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# Namespace Uralstech.UXR.QuestCamera

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Extensions for System.Action.

### [CameraDevice](#)

A wrapper for a native Camera2 CameraDevice.

### [CameraInfo](#)

Wrapper for Camera2's CameraCharacteristics.

### [CameraInfo.CameraIntrinsics](#)

Defines the camera's intrinsic properties. All values are in pixels.

### [CameraSupport](#)

Utility to check if the current Meta Quest device supports the Passthrough Camera API.

### [CapturePipeline<T>](#)

Simple class for grouping a capture session and its texture converter.

### [ContinuousCaptureSession](#)

A wrapper for a native Camera2 CaptureSession and ImageReader.

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QOL extensions for the JNI.

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A wrapper for a native Camera2 CaptureSession and ImageReader.

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### [CameraDevice.ErrorCode](#)

Error codes that can be returned by the native CameraDevice wrapper.

### [CameraInfo.CameraEye](#)

The camera eye.

### [CameraInfo.CameraSource](#)

The source of the camera feed.

### [CaptureTemplate](#)

Capture template to use when recording.

### [NativeWrapperState](#)

The current assumed state of a native wrapper.

# Class ActionExtensions

Namespace: [Uralstech.UXR.QuestCamera](#)

Extensions for System.Action.

```
public static class ActionExtensions
```

## Inheritance

object ← ActionExtensions

## Methods

### InvokeOnMainThread(Action?)

Invokes the current action on the main thread.

```
public static void InvokeOnMainThread(this Action? current)
```

## Parameters

**current** Action

### InvokeOnMainThread<T>(Action<T>?, T)

Invokes the current action on the main thread.

```
public static void InvokeOnMainThread<T>(this Action<T>? current, T arg0)
```

## Parameters

**current** Action<T>

**arg0** T

## Type Parameters

T

## InvokeOnMainThread<T0, T1>(Action<T0, T1>?, T0, T1)

Invokes the current action on the main thread.

```
public static void InvokeOnMainThread<T0, T1>(this Action<T0, T1>? current, T0 arg0,  
T1 arg1)
```

### Parameters

**current** Action<T0, T1>

**arg0** T0

**arg1** T1

### Type Parameters

**T0**

**T1**

# Class CameraDevice

Namespace: [Uralstech.UXR.QuestCamera](#)

A wrapper for a native Camera2 CameraDevice.

```
public class CameraDevice : AndroidJavaProxy
```

## Inheritance

object ← CameraDevice

## Constructors

### CameraDevice()

```
public CameraDevice()
```

## Fields

### \_cameraDevice

```
protected AndroidJavaObject? _cameraDevice
```

## Field Value

AndroidJavaObject?

## Properties

### CameraId

The ID of the camera being wrapped. This value is **not** cached - it is requested from the native plugin on every access.

```
public string CameraId { get; }
```

Property Value

string

## CurrentState

The current assumed state of the native CameraDevice wrapper.

```
public NativeWrapperState CurrentState { get; }
```

Property Value

[NativeWrapperState](#)

## IsActiveAndUsable

Is the native CameraDevice wrapper active and usable?

```
public bool IsActiveAndUsable { get; }
```

Property Value

bool

## Methods

### Close()

Closes the camera device.

```
public WaitUntil Close()
```

Returns

WaitUntil

## CloseAsync(CancellationToken)

Closes the camera device.

```
public Awaitable<bool> CloseAsync(CancellationTokentoken = default)
```

### Parameters

**token** CancellationTokentoken

### Returns

Awaitable<bool>

[true](#) if the device was closed successfully, [false](#) if the operation was cancelled.

## CreateContinuousCaptureSession(Resolution, CaptureTemplate)

Creates a new repeating/continuous capture session for use.

```
public CapturePipeline<ContinuousCaptureSession>? CreateContinuousCaptureSession(Resolutionresolution, CaptureTemplate captureTemplate = CaptureTemplate.Preview)
```

### Parameters

**resolution** Resolutionresolution

The resolution of the capture.

**captureTemplate** [CaptureTemplate](#)

The capture template to use for the capture

### Returns

[CapturePipeline](#)<[ContinuousCaptureSession](#)>

A new capture session wrapper, or [null](#) if any errors occurred.

## Remarks

Once you have finished using the capture session, call [CloseAndDispose\(\)](#) or [CloseAndDisposeAsync\(CancellationToken\)](#) to close and dispose the session to free up native and compute shader resources.

## CreateOnDemandCaptureSession(Resolution)

Creates a new on-demand capture session for use.

```
public CapturePipeline<OnDemandCaptureSession>? CreateOnDemandCaptureSession(Resolution resolution)
```

## Parameters

**resolution** Resolution

## Returns

[CapturePipeline](#)<[OnDemandCaptureSession](#)>

## CreateOnDemandSurfaceTextureCaptureSession(Resolution, CaptureTemplate)

Creates a new on-demand OpenGL SurfaceTexture based capture session for use. Equivalent to [OnDemandCaptureSession](#).

```
public OnDemandSurfaceTextureCaptureSession?  
CreateOnDemandSurfaceTextureCaptureSession(Resolution resolution, CaptureTemplate captureTemplate = CaptureTemplate.Preview)
```

## Parameters

**resolution** Resolution

**captureTemplate** [CaptureTemplate](#)

## Returns

## CreateSurfaceTextureCaptureSession(Resolution, CaptureTemplate)

Creates a new OpenGL SurfaceTexture based capture session for use. Equivalent to [ContinuousCaptureSession](#).

```
public SurfaceTextureCaptureSession? CreateSurfaceTextureCaptureSession(Resolution  
resolution, CaptureTemplate captureTemplate = CaptureTemplate.Preview)
```

### Parameters

**resolution** Resolution

The resolution of the capture.

**captureTemplate** [CaptureTemplate](#)

The capture template to use for the capture

### Returns

[SurfaceTextureCaptureSession](#)

A new capture session wrapper, or [null](#) if any errors occurred.

### Remarks

This is an experimental capture session type that uses a native OpenGL texture to capture images for better performance. The results of this capture session may be more noisy compared to [ContinuousCaptureSession](#). Requires OpenGL ES 3.0 as the project's Graphics API. Works with single and multi-threaded rendering.

Once you have finished using the capture session, call [Close\(\)](#) or [CloseAsync\(CancellationToken\)](#) to close and [Dispose\(\)](#) to dispose the session to free up native resources.

