

Report of 6G Internet Network



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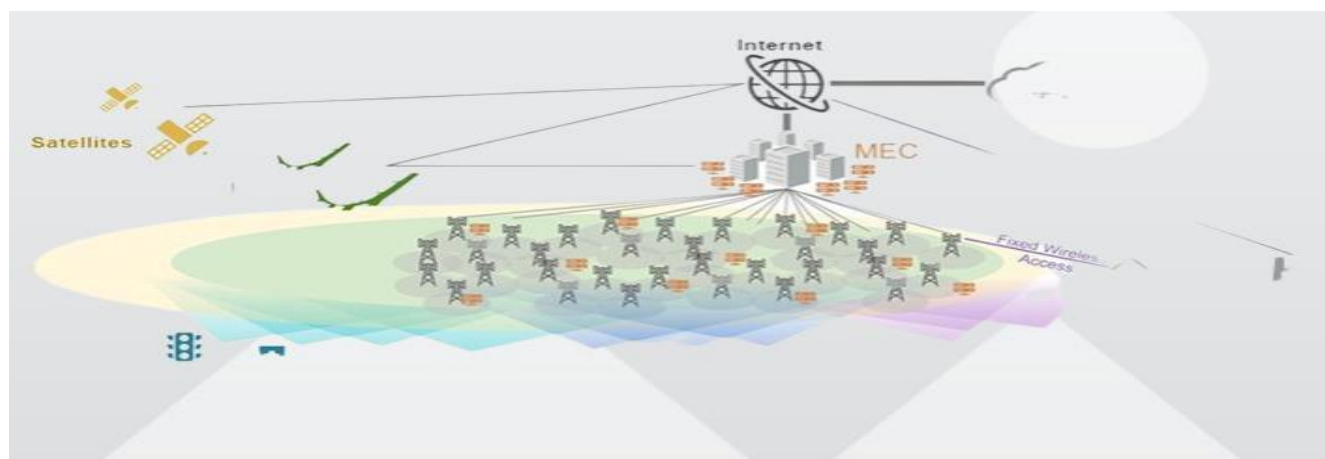
Introduction: Name of 6G internet refers to the Sixth Generation of Wireless Network Communications Technology evaluation of super faster all over the technologies through about year of 2030-2045, used of 5G We already realized the demand pull up 6G internet being deployed today. This super faster technology research journey was begun in the year of 2019. Mainly 6G wireless networking will sensing for changing pull up new Global framework human interstation order and it will used in long distance area, Artificial intelligent (IoT) Technology, Satellite Communication, industrial approached, public safety, Threat detection, Cloud computing, Data center, Global navigation System and it will pull up purpose of as usual required of human needed in the year of about 2030. The 6G internet main rule paly will be the outcome the big change of the global framework and 100 times of the faster world then today. For example, it's easy to understand the today's data transmission speed what we are taking the benefit from the 5G network technology. Technology is upgrading day by day and the world is going to faster and smaller to human's command center what we are accepting today and that we are going to accept in future. In the 6G internet the main problem will be the security, hence the quantum computing will be used in this word, Trust network security and privacy of digital twin 6G Because of in the 6G generation Everything will be the virtual world and that will be accessible

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in any time of analysis and detection. Open interface and environment with multiple stakeholders, Trustworthiness must be assured across devices sub network hit cloud computing and the local computing, data center, Telecom operation, map development and automated loop technology. There security will be the main feature and challenges of technology of trace up.

