LiPod P1 3D Laser Scanner FAQ

1. **Why is the scanner labeled with a 600m range, but the actual measurement is only around 200 meters?**

The scanner's maximum range is theoretical, under optimal conditions (80% reflectivity, laser incident angle of 90°). In reality, objects being scanned rarely meet these conditions, so the actual range tends to be significantly shorter than the labeled range.

2. **What are the differences between the P1 and other well-known scanners (Faro, Trimble, Leica)?**

The P1 is a long-range pulse scanner, whereas most well-known scanners are phase-based. The P1 is slightly less accurate but has an advantage in scanning distance.

3. **What is the recommended distance between stations for scanning common buildings?**

For outdoor building scans, the distance between stations should be 15-20 meters. If the distance is too far, it may lead to difficulties in registration due to low overlap. For indoor buildings, stations should be set up in blind spots, with an interval of about 10 meters (100m 6mm mode).

4. **What does the red icon in the top left corner mean?**

The red icon indicates the sensor status, meaning the sensor is not functioning properly. This could either mean the sensor is damaged

(remaining red under proper conditions) or that environmental conditions are not met for use.

5. **Why does scanning in 280m or 600m mode take much time than shorter-range mode?**

These modes are used for mid-to-long-range scanning, so the laser's horizontal and vertical scanning speeds will be slowed down in order to adjust the energy and transceiver time to sweep to a longer distance, so it will increase the scanning time.

6. **What modes are recommended for indoor and outdoor scanning, and what are the common use cases for each mode?**

100m 3mm: For extremely detailed scans, such as cultural relics, ancient buildings, and broad-leaved forest plant analysis. This mode consumes the most data and is slowest to process.

100m 6mm: Commonly used for general indoor and close-range outdoor scanning.

100m 12mm: Suitable for both indoor and outdoor scans where less detail is needed.

100m 24mm: A quick preview mode for scanning objects without detailed requirements, providing a fast scan of object contours.

280m 600m mode: Lower point frequency, suitable for large or long-distance targets such as power towers, power lines, and very tall buildings.

7. **Is the registration process the same for different range modes, and can they all be done automatically?**

For close-range scans (100m mode), automatic registration works well if station distances and overlaps are set properly. For mid-to-long-range scans, the overlap may be limited to the main subject, making automatic registration less reliable. In such cases, manual or semi-automatic registration should be used.

8. **What if only part of the stations is registered automatically, and multiple clusters are created?**

You can register clusters together by selecting two stations with overlapping areas. Manual alignment and fine registration can then be used to connect clusters, which will merge them into one.

9. **Does automatic registration require Adjusting(leveling) the alignment? What is the purpose of adjustment?**

Automatic registration adjusts the alignment automatically before finishing. For manual registration, you can click the Adjustment to reduce cumulative errors.

10. **What measures can be taken to obtain high-precision point cloud data with absolute positions?**

- Ensure station distances and overlaps, with at least 30% overlap.
- Use 100m 6mm or 3mm modes for more details.
- Use a total station for control points instead of RTK, as total stations

can achieve millimeter-level accuracy.

- Use precise targets like target balls or boards when picking points, rather than feature points, to minimize errors.
- Distribute control points evenly in the survey area, with more than four points, and place them about 15m apart for large areas.
- Maintain a solid network shape, square areas are more solid than linear areas. Reinforce the network as necessary.

11. Why aren't the target balls automatically recognized, and how should they be placed?

The automatic recognition of the target balls depends on their placement. If they're too far away from the station, the accuracy may be affected. For best results, place them within 10m of the station, at the same height as the scanner. If the target balls can't be automatically recognized, manually select them for registration.

12. In which scenarios should target balls (papers, boards) be used?

- Most scanning data can be registered automatically, but in scenarios like tunnels or long corridors where features are hard to recognize, target balls are necessary. For areas requiring high accuracy, target balls can help control the scanner's precision and cumulative errors in registration.
- In order to better control the accuracy of the scanner and the cumulative error of registration when collecting data in featureless areas with particularly high accuracy requirements, the Station Correct function can

be used, which can confirm the absolute position of the station data through the absolute position of the three targets, so that even if the stations are not registered, the neighboring stations can be united together by the absolute coordinates, which can avoid the error caused by registration and further improve the absolute accuracy.

13. What causes trailing noise at the edges of scanning objects, and how can it be removed?

Trailing noise at the edges occurs when part of the laser spot hits one object, and the rest hits another object in the vicinity behind this object. This creates distance measurement errors and causes a trailing effect, which can be solved by the Edge Filter function in the Lifuser-pod software.

14. What are the recommended steps for processing large-scale scan projects (100+ stations)?

Automatic registration will handle most stations, but for any that aren't registered correctly, manual registration should be used. If scanning spans multiple days, data from different days can be imported into separate station maps. Once registration is complete, combine the data into one map and reinforce the network.

For large-scale stations, if you need to spend days scanning the entire area, but you need to register the day's data every day, you can create multiple station maps under the same site map, import the day's data into

each site map for registration, and finally move all the registered data to the same site map , and then manually register the data by cluster registration to strengthen the connection network.

15. If both automatic and manual registration fail, is the data useless? What can be done to remedy this situation?

If neither automatic nor manual registration works, it usually means the station setup was improper. In most cases, you can supplement the setup station to scan the data and thus rejoin the data.

16. What can cause damage to the scanner or peripheral electronics during use of the scanner? How to avoid this situation of damage?

• During field work, scanning highly reflective objects, especially prisms, is prohibited. Due to their excessive concentrating emission capacity, they can cause damage to the laser receiver and require costly module replacement. Please be careful with the scanning of the total station prism during the operation of the total station to ensure that the prism receives Scan again after getting up.

• Although the wavelength 1550nm is longer, but for better ranging, the power tends to be higher, resulting in an impact on the cmos, ccd of cell phones, cameras and other imaging devices. Especially when the laser is fired directly at the lens, it is easy to cause damage to the imaging device sensor, please be sure to pay attention to the shooting techniques and angles when shooting scanner operations to ensure the safety of external

equipment.

17. Why is it that nominal 600m ranging, when scanning an outdoor building with a 100m stall, requires setting stations every 10-20m?

There are two reasons:

1. It is not visible, so it cannot be scanned. It has nothing to do with the measurement range. Many outdoor buildings have right-angle wall bends, so you must densify the stations at the corners to ensure overlap.

2. The terrestrial laser scanner is usually installed at a height of only 1.5 meters above the ground. When scanning at a distance that is too far away, it will form a right-angled triangle with a very small acute angle. The laser incidence angle is too small to receive the energy reflected back from the ground, resulting in the inability to measure the point. But when it scans buildings, the angle of incidence is relatively large, so both the scanning subject and the registration subject are buildings. Due the long distance, the overlap of the building parts is not enough, which may cause auto register to fail.

18. When is it possible to set the stations at long intervals(>20m)?

It depends on what you're scanning, if you need to scan architectural details, either indoors or outdoors it's recommended that the stations are close to each other (10m or so). If you just scan individual buildings and there is no obstruction around, you can set the distance between stations farther away. For example, if you are scanning power towers, landmarks,

wind towers, etc., you can set the distance between stations to more than 50 meters, but in this case the main overlap area of the data of the two stations will be the scanned object, and the overlap is very less, so you need to manually register data.