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5G NETWORK- WIRELESS TECHNOLOGY :

The future depends on connectivity. From artificial intelligence and self-driving cars to telemedicine and mixed reality to as yet undreamt technologies, all the things we hope will make our lives easier, safer, and healthier will require high-speed, always on internet connections. To keep up with the explosion of new connected gadgets and vehicles, the mobile industry has introduced something called 5G- Fifth generation of wireless networking technology.

Introduction:

5G is the 5th generation mobile network. It is a new global wireless standard after 1G, 2G, 3G and 4G networks. 5G enables a new kind of network that is designed to connect virtually everyone and everything together including machines, objects and

devices. 5G wireless technology is meant to deliver higher multi - Gbps peak data speeds, ultra low latency, more reliability, massive network capacity, increased availability, and a uniform user experience to more users.

Invention:

No specific company or person owns 5G, but there are several companies within the mobile ecosystem that are contributing to bring 5G to life. Qualcomm has played a major role in inventing many foundational technologies that drive industry forward. We're at the heart of the 3rd generation partnership project (3GPP), the industry organization that defines the global specifications for 3G UMTS, LTE and 5G technologies.

Previous generations of mobile networks:

- First generation-1G

1980's : 1G delivered analog voice.

- Second Generation-2G

Early 1990's : 2G introduced digital voice (e.g. CDMA- Code Division Multiple Access)

- Third Generation-3G

Early 2000s : 3G brought mobile data(e.g. CDMA 2000)

- Fourth Generation-4G

2010's : 4G LTE ushered in the era of mobile broadband.

- 5G is a unified, more capable air interface. It has been designed with an extended capacity to enable next generation user experiences, empower new deployment models and deliver new services.

Where is 5G being used?

Broadly speaking, 5G is used across three main types of connected services.

1.Enhanced Mobile Broadband (eMBB):

It aims to service more densely populated metropolitan centers with downlink speeds approaching 1Gbps indoors, and 300 Mbps outdoors. In addition to making our smartphones better 5G mobile technology can usher in new immersive experiences such as VR and AR with faster, more uniform data rates, lower latency and lower cost per bit.

2.Massive Critical communications :

5G can enable new services that can transform industries with ultra-reliable, available, low latency links like remote control of critical infrastructure, vehicles and medical procedures.

3.Massive Internet of things :

5G is meant to seamlessly connect a massive number of embedded sensors in virtually everything through the ability to scale down in data rates, power and mobility providing extremely lean and low-cost connectivity solutions.

How 5G works?

As any other cellular networks will consist of cells divided into sectors and send data through radio waves . Each cell is connected to a network backbone through a wired or wireless connection. 5G may transmit data over the frequencies currently used for Wi-Fi. It promises a smarter, faster and efficient network. The goal of 5G is to have far higher speeds available at higher capacity per sector and at far lower latency than 4G. In order to increase network efficiency, the cell is subdivided into micro and pico cells. 5G will be a new mobile revolution as it is expected to provide gigabit-per-second data rates anytime, anywhere.

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5G Technology has the following advanced features:

- Architecture will be device-centric, distributed, programmable and cloud based.
- High data rates.
- One to 10 Gbps connections to end points
- One millisecond end-to-end round trip delay.

Potencial applications:
Some of the significant applications of 5G wireless technologies include:

- Virtual reality/augmented reality
- Autonomous driving/connected cars
- Wireless cloud-based office/multiple-person videoconferencing
- Unified global standard for all
- Network availability
- Blockchain
- 3D and ultra HD videos
- Smart grid
- Mobile security

5 major players in 5G wireless:

1. China mobile
2. Verizon
3. Arm limited
4. Huawei
5. Reliance Jio

The World's biggest 5G use case:
One of the hallmarks of China Mobile's C-RAN cell site architecture is the total eliminate of the on-site base band unit (BBT) precessors, which were typically co-located with the site's radio head. That functionality is instead virtualized and moved to a centralized cloud platform, for which multiple BBU'S control systems share tenancy, in what's called the baseband pool. The cloud data center is powered and cooled independently, and linked to each of the base stations by no greater than 40km of fiber optic cable.
5G Tower:
5G will bring ultrafast speeds, greater capacity and ultra low latency characteristics that will allow mobile networks to offer connectivity reliable enough to support critical applications for the first time. This has placed a focus on the 5G tower technology that operators have to install to deliver 5G.
5G networks will be powered by cloud-based cores that allow physical functions to be virtualized and moved around the network. Software upgrades will make it easier to roll out new features. To deliver this, new technology must be installed on 5G towers.
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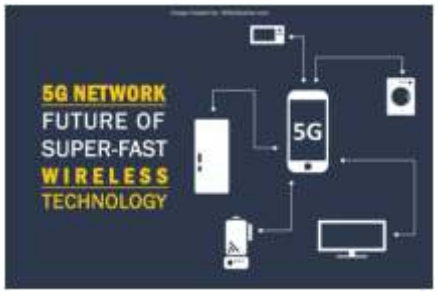

PERSEVERANCE ROVER

1} Information about Perseverance Rover:

Perseverance is a car-sized Mars rover designed to explore the crater Jezero on Mars as part of NASA's Mars 2k20 mission. It was manufactured by the Jet Propulsion Laboratory and was launched on 30th July 2k20, at 11:50 UST. Confirmation that the rover successfully landed on Mars was received on 18th February 2k21, at 20:55 UST. As of 10th July 2k21, Perseverance has been active on Mars for 138 sols (142 days on earth) since its landing.

