

# Namespace Axys

## Classes

### [AxysPlugin](#)

Entry point for the Axys Rhino plug-in. Rhino creates a single instance of this class which manages the plug-in life cycle. The plug-in logs its load and shutdown events using [Logger](#).

### [ScriptPipeMeshBlockCommand](#)

Automates the creation of a pipe from selected curves, meshes the result and defines a block instance from those meshes.

# Class AxysPlugin

Namespace: [Axys](#)

Assembly: RhinoPlugin.dll

Entry point for the Axys Rhino plug-in. Rhino creates a single instance of this class which manages the plug-in life cycle. The plug-in logs its load and shutdown events using [Logger](#).

```
public class AxysPlugin : PlugIn
```

## Inheritance

[object](#) ← PlugIn ← AxysPlugin

## Inherited Members

[PlugIn.LoadPlugIn\(string, out Guid\)](#) , [PlugIn.Find\(Assembly\)](#) , [PlugIn.Find\(Guid\)](#) ,  
PlugIn.LoadComputeExtensionPlugins() , [PlugIn.GetPluginSettings\(Guid, bool\)](#) ,  
[PlugIn.SavePluginSettings\(Guid\)](#) , PlugIn.RaiseOnPlugInSettingsSavedEvent() ,  
PlugIn.FlushSettingsSavedQueue() , [PlugIn.Icon\(Size\)](#) , PlugIn.GetCommands() ,  
[PlugIn.DisplayHelp\(nint\)](#) , PlugIn.ResetMessageBoxes() , PlugIn.CreateCommands() ,  
PlugIn.RegisterCommand(Command) , PlugIn.GetPlugInObject() ,  
PlugIn.ShouldCallWriteDocument(FileWriteOptions) ,  
PlugIn.WriteDocument(RhinoDoc, BinaryArchiveWriter, FileWriteOptions) ,  
PlugIn.ReadDocument(RhinoDoc, BinaryArchiveReader, FileReadOptions) ,  
[PlugIn.OptionsDialogPages\(List<OptionsDialogPage>\)](#) ,  
[PlugIn.DocumentPropertiesDialogPages\(RhinoDoc, List<OptionsDialogPage>\)](#) ,  
[PlugIn.ObjectPropertiesPages\(List<ObjectPropertiesPage>\)](#) ,  
PlugIn.ObjectPropertiesPages(ObjectPropertiesPageCollection) ,  
PlugIn.GetLicense(LicenseBuildType, ValidateProductKeyDelegate, OnLeaseChangedDelegate) ,  
[PlugIn.GetLicense\(LicenseCapabilities, string, ValidateProductKeyDelegate, OnLeaseChangedDelegate\)](#) ,  
[PlugIn.SetLicenseCapabilities\(string, LicenseCapabilities, Guid\)](#) ,  
[PlugIn.AskUserForLicense\(LicenseBuildType, bool, string, object, ValidateProductKeyDelegate, OnLeaseChangedDelegate\)](#) ,  
PlugIn.ReturnLicense() , [PlugIn.GetLicenseOwner\(out string, out string\)](#) , PlugIn.SaveSettings() ,  
[PlugIn.CommandSettings\(string\)](#) , [PlugIn.GetPlugInInfo\(Guid\)](#) ,  
[PlugIn.PlugInExists\(Guid, out bool, out bool\)](#) , PlugIn.GetInstalledPlugIns() ,  
[PlugIn.GetInstalledPlugIns\(bool\)](#) , PlugIn.GetInstalledPlugInNames() ,  
[PlugIn.GetInstalledPlugInNames\(PlugInType, bool, bool\)](#) ,  
[PlugIn.GetInstalledPlugInNames\(PlugInType, bool, bool, bool\)](#) , PlugIn.GetInstalledPlugInFolders() ,

[PlugIn.NameFromPath\(string\)](#) , [PlugIn.PathFromName\(string\)](#) , [PlugIn.PathFromId\(Guid\)](#) ,  
[PlugIn.IdFromPath\(string\)](#) , [PlugIn.IdFromName\(string\)](#) , [PlugIn.LoadPlugIn\(Guid\)](#) ,  
[PlugIn.LoadPlugIn\(Guid, bool, bool\)](#) , [PlugIn.GetEnglishCommandNames\(Guid\)](#) ,  
[PlugIn.SetLoadProtection\(Guid, bool\)](#) , [PlugIn.GetLoadProtection\(Guid, out bool\)](#) ,  
PlugIn.IsTextureSupported(RenderTexture) , PlugIn.Assembly , PlugIn.Id , PlugIn.LicenseId ,  
PlugIn.Name , PlugIn.Version , PlugIn.Description , PlugIn.LoadAtStartup , PlugIn.LoadTime ,  
PlugIn.AddToHelpMenu , PlugIn.LocalPlugInName , PlugIn.SettingsDirectoryAllUsers ,  
PlugIn.SettingsDirectory , PlugIn.Settings , PlugIn.WindowPositionSettings ,  
PlugIn.AskOnLoadProtection , PlugIn.InstalledPlugInCount , PlugIn.UnknownUserData ,  
PlugIn.SettingsSaved , [object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) ,  
[object.GetHashCode\(\)](#) , [object.GetType\(\)](#) , [object.MemberwiseClone\(\)](#) ,  
[object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Constructors

