

# Determining Image Coordinates in MultiSpec



## What Changes Have Occured?

Beginning in 2000, GLOBE Program images provided to schools contain “georeferencing” data. That is, they contain information that allows you to directly access the position on the earth of any location in your image. To determine if you have such an image, examine the files on your GLOBE supplied disk. Georeferenced images will contain the following files:

XXXXXXXXXX.bil  
XXXXXXXXXX.hdr  
XXXXXXXXXX.prt

## What Do These Files Mean?

<u>Extension</u>	<u>File Type</u>
.bil	This is your image file
.hdr	A “header” file, read by software to provide location data
.prt	A “projection” file. This is a simple “text” file that you can access to obtain location data.

MultiSpec is able to read the header file and provide you with coordinate information about your image, *provided you are using a current version of MultiSpec*. If your MultiSpec program predates May 5, 2001, download the latest version from the Purdue site at:

<http://dynamo.ecn.purdue.edu/~biehl/MultiSpec/>

## How Do I Do It?

- ☐ **Launch** MultiSpec and **Open** your image in any band combination.
- ☐ Now open the “**Coordinate View**” window according to the instructions below.

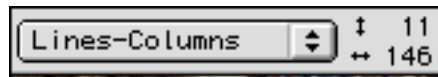
### Macintosh Version:

- ☐ From the **Window** menu, select **Show Coordinate View**.

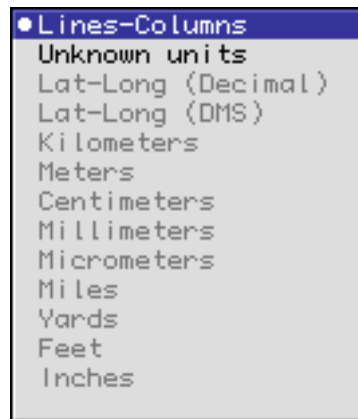
### PC Version

- ☐ From the **View** menu, select **Show Coordinate View**.

- ❑ Your image now shows the **Coordinate Window**, shown below, that displays the line and column number for the cursor position.



- ❑ From the pull-down menu at "**Lines-Columns**," select "**Unknown Units**" as shown below.



- ❑ Your Coordinate View window now displays numbers similar to those shown below.



### **This Does Not Look Like Latitude/Longitude!**

The coordinate window is displaying the image location in Mercator coordinates, but not in “normal” latitude/longitude. The coordinates are in the system known as **Universal Transverse Mercator (UTM)**. If you are not familiar with UTM coordinates, the next page of this tutorial provides some introductory information.

If you are already familiar with UTM, you can now accurately locate your GLOBE measurement sites on your image. This can be done either by setting your GPS unit to display UTM and taking readings at your sites, or using a “lat/lon to UTM” conversion program, available on many websites, to convert the readings you have already taken to UTM.

## What is UTM?

In the UTM system, the Earth is divided into 60 “zones” of longitude, each one 6° wide. Your position is measured in meters east of the western boundary of your zone, and in meters north either the Equator (Northern Hemisphere) or the South Pole (Southern Hemisphere.)



In the example above, the cursor is located:

4, 487,955 m north of the Equator

and

444,705 m from the reference line of its zone. (See **Appendix 1**)

## How Do I Know Which Zone I Am In?

Using your favorite word processing program, open the “.prt” (projection) file that accompanies your image. The first page of the .prt file for the image used in this tutorial (from Spain) is shown below. Note the data boxed in red: This gives you the UTM zone for your image.

```
IMAGE NAME:/sgs20/disk2/hubb/globe/myextras/p20132_spain001_tm.ddd
      NL:512          NS:512          NB:5          DTYPE:BYTE
LAST MODIFIED:      DATE:9-Nov-01    TIME:1422:46   SYSTEM:ieee-std
PROJ. CODE:(1)UTM          Valid:VALID
ZONE CODE:30              Valid:VALID
DATUM CODE:(317)WGS 1984:WGS84      Valid:VALID
PROJ. PARM:              Valid:VALID
A:  0.000000000000000E+00  0.000000000000000E+00  0.000000000000000E+00
B:  0.000000000000000E+00  0.000000000000000E+00  0.000000000000000E+00
C:  0.000000000000000E+00  0.000000000000000E+00  0.000000000000000E+00
D:  0.000000000000000E+00  0.000000000000000E+00  0.000000000000000E+00
E:  0.000000000000000E+00  0.000000000000000E+00  0.000000000000000E+00
CORNER COOR:          Y          X          Valid:VALID
  ULcorner:4.4848800000000E+06  4.3929000000000E+05
  URcorner:4.4848800000000E+06  4.5462000000000E+05
  LLcorner:4.4695500000000E+06  4.3929000000000E+05
  LRpcorner:4.4695500000000E+06  4.5462000000000E+05
PROJ. DIST:3.0000000000000E+01  3.0000000000000E+01  Valid:VALID
PROJ. UNITS:meters          Valid:VALID
  INCREMENT:1.0000000000000E+00  1.0000000000000E+00  Valid:VALID
MASTER COOR:2927  4230
```

## Appendix 1: What do These Numbers Mean?

In the UTM system, the 60 zones of longitude begin at the 180° meridian and are numbered increasing to the east. The United States is covered by 10 zones, beginning with #10 on the west coast, and ending with #19 on the east coast. All positions in the UTM system are measured in distances north (northing) and east (easting) of a reference line.

For the Northern Hemisphere, the equator is assigned a value of 0 000 000, and the latitude, or “northing coordinate” is measured in meters from the equator.



In the example above, the point being located is 4,487,995 m North of the Equator.

For the Southern Hemisphere, the South Pole is the origin, and locations are measured in meters north of that point, with the Equator being assigned a value of 10 000 000.

For each longitudinal zone, the central meridian is assigned a value of 500 000. Longitude values, called “easting coordinates” increase from west to east in each zone. Values less than 500 000 are to the west of the central meridian, and values greater than 500 000 are to the east of this line.

In the example above, the point 444,705 is 55 295 m to the west of the central meridian,