This Rover has four main objectives that supports the Mars Exploration Program's science goals:

1] Looking for habitability- identifying past environmental conditions.
2] Seeking biosignatures- seeking the signs of past microbial life, particularly in specific rock types.
3] Caching samples- collecting core rocks and soil samples.
4]Preparing for humans- test oxygen production from the Martian atmosphere.

2} The Rover's Body:

The Perseverance rover's body is called the warm electronics box, or "WEB" in short. Like a car body, the rover's body is strong whose outer layer protects the rover's computer and electronics materials. The warm electronics box is closed on the top by a piece called the Rover Equipment Deck. The Rover Equipment Deck makes the rover like a convertible car, allowing a place for the rover mast and cameras to sit out in the Martian air, taking pictures with a clear view of the terrain as the rover travels. Perseverance has a new science and technology toolbox. The main difference of this rover is that, it has a new coring drill to collect samples from the Martian land. The samples are then sealed in tubes and placed on the surface of Mars. Perseverance has a combination of the larger instrument suite, new sampling and caching system, along with narrow wheels.

3} Tech Specs :-

1]Main job- Carry and protect the computer, electronic and instrument system.
2] Length- 10 feet (3 meters)
3] Width- 9 feet (2.7 meters)
4] Height- 7 feet (2.2 meters)
5] Mass- 2,260 pounds/1,205 kg.
6] Diameter- 8 feet (2.7 meters)
7] Power- 110 W (0.15 hp)

4} Why is it called Perseverance:

Considering the pandemic situation, it was named Perseverance as it's name defines 'the continued efforts to do or achieve something despite of difficulties, failure or opposition.' The robot was not named for the special theological meaning (OED: to continue until death in a state of grace), but they stated it in another sense- of remaining loyal, rather than going rogue in space, which seemed to be successful in a well defined manner.

5} Flight history:

1] Launch date- 30th July 2020, 11:50:00 UTC.
2] Launch site- Cape Canaveral, SLC-41.
3] Landing date- 18th February 2021, 20:55:00 UTC.
4] Landing site- 18.4447degree N – 77.4508degree E, Octavia E. Butler Landing, Jezero.
5] Total hours- 3392 hours since landing
6]Distance travelled- 1.44 km (0.89 mi) as of 9th July 2021.

6} How does NASA controls Perseverance Rover?

NASA's Perseverance Rover made a history by successfully landing on the red planet, nearly 7 months after its take-off. This Mars mission valued $3 billion which is controlled by an Indian-origin scientist Prof. Sanjeev Gupta. Prof. Gupta accompanied by a team of nearly 400 scientists who direct the rover to drill the samples on Mars. When NASA landed its Mars rover Perseverance on the Martian surface, it was an Indian-American team who handles the control and landing system. Swati Mohan spearheaded the altitude control and landing system that navigated a touchdown. It is first trek of the agency's largest&most advanced rover sent on the red planet which marks a major milestone in history.

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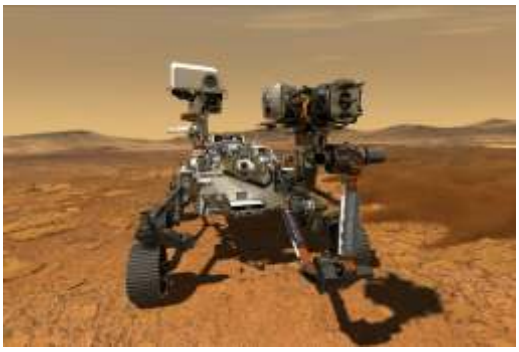

MIRRORLESS CAMERA

A mirrorless interchangeablelens camera (MILC) or simply mirrorless camera, also called digital singlelens mirrorless (DSLM) or electronic viewfinder interchangeable lens (EVIL) camera, is a photo camera featuring a single, removable lens and a digital display. The camera does not have a reflex mirror or optical viewfinder like a digital singlelens reflex (DSLR) camera. Many mirrorless cameras retain a mechanical shutter. Like a DSLR, a mirrorless camera accepts any of a series of interchangeable lenses compatible with its lens mount.

Compared to DSLR cameras, mirrorless cameras are mechanically simpler and are typically smaller, lighter, and quieter due to the elimination of the moving mirror. While nearly all mirrorless cameras still have a mechanical shutter, many also have an electronic shutter, allowing completely silent operation.

Until the mid 2010s mirrorless cameras were somewhat challenged to provide an electronic viewfinder with the clarity and lowlag responsiveness of the optical viewfinders used on DSLRs, especially under strong sunlight or when photographing the sky at night. The fact that the image from the lens is always projected onto the image sensor allows for features that are only available in DSLRs when their mirror is locked up into "live view" mode. This includes the ability to show a focuspeaking display, zebra patterning, and face or eye tracking. Moreover, the electronic viewfinder can provide live depth of field preview, can show a poorlyilluminated subject how it would look with correct exposure in real time, and makes it easier to view the results of an exposure in bright sunlight.

With the latest phasedetect autofocus available on some mirrorless cameras, the autofocus speed and accuracy of some models has been shown to be as good as DSLRs. But compared with DSLRs, mirrorless cameras have shorter battery life (due to prolonged use of LCD and/or OLED displays, necessary for the viewfinder) and often smaller buffers (to save battery). Onsensor autofocus is free of the adjustment requirements of the indirect focusing system of the DSLR (which relies on a separate autofocus sensor located below the reflex mirror), and the latest mirrorless cameras can shoot with phasedetect autofocus at up to 20 frames per second using up to 693 focus points—a number far exceeding what is available on any DSLR. However, onsensor phase detection autofocus (except for Canon`s Dual Pixel Autofocus) repurposes pixel sites for autofocus acquisition, meaning image data is partially or entirely missing for the autofocus "pixels". This can result in banding artifacts in the final image.

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