### AxysPlugin()

```
public AxysPlugin()
```

## Properties

### Instance

Gets the singleton instance of the plug-in created by Rhino.

```
public static AxysPlugin Instance { get; }
```

### Property Value

[AxysPlugin](#)

## Methods

### OnLoad(ref string)

Initializes the plug-in when Rhino loads it.

```
protected override LoadReturnCode OnLoad(ref string errorMessage)
```

## Parameters

errorMessage [string](#)

Receives a description in case the plug-in fails to load.

## Returns

LoadReturnCode

The Rhino.Plugins.LoadReturnCode describing load success.

## OnShutdown()

Invoked by Rhino during application shutdown to perform cleanup.

```
protected override void OnShutdown()
```

# Class ScriptPipeMeshBlockCommand

Namespace: [Axys](#)

Assembly: RhinoPlugin.dll

Automates the creation of a pipe from selected curves, meshes the result and defines a block instance from those meshes.

```
public class ScriptPipeMeshBlockCommand : Command
```

## Inheritance

[object](#) ← Command ← ScriptPipeMeshBlockCommand

## Inherited Members

[Command.IsValidCommandName\(string\)](#) , [Command.GetMostRecentCommands\(\)](#) ,  
[Command.RunProxyCommand\(Command.RunCommandDelegate, RhinoDoc, object\)](#) ,  
Command.OnHelp() , Command.GetCommandStack() , Command.InCommand() ,  
Command.InScriptRunnerCommand() , [Command.IsCommand\(string\)](#) ,  
[Command.LookupCommandId\(string, bool\)](#) , [Command.LookupCommandName\(Guid, bool\)](#) ,  
[Command.GetCommandNames\(bool, bool\)](#) , [Command.DisplayHelp\(Guid\)](#) ,  
Command.ReplayHistory(ReplayHistoryData) , Command.LastCommandId ,  
Command.LastCommandResult , Command.PlugIn , Command.Id , Command.LocalName ,  
Command.Settings , Command.CommandContextHelpUrl , Command.BeginCommand ,  
Command.EndCommand , Command.UndoRedo , [object.Equals\(object\)](#) ,  
[object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Properties

### EnglishName

Gets the name of the command. This method is abstract.

```
public override string EnglishName { get; }
```

### Property Value

[string](#)

## Instance

Singleton instance of the command.

```
public static ScriptPipeMeshBlockCommand Instance { get; }
```

## Property Value

[ScriptPipeMeshBlockCommand](#)

## Methods

### RunCommand(RhinoDoc, RunMode)

Pipes the selected curves, converts them to meshes and creates a block instance.

```
protected override Result RunCommand(RhinoDoc doc, RunMode mode)
```

#### Parameters

**doc** RhinoDoc

Active Rhino document.

**mode** RunMode

Execution mode.

#### Returns

Result

Result of the command execution.

# Namespace Axys.Commands

## Classes

### [ExportToVision](#)

Exports geometry to USDZ format and streams the file to connected Axys clients via WebSocket.

### [StartAxysCommand](#)

Rhino command that starts the local WebSocket server allowing external Axys clients to connect and exchange messages.

### [TrackObjectCommand](#)

Wraps [ExecuteTrackObjectLogic\(RhinoDoc\)](#) in a Rhino command so object tracking can be invoked interactively.

