**Industrial Visit Report**

Submitted in Partial Fulfillment of requirements for the Award of

Degree of Bachelor of Technology in Computer Science and Engineering

Submitted by

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Submitted To



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**List of Industries Visited**

1. Indian Space research Organization (ISRO)
   * Location: Satellite Rd, Satellite, Ahmedabad, Gujarat 380015
   * Date of Visit: 11 October, 2023
2. [eInfochips (An Arrow Company)](https://www.linkedin.com/company/einfochips?trk=public_post-text" \t "_self)
   * Location: 4G34+4FC, Ratna building, eInfochips Rd, Ahmedabad, Gujarat 380060
   * Date of Visit: 8 February, 2024
3. Sahajanand Laser Technology Ltd.
   * Location:  E-30, GIDC Electronic Estate, Sector 26, Gandhinagar, Gujarat 382028
   * Date of Visit: 12 March, 2024

**Introduction**

The purpose of this report is to document and reflect upon the experiences and insights gained during the industrial visit. It aims to provide a comprehensive overview of the company's operations, work culture, and industry practices observed during the visit. Additionally, this report highlights the practical knowledge acquired, the skills developed, and the relevance of this visit to future professional growth. By analyzing the outcomes of this experience, the report seeks to establish a connection between theoretical learning and real-world industry applications, thereby enhancing the overall educational experience.

Industrial visits are highly significant in the context of computer science engineering program. They offer valuable practical exposure that complements the theoretical knowledge gained in the classroom. Through these visits, I was able to observe and understand the real-world application of various concepts and technologies.

These visits provided insights into the operational environment of technology companies, including their development processes, project management practices, and the implementation of both software and hardware solutions. Interacting with industry professionals allowed me to learn about current industry trends, emerging technologies, and best practices that are not always covered in academic settings.

Moreover, industrial visits offer excellent networking opportunities, enabling me to connect with potential future employers and mentors. This practical experience bridges the gap between theoretical learning and real-world application, enhancing my overall understanding of the field and better preparing me for my future career in computer science.

**Objectives of the Industrial Visits:**

**1. ISRO Space Applications Centre (SAC), Ahmedabad:**

* **Objective 1:** To gain a comprehensive understanding of the satellite development process, from design to deployment.
* **Objective 2:** To explore the advanced technologies and methodologies used in space research and satellite communication.
* **Objective 3:** To observe the testing facilities and learn about the quality assurance processes for space missions.
* **Objective 4:** To connect theoretical knowledge of satellite technology with practical, real-world applications.

**2. eInfochips (an Arrow company):**

* **Objective 1:** To understand the development process of embedded systems and the role of product engineering in technology innovation.
* **Objective 2:** To explore the integration of IoT and cloud-based solutions in modern technology applications.
* **Objective 3:** To observe the end-to-end product development lifecycle, from design to deployment.
* **Objective 4:** To gain insights into the practical applications of computer science concepts, particularly in the areas of embedded systems, IoT, and digital transformation.

**3. Sahjanand Laser Technology Ltd.:**

* **Objective 1:** To observe the operation of advanced laser cutting and marking machines used in various industrial applications.
* **Objective 2:** To understand the role of laser technology in modern manufacturing and product customization.
* **Objective 3:** To explore the technological innovations and automation processes implemented in laser technology.
* **Objective 4:** To connect academic knowledge of technology and engineering with practical applications in the manufacturing sector.

**Description of the Industries**

1. Indian Space research Organization (ISRO)

ISRO Space Applications Centre (SAC) is a prominent research and development center located in Ahmedabad, Gujarat, India. It is a part of the Indian Space Research Organization (ISRO), one of the world’s leading space agencies.

**Brief History :** It Established in 1972, SAC was initially set up to cater to the space applications and satellite technology needs of India. Over the decades, SAC has evolved into a key player in the development of satellite systems and technologies for various applications, including communication, earth observation, and space exploration. The center has played a crucial role in advancing India's space capabilities and supporting the country's space missions.

**Products or Services Offered:** SAC specializes in the design, development, and testing of satellite systems and payloads. The center focuses on:

* **Satellite Design and Development:** Creating communication satellites, earth observation satellites, and scientific satellites.
* **Payload Integration:** Developing payloads for various applications such as remote sensing, telecommunication, and meteorology.
* **Mission Operations:** Supporting satellite launch and operation phases to ensure successful mission execution.
* **Technology Research:** Innovating and improving technologies related to satellite communication, data processing, and space science.

**Role in the Market :**

SAC plays a pivotal role in the space sector by advancing satellite technology and supporting various national and international space missions. Its contributions are essential for India’s space program, enabling advancements in communication, weather forecasting, disaster management, and resource monitoring. The center's work supports not only space exploration but also applications that impact everyday life, such as broadcasting and telecommunication.

