ECC 203 : Electromagnetics and Radiating Systems

Introduction

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Gowrish Basavarajappa

- B.E : BIT, Bengaluru – VTU, Karnataka (GATE – AIR 4)
- M.Tech : IIT Delhi (RF and Microwave Engineering) – 2013
- Systems Engineer : Cypress Semiconductors – 2014
  - Antennas
- Scientist / Engineer : ISRO – 2017
  - Band Pass Filters (BPF)
- Ph.D. : University of Waterloo, Canada
  Tunable BPF for Communication Systems – (2021)
- Publications – 59 (Journals : 28, Conferences : 31)
- Patents – 2 (US - Granted), 2 (Indian – Patent Granted and 1 ToT), 3 Applied
- Awards
  - IEEE SPACE Best Paper Award – 2024
  - IEEE WAMS Young Professional Excellence Award – 2023
  - RIDE Young Scientist Award – 2022
  - IEEE IMS Best Advanced Paper Award 2019, Boston
  - IETE Journal Award 2016 and 2018
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Gowrish Basavarajappa

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4 July 2024

No Release Found

Special Service and Features

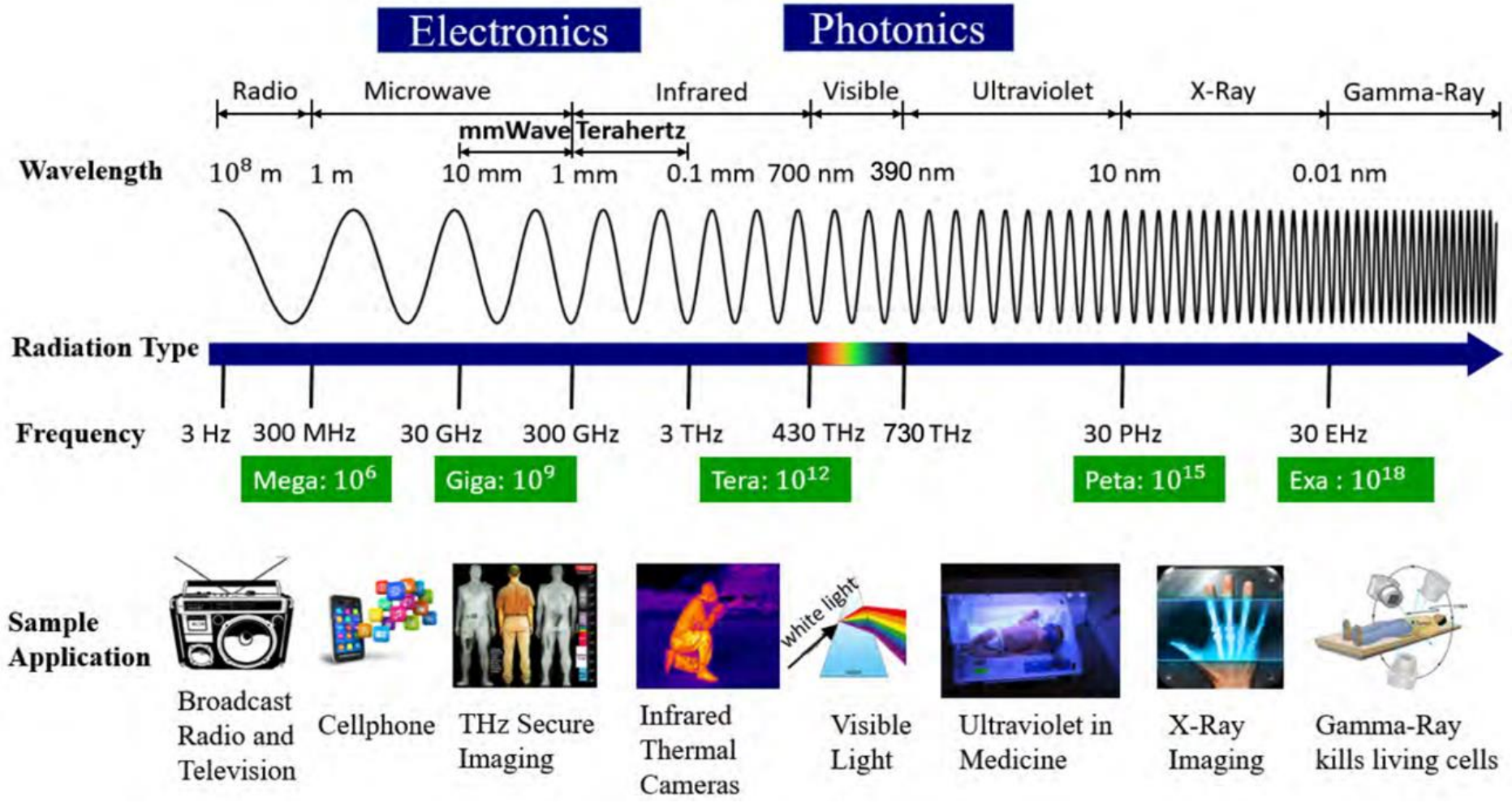
IIT Roorkee and Rapid Parts Solutions (OPC) Private Limited, have signed a Technology Transfer Agreement on the technology entitled “A scalable balun filter”