# Class ExportToVision

Namespace: [Axys.Commands](#)

Assembly: RhinoPlugin.dll

Exports geometry to USDZ format and streams the file to connected Axys clients via WebSocket.

```
public class ExportToVision : Command
```

## Inheritance

[object](#) ← Command ← ExportToVision

## Inherited Members

[Command.IsValidCommandName\(string\)](#) , [Command.GetMostRecentCommands\(\)](#) ,  
[Command.RunProxyCommand\(Command.RunCommandDelegate, RhinoDoc, object\)](#) ,  
Command.OnHelp() , Command.GetCommandStack() , Command.InCommand() ,  
Command.InScriptRunnerCommand() , [Command.IsCommand\(string\)](#) ,  
[Command.LookupCommandId\(string, bool\)](#) , [Command.LookupCommandName\(Guid, bool\)](#) ,  
[Command.GetCommandNames\(bool, bool\)](#) , [Command.DisplayHelp\(Guid\)](#) ,  
Command.ReplayHistory(ReplayHistoryData) , Command.LastCommandId ,  
Command.LastCommandResult , Command.Plugin , Command.Id , Command.LocalName ,  
Command.Settings , Command.CommandContextHelpUrl , Command.BeginCommand ,  
Command.EndCommand , Command.UndoRedo , [object.Equals\(object\)](#) ,  
[object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Constructors

### ExportToVision()

Initializes a new instance of the command and stores it in [Instance](#) for access from script commands.

```
public ExportToVision()
```

## Fields

## LastExportedUSDZPath

File path of the most recently exported USDZ file.

```
public static string LastExportedUSDZPath
```

### Field Value

[string](#)

## SelectedObjectId

Identifier of the object last selected for export.

```
public static Guid SelectedObjectId
```

### Field Value

[Guid](#)

## Properties

### EnglishName

Gets the name of the command. This method is abstract.

```
public override string EnglishName { get; }
```

### Property Value

[string](#)

### Instance

Singleton instance created by Rhino so other classes can invoke the command.

```
public static ExportToVision Instance { get; }
```

## Property Value

[ExportToVision](#)

## Methods

### ExportUSDZ(dynamic)

Handles the `ExportUSDZ` command received from a WebSocket connection.

```
public static Result ExportUSDZ(dynamic message)
```

#### Parameters

`message` dynamic

JSON payload describing the export request.

#### Returns

Result

`Rhino.Commands.Result.Success` if the request is dispatched.

#### Remarks

Execution is marshalled onto the Rhino UI thread.

### RunCommand(RhinoDoc, RunMode)

Prompts the user for an object selection and stores the identifier for export. If no object is selected the command attempts to create a pipe → mesh → block and selects the resulting instance.

```
protected override Result RunCommand(RhinoDoc doc, RunMode mode)
```

#### Parameters

**doc** RhinoDoc

Active Rhino document.

**mode** RunMode

Execution mode.

## Returns

Result

Rhino.Commands.Result.Success when an object is selected.

# Class StartAxysCommand

Namespace: [Axys.Commands](#)

Assembly: RhinoPlugin.dll

Rhino command that starts the local WebSocket server allowing external Axys clients to connect and exchange messages.

```
public class StartAxysCommand : Command
```

## Inheritance

[object](#) ← Command ← StartAxysCommand

## Inherited Members

[Command.IsValidCommandName\(string\)](#) , [Command.GetMostRecentCommands\(\)](#) ,  
[Command.RunProxyCommand\(Command.RunCommandDelegate, RhinoDoc, object\)](#) ,  
Command.OnHelp() , Command.GetCommandStack() , Command.InCommand() ,  
Command.InScriptRunnerCommand() , [Command.IsCommand\(string\)](#) ,  
[Command.LookupCommandId\(string, bool\)](#) , [Command.LookupCommandName\(Guid, bool\)](#) ,  
[Command.GetCommandNames\(bool, bool\)](#) , [Command.DisplayHelp\(Guid\)](#) ,  
Command.ReplayHistory(ReplayHistoryData) , Command.LastCommandId ,  
Command.LastCommandResult , Command.PlugIn , Command.Id , Command.LocalName ,  
Command.Settings , Command.CommandContextHelpUrl , Command.BeginCommand ,  
Command.EndCommand , Command.UndoRedo , [object.Equals\(object\)](#) ,  
[object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Properties

### EnglishName

Gets the name of the command. This method is abstract.

```
public override string EnglishName { get; }
```

### Property Value

[string](#)

## Instance

Singleton instance created by Rhino so the command can be executed programmatically.

```
public static StartAxysCommand Instance { get; }
```

## Property Value

[StartAxysCommand](#)

## Methods

### RunCommand(RhinoDoc, RunMode)

Starts the WebSocket server on the local machine.

```
protected override Result RunCommand(RhinoDoc doc, RunMode mode)
```

#### Parameters

**doc** RhinoDoc

Active Rhino document.

**mode** RunMode

Command run mode.

#### Returns

Result

Success if the server was started.