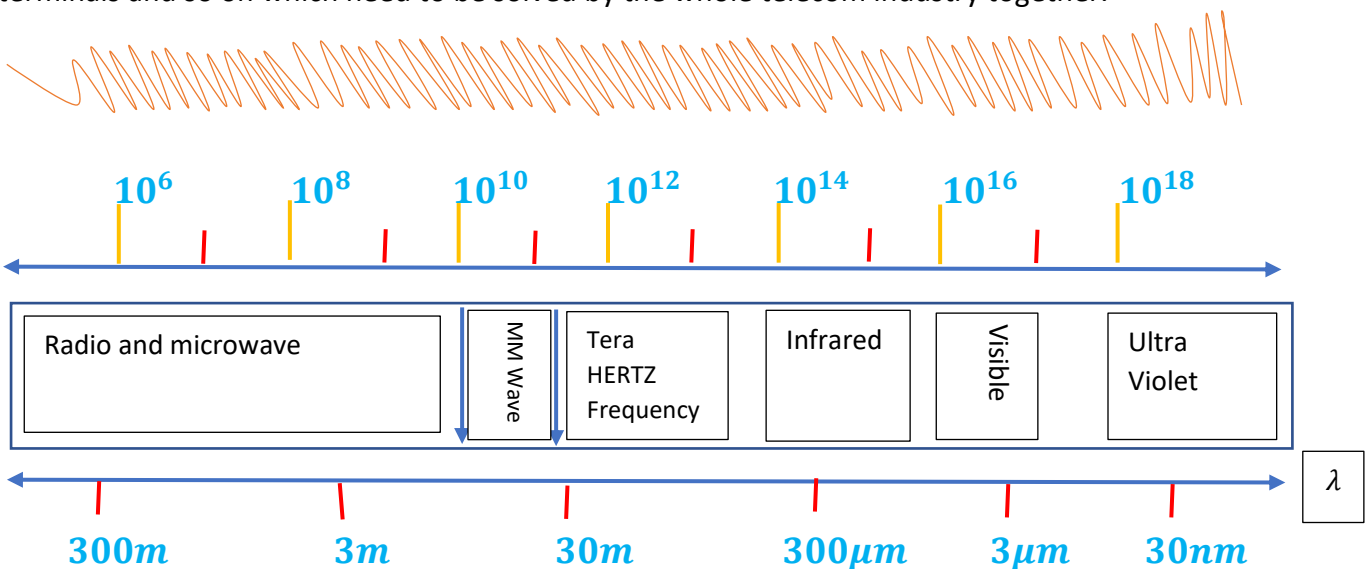
Description: Change of the new Global world order and full fill of the human inter-attraction statics of the year through 2030. As called name of the 6G which is comes from definition of 6 generation internet connectivity. Still now it's on research in the laboratory. The first research start was in Norway. Especially the Research on the work of faster frequency transmission. Work on 6G internet Will be built on the foundation and the new capabilities with start-up a new model. 6G responsibility, capacity and lower latency will work with free application which through of local processing power and together connected with more devices to the frequency. Finally exist of 6G it will be a big evaluation. Six Generation network will be direct satellite connected technology. Configuration of satellite communication connected into 6G devices and same as tools networks signals can switch up any place and any area easily. It will be high super-massive coverage speed network signals. The high massive super speed network will be used in AI configurable tools, Research, global satellite system, weather analytics, DNA analysis and any powerful free connected devices. The capacity of security of ration is high lever response base to receiver under coverage service with no break and brick minimum capacity central response.

❖ **What is the 6G Base Station:** Network Architecture Base stations need Visible installation, High power require cooling, blocking, Today's 6G set-up will be the Centralized configured with



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- ❖ **Terahertz frequency band:** 6G will use the terahertz (THz) frequency band and density of 6G networks find the goal of level. The massive of the frequency user wireless electromagnetic waves, smart devices increase the limited spectrum bandwidth needs more server more terminals. it will enter the higher frequency terahertz frequency band. Terahertz frequency band refers to the frequency band from 100GHz to 10THz, which will be exploited in 6G era. Petty Having wide band width, it has never been used ever before. That means it can be exploited no limitations. However, it is estimated that the terahertz in 6G era will have the same problems as the millimeter wave today. weak capability of covering, high cost of deploying network, the premature ecosystem terminals and so on which need to be solved by the whole telecom industry together.



