Survey Data Collection with Survey Solutions

Perugia, Italy

Survey Solutions: GPS and Maps

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May 28 - June 01, 2018

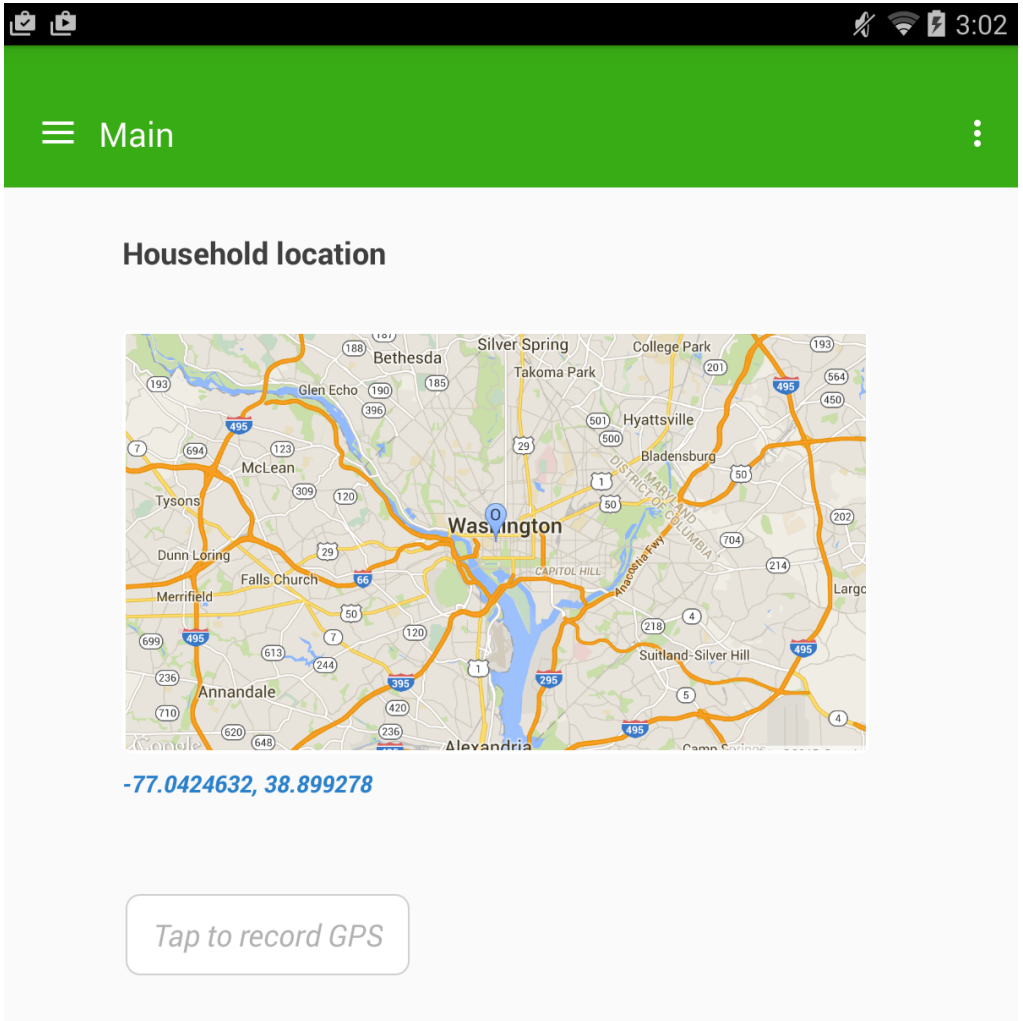
GPS and Maps

1. GPS
2. Area
3. Offline maps
4. Offline maps management

GPS Location

- GPS location question allows to record the location of the tablet device (typically the interview location).
- GPS question must be “answered” by the interviewer, it is not recorded without the interviewer’s knowledge.
- GPS question is anwered by pressing a button, not inputting coordinates directly.

GPS on the tablet



When the tablet is connected to the Internet, a map of the neighborhood of the current location will be shown*.

Otherwise only the coordinates will be shown.

*) Showing the map can be switched off in the Interviewer App settings.

GPS Location

- Capturing GPS location may take several seconds. It is best done before or after the conversation with the respondent, not to interrupt the flow of the interview.
- Capturing GPS location may take a significant time after a cold start.
- To capture the location the tablet must have a GPS receiver inside and be receiving the signal.
- Some tablets may contain location sensors of other systems, or a combination of several sensors for multiple systems: *GPS, GLONASS, Galileo, Beidou*.
- This may result in higher accuracy positioning, and/or faster first location fix.
- For problems with the GPS location fix, contact the system owner, and/or the tablet manufacturer, not the Survey Solutions team.

GPS Location

- One interview may contain multiple GPS location questions, for example a survey of infrastructure of villages may collect location of the bank, post office, bus station, hospital, school, and other infrastructure elements.
- Another example, is capturing GPS location for every visit to the household.

Traditional ways of capturing an area of a plot

1. **Ask the land owner:** recall; rounding.
2. **Ask some database:** online connectivity; respondents and plots identification; informal holdings.
3. **Rope and compass measure:** travel to location; may be complicated for interviewers; additional equipment and training
4. **GPS measure:** additional equipment; travel to location; time to walk along the boundaries of all plots; precision depends on quality and settings of the equipment being used.