# Class TrackObjectCommand

Namespace: [Axys.Commands](#)

Assembly: RhinoPlugin.dll

Wraps [ExecuteTrackObjectLogic\(RhinoDoc\)](#) in a Rhino command so object tracking can be invoked interactively.

```
public class TrackObjectCommand : Command
```

## Inheritance

[object](#) ← Command ← TrackObjectCommand

## Inherited Members

[Command.IsValidCommandName\(string\)](#) , [Command.GetMostRecentCommands\(\)](#) ,  
[Command.RunProxyCommand\(Command.RunCommandDelegate, RhinoDoc, object\)](#) ,  
Command.OnHelp() , Command.GetCommandStack() , Command.InCommand() ,  
Command.InScriptRunnerCommand() , [Command.IsCommand\(string\)](#) ,  
[Command.LookupCommandId\(string, bool\)](#) , [Command.LookupCommandName\(Guid, bool\)](#) ,  
[Command.GetCommandNames\(bool, bool\)](#) , [Command.DisplayHelp\(Guid\)](#) ,  
Command.ReplayHistory(ReplayHistoryData) , Command.LastCommandId ,  
Command.LastCommandResult , Command.PlugIn , Command.Id , Command.LocalName ,  
Command.Settings , Command.CommandContextHelpUrl , Command.BeginCommand ,  
Command.EndCommand , Command.UndoRedo , [object.Equals\(object\)](#) ,  
[object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) , [object.GetType\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) , [object.ToString\(\)](#)

## Properties

### EnglishName

Gets the name of the command. This method is abstract.

```
public override string EnglishName { get; }
```

### Property Value

[string](#)

## Instance

Singleton instance created by Rhino.

```
public static TrackObjectCommand Instance { get; }
```

## Property Value

[TrackObjectCommand](#)

## Methods

### RunCommand(RhinoDoc, RunMode)

Executes the tracking routine and sends object information over WebSocket.

```
protected override Result RunCommand(RhinoDoc doc, RunMode mode)
```

#### Parameters

**doc** RhinoDoc

Active Rhino document.

**mode** RunMode

Execution mode.

#### Returns

Result

Result of the tracking operation.

# Namespace Axys.Managers.Geometry

## Classes

### [ExportHelpers](#)

Helper routines used during USDZ export operations.

### [GeometryConversion](#)

Utility methods that convert Rhino geometry into forms suitable for USDZ export.

## Structs

### [ExportHelpers.ExportResult](#)

Result information returned from an export operation.

# Class ExportHelpers

Namespace: [Axys.Managers.Geometry](#)

Assembly: RhinoPlugin.dll

Helper routines used during USDZ export operations.

```
public static class ExportHelpers
```

## Inheritance

[object](#) ← ExportHelpers

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) ,  
[object.GetType\(\)](#) , [object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) ,  
[object.ToString\(\)](#)

## Methods

### CalculateBlockInstanceOrigin(RhinoObject)

Calculates the origin point of a block instance by combining the bounding boxes of its contained geometry.

```
public static Point3d CalculateBlockInstanceOrigin(RhinoObject obj)
```

## Parameters

**obj** RhinoObject

The instance object to evaluate.

## Returns

Point3d

Center point of the block instance or Rhino.Geometry.Point3d.Unset on failure.

# ExportSelectedObjectToUSDZ(RhinoDoc, GeometryBase, Guid)

Exports the specified geometry to a temporary USDZ file.

```
public static ExportHelpers.ExportResult ExportSelectedObjectToUSDZ(RhinoDoc doc,  
GeometryBase preparedGeometry, Guid objectId)
```

## Parameters

**doc** RhinoDoc

Active Rhino document.

**preparedGeometry** GeometryBase

Geometry already prepared for export.

**objectId** [Guid](#)

Identifier of the object being exported.

## Returns

[ExportHelpers.ExportResult](#)

Information about the exported file.

# Struct ExportHelpers.ExportResult

Namespace: [Axys.Managers.Geometry](#)

Assembly: RhinoPlugin.dll

Result information returned from an export operation.

```
public struct ExportHelpers.ExportResult
```

## Inherited Members

[ValueType.Equals\(object\)](#) , [ValueType.GetHashCode\(\)](#) , [ValueType.ToString\(\)](#) ,  
[object.Equals\(object, object\)](#) , [object.GetType\(\)](#) , [object.ReferenceEquals\(object, object\)](#)

## Fields

### Path

Location of the generated file.

```
public string Path
```

### Field Value

[string](#)

### Success

Whether the export succeeded.

```
public bool Success
```

### Field Value

[bool](#)

# Class GeometryConversion

Namespace: [Axys.Managers.Geometry](#)