■ Exclusive Future of 6G:

- **Test Satellite Lunch:** Satellite launch from lower orbit, Stuttgart connector Agenda role. Future Connectivity Fiber, Cellular, LEO Satellites Augmented Reality (AR) Virtual Reality (VR) Tools Things and with people through 2030. The satellite technology will used in very high massive artificial. Two kind satellite technology used one is the infield of artificial intelligent and another is the physical general technology. Used of 6G technology used in place of orbit in the outer of planet in the space. Passive satellites have electracy generating system for equipment or board such solar panels or radioisotope thermoelectric generators. Most satellites also have a method of communication to

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ground station called transponders. Direct service of the Ground to the orbit that's called the (RTGs)

Most of the Technology have a method of communication channel which is the ground and the space communication channel transponders. Many satellites use have to configured their bus channel the most popular is the CubeSats worldwide. Most of the satellite's communications radio actives.

- **Science Research:** Medical industry network channel is the most important for Sequencing the DNA. Identifying Analysis fingerprint, pattern, Determining the order of bases sequencing. Whole o genome sequencing is laboratory procedures that's the under work of Artificial intelligent where thorough needed very powerful internet connection, 6G internet will be the best choose. Mainly Data analysis, Scientists use computer for analysis tools to compare sequences form multiple bacteria and identify differences under the network. It will be more massive good for Upgraded in used of 6G.
- **High Tech Zone:** 6G network communication setup of factory Automation and super stability is the used of key point. Raw infrastructure, critical data visualization, upgraded security and progress work resource allocation problem for an infrastructure-based communication architecture, autonomous vehicles and robots in factory number of channel uses parameterize the reliability and latency in the considered optimization problems.

- **Global of Visions:**

- ✚ PRAN

- ✚ Realtime Data Transmission

- ✚ Direct Satellite Connection

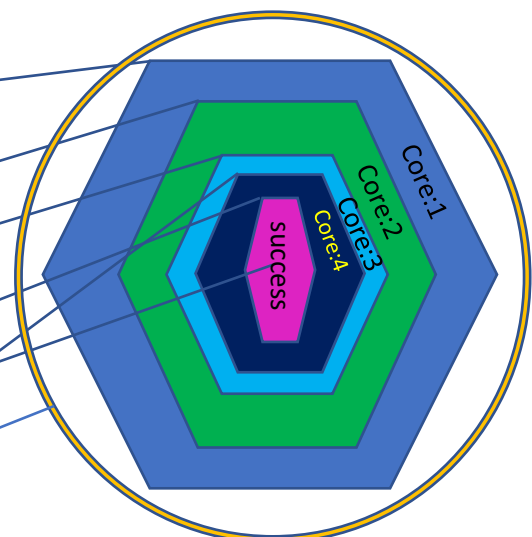
- ✚ Fully direct Connected with Full coverage

- ✚ Position Capabilities

- ✚ Reliable service

Target Fill-up, All about
Business Challenges

Moment of the Horizon 2030-2045 Should be implemented on Argue
Spectrum Above 100GHz, Cyber Security, Zero Touch, Big data and IoT