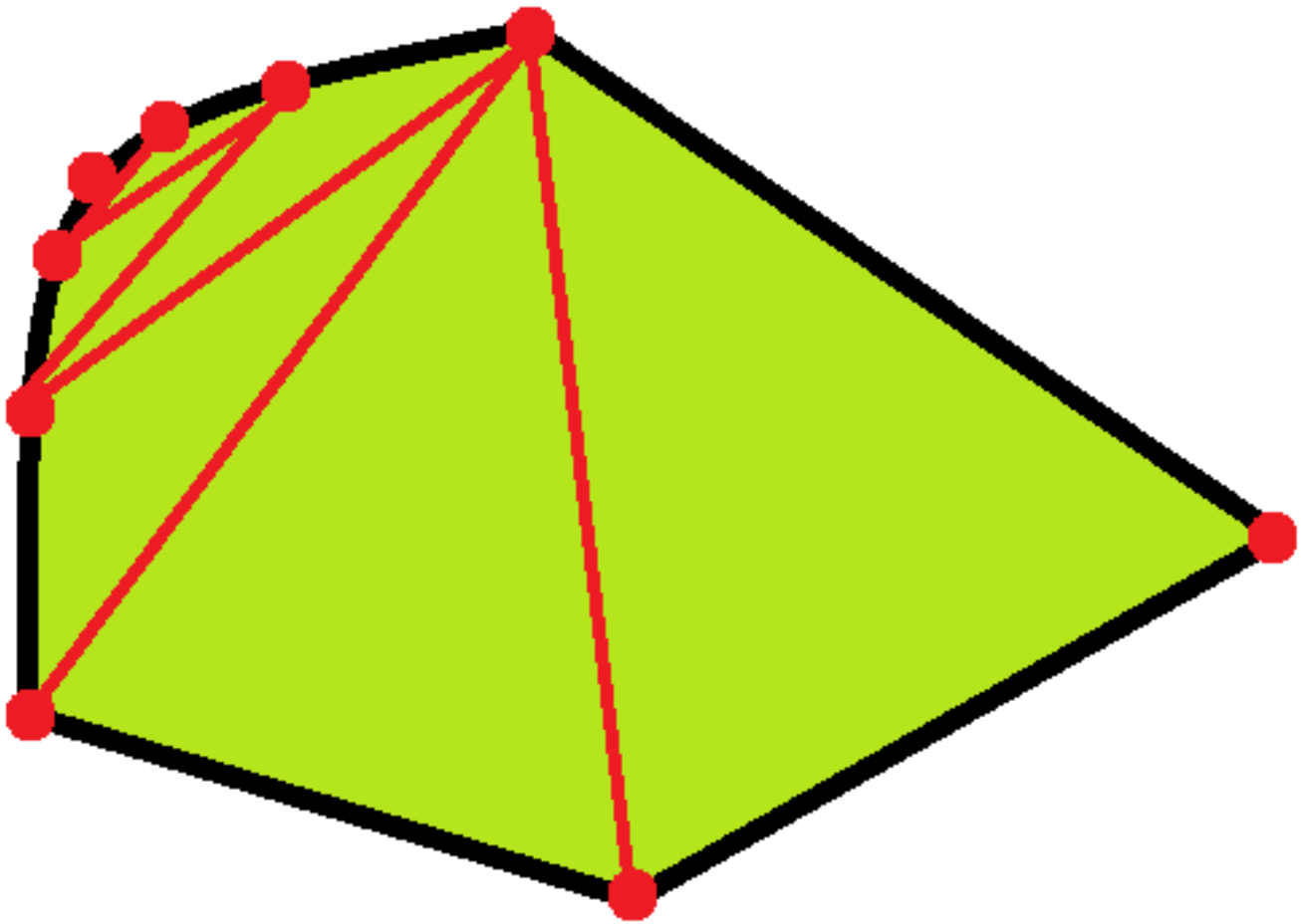
GPS Waypoints

Capturing GPS waypoints around the field.

GPS Waypoints

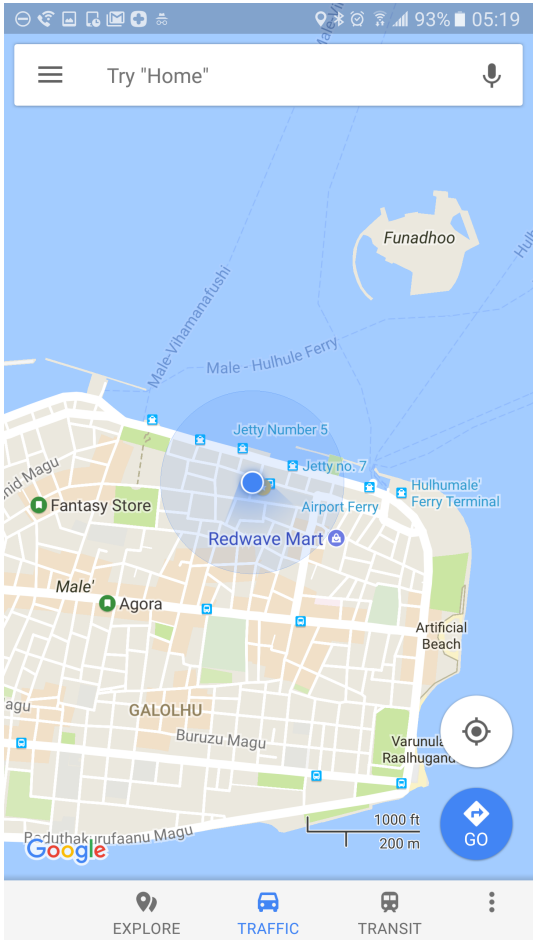
An interviewer and the plot owner are walking around the plot to capture the plot boundary waypoints. *Uganda, May 2018.*

