GPS DATA COLLECTION STANDARDS

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INTRODUCTION

New Hampshire GRANIT is a cooperative project to create, maintain, and make available a statewide geographic data base serving the information needs of state, regional, and local decision-makers. Increasingly, GRANIT is using Global Position Systems (GPS) technology to collect locational data and to provide ground truth information. The purpose of this document is to record the standards that GRANIT has developed for data collection and navigation using a GPS.

Limitations

The standards documented herein were developed based upon the needs of GRANIT's projects, and they reflect the GPS units and software currently being used by project staff. They should not be assumed to apply to every project or every system, as typically standards must be set based upon a project's specific requirements. For example, there is no single standard with respect to where a user should stand while collecting GPS data that is appropriate for all data collection needs. In a historic resources inventory, it may be appropriate for the user to stand at the front door of each building, whereas for a land cover assessment, the user may aim for the center of a 30m x 30m Landsat TM image pixel. GRANIT strongly advises that users review this document, and augment and/or modify it by developing specific standards to reflect the specific type of data they are collecting and their anticipated usage of that data.

HARDWARE AND SOFTWARE

The GRANIT project uses Trimble Pro XRS systems with Asset Surveyor v. 5.10. These are mapping grade units with the capacity to receive real time correction, and to collect, store and transfer data. Each unit also carries a subscription for satellite differential service. Pathfinder Office v. 2.70 is used to transfer data to and from GIS applications and to post-process any points collected without real time correction.

SETTINGS

Coordinate System and Units

All GRANIT data are referenced to the New Hampshire State Plane Coordinate System, Zone 4676 (FIPSZONE 2800), and use the NAD 83 (North American Datum 1983) geodetic control based on the WGS 84 spheroid. Data transfer to and from the GPS units is therefore easiest when

the coordinate systems are set to US State Plane 1983, New Hampshire zone, and the units recorded in US survey feet.

Data Collection and Navigation Parameter Settings

The standards used in the field vary, depending on whether the purpose is data collection or navigation. Data collection requires a higher level of accuracy than most navigation, and therefore stricter standards are applied. Navigation *may* require a very high level of accuracy, such as when navigating to a specific point for ground truthing; however, less stringent standards may be used when still far away from the point (>500 feet), or when navigating back to a vehicle. Therefore, some navigation standards are presented as a range of values, and while settings may be relaxed in some situations to find more satellites and generate more readings, they should be changed to the stricter standards as the user approaches a waypoint.

GRANIT retains many of the default receiver settings, and several others do not apply to the projects for which we typically use GPS. The settings listed below are only those that we adjust.

	DATA COLLECTION	NAVIGATION
Logging Intervals	GRANIT primarily collects point features, for which the selected interval is one per second. For line and polygon features, this selection would depend upon the straightness of the line and the speed of travel. Twenty to 60 static position fixes are needed when collecting a point feature.	Not applicable.
Position Mode	Manual 3-D	Manual 3-D (although Auto 2D/3D may be used if four satellites are not available, and high accuracy is not required)
Elevation Mask	15	Variable: 8 (less accurate) to 15 (more accurate)
Signal to Noise Ratio (SNR) Mask	6	6
PDOP Mask	6	Variable: 6 (more accurate) to 10 (less accurate)
PDOP Switch	6	6
Real time correction	Required for collection (set to "wait for real-time"). If it is unavailable, data may be post-processed using the differential correction utility in pathfinder office software and data downloaded from a base station.[1]	Not required for coarse navigation (set to "use uncorrected gps"). However, for highly accurate navigation to a waypoint, the user can set it to "wait for real-time." If real time correction is available, the user should try to get within 10 feet of the intended waypoint. Without real time correction, the user should get within 20 feet.

[1]GRANIT staff presently utilizes base station data from the New Hampshire Department of Transportation (http://www.nh.gov/dot/bureaus/highwaydesign/gps/), University of New

Hampshire (http://fac-gis.unh.edu/), and Vermont Agency of Transportation Continuously Operating GPS Reference Station (CORS) (http://www.aot.state.vt.us/geodetic/cors/vt-real-time.htm).