

The background features a view of Earth from space, with the horizon and atmosphere visible. Below the Earth, the surface of the Moon is shown. A complex network of glowing green and blue lines and nodes is overlaid on the scene, representing a global or space-based communication network. The lines curve across the Earth and connect various points, some of which are bright green nodes. The overall aesthetic is futuristic and technological.

CSMAC Subcommittee 2: 6G

December 9, 2022

Subcommittee Members

- Reza Arefi, Co-Chair
- Carolyn Kahn, Co-Chair
- Michael Calabrese
- Thomas S. Dombrowsky Jr.
- Mark Gibson
- Dale Hatfield
- Jennifer Manner
- Jennifer McCarthy
- Danielle Piñeres
- Glenn Reynolds
- Dennis Roberson
- Jesse Russell
- Steve Sharkey
- Mariam Sorond
- Rikin Thakker
- Jennifer Warren
- Richard Orsulak, NTIA Liaison
- Jessica Quinley, FCC Liaison
- Antonio Richardson, Designated Federal Officer

Mandate

- NTIA seeks input on what sort of use cases 6G may entail
 - Importantly, NTIA would like the CSMAC to consider use cases beyond traditional wireless communications including safety, sensor, radar, space and other scientific applications and address 6G's potential impact on federal government users
- When considering spectrum bands that could be used to support 6G, NTIA observes that the THz bands have been identified for potential use
 - How would such use impact government users in that range and what recommendations could be made to help prepare for this
 - Are there other spectrum bands that may be appropriate for 6G and beyond use?

NTIA Clarification: The scope should concentrate on 6G services only. This effort should consider generally the benefits to federal government user, the positives for the federal government as a user or federal equities, and how federal agencies can benefit broadly from 6G.

Schedule

- Subcommittee kickoff: August 22, 2022
- Held 6 subcommittee meetings
 - Scope & planning
 - Developed approach
 - Drafted report outline
 - Developed interview questions
 - Discussed initial contributions
 - Prepared update to full CSMAC
- Deliver draft paper and recommendations: August/September 2023
- Deliver final paper and recommendations: December 2023

Interview Plan

- Conduct interviews with federal agencies, service providers, equipment manufacturers, and academia and other non-profit organizations
- Request written and/or verbal responses on 6G question topics:
 - Development
 - Use cases
 - Traditional wireless, non-traditional, new and emerging, unlicensed
 - Domestic and international differences
 - Benefits to federal government users
 - Spectrum
 - Mid-band (5-16 GHz) use and impact to government users in that range
 - THz band (>95 GHz) use and impact to government users in that range
 - Open and virtual networks and impact to government users
 - International considerations

6G Vision (Draft)

CSMAC offers the following draft vision for 6G:

Dynamic connectivity across public and private digital and physical domains that enables intelligent communications and creates conditions for economic growth, enhanced national security, and societal well-being.

While 6G deployment may be years out, the U.S. must take steps now to lay the foundation for its success.

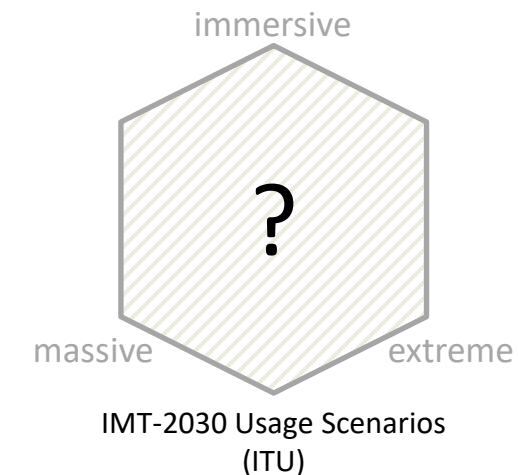
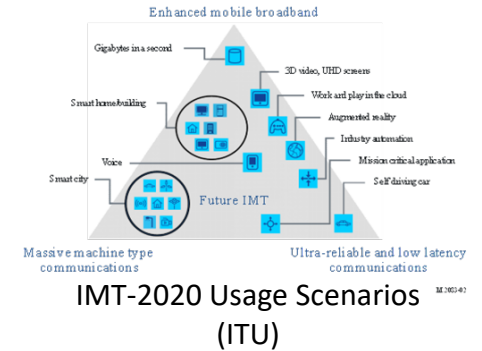
CSMAC is focused on looking ahead at the benefits of 6G to federal agency users.

Draft Report Outline

- Introduction
- 6G vision
- Overview of organizations involved in 6G development
- Key application drivers
- Technologies and technical capabilities of 6G
- Security
- 6G use cases (domestic & international)
- Potential use of 6G by federal government users
- Potential spectrum bands to support 6G and potential implications to government users
- International considerations
- Recommendations to help prepare for impact to government users
- CSMAC recommendations

[Tentative] 6G Usage Scenarios

- 6G/IMT-2030 usage scenarios are currently under discussion in ITU, expected to be agreed by June 2023
- Current thinking adds a new set of usage scenarios to those to be evolved from 5G usage scenarios
- The new usage scenarios combine communication technology with non-communication techniques such as sensing, distributed computing and distributed artificial intelligence



Additional Considerations

- Evolution of 6G, including its dependency on 5G advancement
- Applicability of bi-directional sharing
- Connections with other CSMAC WGs (e.g., Electromagnetic Compatibility Improvements, UWB)
- The evolution of the connectivity ecosystem (e.g., satellites, Wi-Fi, cellular)
- Differentiation of 6G use cases

Initial Observations

- Timelines driven by technology maturity, SDOs, industry, governments and national regulatory agencies, and ITU
- Currently, there is no agreed definition of 6G at this early stage
 - There is a lot of uncertainty around 6G; this can influence investments
 - Lack of a unified approach
- International implications include spectrum harmonization, technical interoperability and standards, global use, and economies of scale
- Federal agency engagement early-on will help shape use cases

Next Steps

- Conduct interviews: December 2022 – June 2023
- Analyze information and develop a draft report: September 2022 – August/September 2023
- Provide updates at full CSMAC meetings
- Deliver draft paper and recommendations: August/September 2023
- Iterate interim findings and conduct follow-on work: August/September 2023 – December 2023
- Deliver final paper and recommendations: December 2023