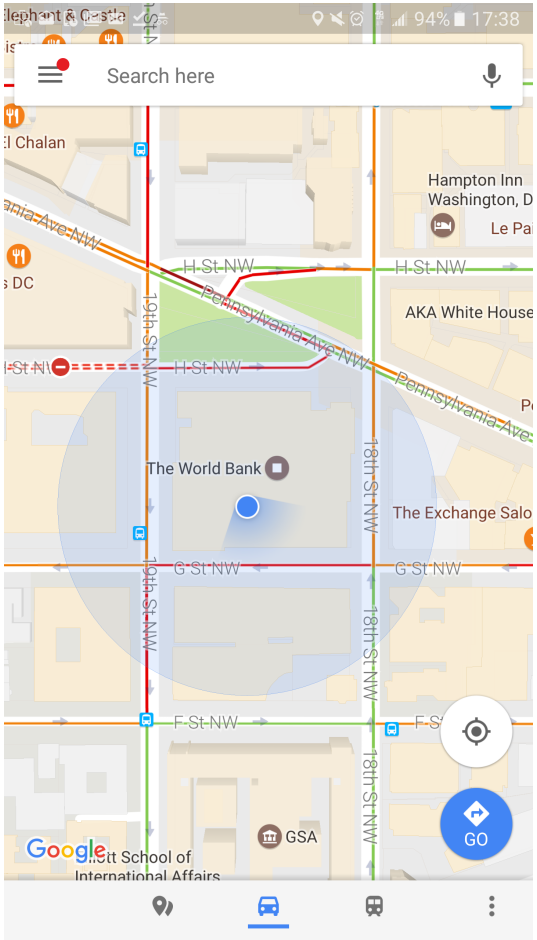
Calculating area by triangulation

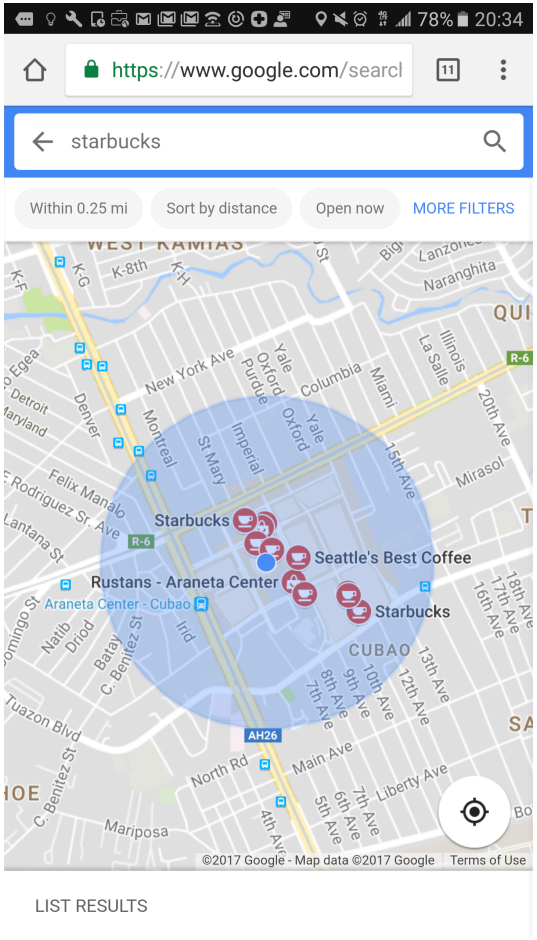


The area of an irregular polygon can be calculated by traingulation.

