Modern data collection record management for the Holloman High Speed Test Track

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**Background**
The Holloman High Speed Test Track is a 16 kilometer rail developed to test items such as aircraft and missiles moving at speeds upwards of Mach 8. To prevent catastrophic failure, the track must be kept in alignment. The process of measuring deviance in the track is arduous because it involves placing, tracking, and recording the data from GPS receivers at specified benchmark points at over 1000 places on the track. Collecting and managing this data is difficult and can take months of work.

**Objective**
To create a mobile software application that facilitates the collection and management of data sets associated with each receiver, and informs the user of the collection's progress.

**Survey Breakdown**
Each receiver can occupy one of four states:
- **Active**: Placed, but not gathering for a baseline
- **Collecting**: Gathering data for a baseline
- **Finished**: Ready for retrieval
- **Retrieved**: Picked up and no longer collecting data

**Approach**
In order to create the most flexible data storage solution, a Peer-to-Peer (P2P) database network was implemented. This system has no central storage location, instead relying on the transfer of data between peers to maintain consistent data models over time. The system also tracks connections and disconnections, utilizing a merging algorithm to sync data models whenever connections become available.

**Conclusion**
By auto-populating data using accurate measurements such as the system clock and location services, user error is mitigated. Distributing data among a network of peers improves the reliability and accessibility of data. These improvements streamline the process of collecting massive amounts of data on the Holloman Track, and can extend to other difficult scenarios requiring offline collaborative data collection.