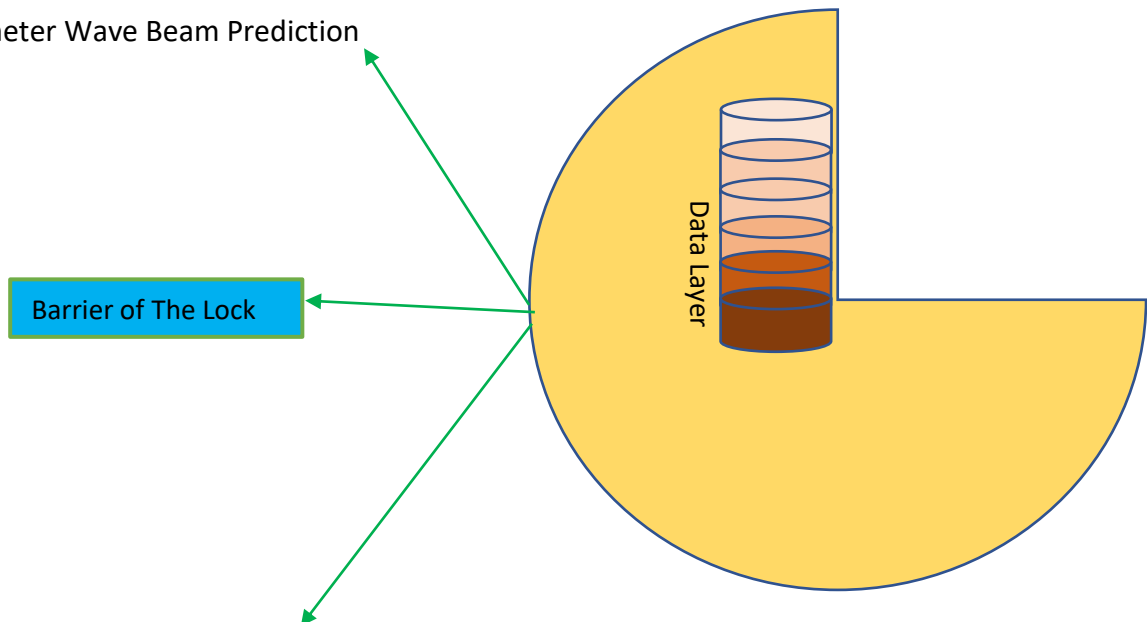
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❖ 6G Security Trust & Layers:

○ IAIS and DC

The super massive tools will be deployed in 6G Layer Security Systems with 100% Trust, Implemented Artificial Intelligent Security with Dynamic Controller which have that Power of Layer.

- 1) Attack on the Devices VIR Applications running on the device
- 2) Automated controlled remote attacks from server or duplicated connected
- 3) Air attack data Exchange and modification and pushing up
- 4) Auto Slower Capability detection
- 5) DND Service
- 6) Connected, Full Controlled with Meta (IAIS)
- 7) Millimeter Wave Beam Prediction

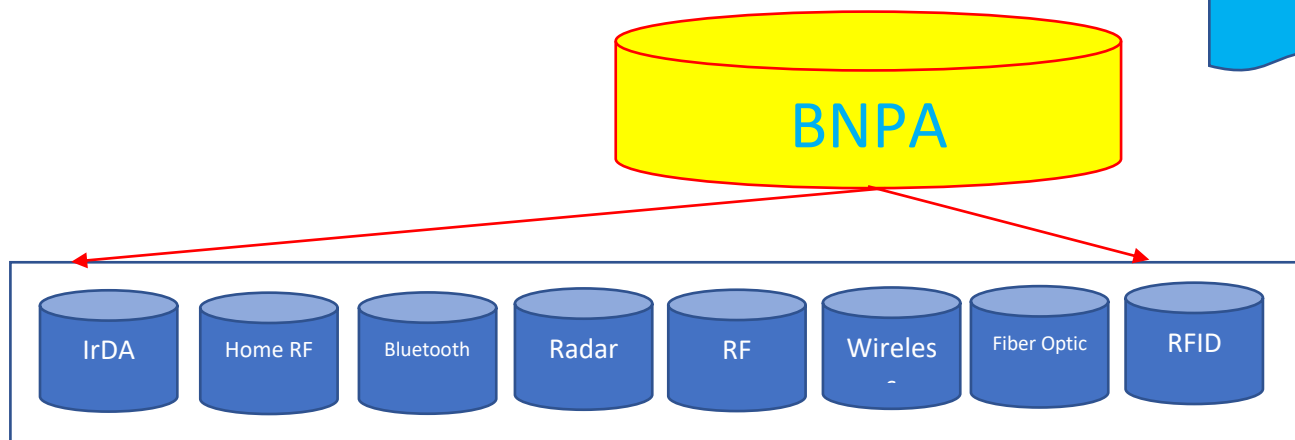


```
1 import warnings
2 warnings.filterwarnings('ignore')
3 # Model running/testing
4 DL_Result={}
5 mse_list = []
6 for id in range(0,num_tot_TX,1):
7     # !!!!! Attack generation !!!!!
8     In_test_adv = fgsm(AP_models[id], In_test,Out_test,num_tot_TX,num_beams,eps)
9     beams_predicted=AP_models[id].predict( In_test_adv, batch_size=10, verbose=0)
10
11     DL_Result['TX'+str(id+1)+'Pred_Beams']=beams_predicted
12     DL_Result['TX'+str(id+1)+'Opt_Beams']=Out_test[:,id*num_beams:(id+1)*num_beams]
13
14     mse = mean_squared_error(Out_test[:,id*num_beams:(id+1)*num_beams],beams_predicted)
15     mse_list.append(mse)
16 print('mse:',np.mean(mse_list))
```