GPS Accuracy

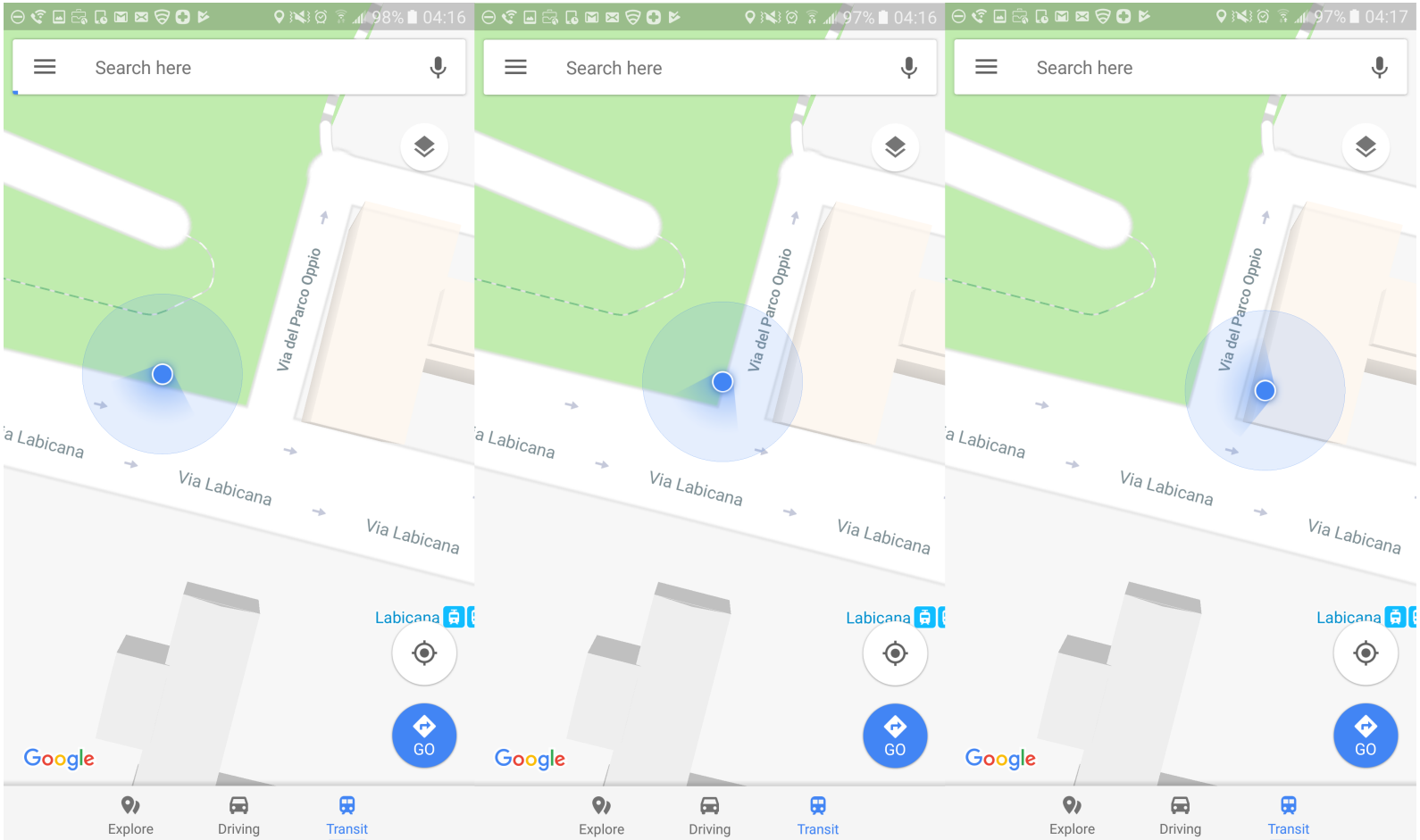






GPS location measurement may be inaccurate.

GPS Accuracy



GPS location measurement may be unstable.