Posted On: 21 MAY 2024 4:04PM by PIB Chennai

Indian Institute of Technology, Roorkee (IIT Roorkee) and Rapid Parts Solutions (OPC) Private Limited, India, have signed a Technology Transfer Agreement on the technology that has been developed at IIT Roorkee by Faculty Prof.Gowrish Basavarajappa, entitled “A scalable balun filter” with application number 202211022250 and Patent no. 510886.

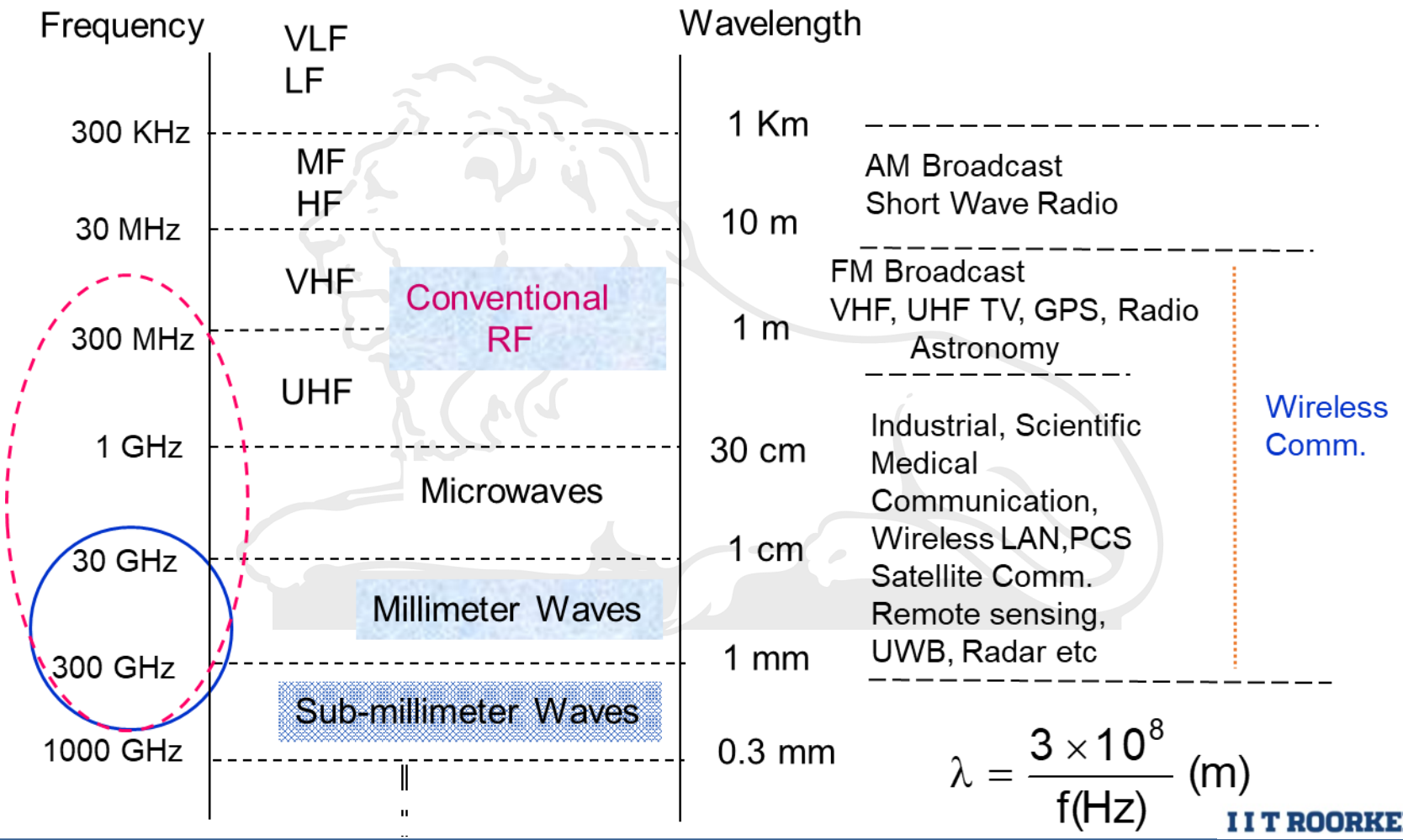
Applications of Electromagnetics

The electromagnetic spectrum, and various applications as a function of frequency

