Lab 3: Real-Time Kinematic (RTK) surveying

CE334 Modern Methods in Geoinformatics 2025–26 II
Instructor: Balaji Devaraju [dbalaji] TA: Kamoosh [kamooshsb24], Ashis [ashisa24]

Issued: 21.01.2026/28.01.2026 Submission: 10.02.2026 23:59 h IST

Introduction

In this laboratory exercise, students will use Real-Time Kinematic (RTK) surveying technique to collect precise spatial data of ground features such as trees, buildings and roads within an allotted survey area. The collected field data will then be processed and visualized using QGIS, an open-source Geographic Information System (GIS) software, to produce a detailed map.

Objective

1. To collect accurate coordinates of real-world features.
2. To process and visualize collected data using GIS software.
3. To generate a map of an allotted area based on RTK survey observations.

Motivation

1. To have a good understanding of the handling of the R10 receiver.
2. To explore the working principle of Real-Time Kinematic (RTK) surveying technique.
3. To learn about the various types of features(Point, Line, Polygon) available in real world.

Instruments and software used

R10 GNSS receiver and QGIS software.

Theory

R10 receiver: The Trimble R10 GNSS receiver incorporates a GNSS antenna, receiver, internal radio, and battery in a rugged lightweight unit that is ideally suited as an all-on-the-pole RTK rover or quick setup/rapid mobilization base station.

Figure 1: R10 receiver

LEDs enable you to monitor satellite tracking, radio reception, data logging status, Wi-Fi status, and power. Bluetooth wireless technology provides cable-free communications between the receiver and controller. R10 receiver antenna is a dual frequency receiver, and it is embedded in the receiver itself. The receiver is mounted on a bipod. R10 receiver is based on the principle of carrier phase frequency hence accuracy is in order of cms (depending on the data acquisition mode (static or kinematic).

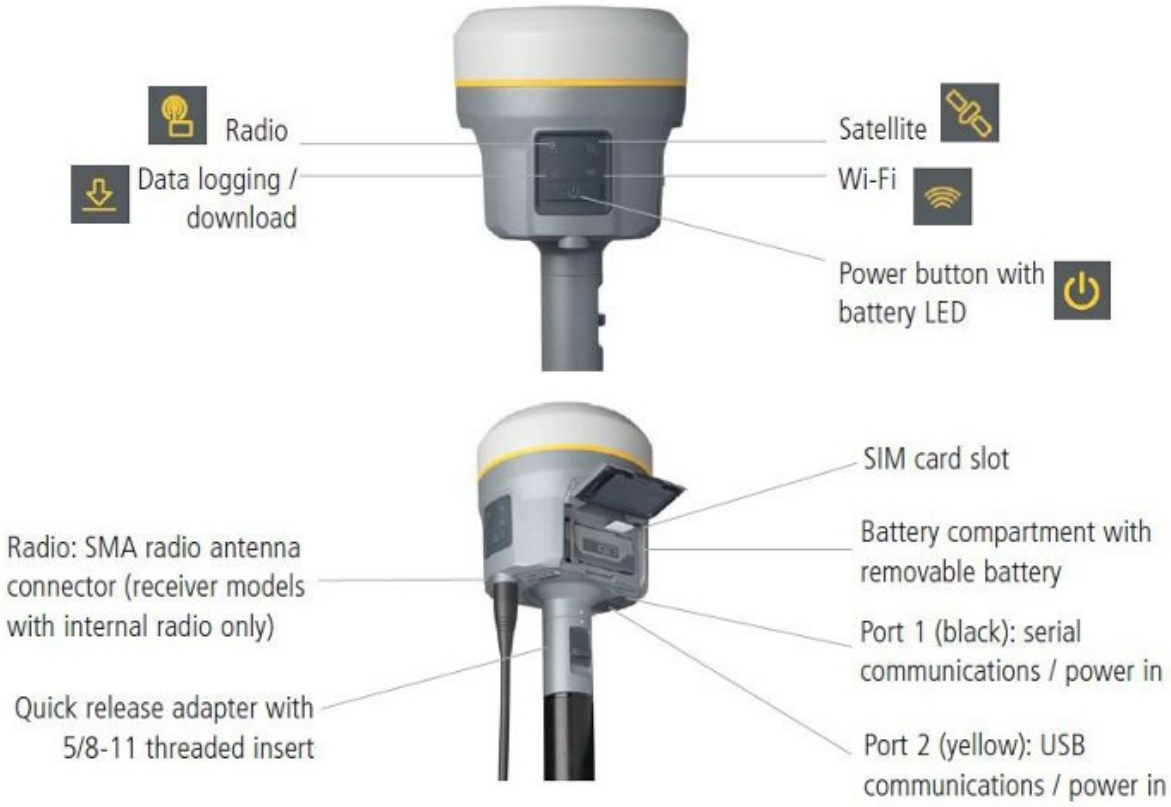

Figure 2: Front and back panel of R10 receiver

Deliverables

Each student group must submit the map and you have to follow the Survey of India guidelines(symbol, scale, etc.) while making map.

Precautions and Best Practices

1. Ensure clear sky visibility for better RTK performance.
2. Always confirm RTK solution status before recording points.
3. Maintain proper instrument handling and safety.