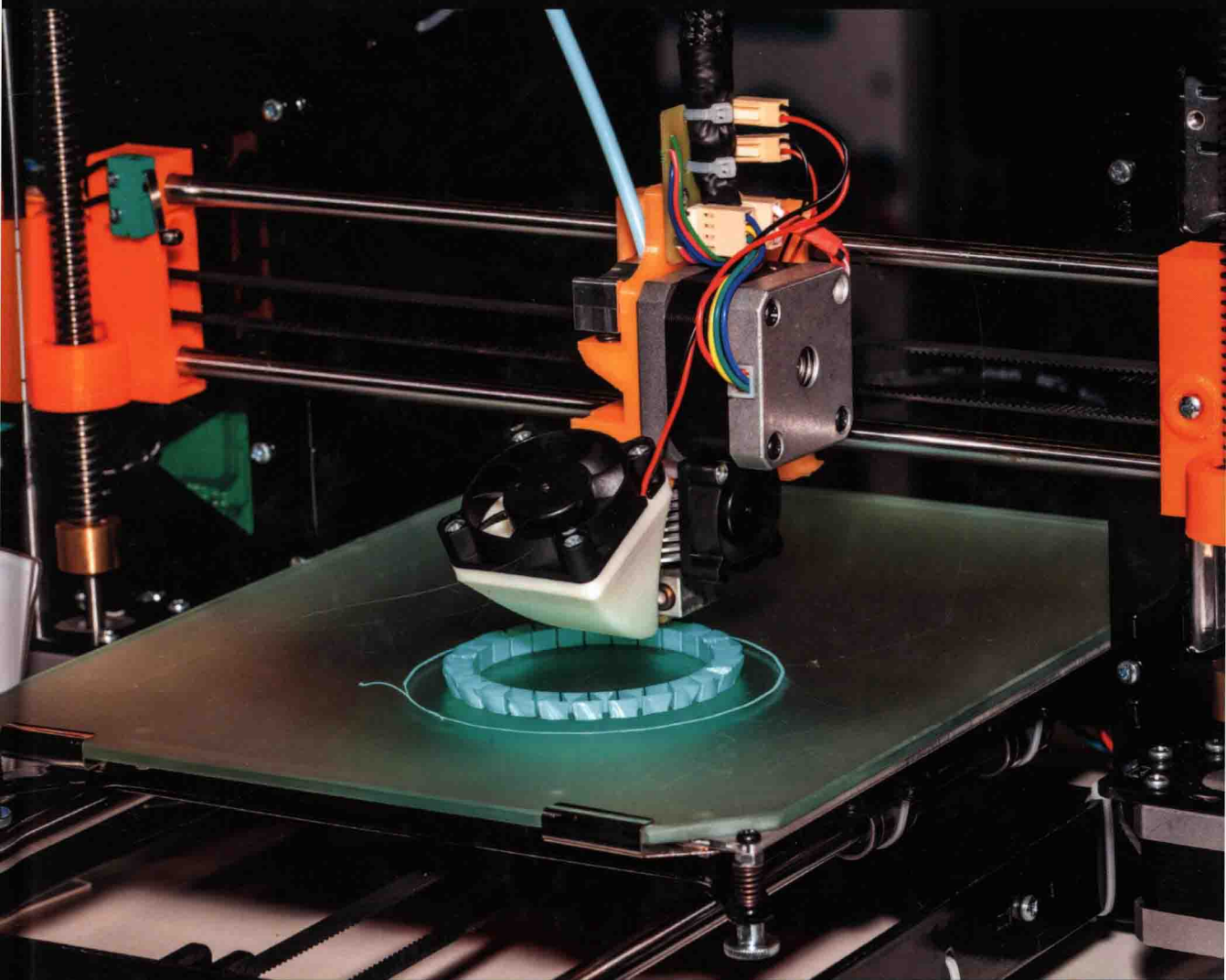


ADDITIVE MANUFACTURING HANDBOOK

Product Development for the Defense Industry



EDITED BY

Adedeji B. Badiru
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David Liu



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Additive Manufacturing Handbook

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Editors

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Additive Manufacturing Handbook

Systems Innovation Series

Series Editor

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Air Force Institute of Technology (AFIT) – Dayton, Ohio

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Dedication

To our families, who continue to support and embrace us in all we do.

Preface

The *Additive Manufacturing Handbook* is a comprehensive collection of chapters written by selected experts from their respective fields. This handbook is unique and unrivaled in its focus and orientation. Popularly known as 3D Printing, additive manufacturing involves direct digital manufacturing of products. This handbook focuses primarily on defense applications, but it is widely applicable to general applications in business, industry, education, research, government, and policy making. Even home-based readers will benefit from this handbook for its rich collection of knowledge-enhancement topics. It is a reference material that anyone interested in this topic will need to have. This handbook is organized into sections that cover both theory and practice of additive manufacturing. It is suitable for students, instructors, researchers, practitioners, and policy makers. All areas of engineering, business, and industry that interface with defense applications can benefit from this handbook. It covers all the essential topics in one volume. Topics covered in the 48 chapters in this handbook include elements of direct digital manufacturing, properties of additive manufacturing, research and development planning for 3D printing, systems engineering framework for 3D printing, product re-configurability, modularity, reliability, adaptability, and reusability using 3D printing, 3D printing using the design, evaluation, justification, and integration (DEJI) system model, hybrid systems of new product development, 3D printing technical workforce development, organizational adaptation for 3D printing, managing 3D printing projects and programs, digital manufacturing sustainability, outsourcing, insourcing, open-sourcing of 3D manufacturing, advanced educational foundation for 3D printing, energy strategies for sustaining 3D technology development, 3D technology transfer model and modes, leveraging 3D printing and big data, global partnership strategies for direct digital manufacturing, manufacturing technology transfer using additive manufacturing techniques, 3D printing consortia and development centers for defense applications, quality inspection in 3D printing, learning and forgetting in an additive manufacturing enterprise, and 3D printing applications in the defense industry.

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