



# IEEE 5G Initiative Overview

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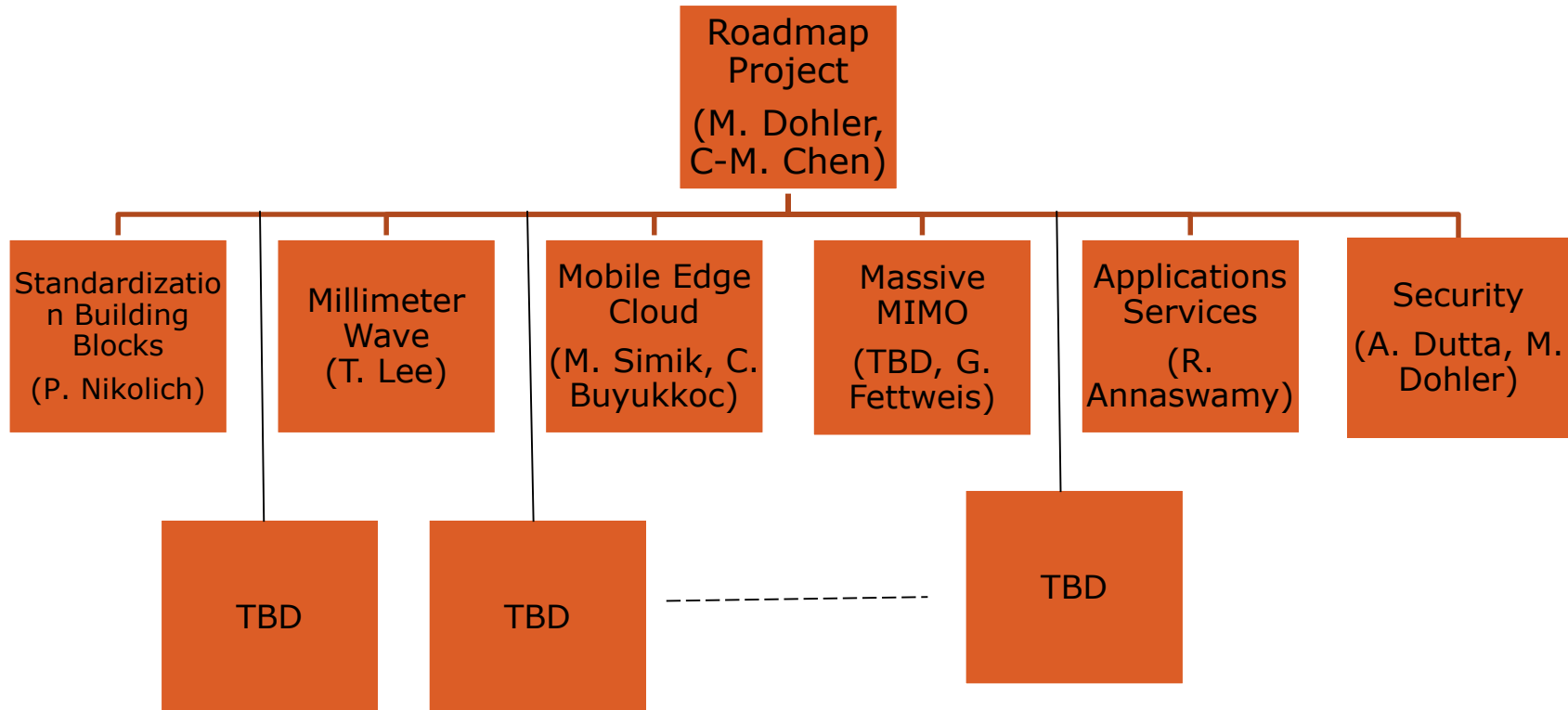
Gerhard Fettweis, Co-Chair

Harold Tepper, Senior Program Director, Future Direction Initiative

Adam Greenberg, Director Industry and Technical Activities, ComSoc

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# Roadmap Working Group (Work in Progress)



