Millimeter Wave Transceiver

Why in News?

Recently, Centre for Development of Telematics (C-DOT) has signed an agreement with the **Indian Institute of Technology-Roorkee (IIT-Roorkee)** for the development of a "Millimeter Wave Transceiver for 5G rural connectivity".

Key Points

- **Millimeter Wave Backhaul Technology Project:**
  - It aims to **develop millimeter wave backhaul technology for improved 5G connectivity,** particularly in rural areas.
    - A limited number of **small cell-based stations (SBSs)** will be connected to the network gateway through fiber, reducing infrastructure needs.
  - The transceiver development will use a **combined optical and millimeter wave approach.**
    - It is expected to **reduce the overall size and cost of the technology**, making it more efficient and affordable.
  - It **aims to reduce India's reliance on international** semiconductor **fabrication industries,** bolstering self-reliance.
  - It will **contribute to generating** Intellectual Property Rights (IPRs) and **developing a skilled workforce** in millimeter wave and Sub-THz technology, preparing for advancements in 5G **and** 6G.
- **Support for Local Industry and Employment:**
  - The project **encourages small and medium-scale industries** to establish manufacturing units in India, especially in **polymer-based and metal-integrated structures.**
  - Increased **local manufacturing will create job opportunities** for Indian engineering graduates.
- **Funding Support under TTDF Scheme:**
  - The agreement is signed under **the Department of** Telecommunications' Telecom Technology Development Fund (TTDF) scheme.
  - TTDF is **designed to fund Indian startups, academia, and R&D institutions, supporting the domestic development and commercialization** of telecom products and solutions.

Millimeter Wave

- **About:**
  - It is a wireless communication technology that **uses high-frequency radio waves to transmit data.**
  - Millimeter waves have a **frequency range of 30–300 GHz, and a wavelength range of 1–10 millimeters.**
- **Uses:**
  - **5G**: Millimeter waves are **used in 5G to provide high-speed,** increased bandwidth communications.
  - **Explosive detection**: Millimeter waves **can pass through clothing** and reflect off of the

body, allowing **imaging systems to detect concealed objects.**
    - **Other applications**: Millimeter waves can be used for **business and residential broadband access, campus area networks, outdoor Wi-Fi hotspots,** and more.

Centre for Development of Telematics (C-DOT)

- It was **established in 1984**. It is an **autonomous Telecom R&D (Research and Development) centre of DoT (Department of Telecom),** Ministry of Communications.
- It is a **registered society under the** Societies Registration Act,1860.
- It is a registered public-funded research institution with the **Department of Scientific and Industrial Research (DSIR),** Ministry of Science and Technology.