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Namespace Uralstech.UXR.QuestCamera

Classes

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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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A wrapper for a native Camera2 CaptureSession and ImageReader.

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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 CameraDevice

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

A wrapper for a native Camera2 CameraDevice.

```
public class CameraDevice : AndroidJavaProxy
```

Inheritance

object ← CameraDevice

Constructors

CameraDevice(string)

```
public CameraDevice(string id)
```

Parameters

id string

Fields

CameraId

The ID of the camera being wrapped.

```
public readonly string CameraId
```

Field Value

string

_cameraDevice

```
protected AndroidJavaObject? _cameraDevice
```

Field Value

AndroidJavaObject?

Properties

CurrentState

The current assumed state of the native CameraDevice wrapper.

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

Property Value

[NativeWrapperState](#)

Methods

CreateContinuousCaptureSession(Resolution, CaptureTemplate)

Creates a new repeating/continuous capture session for use.

```
public CapturePipeline<ContinuousCaptureSession>? CreateContinuousCaptureSession(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

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

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

Remarks

Once you have finished using the capture session, call [DisposeAsync\(\)](#) 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

[OnDemandSurfaceTextureCaptureSession](#)

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 experimental capture session uses a native OpenGL texture to capture images for better performance and 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 [DisposeAsync\(\)](#) to dispose the session to free up native resources.

DisposeAsync()

Closes and disposes the camera device.

```
public ValueTask DisposeAsync()
```

Returns

ValueTask

~CameraDevice()

```
protected ~CameraDevice()
```

Invoke(string, nint)

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

Parameters

methodName string

javaArgs nint

Returns

nint

WaitForInitialization()

Waits until the CameraDevice opens or errs out.

```
public WaitUntil WaitForInitialization()
```

Returns

WaitUntil

WaitForInitializationAsync(CancellationToken)

Waits until the CameraDevice opens or errs 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>

Remarks

The camera ID may be [null](#) if the camera could not be opened in the first place.

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](#)>

Remarks

The camera ID may be [null](#) if the camera could not be opened in the first place.

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?

NativeCameraCharacteristics

The native CameraCharacteristics object.

```
public readonly AndroidJavaObject NativeCameraCharacteristics
```

Field Value

AndroidJavaObject

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[]

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

DisposeAsync()

Closes and disposes the capture session and texture converter.

```
public ValueTask DisposeAsync()
```

Returns

ValueTask

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](#)

Methods

DisposeAsync()

Closes and disposes the capture session.

```
public ValueTask DisposeAsync()
```

Returns

ValueTask

~ContinuousCaptureSession()

```
protected ~ContinuousCaptureSession()
```

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

OnDisposeCompleted

Called when the native wrapper has been completely disposed.

```
protected event Action? OnDisposeCompleted
```

Event Type

Action

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	
yBuffer (IntPtr)	Pointer to the buffer containing Y (luminance) data of the frame.
uBuffer (IntPtr)	Pointer to the buffer containing U (color) data of the frame.
vBuffer (IntPtr)	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.

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 is being/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.OnSessionConfigured](#) ,
[ContinuousCaptureSession.OnSessionConfigurationFailed](#) ,
[ContinuousCaptureSession.OnSessionRequestSet](#) , [ContinuousCaptureSession.OnSessionRequestFailed](#) ,
[ContinuousCaptureSession.OnSessionActive](#) , [ContinuousCaptureSession.OnSessionClosed](#) ,
[ContinuousCaptureSession.OnFrameReady](#) , [ContinuousCaptureSession.OnDisposeCompleted](#) ,
[ContinuousCaptureSession.captureSession](#) , [ContinuousCaptureSession.Invoke\(string, nint\)](#) ,
[ContinuousCaptureSession.WaitForInitialization\(\)](#) ,
[ContinuousCaptureSession.WaitForInitializationAsync\(CancellationToken\)](#) ,
[ContinuousCaptureSession.DisposeAsync\(\)](#)

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](#)[↗], otherwise, [false](#)[↗].

Class TaskExtensions

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

Extensions for System.Action.

```
public static class TaskExtensions
```

Inheritance

object ← TaskExtensions

Methods

HandleAnyException(Task)

Adds a continuation to a task to log exceptions.

```
public static void HandleAnyException(this Task current)
```

Parameters

current Task

InvokeOnMainThread(Action?)

Invokes the current action on the main thread.

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

Parameters

current Action

Returns

Task

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

Invokes the current action on the main thread.

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

Parameters

current Action<T>

arg0 T

Returns

Task

Type Parameters

T

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

Invokes the current action on the main thread.

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

Parameters

current Action<T0, T1>

arg0 T0

arg1 T1

Returns

Task

Type Parameters

T0

T1

Yield(ValueTask)

Allows for "yielding" a System.Threading.Tasks.ValueTask using a WaitUntil object.