# Mapping topics to building blocks

Topics	Areas	WGs
"What do we need - verticals"		
5G as enabler for Medical IoT – MI5		
Microgrid-based Power Infrastructure for Integrated Energy and Cellular Service Management		
Automotive Sector Perspective		
Heterogeneous V2X networks		
5G roadmap for V2X services		

# Mapping topics to building blocks

Topics	Areas	WGs
"How do we do it - Radio Feature Design"		
IoT Wireless Security		
LiFi Attocellular Networking		
Forward Error Correction Schemes		
CMOS and BiCMOS Integrated circuits for 5G and beyond		
MTT-S mm-wave circuits perspective		
AP-S antenna perspective		
D2D technologies		
EMC Contribution – AP-S		

# Mapping topics to building blocks

Topics	Areas	WGs
<b>"How do we do it - Core/Service Support Design"</b>		
5G launch and Enhance EPC to support 5G use cases		
5G OMEC: proposed mission and roadmap		
<b>CORD: Network Edge Platform for Service Delivery</b>		
5G empowering IoT		
5G Security		

# Mapping topics to building blocks

Topics	Areas	WGs
"How to make business out of it"		
Micro operators for vertical specific service delivery in 5G	Matti Latva-aho	2:00PM – 2:05PM
A 5G Roadmap Breakdown Structure	Adam Drobot	2:05PM – 2:10PM

# Initiative Goals/Objectives

- Foster collaboration and connect technical & business communities to IEEE 5G experts and resources
- Establish IEEE as a **Thought Leader** and essential to the 5G community
- To be recognized as the go-to resource for engineering and technology professionals in industry, academia and government working on 5G
- Develop and promote valued programs, products and services for the 5G community
- Present a single IEEE face/voice to the 5G marketplace
- Be a true global 5G initiative capturing the needs of all global regions
- Create a neutral platform/forum where those interested in 5G can engage and collaborate
- Be the catalyst for IEEE cross-society activities on 5G

# 5G Ecosystem

- IEEE, like many other organizations, believes that 5G ecosystem is rather large and will cover many different areas:
  - Not only an evolution of LTE
  - New services, new technologies, new frequencies (6 GHz and mm-wave), new industries, new business models
  - Multi connectivity across bands & technologies
    - carrier aggregation with integrated MAC across sub- 6GHz & above 6GHz, 802.X and macro cells (legacy)
    - carrier aggregation for mission-critical resilience via multi-connectivity
  - “Rethinking” of fundamental areas used in previous ‘Gs’ (cell architectures, antennas, core networks, etc. -- Is it appropriate to continue to use the word “generation”?)



# Initiative Importance to Industry

- Emerging applications such as SDN/NFV, IOT, M2M, eHealth are some key drivers for 5G
- Helps to build a neutral environment involving operators, vendors, academics, regulators, and users to identify problems and propose solutions
- 5G is disruptor and creates opportunities for startups and entrepreneurs
- IEEE can drive the ongoing industry efforts with an all inclusive approach

