2016 Microsoft Indoor Localization Competition

Leica Geosystems Pegasus Backpack

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***Abstract*—The Pegasus Backpack from Leica Geosystems is a compact mobile mapping system which incorporates multi-sensor navigation to achieve precise indoor and outdoor localization. The backpack localizes using a combination of GNSS, Inertial and Lidar SLAM technologies. The system has 2 methods of initialization:**

1. **Outdoor initialization (with access to GNSS signals)**

   The backpack is activated outdoors. After a short alignment procedure the operator travels indoors to survey the area of interest. At the end of the survey, the operator returns outdoors to complete the data collection. No supplementary infrastructure is needed.

2. **Indoor initialization (no GNSS signals used)**

   The backpack is activated indoors. After a short alignment procedure, the operator surveys the area of interest and returns to the same spot it started. The start/stop position is temporally marked – but its position does not need to be known.

The Backpack does not provide real-time positioning. The navigation solution is determined in a post-processing step which can begin immediately after the survey. Solution times are proportional to survey times.

To provide target positions for the Competition, the Pegasus Backpack would be initialized, complete the survey of the room, perform a post-processing navigation step and generate a complete map of the competition area. The map would be adjusted into the local coordinate system of the room given the system origin point and orientation (alternatively the backpack initial position can be used as local control). The final 3D target positions would be measured from the adjusted map.

Leica Geosystem Pegasus Backpack:
http://leica-geosystems.com/products/mobile-sensor-platforms/capture-platforms/leica-pegasus-backpack