## Dispose()

Releases native plugin resources. Make sure to call [Close\(\)](#) or [CloseAsync\(CancellationTokens\)](#) before disposing this object.

```
public void Dispose()
```

## Invoke(string, nint)

```
public override nint Invoke(string methodName, nint javaArgs)
```

### Parameters

**methodName** string

**javaArgs** nint

### Returns

nint

## WaitForInitialization()

Waits until the CameraDevice is open or erred out.

```
public WaitUntil WaitForInitialization()
```

### Returns

WaitUntil

## WaitForInitializationAsync(CancellationToken)

Waits until the CameraDevice is open or erred out.

```
public Awaitable<NativeWrapperState> WaitForInitializationAsync(CancellationToken token  
= default)
```

## Parameters

**token** CancellationToken

## Returns

Awaitable<[NativeWrapperState](#)>

The current state of the CameraDevice.

## Events

### OnDeviceClosed

Invoked when the CameraDevice is closed, along with the camera ID.

```
public event Action<string>? OnDeviceClosed
```

#### Event Type

Action<string>

### OnDeviceDisconnected

Invoked when the CameraDevice is disconnected, along with the camera ID.

```
public event Action<string>? OnDeviceDisconnected
```

#### Event Type

Action<string>

### OnDeviceErred

Invoked when the CameraDevice encounters an error, along with the camera ID.

```
public event Action<string, CameraDevice.ErrorCode>? OnDeviceErred
```

Event Type

Action<string, [CameraDevice.ErrorCode](#)>

## OnDeviceOpened

Invoked when the CameraDevice is opened, along with the camera ID.

```
public event Action<string>? OnDeviceOpened
```

Event Type

Action<string>

# Enum CameraDevice.ErrorCode

Namespace: [Uralstech.UXR.QuestCamera](#)

Error codes that can be returned by the native CameraDevice wrapper.

```
public enum CameraDevice.ErrorCode
```

## Fields

**CameraAccessException = 1000**

The native code encountered a CameraAccessException.

**CameraDeviceError = 4**

The camera device has encountered a fatal error.

**CameraDisabled = 3**

The camera device could not be opened due to a device policy.

**CameraInUse = 1**

The camera device is in use already.

**CameraServiceError = 5**

The camera service has encountered a fatal error.

**MaxCamerasInUse = 2**

The camera device could not be opened because there are too many other open camera devices.

**SecurityException = 1001**

The native code encountered a SecurityException.

**Unknown = 0**

Unknown error.

# Class CameraInfo

Namespace: [Uralstech.UXR.QuestCamera](#)

Wrapper for Camera2's CameraCharacteristics.

```
public record CameraInfo
```

## Inheritance

object ← CameraInfo

## Constructors

### CameraInfo(AndroidJavaObject)

```
public CameraInfo(AndroidJavaObject cameraInfo)
```

## Parameters

**cameraInfo** AndroidJavaObject

## Fields

### CameraId

The actual device ID of this camera.

```
public readonly string CameraId
```

## Field Value

string

## Eye

(Meta Quest) The eye which the camera is closest to.

```
public readonly CameraInfo.CameraEye Eye
```

Field Value

[CameraInfo.CameraEye](#)

## Intrinsics

The intrinsic data for this camera.

```
public readonly CameraInfo.CameraIntrinsics? Intrinsics
```

Field Value

[CameraInfo.CameraIntrinsics](#)

## LensPoseRotation

The orientation of the camera relative to the sensor coordinate system.

```
public readonly Quaternion? LensPoseRotation
```

Field Value

Quaternion?

## LensPoseTranslation

The position of the camera's optical center.

```
public readonly Vector3? LensPoseTranslation
```

Field Value

Vector3?

## Source

(Meta Quest) The source of the camera feed.

```
public readonly CameraInfo.CameraSource Source
```

Field Value

[CameraInfo.CameraSource](#)

## SupportedResolutions

The resolutions supported by this camera.

```
public readonly Resolution[] SupportedResolutions
```

Field Value

Resolution[]

## Properties

### NativeCameraCharacteristics

The native CameraCharacteristics object.

```
public AndroidJavaObject NativeCameraCharacteristics { get; }
```

Property Value

AndroidJavaObject

Remarks

The caller is responsible of disposing the returned AndroidJavaObject.

## Exceptions

### ObjectDisposedException

Thrown if the current [CameraInfo](#) object was disposed.

## Methods

### Dispose()

Releases native plugin resources.

```
public void Dispose()
```

## Operators

### implicit operator string(CameraInfo)

```
public static implicit operator string(CameraInfo camera)
```

### Parameters

**camera** [CameraInfo](#)

### Returns

string

# Enum CameraInfo.CameraEye

Namespace: [Uralstech.UXR.QuestCamera](#)

The camera eye.

```
public enum CameraInfo.CameraEye
```

## Fields

**Left = 0**

The leftmost camera.

**Right = 1**

The rightmost camera.

**Unknown = -1**

Unknown.

# Class CameraInfo.CameraIntrinsics

Namespace: [Uralstech.UXR.QuestCamera](#)

Defines the camera's intrinsic properties. All values are in pixels.

```
public record CameraInfo.CameraIntrinsics
```

## Inheritance

object ← CameraInfo.CameraIntrinsics

## Constructors

CameraIntrinsics(Vector2, Vector2, Vector2, float)

```
public CameraIntrinsics(Vector2 resolution, Vector2 focalLength, Vector2 principalPoint,  
float skew)
```

## Parameters

**resolution** Vector2

**focalLength** Vector2

**principalPoint** Vector2

**skew** float

## Fields

FocalLength

Focal length in pixels.

```
public readonly Vector2 FocalLength
```

Field Value

Vector2

## PrincipalPoint

Principal point in pixels from the image's top-left corner.

```
public readonly Vector2 PrincipalPoint
```

Field Value

Vector2

## Resolution

Resolution in pixels.

```
public readonly Vector2 Resolution
```

Field Value

Vector2

## Skew

Skew coefficient for axis misalignment.

```
public readonly float Skew
```

Field Value

float

# Enum CameraInfo.CameraSource

Namespace: [Uralstech.UXR.QuestCamera](#)

The source of the camera feed.

```
public enum CameraInfo.CameraSource
```

## Fields

**PassthroughRGB = 0**

Meta Quest Passthrough RGB cameras.

