**Data Collection Objectives:**

The processes of data collection, processing, and analysis for this project are designed to detect prescribed ways of viewing and experiencing shrines. Chacoan structures are widely believed to have intentional visual connections with one another at community and regional scales. Assuming this is the case at Kin Klizhin as well, I plan to investigate what and how the residents of Kin Klizhin sought to communicate their ideology through these visual connections. This will be done by assessing visual connections between structures. Two sets of data will be used: GPS and photographic data of visibility at Kin Klizhin, and elevation data for the area that surrounds the site. These data will be used to generate digital representations of the intervisibility between points at the site (lines-of-sight) and models of what is visible to a person standing at particular points at the site (viewsheds).

A series of specific questions will be asked of the visual connections identified at Kin Klizhin with the ultimate goal of identifying the relationships between buildings in the community as they were imagined by the inhabitants. Preliminary questions include:

* Are there particular areas within the community that have significantly higher or lower visibility than the average?
* Are there viewing directions that are more represented than others? (directionality of visibility important?)
* When looking at the community from the tower kiva, what is the distribution of visibility across the community? Which areas are more or less visible?
* From what locations within the community is the tower kiva visible and not visible?

These and other similar questions will be investigated using line-of-sight visual connections as a primary data source and viewsheds as ancillary data for evaluating these line-of-sight connections. Viewsheds will provide a continous backdrop on which to drape discrete lines-of-sight to see where they fall in the spectrum of visibility and invisibility for each shrine.

Visual connections will be determined based on GPS point data collected at Kin Klizhin using GPS receivers. Three dimensional point locations will be acquired at multiple locations surrounding each structure at the site. Point locations will be collected for the corners, walls, and entrance, all at the ground level. For example, the location of a rectangular cluster of room blocks will be recorded from each corner of the rectangle and in the center of the building’s entrance (there is typically only one). The location of the entrance to each building will be recorded as this is assumed to be the most likely location for within-community intervisibility to occur with other structures and is common to all the structures of the site, whereas open windows and rooftops are either not readily accessible or not present.

The decay of buildings can significantly impact the relationships of visibility, even within a site, so this is an important thing to consider. We will attempt to estimate the height of buildings while in the field so that I can use this information to model the site digitally during my analysis. This will require not only measuring but also observing the qualities of the remaining structure to determine if it might have once stood taller than it does now. The survey report and other previous archaeological studies of the site will be helpful in making these determinations. These data will be collected primarily as notes coded with the site number.

We will take digital panoramic (360 degree) images will be captured, showing what is visible for a person standing along the margins of the tower kiva and at points in the site we deem significant while in the field. These will be used to check the results of the computerized visibility analysis, evaluate the scheme used in data processing which categorizes visibility by range (near, mid-range, far) and as an entry point for consumers of the final products of this project to connect the spatial data with real-life experience.

Finally, we will experiment with ranges of visibility. This will be done by observing a high-contrast object (such as a person in bright clothing that contrasts the red-brown soil) at further and further distances away from the viewer. A preliminary scheme will be proposed for ranges of distances that afford high, medium and low-quality visibility in the study area based on the detail with which the viewer can see the high-contrast object (Dungan 2009:53-59). This scheme will be considered during the data processing portion of the project and evaluated during the data analysis portion.

Every evening all data collected on the GPS units (and project files that were edited on the units) will be saved and they will be charged for the next day’s use. Digital images and paper notes will be returned to me where it will be stored in a bin together each night.

If possible, each evening we will back up the data stored on each GPS unit on a field computer. We will also check the Trimble Planning software almanac for the prime times to collect GPS data in the study area. This way we can schedule our time so that we maximize the accuracy and precision of the GPS data collected.

