

The Upcoming 6G Technology

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Abstract: The importance of electronics in the modern world is hard to overstate, touching every aspect of life. Telecommunications offers a striking example of the rapidity of the electronics revolution. The move from 1G to 4G took a full decade. The pace of new technologies is accelerating, meaning that the time to 5G and 6G will be much shorter. It may be a little as three years until 6G is a reality. Higher speed, lower power, smaller packages and increasing demands in system designers. 6G mobile technology in upcoming name in the field of mobile communication technologies, it is based on set of standards which enable devices to connect internet with broadband wireless access. These technologies are helping us in shortening distances such as millions of kilometers are now shorten into few meters.

Keywords: Mobile communication, 1G, 4G, 5G, 6G.

1. Introduction

Wireless technologies are at boom nowadays, as they help users to transfer information from one point to another without any efforts at part of users. These technologies are helping us in shortening distances such as millions of kilometres are now shorten into few meters. A variety of tasks can be performed at anytime and anywhere. 6G, an abbreviation for Sixth-Generation is a term used to describe the next complete evolution in wireless communication and the 6G technology will surely make a phenomenal change in mobile technologies. 6G technology is the upcoming name in field of mobile communication technologies, which is based on set of standards which enable devices to connect internet with broadband wireless access. Complete information about this technology has not been provided yet, but some sources think that this technology will also follow the path of previous series.

2. 6G Vision

1) Intelligent Connectivity

6G networks will face many challenges such as more complex and huge networks more types of terminals and network devices, and more complex and diverse business types. "Intelligent connectivity" will meet two requirements at the same time: on the one hand, all the related connected devices in the network itself are intelligent, and the related services have been intelligent; on the other hand, the complex and huge network itself needs intelligent management.

2) Deep Connectivity

Traditional cellular networks including 5G have the concept of deep coverage, mainly to optimize the deep coverage of

indoor access requirements. In order to achieve deep indoor coverage, outdoor macro base stations are usually used to cover indoor or deploy wireless nodes indoors. The object of communication has expanded from human centered communication to the simultaneous communication of things that is so called interconnection of things. Therefore, the design and deployment of 6G networks need to take into account both the deep coverage requirements of people and objects, especially the deep coverage of the ITU scenarios.

3) Holographic Connectivity

VR/AR (Virtual and Augmented Reality) is one of the most important requirements of 6G. High fidelity AR/VR will be ubiquitous, and holographic communication and display can also be carried out at anytime and anywhere so that people can enjoy fully immersed holographic interactive experience at any time and place, that is to realize the communication vision of so-called "holographic connectivity."

4) Ubiquitous Connectivity

The range of activities of the equipment will greatly expand the geographic space of communication access including unmanned detectors deployed in the deep sea or deep space, autonomous robots in the harsh environment intelligent remote control equipment and so on. In addition, with the rapid development of science and technology in the fields of astronautics, deep sea exploration and other fields, and the improvement of survival ability in some extreme natural environments, human activity space is also expanding rapidly.

3. 6G with Satellite Networks

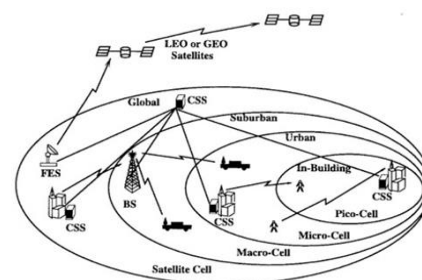


Fig. 1. 6G with satellite networks

6G is proposed to integrate 5G with satellite networks for global coverage. 6G technology is considered to be cheap and Fast Internet Technology which provides very fast Internet speed access on air through wireless and mobile devices

possibly up to 11Gbps, while travelling or in a remote location.

The satellite networks consist of:

- a) Navigation satellite network
- b) Telecommunication satellite networks
- c) Earth imaging satellite networks

To integrate these three kinds of satellite networks to provide network position identifier, multimedia and internet connectivity, and weather information services to the mobile users are key objectives for 6G. Specially designed nano antenna will be implemented at different geographical locations or positions along roadsides, villages, malls, airports, hospitals to broadcast such high speed EM signals.

