

# MiscPlanetCoordConverter

**Inherits From:** MiscCoordConverter : Object

**Declared In:** misckit/miscgiskit/MiscPlanetCoordConverter.h

## Class Description

A MiscPlanetCoordConverter object is able to convert any standard UTM Grid Coordinate to World Coordinates and vice versa. MiscUTMCoord and its' subclasses rely on it for conversion services.

This converter will respond to the **convert:to:** method for the following coordinate conversions:

<b>From Class</b>	<b>To Class</b>	<b>Note</b>
UTM	World	

World	UTM	
UKUTM	World	
World	UKUTM	
Zone UTM	World	
World	Zone UTM	
World	World	
UKUTM	UKUTM	
Zone UTM	Zone UTM	Will always try, but returns NO if zones are different.

For information on the underlying mathematics, refer to:

UK Ordnance Survey Information, "Transverse Mercator Projection, Constants, Formula and Methods",  
March 1983

;−The equations are theoretically accurate to within 1 millimeter going from world to UTM and approximately .001 second of arc going from UTM to world. Extra decimal places are stored for the purpose of slowing error propagation that affects the numbers at the millimeter scale, not because the extra digits are meaningful in and of themselves. If calculations require greater than 1mm accuracy, a different set of equations must be used:

Redfern, JCB, "Transverse Mercator Formulae", 1948, Empire Survey Review, 9(69) pg318-322

## Instance Variables

```
MiscUTMConstants *xlate;  
double sinPhi;  
double sin2Phi;  
double rho;  
double nu;  
double etaSqrd;  
double M;
```

xlate

pointer to the MiscUTMConstants object for direct access to conversion constants.

sinPhi

Internal blackboard temporary value:  $\sin \phi$ .

sin2Phi

Internal blackboard temporary value:  $\sin^2 \phi$ .

rho

Internal blackboard temporary value:  $\rho$ .

nu

Internal blackboard temporary value:  $\nu$ .

etaSqrd

Internal blackboard temporary value:  $\epsilon^2$ .

M

Internal blackboard temporary value: Developed Arc of a Meridian from  $\phi$  to the True Origin.

## Method Types

Creating new instances

+ new

- finishUnarchiving

Internal methods for subclassing- blackboardCalc:

- calcM:
- calcPhiPrime:
- + superalloc

## Class Methods

### **alloc**

Disables the inherited **alloc** method to prevent multiple MiscPlanetCoordConverters from being created. There's only one MiscPlanetCoordConverter for each application; you access it through the **new** method. Returns an error message.

**See also:** + **new**

### **allocFromZone:**

Disables the inherited **allocFromZone** method to prevent multiple MiscPlanetCoordConverters from being created. There's only one MiscPlanetCoordConverter object for each application; you access it through the **new** method. Returns an error message.

**See also:** + **new**

**new**

+ new

Create and initialize an instance of MiscPlanetCoordConverter if one does not already exist. If one already exists, return it. The new instance is registered so that it can also act as a subcontractor for other convertors.

**See also:** - free

**superalloc**

+ superalloc

**Internal use only.** Since normal alloc's are disabled, but we still must allow for subclasses that ALSO have only one instance, we have supplied this backdoor for allocation. Only for use by subclass writers.

**See also:** + new

## Instance Methods

**finishUnarchiving**

- finishUnarchiving

A **finishUnarchiving** message is sent after the MiscPlanetCoordConverter object has been read in from a

stream. This method substitutes an existing one substituted for it. **self** is freed and the existing object is returned.

## Internal Instance Methods

### **blackboardCalc:**

- (void)**blackboardCalc:** (double) *phi*

**Internal use only.** Calculate values for **sinPhi**, **sin2Phi**, **rho**, and **etaSqrd**. Uses **xlate** as a pointer to directly access data in a MiscUTMConstants object. Useful for subclass writers who have in depth knowledge of the internal code.

**See also:** - **calcM:**, - **calcPhiPrime:**

### **calcM:**

- (double)**calcM:** (double) *phi*

**Internal use only.** Calculate value for **M** given the value of *phi* as an argument. Uses **xlate** as a pointer to directly access data in a MiscUTMConstants object. Useful for subclass writers who have in depth knowledge of the internal code. Returns **M**.

**See also:** - **blackboardCalc:**, - **calcPhiPrime:**

**calcPhiPrime:**

- (double)calcPhiPrime: (double) *N*

**Internal use only.** Calculate a guess value for phi given the value of *N* (grid Northings) as an argument. Uses **xlate** as a pointer to directly access data in a MiscUTMConstants object. Useful for subclass writers who have in depth knowledge of the internal code. Returns **phi**.

**See also:** - **blackboardCalc:**, - **calcM:**