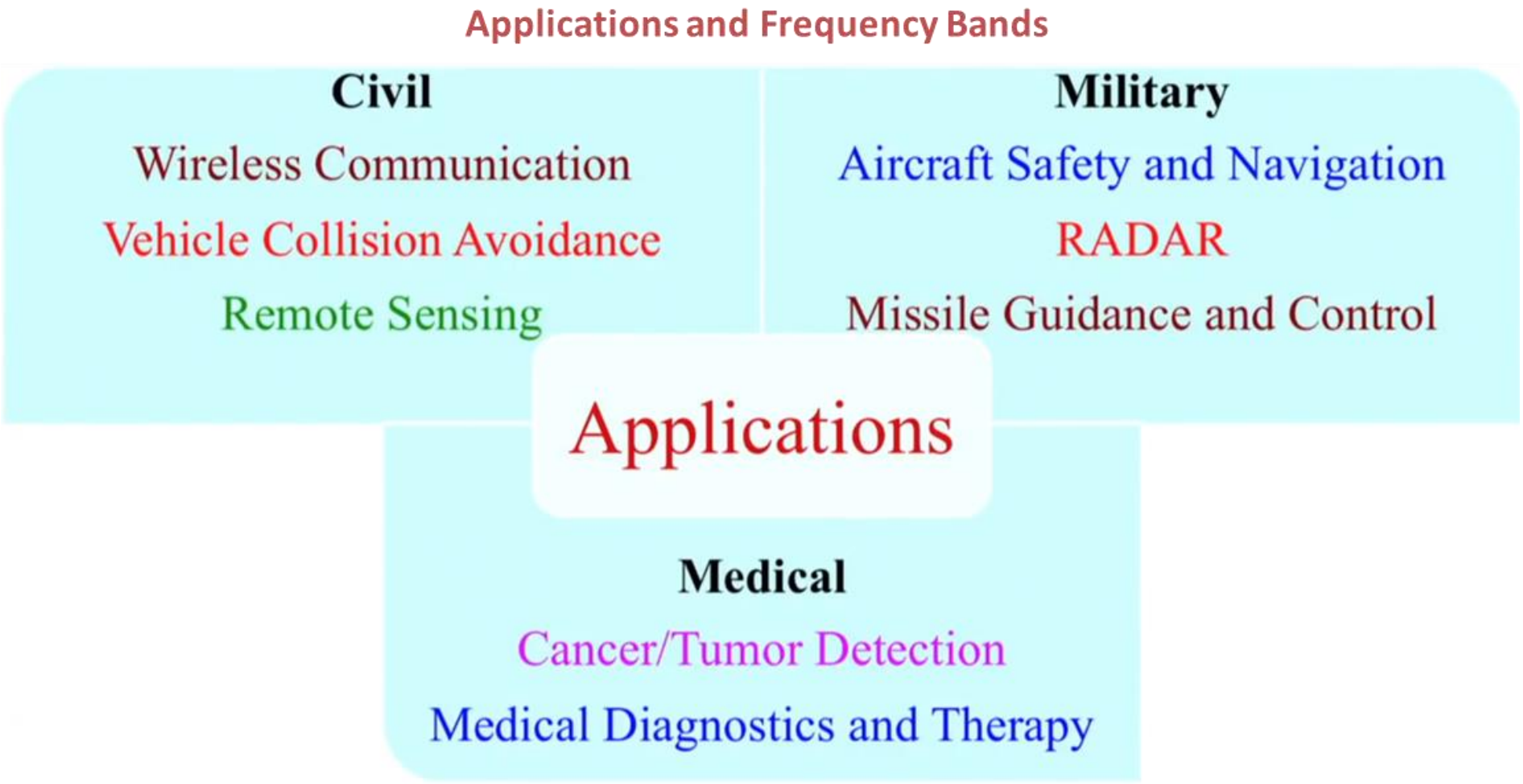


Applications of Electromagnetics

The Electromagnetic Spectrum



Applications of Electromagnetics



Applications of Electromagnetics

- ***All RF and Microwave wireless communication systems employ one or more antennas, TR Modules, Filters etc.***