The globe will be decorated by fly sensors with the help of 6G technology. These fly sensors will provide information to their remote observer stations, further these stations will check any activity upon a special area such as the activity of terrorists, intruders etc.

1) 6G Standards

US military has deployed Global Position System (GPS) many years. European GALILEO, Chinese COMPASS and Russian GLONASS have being developed and deployed by military only and since 5G is migration from 4G which is based on MCCDMA standard, if 6G integrate 5G with these four satellite networks, 6G should have four standards. On the other words, there are four technologies, networks and systems on 6G. Handoff / roaming must happen on space between these four networks and systems and technologies. But how this happens is only under research.

4. 6G Architecture

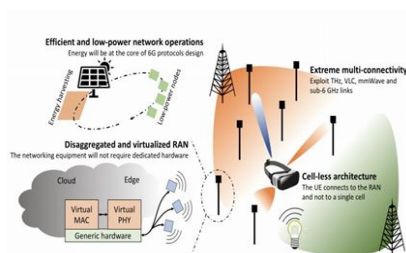


Fig. 2. 6G Architecture

1) Efficient and low power network operations

User terminals and networking equipment will need to be powered with energy sources and given the scale expected in 6G networks, it is necessary to design the system to be more efficient and less energy consuming with respect to current networks. This means that both the circuitry and the communication stack will be developed with energy awareness in mind.

2) Disaggregation and virtualized RAN

6G networks will have an architecture where the units deployed on the ground will contain just the physical antennas and the lowest amount of processing units possible. The virtualization will decrease the cost of networking equipment,

making a massively dense deployment economically feasible.

3) Extreme multi-connectivity

The terahertz and VLC deployments will call for a massive increase in the density of access points, which should be provided with extreme multi-connectivity to their neighbors and the core network.

4) Cell-less Architecture

6G will break the current boundaries of cells, with UEs connected to the network as a whole and not to a single cell. This can be achieved through multi connectivity techniques, and the support for different and heterogeneous radios in the devices. The cell-less network procedures will guarantee a seamless mobility support, without overhead due to handovers and will provide QoS guarantees even in challenging mobility scenarios such as vehicular ones.

5) 3D Network Architecture

The future 6G architectures will provide three-dimensional (3D) coverage, thereby complementing terrestrial infrastructures with non-terrestrial platforms. Moreover, these elements could also be quickly deployed to guarantee seamless service continuity and reliability.

5. 6G Advantages

1. Data rates up to 10-11 gbps.
2. Home automation and other related applications.
3. Smart Homes, Cities and Villages.
4. Space technology and Defence applications will be modified with 6G networks.
5. Home based ATM systems.
6. Satellite to Satellite Communication for the development of mankind.
7. Natural Calamities will be controlled with 6G networks.
8. Sea to Space Communication.

6. 6G Applications

1. It can able to charge your mobile using your own heartbeat.
2. It provides to perceive your grandmother's sugar level with your mobile.
3. It knows the exact time of your child birth that too in nano seconds.
4. The mobile rings according to your mood.

7. Conclusion

The world is trying to become completely wireless, demanding uninterrupted access to information anytime and anywhere with better quality, high speed, increased bandwidth and reduction in cost. After 4G the next generation 5G aims a real wireless world with no limitations while 6G integrates 5G with satellite networks. Due to variable technologies and standards, with 6G handoff/ roaming will be an issue. This drives the 7G of mobile wireless networks which aims to

acquire space roaming.

A new revolution of 6G technology is about to begin because 6G technology will give tough competition to normal computer and laptops whose marketplace value will be affected. There are a lots of improvements from 1G, 2G, 3G, 4G, 5G to 6G in the world of telecommunications. The new coming 6G technology is available in the market in affordable rates, high peak future and much reliability than its preceding technologies.

The 6G system will be implemented in the coming years which are a miracle in the field of communication engineering technology.

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