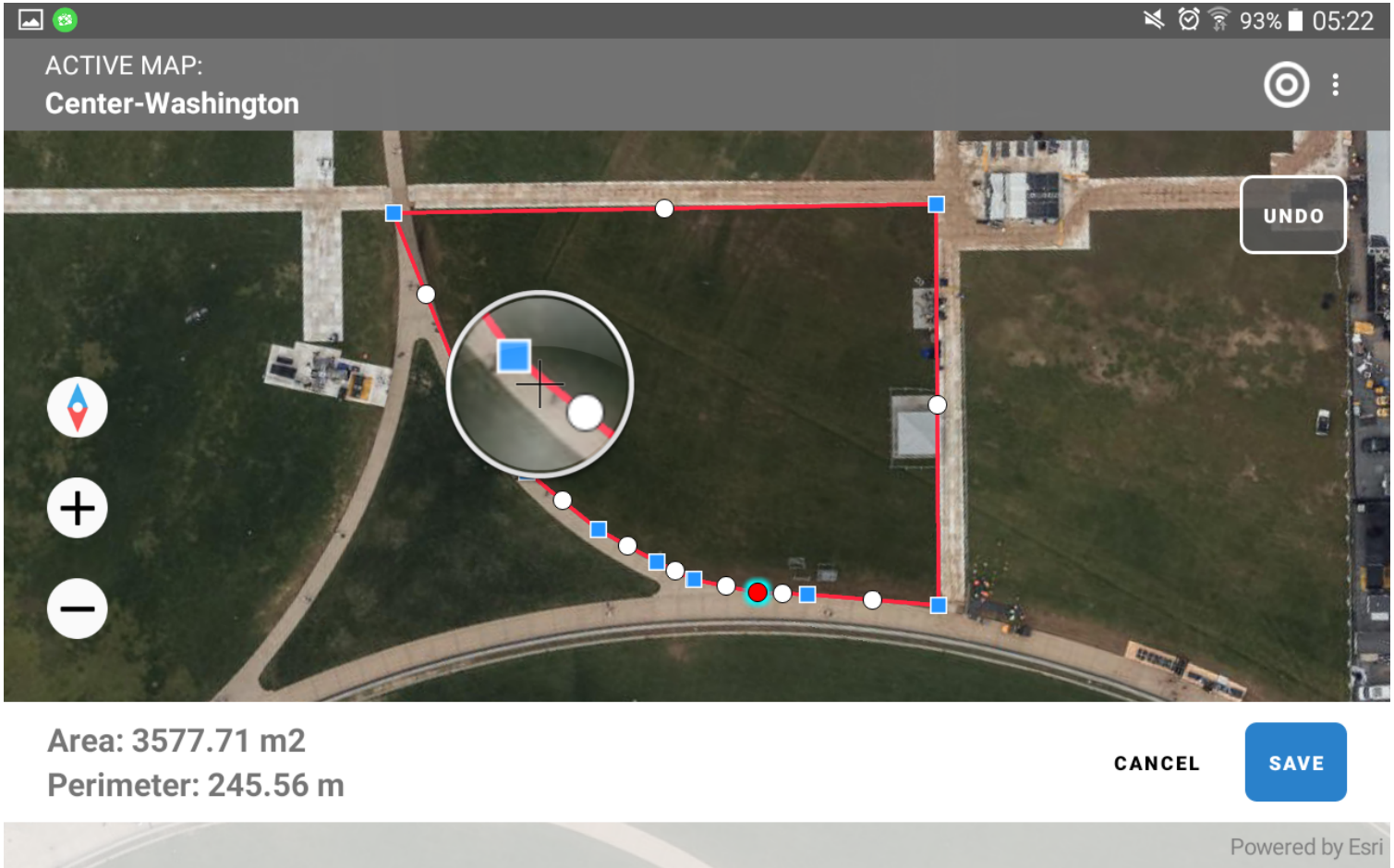
Offline maps

New approach for area measurement: use offline satellite maps for outlining the area on the device. Survey Solutions: area question.

Offline maps

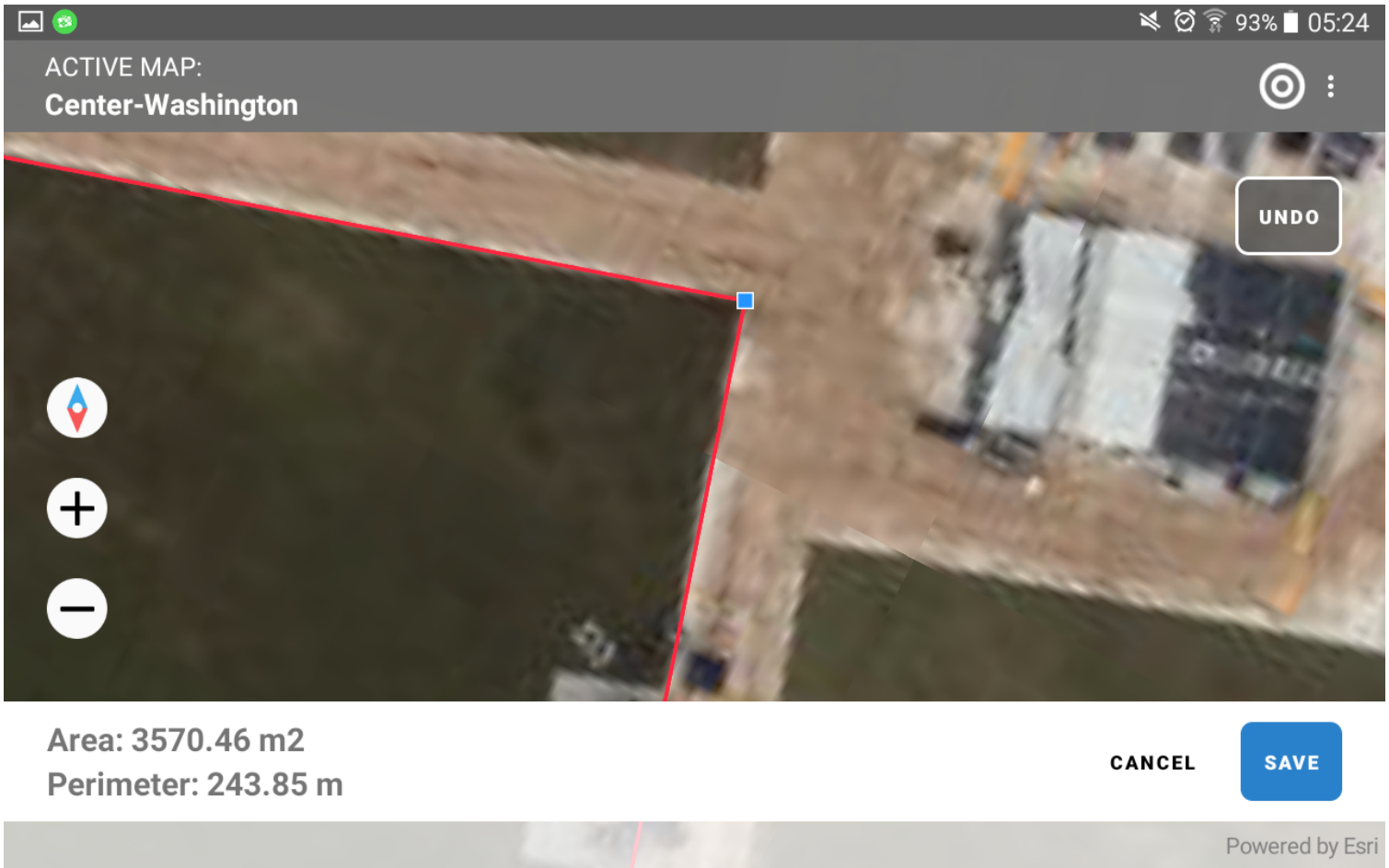
Irregular areas can be captured with multiple boundary points.