**Unknown = -1**

Unknown.

# Class CameraSupport

Namespace: [Uralstech.UXR.QuestCamera](#)

Utility to check if the current Meta Quest device supports the Passthrough Camera API.

```
public static class CameraSupport
```

## Inheritance

object ← CameraSupport

## Remarks

Requires the Meta XR Core SDK.

## Fields

### MINSUPPORTOSVERSION

```
public const int MINSUPPORTOSVERSION = 74
```

Field Value

int

## Properties

### HorizonOSVersion

Get the Horizon OS version number on the headset

```
public static int? HorizonOSVersion { get; }
```

Property Value

int?

## Remarks

Requires the Meta XR Core SDK.

## IsSupported

Returns true if the current headset supports Passthrough Camera API

```
public static bool IsSupported { get; }
```

## Property Value

bool

## Remarks

Requires the Meta XR Core SDK.

# Class CapturePipeline<T>

Namespace: [Uralstech.UXR.QuestCamera](#)

Simple class for grouping a capture session and its texture converter.

```
public class CapturePipeline<T> where T : ContinuousCaptureSession
```

## Type Parameters

T

### Inheritance

object ← CapturePipeline<T>

## Constructors

### CapturePipeline(T, YUVToRGBAConverter)

```
public CapturePipeline(T captureSession, YUVToRGBAConverter textureConverter)
```

## Parameters

captureSession T

textureConverter [YUVToRGBAConverter](#)

## Fields

### CaptureSession

The capture session wrapper.

```
public readonly T CaptureSession
```

## Field Value

## TextureConverter

The YUV to RGBA texture converter.

```
public readonly YUVToRGBAConverter TextureConverter
```

Field Value

[YUVToRGBAConverter](#)

## Methods

### CloseAndDispose()

Closes and disposes the capture session and texture converter.

```
public IEnumerator CloseAndDispose()
```

Returns

IEnumerator

### CloseAndDisposeAsync(CancellationTokens)

Closes and disposes the capture session and texture converter.

```
public Awaitable CloseAndDisposeAsync(CancellationTokens token = default)
```

Parameters

**token** CancellationTokens

Returns

Awaitable

# Enum CaptureTemplate

Namespace: [Uralstech.UXR.QuestCamera](#)

Capture template to use when recording.

```
public enum CaptureTemplate
```

## Fields

**Default = 0**

Default value, do not use.

**Preview = 1**

Creates a request suitable for a camera preview window.

**Record = 3**

Creates a request suitable for video recording.

**StillCapture = 2**

Creates a request suitable for still image capture.

**VideoSnapshot = 4**

Creates a request suitable for still image capture while recording video.

# Class ContinuousCaptureSession

Namespace: [Uralstech.UXR.QuestCamera](#)

A wrapper for a native Camera2 CaptureSession and ImageReader.

```
public class ContinuousCaptureSession : AndroidJavaProxy
```

## Inheritance

object ← ContinuousCaptureSession

## Derived

[OnDemandCaptureSession](#)

## Remarks

This is different from [OnDemandCaptureSession](#) as it returns a continuous stream of images.

## Constructors

### ContinuousCaptureSession()

```
public ContinuousCaptureSession()
```

## Fields

### \_captureSession

The native capture session object.

```
protected AndroidJavaObject? _captureSession
```

## Field Value

AndroidJavaObject?

# Properties

## CurrentState

The current assumed state of the native CaptureSession wrapper.

```
public NativeWrapperState CurrentState { get; }
```

Property Value

[NativeWrapperState](#)

## IsActiveAndUsable

Is the native CaptureSession wrapper active and usable?

```
public bool IsActiveAndUsable { get; }
```

Property Value

bool

# Methods

## Close()

Closes the capture session.

```
public WaitUntil Close()
```

Returns

WaitUntil

## CloseAsync(Cancellation\_token)

Closes the capture session.

```
public Awaitable<bool> CloseAsync(Cancellation_token token = default)
```

## Parameters

**token** Cancellation\_token

## Returns

Awaitable<bool>

[true](#) if the session was closed successfully, [false](#) if the operation was cancelled.

## Dispose()

Releases native plugin resources. Make sure to call [Close\(\)](#) or [CloseAsync\(Cancellation\\_token\)](#) before disposing this object.

```
public void Dispose()
```

## Invoke(string, nint)

```
public override nint Invoke(string methodName, nint javaArgs)
```

## Parameters

**methodName** string

**javaArgs** nint

## Returns

nint

## WaitForInitialization()

Waits until the CaptureSession is open or erred out.

```
public WaitUntil WaitForInitialization()
```

Returns

WaitUntil

## WaitForInitializationAsync(CancellationToken)

Waits until the CaptureSession is open or erred out.

```
public Awaitable<NativeWrapperState> WaitForInitializationAsync(CancellationToken token  
= default)
```

Parameters

**token** CancellationToken

Returns

Awaitable<[NativeWrapperState](#)>

The current state of the CaptureSession.

## Events

### OnFrameReady

Callback for processing the YUV 4:2:0 frame.

```
public event Action<nint, nint, nint, int, int, int, long>? OnFrameReady
```

Event Type

Action<nint, nint, nint, int, int, int, long>

## Remarks

This callback may not be called from the main thread.

Parameters	
<b>yBuffer (IntPtr)</b>	Pointer to the buffer containing Y (luminance) data of the frame.
<b>uBuffer (IntPtr)</b>	Pointer to the buffer containing U (color) data of the frame.
<b>vBuffer (IntPtr)</b>	Pointer to the buffer containing V (color) data of the frame.
<b>yRowStride (int)</b>	The size of each row of the image in yBuffer in bytes.
<b>uvRowStride (int)</b>	The size of each row of the image in uBuffer and vBuffer in bytes.
<b>uvPixelStride (int)</b>	The size of a pixel in a row of the image in uBuffer and vBuffer in bytes.
<b>timestamp (long)</b>	The timestamp the frame was captured at in nanoseconds.