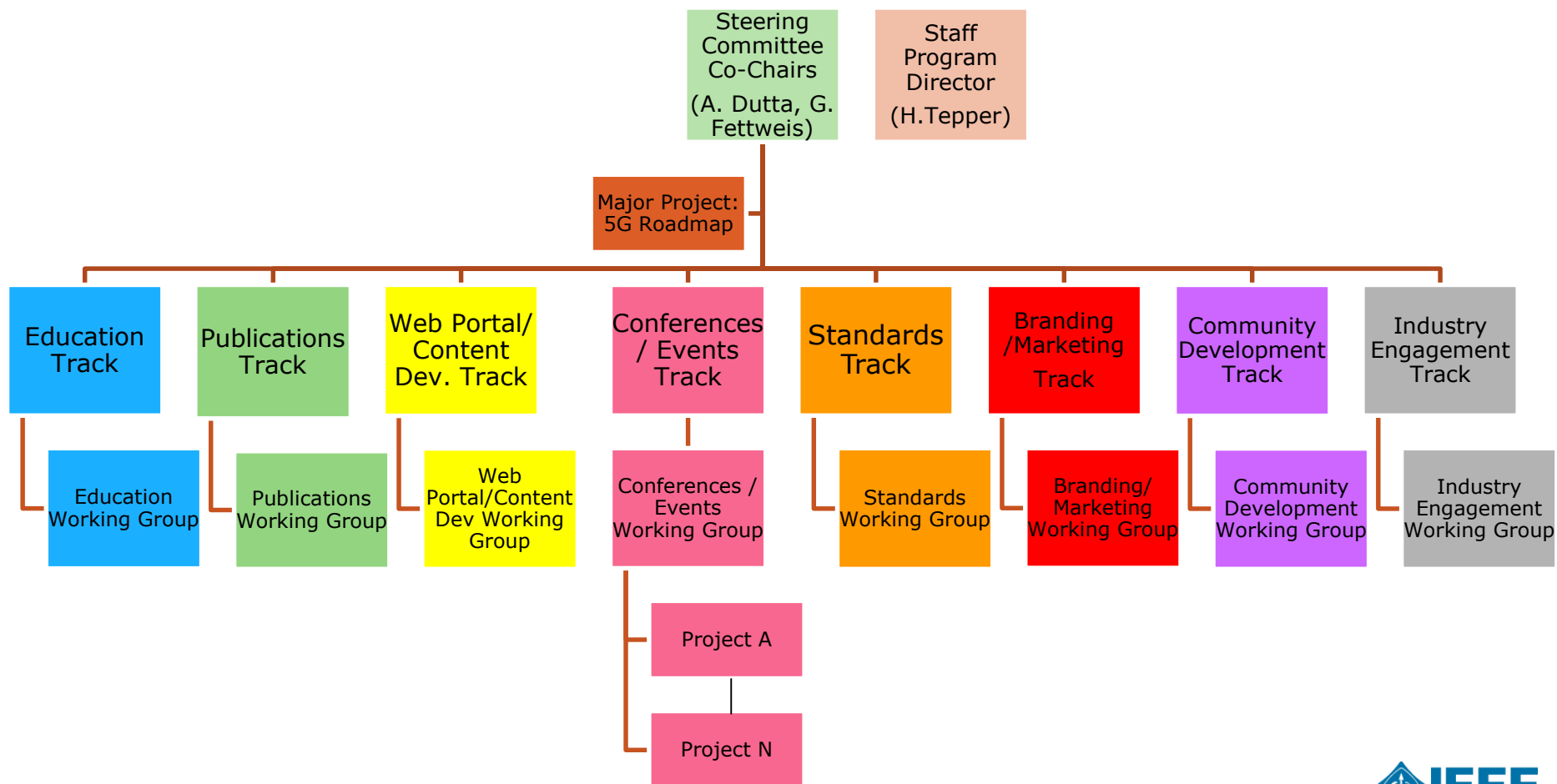
# Initiative Importance to IEEE

- Establish and grow a vibrant global 5G Technical Community that binds heavily with the IEEE
- Identify standardization opportunities and standardization gaps related to 5G
- Facilitate the development of 5G technical architectures
- Develop 5G products: Conferences, Publications, Education, Training, etc.
- Leverage IEEE's value and platform for 5G industry-wide consensus development
- Help create a vibrant 5G ecosystem (e.g., policy) toward 2020 and beyond
- Develop a future roadmap for the anticipated paradigm shifts (evolutionary and revolutionary)

# Recent Background

- Convened Kick-Off Workshop in Princeton, NJ on 29-30 August 2016
  - Participation by over 30 volunteers and IEEE staff representing 12 Societies/OUs
    - Communications
    - Computer
    - Solid States Circuits
    - Signal Processing
    - Vehicular Technology
    - Technology and Engineering Management
    - Instrumentation & Measurement
    - Intelligent Transportation
    - Microwave Theory and Techniques
    - Standards Association
    - Educational Activities
    - Future Directions
- Identified Working Groups and Projects for 2016/2017

