

1.3 Hardware

Hardware encompasses all physical assets related to technology, computers, and electronics needed for a project. When designing a mapping project, managers will need to assess what hardware is necessary and what specifications. While workflow influences the selection of hardware necessary, it is important to note that the availability of technology and resources for procurement may place restrictions on hardware selection. In this way, hardware availability can also influence the workflow. Questions to ask during hardware selection:

- Will mappers be collecting data in the field? If yes, see Mobile Data Collection: smartphones & tablets to determine what devices are best for field data collection.
- Will mappers be collecting data for more than: 4 hours a day with OpenMapKit and/or navigation/tracking apps? 6 hours with OpenDataKit or KoboCollect? If yes, see Powerbanks and charging.
- Will data need to be stored or backed up physically? see Storage Devices: POSM & Hard Drives
- Will there be digitization and editing of data? Will maps and visualizations need to be made from data? See Computers.

Mobile data collection: smartphones & tablets

Smartphones versus tablets When choosing a type of device for mobile data collection, it is important to determine if a smartphone or tablet is more appropriate for mapping activities. Each device types have pros and cons, so it's important to understand what is best for a particular project, mapper, and environment.

When planning to use OpenDataKit:

Most any Android smartphone will do, as long as it has a relatively modern Android version (4.1+).

When planning to use OpenMapKit:

To enable OpenMapKit to run fluently and be able to handle larger background maps (in 'mbtiles' format) and OSM data, please make sure that phones have:

- At least 1.5, but preferably 2 GB of RAM
- Preferably 16 GB of storage
- A modern Android version (6.0+)

Furthermore, the following are recommended:

- A 5" screen for usability
- A decently sized battery. For extended usage, it may be necessary to have battery packs
- Make sure to have enough charging options, such as car chargers and extension cords

The following phones/models have been verified to work well on various projects:

Smartphones:

- Tecno Camon C9 (2 GB RAM)
- Tecno L9 (2 GB RAM, 16 GB storage)
- Huawei Y5 (2017) and Huawei Y6 Pro (2 GB RAM, 16 GB storage)
- Sony Experia L1 (2 GB RAM, 16 GB storage)
- Motorola Moto G5 (2 GB RAM, 16 GB storage)
- Infinix

Tablets:

- Samsung Tab A (SM-T285, 7", 2016) (1.5 GB RAM, 8GB storage)
- Huawei Mediapad t3 10 AGS-W09

Protecting mobile devices HOT recommends that cases are procured for all mobile data collection devices, regardless of type. This will help protect the devices from weather, dropping, sun exposure,

and other hazards. Ultimately, protecting devices not only reduces costs associated with device loss or replacement, it also protects the loss of data stored in the devices.

Power banks and charging

Storage Devices: POSM & Hard Drives

Computers

Determining the specifications, quality, and type of computer depends on the needs of the project or activity. At minimum, computers involved with mapping activities should have the following specifications:

- 15" screen or larger
- Processor: Core i5, relatively new
- RAM: preferably at least 8gb
- 512 GB hard disk or larger
- Operating system: Windows or Linux preferred for most applications

The following computers have been verified to work well on various projects, categorized by typical use:

a) Training, data cleaning and basic GIS/data processing

- Lenovo Ideapad 320
- HP 250 G6
- Lenovo ThinkPad X234
- DELL Latitude E6430s
- HP Elitebook 840

b) Advanced GIS and drone imagery processing

- Acer Aspire e5-575

Hardware Management Considerations

- Create and have all mapping participants sign an agreement for the responsibility and liability of devices
- Create an equipment sign out log