**Unique Features or Technologies Observed:** During the visit, several unique features and technologies were observed, including:

* **Advanced Satellite Systems:** The development of sophisticated satellites with high-resolution imaging capabilities and enhanced communication features.
* **Integrated Payload Technologies:** Innovations in payload design for diverse applications, including state-of-the-art sensors and instruments.
* **Space Mission Support Facilities:** Cutting-edge facilities for satellite testing, integration, and launch preparations, demonstrating ISRO’s commitment to precision and reliability in space missions.

1. eInfochips - An arrow company

eInfochips, a part of Arrow Electronics, is a global technology company headquartered in Ahmedabad, Gujarat, India. It operates as a leading provider of technology solutions and services.

**Brief History:** It Founded in 1994, eInfochips has evolved into a prominent player in the technology sector, specializing in embedded systems, product engineering, and digital transformation services. The company became part of Arrow Electronics in 2018, which further expanded its global reach and capabilities. eInfochips has a strong track record of delivering innovative technology solutions across various industries, including healthcare, automotive, and telecommunications.

**Products or Services Offered:** eInfochips offers a wide range of products and services, including:

* **Embedded Systems Development:** Design and development of embedded systems for various applications, such as consumer electronics, industrial automation, and medical devices.
* **Product Engineering:** Comprehensive engineering services, including hardware design, software development, and system integration for technology products.
* **Digital Transformation Solutions:** Services related to IoT (Internet of Things), cloud computing, and data analytics to drive digital transformation for businesses.
* **Consulting and Support:** Technology consulting, project management, and support services to assist clients in implementing and managing complex technology solutions.

**Role in the Market :**

eInfochips plays a critical role in the technology and electronics sector by providing end-to-end solutions that drive innovation and efficiency. Its expertise in embedded systems and product engineering supports the development of cutting-edge technology products and solutions for a wide range of industries. The company’s contributions to digital transformation help businesses leverage emerging technologies to enhance their operations and competitive edge.

**Unique Features or Technologies Observed:** During the visit, several unique features and technologies were observed, including:

* **Innovative Embedded Solutions:** Advanced embedded system designs that integrate seamlessly with modern technology applications, demonstrating high performance and reliability.
* **IoT and Cloud Capabilities:** Cutting-edge IoT platforms and cloud-based solutions that facilitate real-time data analysis and connectivity for smart devices and systems.
* **Product Development Processes:** Streamlined product engineering methodologies that emphasize rapid development and deployment of technology solutions while maintaining high standards of quality and performance.

1. Sahjanand Laser Technology Ltd.

Sahjanand Laser Technology Ltd. is a leading provider of laser cutting and marking solutions, headquartered in Gandhinagar, Gujarat, India.

**Brief History:** It Founded in 2005, Sahjanand Laser Technology Ltd. has grown to become a prominent name in the field of laser technology. The company specializes in developing and supplying advanced laser machines and solutions for various industrial applications. Over the years, Sahjanand Laser Technology has established a strong reputation for innovation and quality in the laser technology sector.

**Products or Services Offered:** Sahjanand Laser Technology Ltd. offers a range of products and services, including:

* **Laser Cutting Machines:** High-precision laser cutting systems for various materials such as metal, plastic, and fabric, used in manufacturing and industrial applications.
* **Laser Marking Systems:** Solutions for marking and engraving on different surfaces, including metal, glass, and plastics, providing high durability and precision.
* **Customization Services:** Tailoring laser technology solutions to meet specific customer requirements, including custom machine design and integration.
* **Support and Maintenance:** Comprehensive support services, including installation, training, and maintenance, to ensure optimal performance and longevity of laser systems.

**Role in the Market :**

Sahjanand Laser Technology Ltd. plays a vital role in the industrial sector by providing cutting-edge laser technology solutions that enhance manufacturing processes and product customization. The company’s products are used in a variety of industries, including automotive, aerospace, electronics, and consumer goods, where precision and efficiency are crucial. Sahjanand Laser Technology contributes to advancing manufacturing capabilities and improving product quality through its innovative laser solutions.

**Unique Features or Technologies Observed:** During the visit, several unique features and technologies were observed, including:

* **High-Precision Laser Machines:** Advanced laser cutting and marking machines that offer exceptional accuracy and speed, suitable for complex and intricate designs.
* **Versatile Applications:** Laser systems capable of working with a wide range of materials and applications, demonstrating flexibility and adaptability in various industrial settings.
* **Technological Innovation:** Innovative features such as automated processing, real-time monitoring, and integration with digital control systems, showcasing the company’s commitment to technological advancement.

**Observations and Learning**

1. Indian Space research Organization (ISRO) :

· During the visit to ISRO SAC, I observed the various stages of satellite development, from design to testing. The facility showcased sophisticated laboratories and testing environments where satellites and payloads are developed and integrated. I saw engineers and scientists working on satellite components, mission control systems, and advanced instrumentation.

