

New 6G book led by the 5G PPP Architecture Working Group (WG) and the Hexa-X project:



TOWARDS SUSTAINABLE AND TRUSTWORTHY 6G

Challenges, Enablers, and Architectural Design

While the 5th Generation (5G) system is being widely deployed across the globe, the ICT industry, research, standardization and consensus building for the 6th generation (6G) are already well underway with high expectations towards the merger of digital, physical, and human worlds. The main goal of this book is to introduce the upcoming 6G technologies and outline the foreseen challenges, enablers, and architectural design trends that will be instrumental in realizing a Sustainable and Trustworthy 6G system in the coming years.

The envisioned 6G system promises to offer a more advanced and comprehensive user experience not only by achieving higher speeds, larger capacity, and lower latency, but also much more improved reliability, greater energy efficiency, and an enhanced security and privacy-preserving framework while natively integrating intelligence end-to-end (E2E). Achieving these goals will require innovative technological solutions and a holistic system design that considers the needs of various stakeholders and future 6G use cases.

Capitalizing on the European 5G Public-Private-Partnership (5G PPP) Phase 3 projects working on 5G & Beyond and 6G research in recent years and the joint efforts between the Architecture WG and the 6G flagship Hexa-X project, this book delves into the critical challenges and enablers of the 6G system, including new network architectures and novel enhancements as well as the role of regulators, network operators, industry players, application developers, and end-users. Accordingly, this book provides a comprehensive landscape of the current research activities on 6G in Europe and sets a solid cornerstone on the 6G development towards a more connected, intelligent, and sustainable world.

Furthermore, as 5G PPP Phase 3 consists of the last calls of the Horizon 2020 program, this book is aimed to lay the architectural foundation for the next European program towards 6G, i.e., Smart Networks & Services (SNS) Joint Undertaking (JU).

Dr. **Ömer Bulakçı** is the 6G Program Manager at Nokia, Germany and the Chair of the 5G PPP Architecture Working Group.

Dr. **Xi Li** is a Senior Researcher at NEC Laboratories Europe in Germany and the Vice-Chair of the 5G PPP Architecture Working Group.

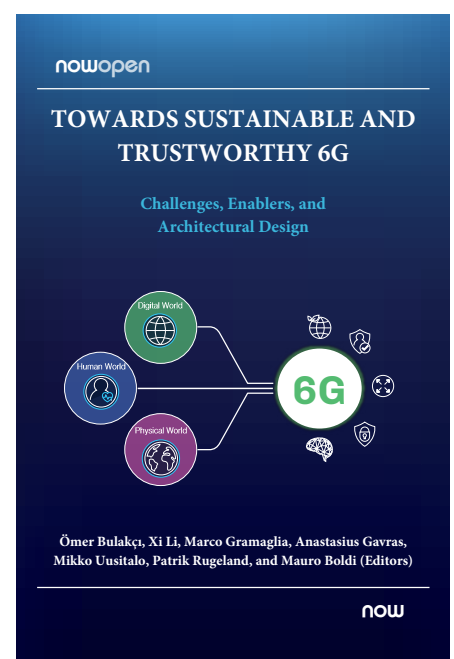
Dr. **Marco Gramaglia** is a visiting professor at University Carlos III of Madrid.

Anastasius Gavras is a programme manager at Eurescom GmbH in Germany.

Dr. **Mikko Uusitalo** is Head of Research Department Radio Systems Research Finland at Nokia Bell Labs and overall lead in the European level 6G Flagship projects Hexa-X and Hexa-X-II.

Dr. **Patrik Rugeland** is a Master Researcher at Ericsson Research, Sweden and is the Technical Manager in the European 6G flagship projects Hexa-X and Hexa-X-II.

Mauro Boldi is a Project Manager in the Innovation department at TIM, Italy, and is currently leading dissemination activities in the European 6G flagship projects Hexa-X and Hexa-X-II.



Book Chapters & Editors

This book comprises one introduction chapter and the following eight chapters.

Chapter (Ch)	Editor(s)	Affiliation(s)
Ch2. Architecture Landscape	<ul style="list-style-type: none"> • Mårten Ericson • Bahare Masood Khorsandi 	<ul style="list-style-type: none"> • Ericsson, Sweden • Nokia, Germany
Ch3. Towards Versatile Access Networks	<ul style="list-style-type: none"> • Mir Ghoraishi 	<ul style="list-style-type: none"> • Gigasys Solutions, UK
Ch4. Towards Joint Communications and Sensing	<ul style="list-style-type: none"> • John Cosmas 	<ul style="list-style-type: none"> • Brunel University London, UK
Ch5. Towards Natively Intelligent Networks	<ul style="list-style-type: none"> • Marco Gramaglia • Xi Li • Gines Garcia-Aviles 	<ul style="list-style-type: none"> • Universidad Carlos III de Madrid, Spain • NEC Laboratories Europe, Germany • I2CAT Foundation, Spain
Ch6. Towards Sustainable Networks	<ul style="list-style-type: none"> • Agapi Mesodiakaki • Md Arifur Rahman 	<ul style="list-style-type: none"> • Aristotle University of Thessaloniki, Greece • IS-Wireless, Poland
Ch7. Towards Continuously Programmable Networks	<ul style="list-style-type: none"> • Dimitris Tsolkas 	<ul style="list-style-type: none"> • Fogus Innovations & services P.C., Greece • National & Kapodistrian University of Athens, Greece
Ch8. Secure, Privacy-Preserving, and Trust-worthy Networks	<ul style="list-style-type: none"> • Alexandros Kostopoulos 	<ul style="list-style-type: none"> • Hellenic Telecommunications Organization S.A. (OTE), Greece
Ch9. 6G Outlook and Timeline	<ul style="list-style-type: none"> • Mauro Boldi • Mikko Uusitalo • Patrik Rugeland 	<ul style="list-style-type: none"> • TIM S.p.A., Italy • Nokia Bell Labs, Finland • Ericsson, Sweden

Contributing Projects