# 5G Initiative Organization



# Working Group Scope

## Education WG

(R. Ting, R. Annaswamy)

- Define, develop and manage portfolio of offerings/activities including:
  - eLearning Modules
  - Tutorials
  - Webinars
  - Podcasts
  - Google Hangouts

## Publications WG

(C-L. I, G. Li)

- Define, develop and manage portfolio of offerings/activities including:
  - eNewsletter
  - Journal, Transactions
  - Magazine
  - Supplements to other publications
  - Special issues in other publications

## Web Portal/ Content Dev. WG

(J. Irvine)

- Determine, source and manage content placed on portal
- Ensure that portal is refreshed on a continuous basis

## Conferences /Events WG

(A. Dutta, L. Ladid)

- Manage Initiative events
  - Conferences
  - Workshops
- Determine and manage participation in other events
  - Patron
  - Exhibitor
  - Panelist
  - Keynote

# Working Group Scope

## Standards WG

(A. Gelman, P. Nikolich)

## Branding/Marketing WG

Ralph Irmer

## Community Development WG

(J. Irvine, A. Wyglinski)

## Industry Engagement WG

(M. Lu, M. Condry)

- Manage portfolio of activities including:
  - New projects
  - Roundtable program for industry leaders
  - Engagement with SDOs and other external organizations
- Rebranding
- Logo development
- Marketing
  - Competitive positioning
  - Visibility
  - Messaging
  - Collateral
- Establish and grow a broad IEEE 5G Community including:
  - IEEE Technical Community
  - Collabratic
  - Twitter
  - LinkedIn
  - Facebook
  - FlipBoard
- Drive engagement with industry including:
  - Partnerships
  - Training
  - Career Development

# 5G Initiative (<http://5g.ieee.org>)

## Summary of Activities

### 2016 Milestones

#### ■ Initiative Launch

- Convened 2 day kick-off workshop in late Aug.
- Attended by over 30 volunteers/staff representing 12 societies/councils/Ous
- Steering Committee Meeting Nov 17, 2016

#### ■ Working Group Formation

- Established volunteer led Working Groups to drive activity including: Web Portal, Content Development, Community Development, Standards, Education, Publications, Branding, Roadmap, Events and Industry Engagement

#### ■ 5G Summits

- Conducted 8 summits across the world: US, China, Germany, India, and Denmark

#### ■ Roadmap (Workshop at Globecom)

- Launched Technical Working Groups including Standardization Building Blocks, Mobile Edge Cloud, Massive MIMO and Millimeter Wave

#### ■ IEEE 5G Web Portal

- Launched new portal on 6 October 2016

#### ■ IEEE 5G Newsletter

- Named Editor-in-Chief, Managing Editor and Assistant Managing Editor

### 2017 Plans

#### ■ 5G Summits ([www.5gsummit.org](http://www.5gsummit.org))

- Continue to conduct summits on a global basis

#### ■ Roadmap

- Develop and publish an IEEE 5G Roadmap modeled after the ITRS Roadmap

#### ■ Publications

- Launch an IEEE 5G Newsletter with original content focused on a broad audience

#### ■ Web Portal/Content Development

- Refresh the portal on a regular basis with original content including written Q&As, interviews, opinion pieces and podcasts

#### ■ Community Development

- Establish and build a global, engaged IEEE 5G Community through a broad range of channels including Collabratec, Twitter and LinkedIn

#### ■ Education

- Introduce a series of webinars and tutorials

#### ■ Standards

- Inventory, update and track 5G related standards activity across industries

# Get Involved!

- Seeking volunteers
  - Broad range of opportunities
    - Technical Areas – Massive MIMO, mmWave, Mobile Edge Cloud, Security.....
    - Functional Areas – Publications, Education, Roadmap, Content/Community Development....
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