## OnSessionActive

Called when the session has started actively processing capture requests.

```
public event Action? OnSessionActive
```

### Event Type

Action

## OnSessionClosed

Called when the session is closed.

```
public event Action? OnSessionClosed
```

### Event Type

Action

## OnSessionConfigurationFailed

Called when the session could not be configured, and a boolean value indicating if the failure was caused due to a camera access/security exception.

```
public event Action<bool>? OnSessionConfigurationFailed
```

Event Type

Action<bool>

## OnSessionConfigured

Called when the session has been configured.

```
public event Action? OnSessionConfigured
```

Event Type

Action

## OnSessionRequestFailed

Called when the session request could not be set.

```
public event Action? OnSessionRequestFailed
```

Event Type

Action

## OnSessionRequestSet

Called when the session request has been set.

public event Action? OnSessionRequestSet

Event Type

Action

# Class JNIExtensions

Namespace: [Uralstech.UXR.QuestCamera](#)

QOL extensions for the JNI.

```
public static class JNIExtensions
```

## Inheritance

object ← JNIExtensions

## Methods

### GetNullableFloat(AndroidJavaObject, string)

Unboxes a native nullable float field into an float?.

```
public static float? GetNullableFloat(this AndroidJavaObject current, string fieldName)
```

## Parameters

**current** AndroidJavaObject

**fieldName** string

## Returns

float?

### GetNullableInt(AndroidJavaObject, string)

Unboxes a native nullable integer field into an int?.

```
public static int? GetNullableInt(this AndroidJavaObject current, string fieldName)
```

## Parameters

**current** AndroidJavaObject

**fieldName** string

The field to unbox.

Returns

int?

The unboxed value.

## UnboxAndCreateGlobalRefForByteBufferElement(nint, int)

Unboxes and creates a global ref of a native ByteBuffer from a native Object array, and returns its direct buffer address.

```
public static (nint obj, nint ptr) UnboxAndCreateGlobalRefForByteBufferElement(nint args,
int index)
```

Parameters

**args** nint

The native array to take the buffer from.

**index** int

The index of the buffer object in the native array.

Returns

(nint obj, nint ptr)

The global reference and the direct buffer address.

## UnboxBoolElement(nint, int)

Unboxes a boolean from a native Object array.

```
public static bool UnboxBoolElement(nint args, int index)
```

## Parameters

**args** nint

The native array to take the boolean from.

**index** int

The index of the boolean object in the native array.

## Returns

bool

The unboxed boolean.

## UnboxIntElement(nint, int)

Unboxes an integer from a native Object array.

```
public static int UnboxIntElement(nint args, int index)
```

## Parameters

**args** nint

The native array to take the integer from.

**index** int

The index of the integer object in the native array.

## Returns

int

The unboxed integer.

## UnboxLongElement(nint, int)

Unboxes a long from a native Object array.

```
public static long UnboxLongElement(nint args, int index)
```

### Parameters

**args** nint

The native array to take the long from.

**index** int

The index of the long object in the native array.

### Returns

long

The unboxed long.

## UnboxStringElement(nint, int)

Unboxes a string from a native Object array.

```
public static string UnboxStringElement(nint args, int index)
```

### Parameters

**args** nint

The native array to take the string from.

**index** int

The index of the string object in the native array.

### Returns

string

The unboxed string.

# Enum NativeWrapperState

Namespace: [Uralstech.UXR.QuestCamera](#)

The current assumed state of a native wrapper.

```
public enum NativeWrapperState
```

## Fields

**Closed = 2**

The native wrapper failed with an error, was disconnected or was closed normally.

**Initializing = 0**

The native wrapper is still initializing.

**Opened = 1**

The native wrapper is open and ready.

# Class OnDemandCaptureSession

Namespace: [Uralstech.UXR.QuestCamera](#)

A wrapper for a native Camera2 CaptureSession and ImageReader.

```
public class OnDemandCaptureSession : ContinuousCaptureSession
```

## Inheritance

object ← [ContinuousCaptureSession](#) ← OnDemandCaptureSession

## Inherited Members

[ContinuousCaptureSession.CurrentState](#) , [ContinuousCaptureSession.IsActiveAndUsable](#) ,  
[ContinuousCaptureSession.OnSessionConfigured](#) ,  
[ContinuousCaptureSession.OnSessionConfigurationFailed](#) ,  
[ContinuousCaptureSession.OnSessionRequestSet](#) , [ContinuousCaptureSession.OnSessionRequestFailed](#) ,  
[ContinuousCaptureSession.OnSessionActive](#) , [ContinuousCaptureSession.OnSessionClosed](#) ,  
[ContinuousCaptureSession.OnFrameReady](#) , [ContinuousCaptureSession.captureSession](#) ,  
[ContinuousCaptureSession.Invoke\(string, nint\)](#) , [ContinuousCaptureSession.WaitForInitialization\(\)](#) ,  
[ContinuousCaptureSession.Close\(\)](#) ,  
[ContinuousCaptureSession.WaitForInitializationAsync\(CancellationToken\)](#) ,  
[ContinuousCaptureSession.CloseAsync\(CancellationToken\)](#) , [ContinuousCaptureSession.Dispose\(\)](#)

## Remarks

This is different from [ContinuousCaptureSession](#) as it only returns a frame from the native plugin when required. This is recommended for single-image capturing or on-demand capturing where you don't need a continuous stream of images.

Why does [OnDemandCaptureSession](#) inherit from [ContinuousCaptureSession](#)? Because under the hood, both do the same thing - a repeating capture session. A true on-demand capture results in a black image, so [OnDemandCaptureSession](#) runs a repeating capture request running on an dummy texture natively, and reads the actual image through an ImageReader only when requested to do so. This means that while the [ContinuousCaptureSession](#) processes each and every frame sent to it, converting it to RGBA, [OnDemandCaptureSession](#) only does it when required.

## Methods

# RequestCapture(CaptureTemplate)

Requests a new capture from the session.

```
public bool RequestCapture(CaptureTemplate captureTemplate = CaptureTemplate.StillCapture)
```

## Parameters

**captureTemplate** [CaptureTemplate](#)

The capture template to use for the capture

## Returns

**bool**

If the capture request was set successfully, [true](#)<sup>↗</sup>, otherwise, [false](#)<sup>↗</sup>.