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```
# Model training function
1 def adv_train(In_train, Out_train, In_test, Out_test,
2               nb_epoch, batch_size, dr,
3               num_hidden_layers, nodes_per_layer,
4               loss_fn, n_BS, n_beams, eps):
5
6     in_shp = list(In_train.shape[1:])
7
8     AP_models = []
9     mcp_save = ModelCheckpoint('model.hdf5', save_best_only=True, verbose=0,
10                               monitor='val_mean_squared_error', mode='min')
11
12     for idx in range(0, n_BS*n_beams-2, n_beams):
13         idx_str = str(idx / n_beams + 1)
14         act_func = 'relu'
15         model = Sequential()
16         model.add(Dense(100, input_dim=in_shp[0], activation=act_func))
17         model.add(Dense(100, activation=act_func))
18         model.add(Dense(100, activation=act_func))
19         model.add(Dense(100, activation=act_func))
20         model.add(Dense(n_beams, activation=act_func))
21         model.compile(loss=loss_fn, optimizer='rmsprop',
22 metrics=['mean_squared_error'])
23
24         history = model.fit(In_train,
25                             Out_train[:, idx:idx + n_beams],
26                             batch_size=batch_size,
27                             epochs=nb_epoch,
28                             verbose=0,
29                             validation_data=(In_test, Out_test[:, idx:idx +
30 n_beams]))
31
32         callbacks = [mcp_save]
33         for _ in range(10):
34             In_train_adv = fgsm(model, In_train, Out_train, n_BS, n_beams)
35             In_train_adv = np.concatenate((In_train, In_train_adv), axis=0)
36
37             Out_train_adv = np.concatenate((Out_train, Out_train), axis=0)
38
39             history = model.fit(In_train_adv,
40                                 Out_train_adv[:, idx:idx + n_beams],
41                                 batch_size=batch_size,
42                                 epochs=nb_epoch*3,
43                                 verbose=0,
44                                 callbacks=callbacks,
45                                 validation_data=(In_test, Out_test[:, idx:idx +
46 n_beams]))
47             model.load_weights('model.hdf5')
48
49         AP_models.append(model)
50     return AP_models
```

➤ Benefit of 6G:



The most emulation of R&D might be a bit early and sensing of the main focus autonomous driving and robotics industry. It can continue optimizing industry operations and creating new products and innovations to unlock the metaverse for businesses even beyond just training and digital twins. And certainly, 6G has the potential to merge value chains, existing businesses or even industries.

➤ Artificial Intelligent and Edge Computing:



Work with Artificial intelligent and cooperative with edge cutting nature is a critical infrastructure, hardware, networks and networking, and argumenta software. List of edge cutting with artificial intelligent use of 6G internet.

1. Shifting edge Computing priorities and forecasts edge deployment.
2. Analysis the requirements from both physical and tools services serve
3. Diversify edge computing hardware grows and popularity
4. Networks edge purpose shape and reimaging internet date store ruts
5. Powerful Software development to switch up the ecosystem of network and AI application.

