NARAYANA ENGINEERING COLLEGE::NELLORE

AUTONOMOUS

Department of Electronics & Communication Engineering

A Report on

Industrial Visit to National Atmospheric Research Laboratory (NARL)

Department of ECE organized an Industrial Visit to "National Atmospheric Research Laboratory (NARL), Gadanki" on 03-02-2023 for III ECE - B students. Total of 48 students along with 2 staffs attended the visit. S. V. Chandrakanth, Scientist/Engineer - SC Coordinated the entire visit.

NARL is an autonomous research laboratory fully funded by the department of space, government of India and involved in carrying out fundamental and applied research in atmospheric and space sciences.

Explaining about various activities performing @NARL

NARL at Gadanki near Tirupati is an autonomous society supported by Department of Space. NARL regularly operates state-of-the-art MST radar, Rayleigh / Mie Lidar, Boundary Layer Lidar, Sodium Lidar, Lower Atmospheric Wind Profiler, Sodar, Disdrometer.

The technical information provided by the NARL team is so informative and upgraded the students with Radar Technology, Optical Rain Gauge, Dual frequency GPS receiver, Automatic Weather Station apart from regular launching of the GPS balloon sonde etc.

NARL mainly concentrate on the atmospheric changes in the various layers of atmosphere like troposphere, stratosphere, mesosphere and ionosphere. They have nearly 20 types of RADARS to observe these changes. The main motto of this laboratory is weather prediction. They predict the future values of weather based on the initial values of weather like humidity, pressure, temperature of that day.

MST RADAR is behind the main seminar hall of NARL where large number of dipole antennas and yagi-uda antennas are placed. Nearly thousands of antennas are placed over there out of which every 16 antennas are grouped into one block. This MST radar ,in particular gives us the information regarding mesosphere, stratosphere and troposphere.

MST Radar

Explaining about MST Radar

The automatic weather station consisting of 5 sensors and tipping bucket rain guage is installed at NARL. The sensors measure pressure, temperature, humidity, wind speed and wind direction. Except the pressure sensor and the rain gauge, the other sensors are mounted on a 3-m tower. Temperature compensated piezo-resistive pressure sensor is used to measure the pressure with a resolution of 0.1 mb. For humidity measurement, a thin film capacitance sensor is used which provides an accuracy of ± 3%. RTD type sensor is used to measure temperature with a resolution of 0.1o C. 3-cup rotor type sensor is used to measure wind speed with an accuracy of ± 1%. Potentiometer type sensor is used to measure the wind direction with a resolution of < 1o. A tipping bucket rain gauge provides rain rate information with a resolution of 0.5 mm.

The total RAM of the super computer is 2.3TB which was amazing. Every day they are storing atleast 500 GB of data regarding weather prediction values. This is the reason why NARL has data storage center. In data storage center they have weather predicted reports from last four years to till date. Out of which primary and secondary

storage is there, newly predicted weather values are stored in primary storage made up of semiconductor and old values are stored in secondary storage made up of magnetic tapes.

Explaining about automatic weather station

The following are the Highlights of the visit

- Students got witnessed the bird eye view of NARL campus, MST Radar, HF Radar, Rain Radar, X-Band Radar, Radar Electronics laboratory
- Students visited High performance computer lab, LIDAR (laser Radar) lab ,L-band Radar lab, Sodar lab

Imapct Analysis:

- The Students gained practical exposure on signal processing, antennas and Radars to enhance their knowledge in respective course and get excellent results in their curriculum.
- The Students Gained better practical exposure on Radar Systems.

PHOTOS

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