Offline maps



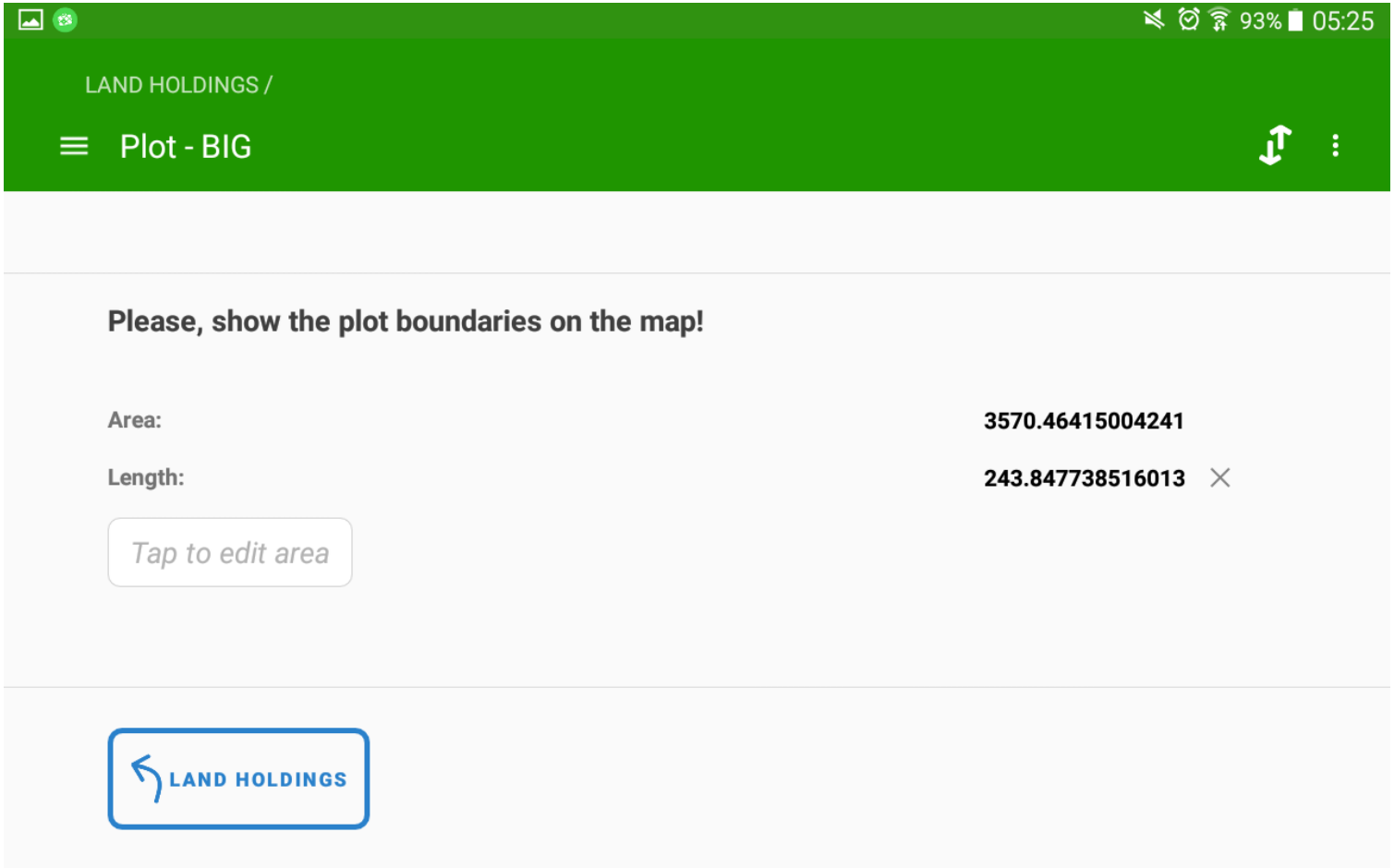
Built-in zoom lens for greater precision.

