

Lidar Mapping - Prototype

Create a mapping system using a Livox Mid-40 Lidar and an APX-15 GNSS-INS module. This system can be used to scan and create a 3D point cloud of an area

[#lidar](#) [#livox](#) [#mapping](#)

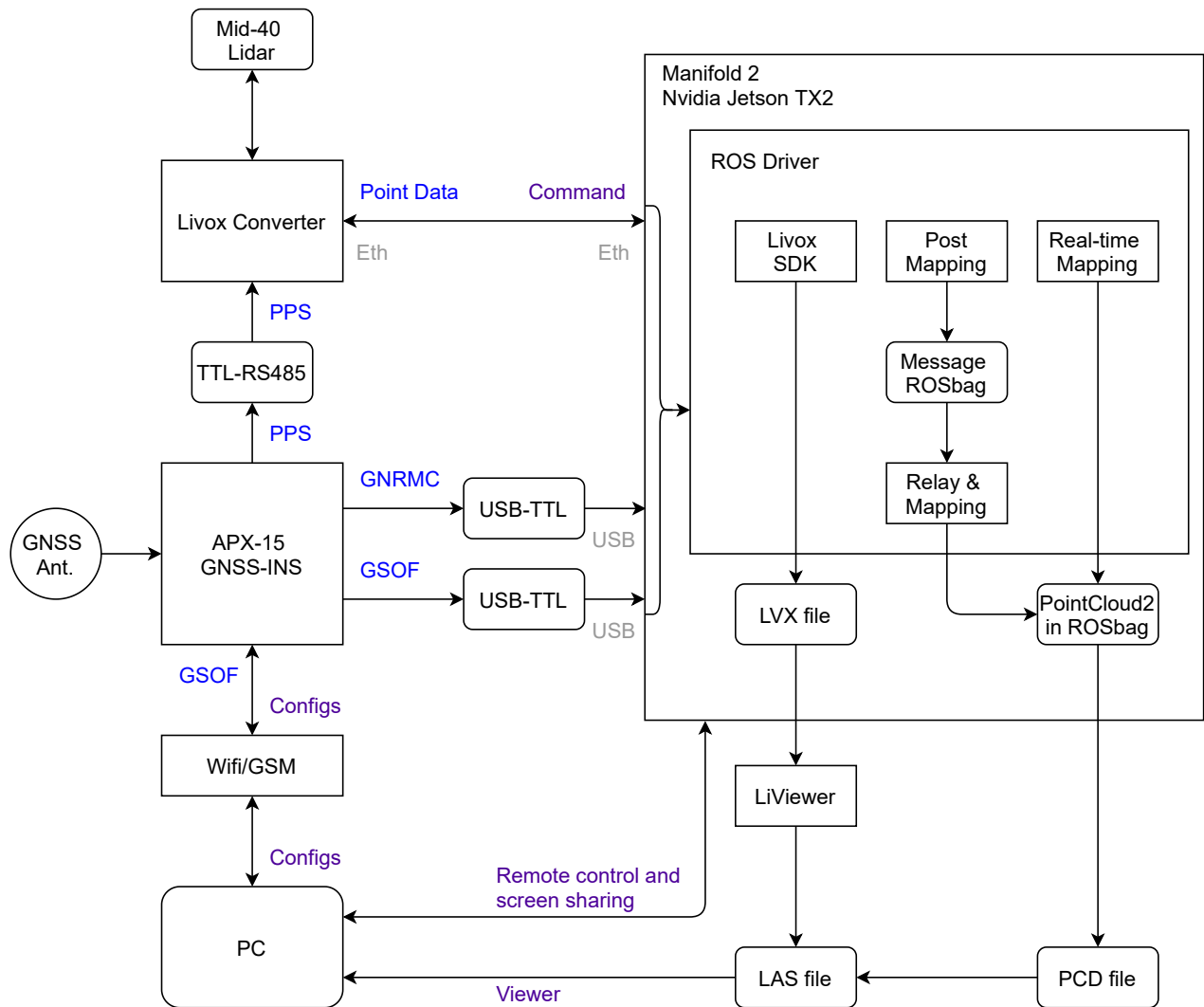
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i This project is based on reference project of [Livox High Precision Mapping](#) with some modification, for learning and creating a customized prototype.

1. System Block Diagram



System Block diagram

Compare to a commercial product:

#	Prototype	LiAir V70
GNSS mode	Single GNSS Input with L1 + L2 Band	Dual GNSS Input L1 Band
Correction	Self-Correct using Multiple GNSS + INS	Self-Correct using Multiple GNSS + INS RTK using a Radio Station PP using a Base Station
Output format	LVX, Rosbag PointCloud2	LiData (private format)

#	Prototype	LiAir V70
Viewer	LiViewer	LiDAR360
Post Processing	No (APX-15 support POCPac UAV post-processing with a base station)	LiGeoreference (use the Base Station)
Analyser	Not Yet	LiPowerLine

LiAir V70, LiDAR360 and LiPowerLine are from [GreenValley](#) company, they have a private data format (in .LiData) file. Example outputs of LiAir V70 are in binary format with unknown data structure. However, they support the standard LAS format.

2. Concerns

- 1. The APX-15 Datasheet shows the accuracy with 0.5-2.0m in the Differential GPS (DGPS) method. RTK method can get 0.02-0.05m accuracy but it notes that this method requires Base Station and Radio Link.**

Ask Supplier: How accurate is the APX-15 if it runs independently (no base station, no access to NTRIP caster)?

Some papers present how to process APX-15 data, but they all do Post-Processing, such as in this paper, and this paper.

The reference project uses NTRIP Caster to get precision accuracy!

- 2. Assume that at an early stage, we do not get cm-accuracy level?**

Ask an AI engineer: How accurate is the point-cloud good for detecting objects?

Need to get real data and evaluate the accuracy of object detection

- 3. POSPac UAV software for APX-15 can do Post processing, but it needs a Base Station. If we choose to do post-processing, we need to find a solution to stick processed data to point-cloud.**

Need to get the output of APX-15 and chose a method to do post-processing

It is better to use an APX-15 in a base station too if using the Trimble GSOF message format.

If using ASCII NMEA format, any GNSS receiver can be used.