# Class UCameraManager

Namespace: [Uralstech.UXR.QuestCamera](#)

Class for interfacing with the native Camera2 API on Android.

```
public class UCameraManager : DontCreateNewSingleton<UCameraManager>
```

## Inheritance

object ← UCameraManager

## Fields

### AvatarCameraPermission

The permission required to access the Meta Quest Avatar Camera.

```
public const string AvatarCameraPermission = "android.permission.CAMERA"
```

Field Value

string

### HeadsetCameraPermission

The permission required to access the Meta Quest's cameras.

```
public const string HeadsetCameraPermission = "horizonos.permission.HEADSET_CAMERA"
```

Field Value

string

### YUVToRGBAComputeShader

The compute shader to use to convert the camera's YUV 4:2:0 images to RGBA.

```
public ComputeShader YUVToRGBAComputeShader
```

Field Value

ComputeShader

## Properties

### Cameras

Returns all available cameras and their characteristics. This is a cached value.

```
public CameraInfo[]? Cameras { get; }
```

Property Value

[CameraInfo\[\]](#)

## Methods

### Awake()

```
protected override void Awake()
```

### GetCamera(CameraEye)

Gets a camera device by the eye it is closest to.

```
public CameraInfo? GetCamera(CameraInfo.CameraEye eye)
```

Parameters

**eye** [CameraInfo.CameraEye](#)

The eye.

Returns

[CameraInfo](#)

A [CameraInfo](#) object or [null](#) if none were found.

## GetCameraInfos()

Gets all available cameras and their characteristics. This is **not** cached.

```
public CameraInfo[]? GetCameraInfos()
```

Returns

[CameraInfo](#)[]

An array of [CameraInfo](#) objects or [null](#) if any errors occurred.

Remarks

[CameraInfo](#) implements System.IDisposable, so make sure to dispose every returned value.

## OnDestroy()

```
protected void OnDestroy()
```

## OpenCamera(string)

Opens a camera device for use.

```
public CameraDevice? OpenCamera(string camera)
```

Parameters

**camera** string

The ID of the camera to open. You can get it from [Cameras](#) or [GetCamera\(CameraEye\)](#).

## Returns

### [CameraDevice](#)

A new camera device wrapper or [null](#) if any errors occurred.

## Remarks

Once you have finished using the camera, close the camera using [Close\(\)](#) or [CloseAsync\(Cancellation Token\)](#) and dispose it using [Dispose\(\)](#) to release all of its native resources.

# Class YUVToRGBAConverter

Namespace: [Uralstech.UXR.QuestCamera](#)

The default YUV 4:2:0 to RGBA converter that uses a compute shader to convert the camera texture to RGBA.

```
public class YUVToRGBAConverter
```

## Inheritance

object ← YUVToRGBAConverter

## Constructors

### YUVToRGBAConverter(Resolution)

```
public YUVToRGBAConverter(Resolution resolution)
```

## Parameters

**resolution** Resolution

## Fields

### \_kernelHandle

```
protected int _kernelHandle
```

## Field Value

int

### \_threadGroupsX

```
protected readonly int _threadGroupsX
```

Field Value

int

## \_threadGroupsY

```
protected readonly int _threadGroupsY
```

Field Value

int

## \_uComputeBuffer

Buffer containing U (color) data of the frame being processed.

```
protected readonly ComputeBuffer _uComputeBuffer
```

Field Value

ComputeBuffer

## \_uvBufferSize

```
protected readonly int _uvBufferSize
```

Field Value

int

## \_vComputeBuffer

Buffer containing V (color) data of the frame being processed.

```
protected readonly ComputeBuffer _vComputeBuffer
```

Field Value

ComputeBuffer

## \_yBufferSize

```
protected readonly int _yBufferSize
```

Field Value

int

## \_yComputeBuffer

Buffer containing Y (luminance) data of the frame being processed.

```
protected readonly ComputeBuffer _yComputeBuffer
```

Field Value

ComputeBuffer

## Properties

### FrameCaptureTimestamp

The timestamp the last frame processed was captured at in nanoseconds.

```
public long FrameCaptureTimestamp { get; protected set; }
```

Property Value

long

## FrameRenderTexture

The RenderTexture which will contain the RGBA camera frames.

```
public RenderTexture FrameRenderTexture { get; protected set; }
```

### Property Value

RenderTexture

## Shader

The shader used to convert YUV 4:2:0 to an RGBA RenderTexture. Uses [YUVToRGBAComputeShader](#) if not specified here.

```
public ComputeShader Shader { get; set; }
```

### Property Value

ComputeShader

## Methods

### CopyArrayToComputeBuffer(byte[], ComputeBuffer)

Copies an array to a compute buffer. If the array is bigger than the buffer, the extra content of the array is ignored.

```
protected static void CopyArrayToComputeBuffer(byte[] source, ComputeBuffer target)
```

### Parameters

**source** byte[]

The array to copy from.

**target** ComputeBuffer

The buffer to copy to.

## Dispose()

Releases the frame RenderTexture and buffers.

```
public void Dispose()
```

## OnFrameReady(nint, nint, nint, int, int, int, long)

Processes a frame received from the native capture session.

```
public virtual void OnFrameReady(nint yBuffer, nint uBuffer, nint vBuffer, int yRowStride,
int uvRowStride, int uvPixelStride, long timestamp)
```

### Parameters

**yBuffer** nint

Pointer to the buffer containing Y (luminance) data of the frame.

**uBuffer** nint

Pointer to the buffer containing U (color) data of the frame.

**vBuffer** nint

Pointer to the buffer containing V (color) data of the frame.

**yRowStride** int

The size of each row of the image in **yBuffer** in bytes.

**uvRowStride** int

The size of each row of the image in **uBuffer** and **vBuffer** in bytes.

**uvPixelStride** int

The size of a pixel in a row of the image in **uBuffer** and **vBuffer** in bytes.

**timestamp** long

The timestamp the frame was captured at in nanoseconds.

## PrepareDataForComputeBuffer(byte[], byte[], byte[], int, int, int, long)

Copies the given data into the shader's buffers and dispatches it.

```
protected virtual void PrepareDataForComputeBuffer(byte[] yCpuBuffer, byte[] uCpuBuffer,
byte[] vCpuBuffer, int yRowStride, int uvRowStride, int uvPixelStride, long timestamp)
```

### Parameters

**yCpuBuffer** byte[]

Array containing Y (luminance) data of the frame.

**uCpuBuffer** byte[]

Array containing U (color) data of the frame.

**vCpuBuffer** byte[]

Array containing V (color) data of the frame.

**yRowStride** int

The size of each row of the image in [\\_yComputeBuffer](#) in bytes.