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➤ Large Area High Speed Coverage:

Ultra-fast changes will happen in the tech world. Turned it massive change will be about 10 times of faster than 5G world, up to 100GBPS but it should be possible reach up 1Tbps. Recent server on working America, South Korea and Japan. It will be any level up of connection through any position same coverage with high altitude.

#Loss less Coverage Theory:

$$\gamma \triangleq \sqrt{(R' + j\omega L')(G' + j\omega C')}$$

No loss definition $R' \ll \omega L'$ So then $G' \ll \omega C'$

Propagation constant

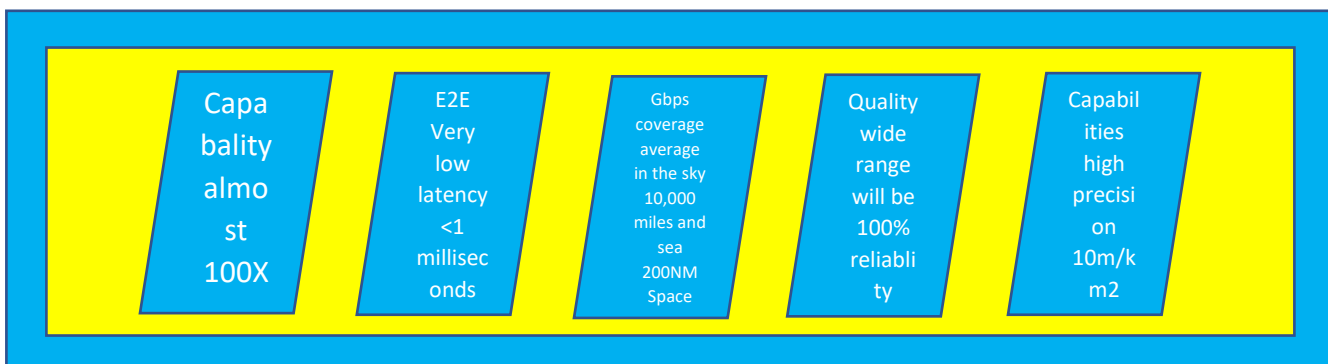
$$\begin{aligned}\gamma &\approx \sqrt{(j\omega L')(j\omega C')} \\ &= \sqrt{-\omega L' C'} \\ &= j\omega \sqrt{L' C'}\end{aligned}$$

Low loss about $\alpha \triangleq \text{Re}\{\gamma\} \approx 0$

$$\beta \triangleq \text{Im}\{\gamma\} \approx \omega \sqrt{L' C'}$$

$$Z_0 = \sqrt{\frac{R' + j\omega L'}{G' + j\omega C'}} \approx \sqrt{\frac{L'}{C'}}$$

Wave Propagates of the space and element of the equivalent circuit model.



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❖ **Problems Risk Register of 6G:** Fully Business and fundamental setting up communication ecosystem as follow vision. Heavy benefit with this technology also has some major problems in the system and environmental configuration.

- ✓ High Speed Open Network with Low configured Layer Security.
- ✓ Visual analysis problem for solve the hybrid IT
- ✓ Hop by hop analysis problems with critical network paths
- ✓ Enhanced Quality of service for end users
- ✓ Network Security low latency, high reliability, wide bandwidth and particular network security.
- ✓ Flexibility, redundancy and self-healing capability

■ 6G key technical indicators

❖ **Measure-Up Key indicators of 6G technology:**

1. Transmission speed reaches 100Gbps-1Tbps, while 5G is only 10Gbps;
2. Positioning accuracy reaches 10 cm, and the outdoor is 1 meter, which is 10 times higher than 5G;
3. Communication delay is 0.1 milliseconds, which is one-tenth of 5G;
4. Interruption is less than one in a million, with ultra-high reliability;
5. Equipment reaches more than one hundred per cubic meter, with ultra-high-density;
6. Terahertz (THz) frequency band for communication, the network capacity is greatly increased.

■ **Model Start-Ups:**

❖ **Robotics:** Throughout the faster world for automation industry and robotics more secure work and human untouchables work will be done by Robotics hence there will be manipulated exclusive faster setup of artificial robots in future, so then think about robotics, autonomous drone industry has a big evaluation in future world work with artificial intelligent. Like Industrial, factories, medical services and online meeting all of these technologies needed more faster mobile internet frequency generation, new and ever more powerful way. Today's hyperconnectivity, the trend toward