Assembly: RhinoPlugin.dll

Utility methods that convert Rhino geometry into forms suitable for USDZ export.

```
public static class GeometryConversion
```

## Inheritance

[object](#) ← GeometryConversion

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) ,  
[object.GetType\(\)](#) , [object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) ,  
[object.ToString\(\)](#)

## Methods

### ConvertMultipleCurvesToJoinedPipe(List<Curve>, RhinoDoc, double)

Converts a collection of curves to pipe Breps and joins them into one Brep.

```
public static Brep ConvertMultipleCurvesToJoinedPipe(List<Curve> curves, RhinoDoc doc, double pipeRadius)
```

## Parameters

**curves** [List](#)<Curve>

Curves to pipe.

**doc** RhinoDoc

Active Rhino document.

**pipeRadius** [double](#)

Radius of the pipe.

## Returns

Brep

Joined Brep of all pipes or `null` if conversion fails.

## ConvertPolyCurveToBrep(PolyCurve, RhinoDoc, double)

Creates a Brep pipe along each segment of a polycurve and joins them into a single Brep.

```
public static Brep ConvertPolyCurveToBrep(PolyCurve polyCurve, RhinoDoc doc,  
double pipeRadius)
```

## Parameters

`polyCurve` PolyCurve

The polycurve to convert.

`doc` RhinoDoc

Active Rhino document.

`pipeRadius` [double](#)

Radius of the generated pipes.

## Returns

Brep

A joined Brep representing the pipe or `null` on failure.

## PrepareGeometryForExport(RhinoDoc, RhinoObject)

Converts the selected object into geometry that can be exported as USDZ. Handles curves, blocks, extrusions and meshes.

```
public static GeometryBase PrepareGeometryForExport(RhinoDoc doc,  
RhinoObject selectedObj)
```

## Parameters

**doc** RhinoDoc

Active Rhino document.

**selectedObj** RhinoObject

Object chosen for export.

## Returns

GeometryBase

Geometry ready for export or **null** if conversion fails.

# Namespace Axys.Managers.Networking

## Classes

### [MessageHandler](#)

Provides helper methods for creating JSON messages exchanged via WebSocket.

### [USDZExportManager](#)

Sends exported USDZ files to connected clients in chunks over WebSocket.

### [WebSocketServerManager](#)

Manages the WebSocket server used for communicating with Axys clients.

# Class MessageHandler

Namespace: [Axys.Managers.Networking](#)

Assembly: RhinoPlugin.dll

Provides helper methods for creating JSON messages exchanged via WebSocket.

```
public class MessageHandler
```

## Inheritance

[object](#) ← MessageHandler

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) ,  
[object.GetType\(\)](#) , [object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) ,  
[object.ToString\(\)](#)

## Methods

### CreateAndSerializeMessage(string, string)

Creates a [WebSocketMessage](#) and serializes it to JSON.

```
public static string CreateAndSerializeMessage(string type, string description)
```

#### Parameters

**type** [string](#)

Message type such as [info](#) or [error](#).

**description** [string](#)

Human readable message text.

#### Returns

[string](#)

JSON encoded message.

# Class USDZExportManager

Namespace: [Axys.Managers.Networking](#)

Assembly: RhinoPlugin.dll

Sends exported USDZ files to connected clients in chunks over WebSocket.

```
public static class USDZExportManager
```

## Inheritance

[object](#) ← USDZExportManager

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) ,  
[object.GetType\(\)](#) , [object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) ,  
[object.ToString\(\)](#)

## Methods

### ExecuteExportAsync(byte[], string)

Streams a USDZ file to all connected clients.

```
public static Task ExecuteExportAsync(byte[] fileBytes, string filePath)
```

## Parameters

**fileBytes** [byte](#)[]

Contents of the USDZ file.

**filePath** [string](#)

Original path to the file on disk for metadata.

## Returns

[Task](#)

# Class WebSocketServerManager

Namespace: [Axys.Managers.Networking](#)

Assembly: RhinoPlugin.dll

Manages the WebSocket server used for communicating with Axys clients.

```
public static class WebSocketServerManager
```

## Inheritance

[object](#) ← WebSocketServerManager

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) ,  
[object.GetType\(\)](#) , [object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) ,  
[object.ToString\(\)](#)

## Methods

### BroadcastBinary(byte[])

Sends raw binary data to all connected WebSocket clients.

```
public static Task BroadcastBinary(byte[] data)
```

## Parameters

**data** [byte](#)[]

Byte array to transmit.