**uvRowStride** int

The size of each row of the image in [\\_uComputeBuffer](#) and [\\_vComputeBuffer](#) in bytes.

**uvPixelStride** int

The size of a pixel in a row of the image in [\\_uComputeBuffer](#) and [\\_vComputeBuffer](#) in bytes.

**timestamp** long

The timestamp the frame was captured at in nanoseconds.

## Events

### OnFrameProcessed

Called when a capture is dispatched for conversion to RGBA, with the capture's timestamp in nanoseconds.

```
public event Action<RenderTexture, long>? OnFrameProcessed
```

#### Event Type

Action<RenderTexture, long>

# Namespace Uralstech.UXR.QuestCamera. SurfaceTextureCapture

## Classes

### [OnDemandSurfaceTextureCaptureSession](#)

On-demand version of [SurfaceTextureCaptureSession](#).

### [STCaptureSessionNative](#)

Class to interact with the native graphics plugin for SurfaceTexture rendering.

### [SurfaceTextureCaptureSession](#)

This is an experimental capture session type that uses a native OpenGL texture to capture images for better performance.

## Structs

### [STCaptureSessionNative.AdditionalUpdateCallbackData](#)

Additional data tracked in C# related to a native renderer update event.

### [STCaptureSessionNative.NativeSetupData](#)

Data for setting up a native renderer.

### [STCaptureSessionNative.NativeUpdateData](#)

Data for updating a native renderer.

## Enums

### [STCaptureSessionNative.NativeEventId](#)

Event ID for native rendering events.

## Delegates

### [STCaptureSessionNative.NativeSetupCallbackType](#)

Callback type for [SetupNativeTexture](#) events.

### [STCaptureSessionNative.NativeUpdateCallbackType](#)

Callback type for [CleanupNativeTexture](#) and [RenderTextures](#) events.

### [STCaptureSessionNative.NativeUpdateCallbackWithTimestampType](#)

Same as [STCaptureSessionNative.NativeUpdateCallbackType](#), but can include a timestamp tracked from C#.

# Class OnDemandSurfaceTextureCaptureSession

Namespace: [Uralstech.UXR.QuestCamera.SurfaceTextureCapture](#)

On-demand version of [SurfaceTextureCaptureSession](#).

```
public class OnDemandSurfaceTextureCaptureSession : SurfaceTextureCaptureSession
```

## Inheritance

object ← [SurfaceTextureCaptureSession](#) ← OnDemandSurfaceTextureCaptureSession

## Inherited Members

[SurfaceTextureCaptureSession.CurrentState](#) , [SurfaceTextureCaptureSession.IsActiveAndUsable](#) ,  
[SurfaceTextureCaptureSession.Texture](#) , [SurfaceTextureCaptureSession.CaptureTimestamp](#) ,  
[SurfaceTextureCaptureSession.OnSessionConfigured](#) ,  
[SurfaceTextureCaptureSession.OnSessionConfigurationFailed](#) ,  
[SurfaceTextureCaptureSession.OnSessionRequestSet](#) ,  
[SurfaceTextureCaptureSession.OnSessionRequestFailed](#) ,  
[SurfaceTextureCaptureSession.OnSessionRegistrationFailed](#) ,  
[SurfaceTextureCaptureSession.OnSessionActive](#) , [SurfaceTextureCaptureSession.OnSessionClosed](#) ,  
[SurfaceTextureCaptureSession.OnFrameReady](#) , [SurfaceTextureCaptureSession.\\_commandBuffer](#) ,  
[SurfaceTextureCaptureSession.\\_captureSession](#) , [SurfaceTextureCaptureSession.\\_nativeTextureId](#) ,  
[SurfaceTextureCaptureSession.OnFrameReadyInvk\(Texture2D, long\)](#) ,  
[SurfaceTextureCaptureSession.InitializeNative\(long\)](#) ,  
[SurfaceTextureCaptureSession.SendNativeUpdate\(STCaptureSessionNative.NativeEventId, STCaptureSessionNative.NativeUpdateCallbackWithTimestampType, long\)](#) ,  
[SurfaceTextureCaptureSession.WaitForInitialization\(\)](#) , [SurfaceTextureCaptureSession.Close\(\)](#) ,  
[SurfaceTextureCaptureSession.WaitForInitializationAsync\(CancellationToken\)](#) ,  
[SurfaceTextureCaptureSession.CloseAsync\(CancellationToken\)](#) , [SurfaceTextureCaptureSession.Dispose\(\)](#)

## Remarks

The results of this capture session may be more noisy compared to [OnDemandCaptureSession](#). Requires OpenGL ES 3.0 as the project's Graphics API. Works with single and multi-threaded rendering.

## Constructors

OnDemandSurfaceTextureCaptureSession(Resolution)

```
public OnDemandSurfaceTextureCaptureSession(Resolution resolution)
```

## Parameters

**resolution** Resolution

## Methods

### Invoke(string, nint)

```
public override nint Invoke(string methodName, nint javaArgs)
```

## Parameters

**methodName** string

**javaArgs** nint

## Returns

nint

### RequestCapture()

Updates the unity texture with the latest capture from the camera.

```
public WaitUntil? RequestCapture()
```

## Returns

WaitUntil?

Returns a WaitUntil operation if the renderer was invoked, [null](#) otherwise.

### RequestCapture(Action<Texture2D, long>)

Updates the unity texture with the latest capture from the camera.

```
public bool RequestCapture(Action<Texture2D, long> onDone)
```

## Parameters

**onDone** Action<Texture2D, long>

Called when the capture has been rendered in unity, with its timestamp.

## Returns

bool

[true](#) if the renderer was invoked, [false](#) otherwise.

## RequestCaptureAsync(CancellationToken)

Updates the unity texture with the latest capture from the camera.

```
public Awaitable<(Texture2D?, long)> RequestCaptureAsync(CancellationToken token = default)
```

## Parameters

**token** CancellationToken

## Returns

Awaitable<(Texture2D?, long)>

The rendered texture and timestamp, or default values if the renderer could not be invoked.