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online work and communication flow by technical and geographically both are entirely in the online world depend on faster internet communication. The 6G evaluation will be focus on the how world faster connected with the technology and present mechanism connected to control the billions of machines nano to large exist analog world-future. The 6G will be the standard and perfect for next upgraded generation communication. These two things will divers the world speed and lower latency, where the terabyte speed will exist a minute. The speed will be massive forward performance (THz) Bands from THz to Giga, the delivering a peak data rate will be almost 1000 gigabytes second. Already China working with the 6G internet future as focusing on assisting the customers with successful commercial deployment.

❖ Autonomous Drone industry:

Unmanned vehicles kits on the Telco cloud platform serve the service in outdoor long distance or inside mission. Such as Logistics Surveillances supply, Emergency Response needed. For any deployed services organization with property and land drones cloud essentials tools. Drones Equipped with such as powerful tools and video camera wide efficiently high perform and quick check the security breaches.

❖ Next Generation of 6G view of 7G:

On Going on My research of 7G Up Coming 7G Network is a faster way of communication channel in Globe. While it is a local call or an international call, the fastest way to do work it is high-speed Internet. 7G is a Voice Over Internet Protocol which demands access to any local or international telecommunication more and more in the whole world. 7G Globe vision to provides space roaming at very high data speeds direct satellites connection and navigation etc.

Faster data supply all over in the world is Norway, through about speed provides Norway will be the first country as a 7G deployer.

References:

1. Bruijnzeel, L. A. and Critchley, W. R. S. (1994).
2. Environmental impacts of logging moist tropical forests,
3. Anderson, J., Clement, J. and Crowder, L. V. (1998).
4. Accommodating conflicting interests in forestry – concepts emerging from pluralism. Unasylva, 194 Vol. 49(3), 3–10Google Scholar,
5. Md Mister Ali B.S.C. Computer Science, Bruijnzeel, L. A.
6. Critchley, W. R. S. (1994). Environmental impacts of logging moist tropical forests,
7. Anderson, J., Clement, J. and Crowder, L. V. (1998).
8. Accommodating conflicting interests in forestry – concepts emerging from pluralism. Unasylva, 194 Vol. 49(3), 3–10 Scholar
9. M.R. Abbad, Electric energy systems—an overview, Electric energy systems analysis and operation, CRC Press (2009)
10. Koliou, M. Valles, J. Reneses, R. Hakvoort, Time-based pricing and electricity demand response: existing barriers and next steps, Util Pol, 40 (2016)

Conclusion: “6G” 6-Generation of mobile network frequency is today's most research attraction in the business world still now it's often and independent research. I have carefully insert all the point and parameters with truly and from my research idea, and insert the era of unique combination of post evolutionary research. It has biggest marketing future through digital channel, Artificial intelligent, build most faster world companies to evaluation of their marketing plans, strategies, promotional and their first categories infrastructure to achieved the goal of lead the world. I explore a lot of materials and papers for work with in both fiction and chain writings ideal publication and models. That is prove that it has a meaningful and powerful goal to evaluation in future.