**Day 1: Setting up data collection on the GPS units**

* Turn on (green button)
* Make sure that second GPS unit is configured properly (COM3 for GPS Controller, COM2 for GPS settings and ArcPad GPS options)
* Familiarizing ourselves with the equipment
  + How to use the cradle
  + Basic stuff: on/off, stylus
  + How the file system works
  + Opening programs
* Creating a place to store the data
  + Open ArcPad using Start menu (if not in menu already, go to Programs and open it from there)
  + Create new project file “kinklizhin.apm” (1 and 2 if using both) – should pop up when you open ArcPad, otherwise use the main menu by clicking the circular GPS receiver image in the top left corner
  + Create new shapefile “kksites.apm” (1 and 2 if using both)
    - File tab, New, shapefile
    - Type of shapefile: pointz (three-dimensional points)
    - Field 1: Date
    - Field 2: number field so we can double-check?
    - Field 3: Label (text, 30 characters)
  + Turn on GPS (“GPS Active”) in GPS drop-down (satellite icon)
  + Set GPS options
    - Open the GPS drop-down (satellite icon in File tab) to explore GPS options
    - Capture tab: Enable Averaging, points (10) averaged, vertices (5)
    - Quality tab: Compulsory warnings, Max PDOP = 10, Max VDOP = 10
  + Make sure that the projection and units are correct in Map Properties
    - File tab, folder icon, Map Properties, projection tab (right-most tab)
    - To change projection: open Table of Contents (icon looks like a stack of yellow papers), Projection icon (like a folder with a globe in it), then select appropriate file
  + How to collect data
    - Make sure you are editing the layer you want to be editing: Feature tab, pencil icon, select layer you want
    - Feature type drop-down (always going to use point or offset-point, which is to the right)
    - Collect point using GPS by clicking the satellite icon with dots around it in the Feature tab (“Capture from GPS”)
      * WARNING: Make sure you wait until the unit collects all 10 of the data points it will be averaging so you get the most accurate data!
      * Fill out the note field and, if applicable, site code
    - If the location you want to measure is offset from your location vertically or horizontally, or both, use the Offset Point icon instead (all the way to the right in the same tab) and you can enter the offset distance and bearing before collecting data

**GPS Collection Routine:**

* Open ArcPad
* Open “kinklizhin.apm” (click this option when opening ArcPad – if it is not listed, navigate to the My ArcPad folder and select the file to open it)
* Enable GPS receiver (GPS Active)
* Ensure that projection, units, and GPS averaging are set correctly
* Add layer “kksites.lyr”
* Make sure that this is the layer being edited in the Features tab
* Select point as the type of feature to collect
* Capture data using “Capture from GPS”
* WARNING: Save the project (File tab, disk icon) every time you close ArcPad or take a break from collecting data (even for a few minutes – the unit goes to sleep to save battery). If the unit turns off fully (you press the power button), any data you collected since the last save will be lost!
* Connect GPS unit to a computer using the cable and copy all relevant data files to a folder for that day (create a new folder each day)
  + WARNING: There are usually 7 files associated with every shapefile, and if you only copy some of them these files will not open in ArcGIS and thus are not properly backed-up. Even if you do not recognize the file type, always copy EVERY FILE with the name of the shapefile or project file that you have created.

**Photograph Routine:**

* Make sure the battery is charged
* Make sure the SD card is in the camera
* Remove the lens cap
* Turn on the camera using the on/off switch on the top right of the body
* Set it to Landscape mode (the mountain icon)
* Ensure that the camera is set to AutoFocus (switch is on the left side of the lens)
* Take a picture
* Write down in notebook:
  + Picture number – find this by pressing the playback button on the bottom left of the back panel, then viewing the picture (use the arrows to scroll through pictures)
  + What the picture is of
  + The compass bearing if necessary (definitely do this if you are creating a panorama)

**Assessing Building Height:**

* Write the date and the page number on the page
* Note the site designation number
* Below the number, describe the wall/structure and include any measurements you have taken
* Describe your assessment of the wall/structure
* Take a photo including as much of the structure as possible, with a scale preferably. Note the number of the photo (the number that appears on the camera before it is taken).

**Assessing Ranges of Visibility:**

* Create a new shapefile
* Turn on the GPS receiver (GPS Active)
* Turn on the GPS tracklog
* Two people will stand still at a designated location and one will collect a data point at that location
* One person will stand still at a designated location while the other walks away holding the GPS unit
* When the stationary person’s facial features are no longer recognizable, the second person will collect a data point
* When the stationary person’s body definition is no longer recognizable and they look “like a blob”, the second person will collect another data point
* Collect a data point when the pin flag is indistinguishable from the background (should be quite far)
* Take photographs of a person at the thresholds identified