# Class STCaptureSessionNative

Namespace: [Uralstech.UXR.QuestCamera.SurfaceTextureCapture](#)

Class to interact with the native graphics plugin for SurfaceTexture rendering.

```
public static class STCaptureSessionNative
```

## Inheritance

object ← STCaptureSessionNative

## Fields

### NativeSetupCallbacksQueue

Event queues for renderer setup events, mapped to the IDs of the unity textures they are for.

```
public static readonly ConcurrentDictionary<uint,  
STCaptureSessionNative.NativeSetupCallbackType> NativeSetupCallbacksQueue
```

#### Field Value

ConcurrentDictionary<uint, [STCaptureSessionNative.NativeSetupCallbackType](#)>

### NativeUpdateCallbacksQueue

Event queues for update events, mapped to the IDs of the native textures they are for.

```
public static readonly ConcurrentDictionary<uint,  
ConcurrentQueue<STCaptureSessionNative.AdditionalUpdateCallbackData>>  
NativeUpdateCallbacksQueue
```

#### Field Value

ConcurrentDictionary<uint, ConcurrentQueue<[STCaptureSessionNative.AdditionalUpdateCallbackData](#)>>

# Methods

## GetRenderEventFunction()

Gets the pointer to the native render event handler.

```
public static extern nint GetRenderEventFunction()
```

### Returns

nint

## NativeSetupCallback(bool, bool, uint, uint, bool)

The actual callback for native renderer setup events.

```
public static void NativeSetupCallback(bool glIsClean, bool sessionCallSent, uint  
unityTextureId, uint textureId, bool idIsValid)
```

### Parameters

**glIsClean** bool

Was the GL context successfully cleaned up in this call?

**sessionCallSent** bool

Was the call to start the capture session sent to the Kotlin class?

**unityTextureId** uint

The unity texture associated with the event.

**textureId** uint

The native texture created by the call, may be invalid.

**idIsValid** bool

Is **textureId** a valid texture?

## Remarks

This will dequeue from [NativeSetupCallbacksQueue](#) and process the callbacks.

## NativeUpdateCallback(uint, bool)

The actual callback for native rendering updates.

```
public static void NativeUpdateCallback(uint textureId, bool success)
```

## Parameters

**textureId** uint

The ID of the native texture which was updated.

**success** bool

If the operation was successful.

## Remarks

This will dequeue from [NativeUpdateCallbacksQueue](#) and process the callback data.

# Struct

## STCaptureSessionNative.AdditionalUpdateCallbackData

Namespace: [Uralstech.UXR.QuestCamera.SurfaceTextureCapture](#)

Additional data tracked in C# related to a native renderer update event.

```
public readonly struct STCaptureSessionNative.AdditionalUpdateCallbackData
```

## Constructors

AdditionalUpdateCallbackData(NativeUpdateCallbackWithTimestampType?, nint, long)

```
public  
AdditionalUpdateCallbackData(STCaptureSessionNative.NativeUpdateCallbackWithTimestampType?  
nextCall, nint nativeData, long timestamp)
```

## Parameters

**nextCall** [STCaptureSessionNative.NativeUpdateCallbackWithTimestampType](#)

**nativeData** nint

**timestamp** long

## Fields

### NativeData

Native data that should be disposed as part of this callback.

```
public readonly nint NativeData
```

Field Value

nint

## NextCall

Optional callback that should be called after processing for the current native callback is done.

```
public readonly STCaptureSessionNative.NativeUpdateCallbackWithTimestampType? NextCall
```

Field Value

[STCaptureSessionNative.NativeUpdateCallbackWithTimestampType](#)

## Timestamp

Timestamp value which will be provided in [NextCall](#).

```
public readonly long Timestamp
```

Field Value

long

# Enum STCaptureSessionNative.NativeEventId

Namespace: [Uralstech.UXR.QuestCamera.SurfaceTextureCapture](#)

Event ID for native rendering events.

```
public enum STCaptureSessionNative.NativeEventId
```

## Fields

CleanupNativeTexture = 2

Disposes a native renderer.

RenderTextures = 3

Renders the textures.

SetupNativeTexture = 1

Sets up a native renderer.

# Delegate STCaptureSessionNative.NativeSetupCallbackType

Namespace: [Uralstech.UXR.QuestCamera.SurfaceTextureCapture](#)

Callback type for [SetupNativeTexture](#) events.

```
public delegate void STCaptureSessionNative.NativeSetupCallbackType(bool glIsClean, bool sessionCallSent, uint unityTextureId, uint textureId, bool idIsValid)
```

## Parameters

**glIsClean** bool

Was the GL context successfully cleaned up in this call?

**sessionCallSent** bool

Was the call to start the capture session sent to the Kotlin class?

**unityTextureId** uint

The unity texture associated with the event.

**textureId** uint

The native texture created by the call, may be invalid.

**idIsValid** bool

Is **textureId** a valid texture?

# Struct

## STCaptureSessionNative.NativeSetupData

Namespace: [Uralstech.UXR.QuestCamera.SurfaceTextureCapture](#)

Data for setting up a native renderer.

```
public struct STCaptureSessionNative.NativeSetupData
```

## Fields

### Height

The height of the texture.

```
public int Height
```

### Field Value

int

### OnDoneCallback

Callback for when the operation is done, type: [STCaptureSessionNative.NativeSetupCallbackType](#).

```
public nint OnDoneCallback
```

### Field Value

nint

### Timestamp

Timestamp associated with the STCaptureSessionWrapper which will be the source for rendering.

```
public long Timestamp
```

Field Value

long

## UnityTexture

The unity texture to render to.

```
public uint UnityTexture
```

Field Value

uint

## Width

The width of the texture;

```
public int Width
```

Field Value

int

# Delegate STCaptureSessionNative.NativeUpdateCallback Type

Namespace: [Uralstech.UXR.QuestCamera.SurfaceTextureCapture](#)

Callback type for [CleanupNativeTexture](#) and [RenderTextures](#) events.

```
public delegate void STCaptureSessionNative.NativeUpdateCallbackType(uint textureId,  
bool success)
```

## Parameters

**textureId** uint

The ID of the native texture which was updated.

**success** bool

If the operation was successful.

# Delegate STCaptureSessionNative.NativeUpdateCallback WithTimestampType

Namespace: [Uralstech.UXR.QuestCamera.SurfaceTextureCapture](#)

Same as [STCaptureSessionNative.NativeUpdateCallbackType](#), but can include a timestamp tracked from C#.

```
public delegate void STCaptureSessionNative.NativeUpdateCallbackWithTimestampType(uint textureId, bool success, long timestamp)
```

## Parameters

**textureId** uint

The ID of the native texture which was updated.