```
public static WaitUntil Yield(this ValueTask current)
```

Parameters

current ValueTask

Returns

WaitUntil

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's avatar camera.

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

Field Value

string

HeadsetCameraPermission

The permission required to access the Meta Quest's Passthrough 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

Gets a cached array of the available cameras and their characteristics.

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

Property Value

[CameraInfo\[\]](#)

Remarks

The disposal of the [CameraInfo](#) objects generated by this property are managed by the [UCamera Manager](#) instance. If you require control of the [CameraInfo](#) objects, use [GetCameraInfos\(\)](#) instead.

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.

Remarks

The [CameraInfo](#) object returned by this method is managed by the [UCameraManager](#) instance, so do not dispose it manually.

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

You will have to manage the disposal of the [CameraInfo](#) objects returned by this method. Use [Cameras](#) if you don't want to handle the objects yourself.

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; accepts [CameraInfo](#) objects through an implicit cast.

Returns

[CameraDevice](#)

A [CameraDevice](#) object or [null](#) if any errors occurred.

Remarks

Once you have finished using the camera, close and dispose of it using [DisposeAsync\(\)](#).

RefreshCachedCameraInfos()

Refreshes the cached array of camera devices.

```
public bool RefreshCachedCameraInfos()
```

Returns

bool

[true](#) if the refresh was successful; [false](#) otherwise.

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()
```

~YUVToRGBAConverter()

```
protected ~YUVToRGBAConverter()
```

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 Task 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.

Returns

Task

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 experimental capture session 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.Texture](#) ,
[SurfaceTextureCaptureSession.CaptureTimestamp](#) , [SurfaceTextureCaptureSession.OnSessionConfigured](#) ,
[SurfaceTextureCaptureSession.OnSessionConfigurationFailed](#) ,
[SurfaceTextureCaptureSession.OnSessionRequestSet](#) ,
[SurfaceTextureCaptureSession.OnSessionRequestFailed](#) ,
[SurfaceTextureCaptureSession.OnSessionRegistrationFailed](#) ,
[SurfaceTextureCaptureSession.OnSessionActive](#) , [SurfaceTextureCaptureSession.OnSessionClosed](#) ,
[SurfaceTextureCaptureSession.OnFrameReady](#) , [SurfaceTextureCaptureSession.OnDisposeCompleted](#) ,
[SurfaceTextureCaptureSession._commandBuffer](#) , [SurfaceTextureCaptureSession._captureSession](#) ,
[SurfaceTextureCaptureSession._nativeTextureId](#) ,
[SurfaceTextureCaptureSession.OnFrameReadyInvk\(Texture2D, long\)](#) ,
[SurfaceTextureCaptureSession.InitializeNative\(long\)](#) ,
[SurfaceTextureCaptureSession.SendNativeUpdate\(STCaptureSessionNative.NativeEventId, STCaptureSessionNative.NativeUpdateCallbackWithTimestampType, long\)](#) ,
[SurfaceTextureCaptureSession.WaitForInitialization\(\)](#) ,
[SurfaceTextureCaptureSession.WaitForInitializationAsync\(CancellationToken\)](#) ,
[SurfaceTextureCaptureSession.Disposed](#) , [SurfaceTextureCaptureSession.DisposeAsync\(\)](#)

Remarks

This experimental capture session uses a native OpenGL texture to capture images for better performance and 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

Properties

HasFrame

Has the capture session received its first frame?

```
public bool HasFrame { get; }
```

Property Value

bool

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(Cancellation_token)

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

```
public Awaitable<(Texture2D?, long)> RequestCaptureAsync(Cancellation_token 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

DeregisterNativeUpdateCallbacks(uint)

Deregisters a native update queue for a texture and disposes allocated data.

```
public static void DeregisterNativeUpdateCallbacks(uint textureId)
```

Parameters

textureId uint

The ID of the native texture to deregister updates of.

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 experimental capture session uses a native OpenGL texture to capture images for better performance.

```
public class SurfaceTextureCaptureSession : AndroidJavaProxy
```

Inheritance

object ← SurfaceTextureCaptureSession

Derived

[OnDemandSurfaceTextureCaptureSession](#)

Remarks

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](#)

Disposed

```
protected bool Disposed { get; }
```

Property Value

bool

Methods

DisposeAsync()

Closes and releases the capture session..

```
public ValueTask DisposeAsync()
```

Returns

ValueTask

~SurfaceTextureCaptureSession()

```
protected ~SurfaceTextureCaptureSession()
```

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 Task 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**.

Returns

Task

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(Cancellation token  
= default)
```

Parameters

token CancellationToken

Returns

Awaitable<[NativeWrapperState](#)>

The current state of the CaptureSession.

Events

OnDisposeCompleted

Called when the native Kotlin wrapper has been completely disposed.

```
protected event Action? OnDisposeCompleted
```

Event Type

Action

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