Offline maps



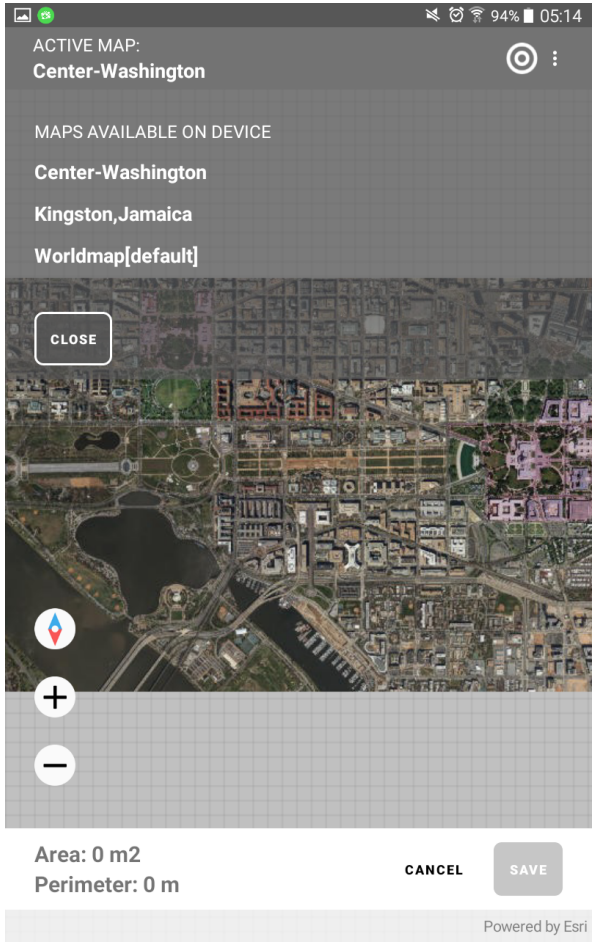
One can zoom in to work with vertices more comfortably without the whole polygon in view.

Offline maps



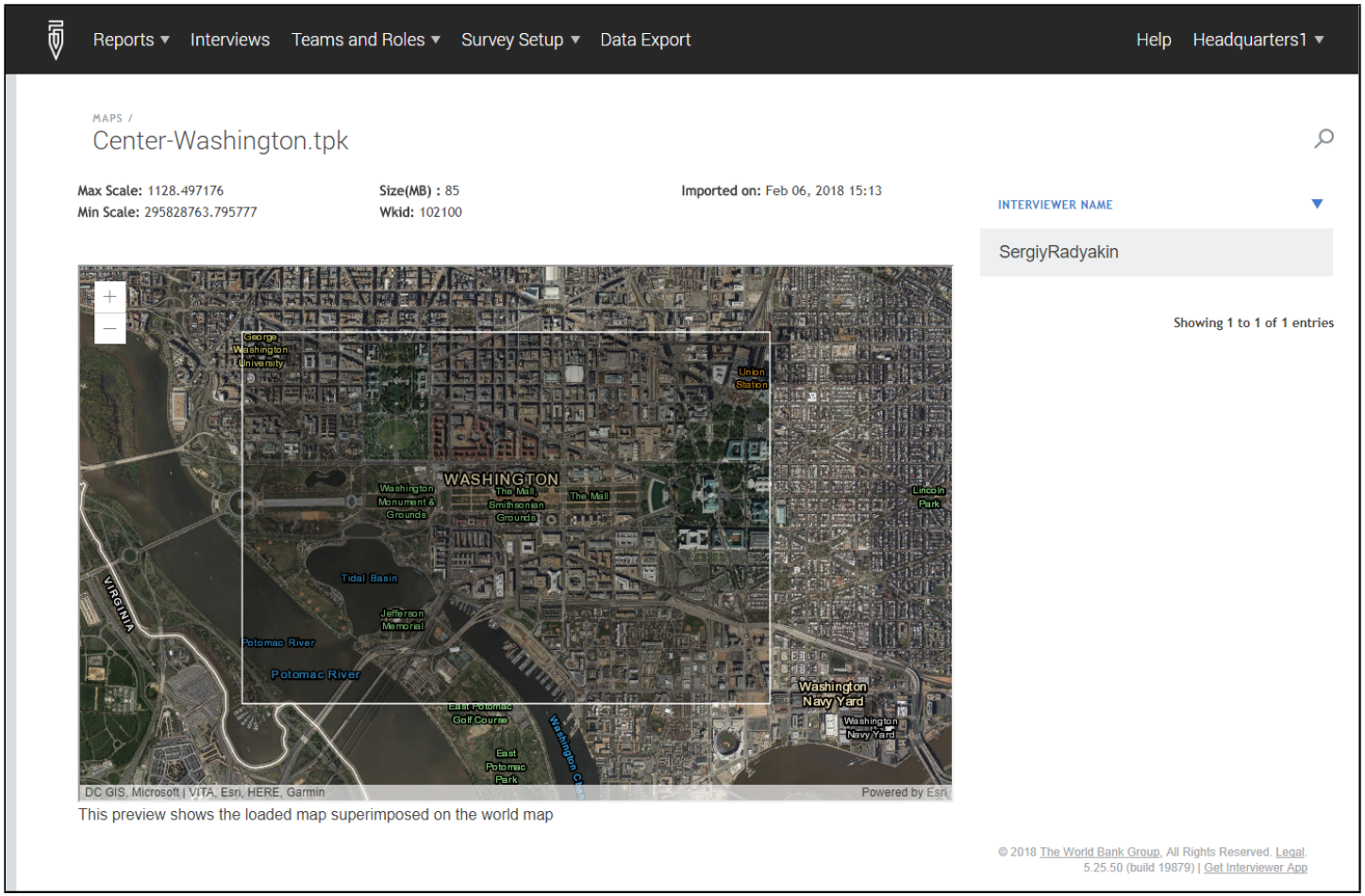
Captured area is shown in the Interviewer App.