**success** bool

If the operation was successful.

**timestamp** long

The timestamp tracked from C#.

# Struct

## STCaptureSessionNative.NativeUpdateData

Namespace: [Uralstech.UXR.QuestCamera.SurfaceTextureCapture](#)

Data for updating a native renderer.

```
public struct STCaptureSessionNative.NativeUpdateData
```

## Fields

### NativeTexture

The native texture to update.

```
public uint NativeTexture
```

### Field Value

uint

### OnDoneCallback

Callback for when the operation is done, type: [STCaptureSessionNative.NativeUpdateCallbackType](#).

```
public nint OnDoneCallback
```

### Field Value

nint

# Class SurfaceTextureCaptureSession

Namespace: [Uralstech.UXR.QuestCamera.SurfaceTextureCapture](#)

This is an experimental capture session type that uses a native OpenGL texture to capture images for better performance.

```
public class SurfaceTextureCaptureSession : AndroidJavaProxy
```

## Inheritance

object ← SurfaceTextureCaptureSession

## Derived

[OnDemandSurfaceTextureCaptureSession](#)

## Remarks

The results of this capture session may be more noisy compared to [ContinuousCaptureSession](#). Requires OpenGL ES 3.0 as the project's Graphics API. Works with single and multi-threaded rendering.

## Constructors

### SurfaceTextureCaptureSession(Resolution)

```
public SurfaceTextureCaptureSession(Resolution resolution)
```

## Parameters

**resolution** Resolution

## Fields

### Texture

The texture being rendered to.

```
public readonly Texture2D Texture
```

Field Value

Texture2D

## `_captureSession`

The native capture session object.

```
protected AndroidJavaObject? _captureSession
```

Field Value

AndroidJavaObject?

## `_commandBuffer`

CommandBuffer for invoking native renderer events.

```
protected readonly CommandBuffer _commandBuffer
```

Field Value

CommandBuffer

## `_nativeTextureId`

The native texture which captures YUV 4:2:0 data.

```
protected uint? _nativeTextureId
```

Field Value

uint?

## Properties

# CaptureTimestamp

The timestamp the last frame processed was captured at in nanoseconds.

```
public long CaptureTimestamp { get; protected set; }
```

Property Value

long

# CurrentState

The current assumed state of the native CaptureSession wrapper.

```
public NativeWrapperState CurrentState { get; }
```

Property Value

[NativeWrapperState](#)

# IsActiveAndUsable

Is the native CaptureSession wrapper active and usable?

```
public bool IsActiveAndUsable { get; }
```

Property Value

bool

# Methods

## Close()

Closes the capture session.

```
public WaitUntil Close()
```

Returns

WaitUntil

## CloseAsync(CancellationTokens)

Closes the capture session.

```
public Awaitable<bool> CloseAsync(CancellationTokens token = default)
```

Parameters

**token** CancellationTokens

Returns

Awaitable<bool>

[true](#) if the session was closed successfully, [false](#) if the operation was cancelled.

## Dispose()

Releases native plugin resources. Make sure to call [Close\(\)](#) or [CloseAsync\(CancellationTokens\)](#) before disposing this object.

```
public void Dispose()
```

## InitializeNative(long)

Initializes the native renderer.

```
protected virtual void InitializeNative(long timestamp)
```

## Parameters

**timestamp** long

The timestamp corresponding to the native capture session wrapper.

## Invoke(string, nint)

```
public override nint Invoke(string methodName, nint javaArgs)
```

## Parameters

**methodName** string

**javaArgs** nint

## Returns

nint

## OnFrameReadyInvk(Texture2D, long)

Invokes [OnFrameReady](#) for child classes.

```
protected void OnFrameReadyInvk(Texture2D texture, long timestamp)
```

## Parameters

**texture** Texture2D

**timestamp** long

## SendNativeUpdate(NativeEventId, NativeUpdateCallbackWithTimestampType?, long)

Sends an update event to the native renderer.

```
protected virtual void SendNativeUpdate(STCaptureSessionNative.NativeEventId eventId,  
STCaptureSessionNative.NativeUpdateCallbackWithTimestampType? callback, long timestamp = 0)
```

## Parameters

**eventId** [STCaptureSessionNative.NativeEventId](#)

The type of the event.

**callback** [STCaptureSessionNative.NativeUpdateCallbackWithTimestampType](#)

An optional callback for the event's completion.

**timestamp** long

An optional timestamp to be tracked in C# code, to be forwarded to **timestamp**.

## WaitForInitialization()

Waits until the CaptureSession is open or erred out.

```
public WaitUntil WaitForInitialization()
```

## Returns

WaitUntil

## WaitForInitializationAsync(CancellationToken)

Waits until the CaptureSession is open or erred out.

```
public Awaitable<NativeWrapperState> WaitForInitializationAsync(CancellationToken token  
= default)
```

## Parameters

**token** CancellationToken

## Returns

Awaitable<[NativeWrapperState](#)>

The current state of the CaptureSession.

## Events

### OnFrameReady

Called when a frame is ready, with its capture timestamp in nanoseconds.

```
public event Action<Texture2D, long>? OnFrameReady
```

#### Event Type

Action<Texture2D, long>

#### Remarks

This callback may not be called from the main thread.

### OnSessionActive

Called when the session has started actively processing capture requests.

```
public event Action? OnSessionActive
```

#### Event Type

Action

### OnSessionClosed

Called when the session is closed.

```
public event Action? OnSessionClosed
```

Event Type

Action

## OnSessionConfigurationFailed

Called when the session could not be configured, and a boolean value indicating if the failure was caused due to a camera access/security exception.

```
public event Action<bool>? OnSessionConfigurationFailed
```

Event Type

Action<bool>

## OnSessionConfigured

Called when the session has been configured.

```
public event Action? OnSessionConfigured
```

Event Type

Action

## OnSessionRegistrationFailed

Called when the session could not be registered with the native renderer.

```
public event Action? OnSessionRegistrationFailed
```

Event Type

Action

# OnSessionRequestFailed

Called when the session request could not be set.

```
public event Action? OnSessionRequestFailed
```

Event Type

Action

# OnSessionRequestSet

Called when the session request has been set.

```
public event Action? OnSessionRequestSet
```

Event Type

Action