## Returns

[Task](#)

### BroadcastMessage(string)

Sends a text message to all connected WebSocket clients.

```
public static void BroadcastMessage(string message)
```

## Parameters

`message` [string](#)

UTF-8 encoded text message.

## GetLocalIPAddressOfSelf()

Attempts to determine a non-loopback IPv4 address for this machine.

```
public static string GetLocalIPAddressOfSelf()
```

## Returns

[string](#)

IP address string.

## Exceptions

[Exception](#)

Thrown if no suitable address is found.

## IsServerRunning()

Determines whether the server is active and has connected clients.

```
public static bool IsServerRunning()
```

## Returns

[bool](#)

True if at least one WebSocket connection is available.

## ProcessUpdateMessage(string)

Processes a position update message received from a client. Moves the referenced Rhino object to the specified coordinates.

```
public static void ProcessUpdateMessage(string json)
```

### Parameters

`json` [string](#)

JSON update payload.

## StartServer()

Starts the WebSocket server and begins listening for client connections.

```
public static void StartServer()
```

# Namespace Axys.Managers.ObjectHandling

## Classes

### [MaterialManager](#)

Utility functions for assigning and selecting materials on Rhino objects.

### [ObjectPositionManager](#)

Provides helper methods for querying and modifying object positions within the Rhino document.

### [SelectionObjectManager](#)

Helper methods for selecting geometry and resolving instance definitions.

# Class MaterialManager

Namespace: [Axys.Managers.ObjectHandling](#)

Assembly: RhinoPlugin.dll

Utility functions for assigning and selecting materials on Rhino objects.

```
public class MaterialManager
```

## Inheritance

[object](#) ← MaterialManager

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) ,  
[object.GetType\(\)](#) , [object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) ,  
[object.ToString\(\)](#)

## Methods

### ApplyMaterialIfMissing(RhinoObject, RhinoDoc, int)

Applies a material to the given object if it does not already have one.

```
public static void ApplyMaterialIfMissing(RhinoObject rhObj, RhinoDoc doc,  
int materialIndex)
```

## Parameters

**rhObj** RhinoObject

Rhino object to modify.

**doc** RhinoDoc

Active Rhino document.

**materialIndex** [int](#)

Index of the material to assign.

## SelectMaterial(RhinoDoc)

Displays a Rhino UI prompt allowing the user to choose a material. Creates a default material when none exist.

```
public static int SelectMaterial(RhinoDoc doc)
```

### Parameters

**doc** RhinoDoc

Active Rhino document.

### Returns

[int](#)

Index of the chosen material.

# Class ObjectPositionManager

Namespace: [Axys.Managers.ObjectHandling](#)

Assembly: RhinoPlugin.dll

Provides helper methods for querying and modifying object positions within the Rhino document.

```
public class ObjectPositionManager
```

## Inheritance

[object](#) ← ObjectPositionManager

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) ,  
[object.GetType\(\)](#) , [object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) ,  
[object.ToString\(\)](#)

## Constructors

### ObjectPositionManager(RhinoDoc)

Initializes a new instance bound to the specified document.

```
public ObjectPositionManager(RhinoDoc doc)
```

## Parameters

**doc** RhinoDoc

Active Rhino document.

## Methods

### CreateObjectData(Guid)

Builds a [RhinoObjectData](#) structure describing a single object.

```
public RhinoObjectData CreateObjectData(Guid objectId)
```

## Parameters

**objectId** [Guid](#)

Identifier of the object.

## Returns

[RhinoObjectData](#)

Serialized data for sending over WebSocket.

## CreateObjectDataBatch(List<RhinoObjectData>)

Packages multiple [RhinoObjectData](#) entries into a batch message.

```
public RhinoObjectDataBatch CreateObjectDataBatch(List<RhinoObjectData>  
objectDataList)
```

## Parameters

**objectDataList** [List](#)<[RhinoObjectData](#)>

Objects to include in the batch.

## Returns

[RhinoObjectDataBatch](#)

Batch container object.

## GetAbsolutePosition(Guid)

Calculates the absolute world position of an object.

```
public Point3d GetAbsolutePosition(Guid objectId)
```

## Parameters

**objectId** [Guid](#)

Object identifier.

## Returns

Point3d

World coordinate of the object center or Rhino.Geometry.Point3d.Unset if not found.

## MoveObject(Guid, Point3d)

Moves an object to the given position in world coordinates.

```
public bool MoveObject(Guid objectId, Point3d newPosition)
```

## Parameters

**objectId** [Guid](#)

Identifier of the object to move.

**newPosition** Point3d

Target world position.

## Returns

[bool](#)

True if the move succeeded.