Offline maps management



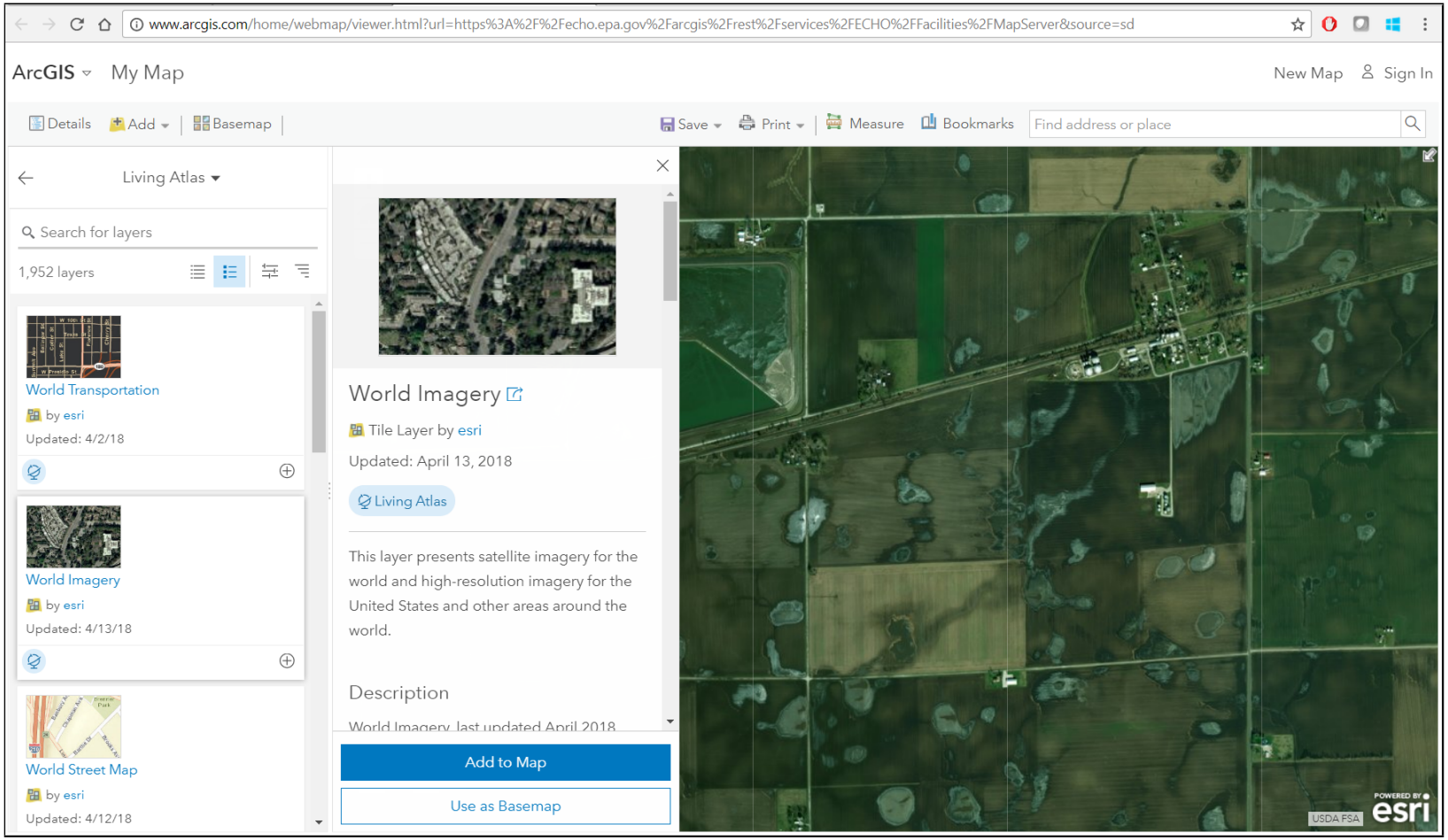
A map is selected from the list of available maps.

Offline maps management



Preview of the map superimposed on the world map.

Offline maps management



Supported file formats: ESRI *.tpk and *.mmpk tile maps, can contain multiple maps, with different resolutions. ESRI provides a maps server product that allows end-user to define the offline area and export it to a *.tpk file.

Export

- The area question is exported as an array of coordinates resulting in potentially very large strings.
- The area itself is not exported (currently) and need to be recalculated from the exported coordinates.
- For example in Stata use `findit fieldarea` or see here

Offline maps: Possible challenges

1. Can the farmers/land owners understand the satellite images? Recognize their parcels on a satellite image?
2. Are satellite images available for the surveyed territories? How much do they cost?
3. Are the images from an appropriate season?
4. Size of the finger and screen matters for accuracy of selection. Patience required.
5. Currently the area question is not accessible from the syntax pending.
6. Currently only one parcel is visible/selectable on the map.
7. Maps can be huge presenting challenge for transmitting them to the interviewers.
8. Maps may need to be prepared by qualified GIS personnel.

Offline maps: Possible challenges

August 23, 1993

August 24, 2002

Seasonal changes or agricultural interventions (in this case irrigation) can radically affect the appearance of the territory in the satellite image and the quality of the area estimation.