* **Key Insights, Processes, or Technologies:**
* **Satellite Design and Integration:** The process of designing and integrating different satellite systems and payloads was highly intricate, involving precise engineering and coordination.
* **Testing Facilities:** The state-of-the-art testing facilities for thermal vacuum tests and vibration tests provided insights into the rigorous testing procedures to ensure satellite reliability.
* **Technological Innovations:** The use of advanced technologies in satellite communication and data processing, including high-resolution imaging systems and sophisticated communication protocols, was particularly interesting.
* **Reflection:**

The visit significantly enhanced my understanding of how theoretical concepts in satellite technology and space missions are applied in practice. Observing the detailed processes and advanced technologies used in space applications deepened my appreciation for the complexities involved in space research and satellite development.

1. eInfochips - an arrow company

At eInfochips, I observed the development of embedded systems and product engineering solutions. The facility included design labs where hardware and software components are developed and tested. The team demonstrated their work on various projects, including IoT devices and cloud-based solutions.

Our session Started with Experience Room: Stepping into the experience room was a game-changer! Surendra Rajput Sir’s detailed explanation of the products showcased left us inspired and informed about the latest advancements.

Then an enlightening session led by Anand Shah provided valuable insights into the company’s operations. From cutting-edge technology to innovative solutions, Then Mr Chitan Pathak Explained about their recent product in Depth. At last, the visit ended with a song that was sung by us and Mr Chintan Pathak

e-Infochips is truly paving the way in the industry. Learned a Lot from the visit!

· **Key Insights, Processes, or Technologies:**

* **Embedded Systems Development:** The process of designing embedded systems, including hardware prototyping and software development, highlighted the integration of different technologies.
* **IoT and Cloud Integration:** The implementation of IoT solutions and cloud computing technologies showcased how data is managed and utilized in real-time applications.
* **Product Engineering Lifecycle:** The end-to-end approach to product engineering, from initial design to deployment, emphasized the importance of iterative development and quality assurance.
* **Reflection:**

The visit provided valuable insights into the practical aspects of embedded systems and product development. It reinforced the relevance of integrating theoretical knowledge with real-world applications, especially in the context of IoT and cloud technologies, which are increasingly important in the field of computer science.

1. Sahjanand Laser Technology Ltd.

During the visit to Sahjanand Laser Technology Ltd., I observed the operation of various laser cutting and marking machines. The facility featured advanced laser systems and precision equipment used for manufacturing and customization of products.

It was the first time we saw how a laser cutting works, what are its components of a layer cutting machine and how it is used in industry, how computers also play a major role in programming the devices to operate fast and efficiently!

One of the parts we found fascinating in the visit was seeing a laser doing imprints on metal and non-metal materials. They were being done with such precision and speed with the help of the machines operated by computers. The guide demonstrated us that machines were having great safety measures as the sensors won’t affect human hand

* **Key Insights, Processes, or Technologies:**
* **Laser Cutting and Marking:** The precision and versatility of laser technology in cutting and marking various materials were impressive. The machines demonstrated high accuracy and efficiency.
* **Customization and Automation:** The ability to customize laser solutions for different industrial needs and the integration of automation in the manufacturing process were noteworthy.
* **Technological Advancements:** Innovations in laser technology, such as automated processing and real-time monitoring, highlighted the company’s focus on enhancing manufacturing capabilities.
* **Reflection:**

The visit to Sahjanand Laser Technology Ltd. offered a deeper understanding of the role of laser technology in modern manufacturing. Observing the advanced machinery and learning about the customization capabilities provided a practical perspective on how laser technology can enhance production processes and product quality.

**Conclusions**

The industrial visits to ISRO SAC Ahmedabad, eInfochips (an Arrow company), and Sahjanand Laser Technology Ltd. provided a wealth of insights and learning opportunities that have greatly enriched my academic and practical understanding.

These visits have significantly enriched my academic knowledge by providing real-world contexts to the theoretical concepts learned in my computer science engineering program. Understanding how complex technologies are developed, tested, and implemented in various industries has deepened my comprehension of the subjects and highlighted the practical applications of my studies.

Moreover, the exposure to cutting-edge technologies and industry practices has broadened my perspective on the current trends and challenges in the tech sector. The hands-on learning experiences gained during these visits have prepared me to better understand the expectations of the industry and have provided valuable insights that will guide my future career in engineering.

**Acknowledgment**

I extend my heartfelt gratitude to the School of Technology (SOT), PDEU, and the Department of CSE, PDEU, for organizing this invaluable industrial orientation. Opportunities like these are instrumental in bridging the gap between academia and industry, providing us with practical insights and preparing us for the challenges of the real world. This experience has not only enhanced our understanding of the industry but also motivated us to apply our academic knowledge in practical scenarios.

A special note of thanks to Dr. Chintan Bhatt, Dr. Hargeet Kaur, and Dr. Soham Vyas for their unwavering support and guidance throughout this journey. The insights you shared and the context you provided during the visits added immense value to our learning experience.