# Class SelectionObjectManager

Namespace: [Axys.Managers.ObjectHandling](#)

Assembly: RhinoPlugin.dll

Helper methods for selecting geometry and resolving instance definitions.

```
public static class SelectionObjectManager
```

## Inheritance

[object](#) ← SelectionObjectManager

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) ,  
[object.GetType\(\)](#) , [object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) ,  
[object.ToString\(\)](#)

## Methods

### EnsureObjectIsSelected(RhinoDoc, Guid)

Ensures an object is selected, optionally prompting the user.

```
public static Guid EnsureObjectIsSelected(RhinoDoc doc, Guid currentId)
```

#### Parameters

**doc** RhinoDoc

Active Rhino document.

**currentId** [Guid](#)

Pre-selected object identifier.

#### Returns

[Guid](#)

The confirmed object identifier or [Empty](#) if selection failed.

## FindInstanceDefinitionByGuid(RhinoDoc, Guid)

Retrieves an instance definition by Guid to avoid name collisions.

```
public static InstanceDefinition FindInstanceDefinitionByGuid(RhinoDoc doc,  
Guid id)
```

### Parameters

**doc** RhinoDoc

Active Rhino document.

**id** [Guid](#)

Identifier of the instance definition.

### Returns

InstanceDefinition

The instance definition or null if not found.

## ProcessInstanceReference(InstanceReferenceGeometry, RhinoDoc, List<Brep>, List<Mesh>, List<Curve>)

Expands an instance reference and collects its geometry into separate lists.

```
public static void ProcessInstanceReference(InstanceReferenceGeometry instanceRef,  
RhinoDoc doc, List<Brep> breps, List<Mesh> meshes, List<Curve> curves)
```

### Parameters

**instanceRef** InstanceReferenceGeometry

Reference geometry pointing to the block instance.

**doc** RhinoDoc

Active Rhino document.

**breps** [List ↗](#)<Brep>

Collection receiving Brep geometry.

**meshes** [List ↗](#)<Mesh>

Collection receiving Mesh geometry.

**curves** [List ↗](#)<Curve>

Collection receiving Curve geometry.

# Namespace Axys.Models

## Classes

[Center](#)

[RhinoObjectData](#)

[RhinoObjectDataBatch](#)

[RhinoObjectInfo](#)

Lightweight container used to expose basic object information to clients.

# Class Center

Namespace: [Axys.Models](#)

Assembly: RhinoPlugin.dll

```
public class Center
```

## Inheritance

[object](#) ← Center

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) ,  
[object.GetType\(\)](#) , [object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) ,  
[object.ToString\(\)](#)

# Properties

X

```
[JsonProperty("x")]
public double X { get; set; }
```

## Property Value

[double](#)

Y

```
[JsonProperty("y")]
public double Y { get; set; }
```

## Property Value

[double](#)

Z

```
[JsonProperty("z")]
public double Z { get; set; }
```

Property Value

double ↗

# Class RhinoObjectData

Namespace: [Axys.Models](#)

Assembly: RhinoPlugin.dll

```
public class RhinoObjectData
```

## Inheritance

[object](#) ← RhinoObjectData

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) ,  
[object.GetType\(\)](#) , [object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) ,  
[object.ToString\(\)](#)

# Properties

## Center

```
[JsonProperty("center")]
public Center Center { get; set; }
```

## Property Value

[Center](#)

## ObjectId

```
[JsonProperty("objectId")]
public string ObjectId { get; set; }
```

## Property Value

[string](#)

## ObjectName

```
[JsonProperty("objectName")]
public string ObjectName { get; set; }
```

### Property Value

[string](#) ↗

## Timestamp

```
[JsonProperty("timestamp")]
public long Timestamp { get; set; }
```

### Property Value

[long](#) ↗

## Type

```
[JsonProperty("type")]
public string Type { get; set; }
```

### Property Value

[string](#) ↗

# Class RhinoObjectDataBatch

Namespace: [Axys.Models](#)

Assembly: RhinoPlugin.dll

```
public class RhinoObjectDataBatch
```

## Inheritance

[object](#) ← RhinoObjectDataBatch

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) ,  
[object.GetType\(\)](#) , [object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) ,  
[object.ToString\(\)](#)

# Properties

## Objects

```
[JsonProperty("objects")]
public List<RhinoObjectData> Objects { get; set; }
```

## Property Value

[List](#)<[RhinoObjectData](#)>

## Timestamp

```
[JsonProperty("timestamp")]
public long Timestamp { get; set; }
```

## Property Value

[long](#)

