MiscUTMConstants

Inherits From: Object

Declared In: misckit/miscgiskit/MiscUTMConstants.h

Class Description

A MiscUTMConstants object is a container for the constants that define a particular Universal Transverse Mercator projection, and a number of fixed constants that are derived from the basic set of parameters.   The basic UTM parameters are:

World coordinate of True Origin: Latitude (in radians),   Longitude   (in radians)
True origin offset from grid origin: Meters East , Meters North
Spheroid: a= major semi-axis meters,   b= minor semi-axis   meters
Scaling at Central Meridian: scale factor

In most cases there is only need of a single instance of a particular set of constants. In such cases a

MiscUTMCoord subclass will create a single instance of a MiscUTMConstants object for use by all its members and then protect that instance against deletion by sending it the **setProtected** method. Once this is done it should not be undone: it is assumed that a MiscUTMConstants object will only be protected if there are many pointers to it laying around, ie the object could not be deleted with finding and nullifying each and every one of the outstanding pointers.

Most of the instance variables are public for fast access by MiscUTMCoordConverter instances. In use a MiscUTMConstants is little more than an object flavored cover for a struct that is passed to converters. It should ONLY be accessed directly by converters.

A MiscUTMConstants object can be generated for any possible UTM coordinate system.

Instance Variables

```
const char* gridName;
double a;
double b;
double F0;

@public
double phi0;
double lambda0;
double E0;
double N0;
double convergence;
double aF0;
double bF0;
double eSqrd;
```

```
double   M1;
double   M2;
double   M3;
double   M4;
```

gridName	Name of the UTM system, for example, "UK National Grid"
a	Ellipsoid major semi-axis in meters.
b	Ellipsoid minor semi-axis in meters.
F0	Scale factor at central Meridian.
phi0	Latitude of True Origin in radians.
lambda0	Longitude of True Origin in radians
E0	True Origin east offset from Grid Origin in meters.
N0	True Origin north offset from Grid Origin in meters.
convergence	Default of .1mm. Used in calculations from Grid back to World coordinates.
aF0	Ellipsoid major semi-axis in meters, corrected by scale factor.
bF0	Ellipsoid minor semi-axis in meters, corrected by scale factor.
eSqrd	Eccentricity squared. Set by UTMCoordConverter.
M1	First constant for calculation of "Developed Arc of a Meridian from phi to the True Origin".
M2	Second constant.
M3	Third constant.
M4	Fourth constant.

Method Types

Initialization	- initGridName:trueOrigin::inGrid::onSphere::centralMeridianScaling:
	- override_eSqrd:n:
	- setProtected
	- setUnprotected

	- free
Information	- gridName
	- isEqual:
Archiving	- read:
	- write:

Instance Methods

free
- **free**

Free the object unless it has been protected. Protected objects can never be freed.

See also: - **setProtected**

gridName
   - **gridName**

Returns a pointer to text name of the UTM grid represented by **self**.

initGridName:trueOrigin::inGrid::onSphere::centralMeridianScaling:
   - **initGridName:**   (const char *) *name* **trueOrigin:** (double) *deg_latitude* **:** (double) *deg_longitude* **inGrid:**
         (double) *e0* **:** (double) *n0* **onSphere:** (double) *a0* **:**   (double) *b0* **centralMeridianScaling:** (double) *f0*

Designated initializer for the MiscUTMConstants class.   The True Origin is specified in decimal degrees for

convenience, although it is stored internally as radians. *e0* and *n0* are the offset of the True Origin from the False Origin in meters. *a0* and *b0* are the major and minor semi-axis of the spheroid in meters. *aUTMConstant* is the id of a user initialized MiscUTMConstants object. *f0* is the scaling factor used on the central meridian, ie the meridian through the True Origin.

See also: - **free**, - **override_eSqrd:n:**

isEqual:
  - **isEqual:***anObject*

Returns YES if *anObject* is either the same object as **self** or if **a**, **b** , **F0**, **phi0, lambda0**, **E0** and **N0** are equal. Equivalence means that the two objects have the same effect when used in a conversion.

override_eSqrd:n:
  - **override_eSqrd:** (double)*new_eSqrd* **n:** (double)*n*

Override the calculated values of **eSqrd** and **n**. This is made available because some old references on UTM grids give truncated or even incorrectly calculated values. In order to reproduce the original value requires using the book values rather than calculated values. **M1-M4** are recalculated using the new constants. Returns **self**.

See also: - **initGridName:trueOrigin:inGrid:onSphere:centralMeridianScaling:**

read:
  - **read:**(NXTypedStream *)*stream*

Reads the object from the typed stream *stream*. Returns **self**.

See also: - **write:**

setProtected
    - **setProtected**

Protect the object from ever being deleted. Once done it should not be undone.   Returns **self**.

See also: - **free**

setUnprotected
    - **setUnprotected**

Unprotect the object so it can be deleted. This exists so that unarchive methods in MiscCoords can substitute a local, previously allocated and protected object for the unarchived one.   Returns **self**.

write:

    - **write:**(NXTypedStream *)*stream*

Writes the object to the typed stream *stream*.   Returns **self**.

See also: - **read:**