- ***Mobile handset***
- ***Example : Samsung Galaxy S8***

https://spectrum.ieee.org/building-smartphone-antennas-that-play-nice-together

Applications of Electromagnetics

- ***Wireless HID (Human Interface Devices)***

- ***Wireless Mouse, Keyboard, Remotes***

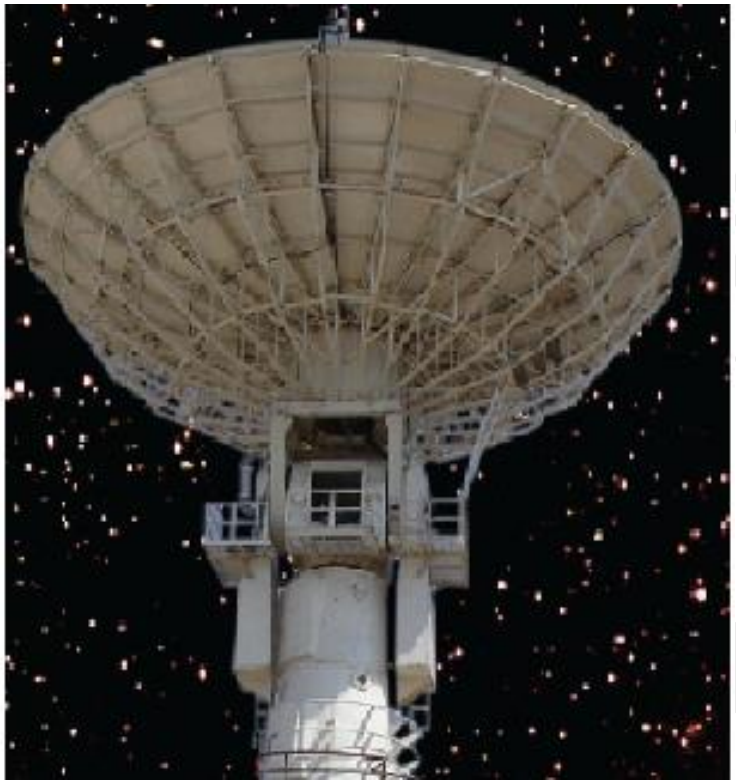
https://mods-n-hacks.gadgethacks.com/how-to/hack-your-old-computer-mouse-into-retro-wireless-bluetooth-mouse-0138759/
https://www.oscium.com/blog/explore-hp-link-5-wireless-keyboard