## Type

```
[JsonProperty("type")]
public string Type { get; set; }
```

## Property Value

[string](#) ↗

# Class RhinoObjectInfo

Namespace: [Axys.Models](#)

Assembly: RhinoPlugin.dll

Lightweight container used to expose basic object information to clients.

```
public class RhinoObjectInfo
```

## Inheritance

[object](#) ← RhinoObjectInfo

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) ,  
[object.GetType\(\)](#) , [object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) ,  
[object.ToString\(\)](#)

## Properties

### Id

Unique identifier of the object.

```
public Guid Id { get; set; }
```

### Property Value

[Guid](#)

### Name

Display name.

```
public string Name { get; set; }
```

### Property Value

[string](#) ↗

## ObjectType

Type of Rhino object.

```
public string ObjectType { get; set; }
```

## Property Value

[string](#) ↗

# Namespace Axys.Utilities

## Classes

### [CommandUtilities](#)

Shared command implementations that can be invoked from multiple entry points.

# Class CommandUtilities

Namespace: [Axys.Utilities](#)

Assembly: RhinoPlugin.dll

Shared command implementations that can be invoked from multiple entry points.

```
public static class CommandUtilities
```

## Inheritance

[object](#) ← CommandUtilities

## Inherited Members

[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) ,  
[object.GetType\(\)](#) , [object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#) ,  
[object.ToString\(\)](#)

## Methods

### ExecuteTrackObjectLogic(RhinoDoc)

Tracks selected objects and broadcasts their positions via WebSocket.

```
public static Result ExecuteTrackObjectLogic(RhinoDoc doc)
```

#### Parameters

**doc** RhinoDoc

Active Rhino document.

#### Returns

Result

Command result indicating success or failure.

# Namespace RhinoPlugin

## Classes

### [GeometryProcessingException](#)

Thrown when geometry processing fails during export or conversion.

### [GeometrySelectionException](#)

Thrown when geometry cannot be selected or resolved.

# Class GeometryProcessingException

Namespace: [RhinoPlugin](#)

Assembly: RhinoPlugin.dll

Thrown when geometry processing fails during export or conversion.

```
public class GeometryProcessingException : Exception, ISerializable
```

## Inheritance

[object](#) ← [Exception](#) ← GeometryProcessingException

## Implements

[ISerializable](#)

## Inherited Members

[Exception.GetBaseException\(\)](#) , [Exception.GetObjectData\(SerializationInfo, StreamingContext\)](#) ,  
[Exception.GetType\(\)](#) , [Exception.ToString\(\)](#) , [Exception.Data](#) , [Exception.HelpLink](#) ,  
[Exception.HResult](#) , [Exception.InnerException](#) , [Exception.Message](#) , [Exception.Source](#) ,  
[Exception.StackTrace](#) , [Exception.TargetSite](#) , [Exception.SerializeObjectState](#) ,  
[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#)

## Constructors

### GeometryProcessingException(string)

```
public GeometryProcessingException(string message)
```

#### Parameters

message [string](#)

### GeometryProcessingException(string, Exception)

```
public GeometryProcessingException(string message, Exception innerException)
```

## Parameters

message [string](#)

innerException [Exception](#)

# Class GeometrySelectionException

Namespace: [RhinoPlugin](#)

Assembly: RhinoPlugin.dll

Thrown when geometry cannot be selected or resolved.

```
public class GeometrySelectionException : Exception, ISerializable
```

## Inheritance

[object](#) ← [Exception](#) ← GeometrySelectionException

## Implements

[ISerializable](#)

## Inherited Members

[Exception.GetBaseException\(\)](#) , [Exception.GetObjectData\(SerializationInfo, StreamingContext\)](#) ,  
[Exception.GetType\(\)](#) , [Exception.ToString\(\)](#) , [Exception.Data](#) , [Exception.HelpLink](#) ,  
[Exception.HResult](#) , [Exception.InnerException](#) , [Exception.Message](#) , [Exception.Source](#) ,  
[Exception.StackTrace](#) , [Exception.TargetSite](#) , [Exception.SerializeObjectState](#) ,  
[object.Equals\(object\)](#) , [object.Equals\(object, object\)](#) , [object.GetHashCode\(\)](#) ,  
[object.MemberwiseClone\(\)](#) , [object.ReferenceEquals\(object, object\)](#)

## Constructors

### GeometrySelectionException(string)

```
public GeometrySelectionException(string message)
```

#### Parameters

message [string](#)

### GeometrySelectionException(string, Exception)

```
public GeometrySelectionException(string message, Exception innerException)
```

## Parameters

message [string](#)

innerException [Exception](#)