Applications of Electromagnetics

- ***Wi-Fi Router, DTH, Base Station,***

Applications of Electromagnetics

- ***Radar Systems, Satellite Ground Station***

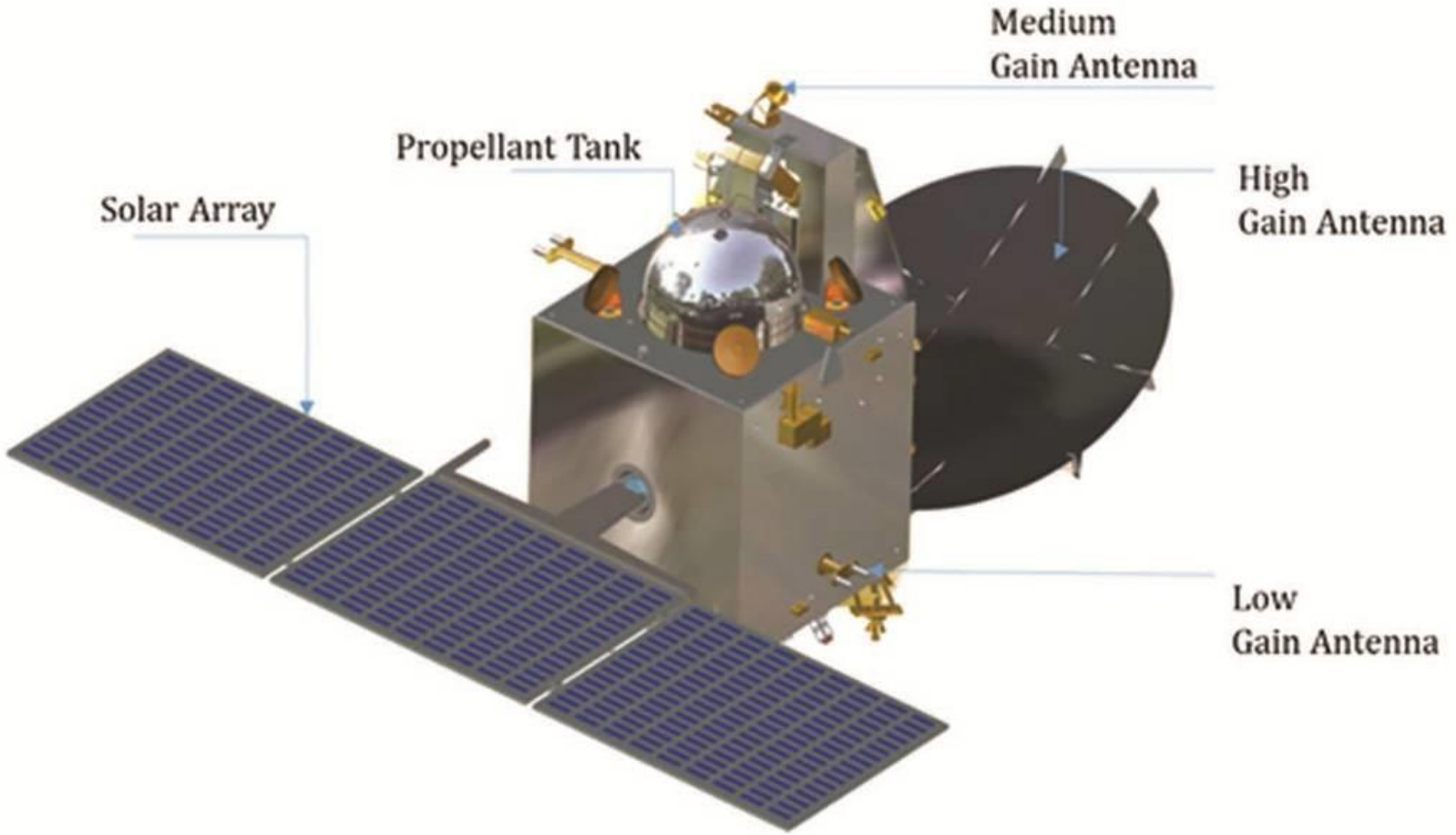


https://www.isro.gov.in/isro-telemetry-tracking-and-command-network-istrac-supports-astrosat-mission

https://en.wikipedia.org/wiki/Radar

Applications of Electromagnetics

- ***Satellite***



https://www.isro.gov.in/Spacecraft/mars-orbiter-mission-spacecraft

Applications of Antenna

- **Companies : Mobile Antenna**

SAMSUNG

LG mobile

ONEPLUS

Applications of Antenna

- **Companies : HID**

NORDIC®
SEMICONDUCTOR

TEXAS
INSTRUMENTS

ANALOG
DEVICES

Applications of Antenna

- **Companies : Base Station**

Applications of Antenna

- **Companies : Defense and Aero-Space**

Course Structure

- **Pre-requisite**

  Vector analysis, Electrostatics, and Magnetostatics are a must (will not be covered in the course)

- **Content Weightage**

1.	Maxwell Equations	→	5
2.	Plane Wave Propagation	→	15
3.	Transmission Lines	→	40
4.	Antenna and Array	→	40

Course Structure

- **Structure**
  - 4 Credit course : 3 Theory + 1 Tutorial (and Simulation)

  - **Examination**
  - CWS : 25 (1 or 2 Quiz)
  - MTE : 25
  - ETE : 50

  - **CAD Tools**
  - Demonstration of Antenna Parameters → CST (3D EM CAD Tool)
  - Demonstration of Waveguide Parameters → HFSS (3D EM CAD Tool)
  - Demonstration of TL Parameters → ADS (Circuit Schematic CAD Tool)

References

References

- M. N. O. Sadiku, “Elements of Electromagnetics,” Oxford University Press, Seventh edition
- N. N. Rao, “Elements of Engineering Electromagnetics,” Illinois ECE Series, Sixth edition
- W. H. Hayt Jr. and J. A. Buck, “Engineering Electromagnetics,” McGraw Hills, Eight edition
- E. C. Jordan and K. G. Balmain, “Electromagnetic Waves and Radiating Systems,” Prentice-Hall, Inc., Second edition
- C. A. Balanis, “Antenna Theory,” Wiley, Fourth edition

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Thank You

Questions?