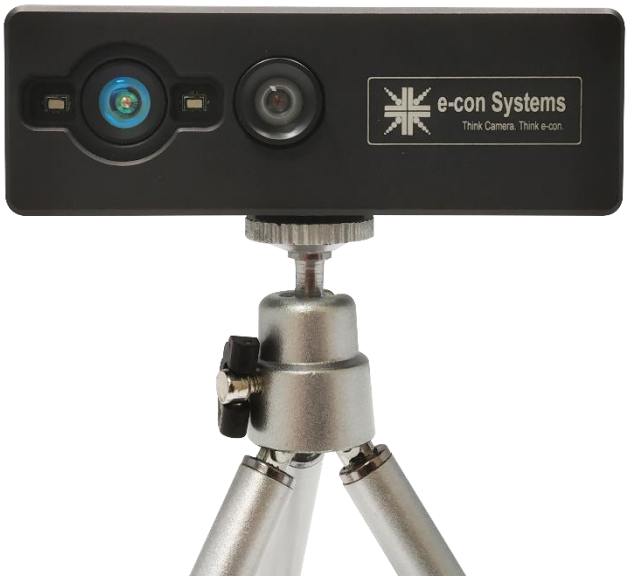
DepthVista

DepthVista SDK API Manual



e-con Systems

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Version 1.5

e-con Systems

11/4/2022

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Contents

Introduction to DepthVista

DepthVista is a 3D camera based on Time of Flight (TOF) technology, USB Video Class (UVC) compliant, USB 3.2 Gen 1 SuperSpeed USB camera from e-con Systems, a leading Embedded Product Design Services Company which specializes in advanced camera solutions.

DepthVista is a RGB-D camera contains both RGB and TOF depth cameras. RGB camera has 1/2.6" AR0234CS CMOS digital image sensor with global shutter from onsemi$_{TM.}$ It has dedicated high performance color Image signal processor. TOF depth camera has 1/4” CCD sensor and dedicated depth processor. DepthVista is a two-board solution containing camera board with the USB 3.2 Gen 1 interface and Laser board along with enclosure.

This document highlights the APIs that are currently used in the sample application of DepthVista.

Prerequisites

The prerequisites are described below.

Window

The Visual C++ redistributable packages install runtime components of Visual C++ libraries that are required to run applications developed using Visual Studio 2017 on a computer. These packages install runtime components of the C Runtime (CRT) and Standard C++.

- Visual C++ redistributable for Visual Studio 2017.
- Build environment support from Visual Studio 2017 and higher Versions.

Linux

To use the APIs in SDK in Linux, either cmake or Qt Creator is required.

- Cmake version 3.5 and above. Cmake GUI can also be used.
- Qt Creator 4.11.1 and higher version is required.

Description

DepthVista has USB interface controller with USB Type-C connector to interface with the host PC. It is a ready-to-manufacture camera board with all the necessary firmware built-in and is compatible with the UVC version 1.0 standard. You can integrate this camera into the products, and this helps to cut short the time-to-market.

DepthVista is UVC compatible and will work with the standard drivers available with Windows and Linux OS. There is no need for any additional driver installation. So, video streaming through UVC is possible without any special drivers on OSes that have built-in support for UVC standards.

The details regarding the supported APIs are explained below.

Result Initialize()

This function initializes all the other APIs and it must be called first before calling any other APIs.

Parameters	Description
Nil	N/A

Return:

- Returns **Ok** when the device is initialized successfully.
- Returns **NotInitialized** when the device is not initialized successfully.

Sample Code:

```
void InitializeCam()
{
 if (Initialize()>0)
   {
     printf("Initialize success");
   }
  else
   {
      printf("Initialize  Failed");
   }
}
```

Result Deinitialize()

This function de-initialize all the API on the device and clears all resources allocated. After invoking this API, no other APIs can be invoked.

Parameters	Description
Nil	N/A

Return:

- Returns **Ok** when the device is de-initialized successfully.
- Returns **NotDeInitialized** when the device is not de-initialized.

Sample Code:

```
void DeinitializeCam()
{
      if(Deinitialize()>0)
      {
            printf("Deinitialize Success\r\n");
      }
      else
      {
            printf("Deinitialize failed\r\n");
      }
}
```

Result GetDeviceCount(uint32_t *gDeviceCount)

This function is used to get the number of DepthVista devices connected to the host PC. The device count will be stored in the given 32-bit integer pointer.

Parameters	Description
`uint32_t *gDeviceCount`	[OUT] Pointer to store device count.

Return:

- Returns **Ok** when the number of devices is obtained successfully.
- Returns **NotInitialized** when the device is not initialized.
- Returns **NoDeviceConnected** when there are no devices connected.

Sample Code:

```
void getDeviceCount()
{
         uint32_t gdeviceCount;
      if(GetDeviceCount(&gdeviceCount)>0)
      {
      printf("Number of devices connected is %d  \r\n\n",
gdeviceCount );
      }
      else
      {
            printf("GetDeviceCount Failed\r\n\n");
      }
}
```

Result GetDeviceListInfo(uint32_t deviceCount, DeviceInfo* gDevicesList)

This function returns the list of information of the devices connected to the host PC. The information is contained in a *DeviceInfo* structure**.** DeviceInfo structure holds the device name, VID, PID, device path and the serial number of the camera.

Parameters	Description
`uint32_t gDeviceCount`	[IN] number of devices connected.
`DeviceInfo *gDevicesList`	[OUT] list of DeviceInfo whose size is gDeviceCount

Member Description:

- char deviceName[50]: This member holds the deviceName of the camera.
- char pid[5]: This member holds the Product ID specific for DepthVista.
- char vid[5]: This member holds the Vendor ID specific for e-con Systems.
- char devicePath[250]: This member holds the path in which the device is enumerated.
- char serialNo[50]: This holds the serial number of the device.

Return:

- Returns **Ok** when the information of all the devices connected was obtained.
- Returns **NotInitialized** when the device is not initialized.
- Returns **NoDeviceConnected** when there are no devices connected.
- Returns **InvalidDeviceIndex** when the device index in invalid.

Sample Code:

```
void GetDeviceListInfo_()
{
      uint32_t gDeviceCount; // get device count from
GetDeviceCount
      DeviceInfo *gDevicesList = new
DeviceInfo[gDeviceCount];
      if(GetDeviceListInfo(gDeviceCount, gDevicesList )>0)
      {
            uint16_t index;
            for(index = 0; index < gDeviceCount; index++)
            {
                  printf("Device name is %s",
gDeviceList[index].deviceName);
                  printf("Device PID is %s",
gDeviceList[index].pid);
                  printf("Device VID is %s",
gDeviceList[index].vid);
```

```
                printf("Device devicePath is %s",
gDeviceList[index].devicePath);
                printf("Device serialNo is %s",
gDeviceList[index].serialNo);
          }
     }
     else
     {
          printf("GetDeviceListInfo failed\r\n");
     }
}
```

Result GetDeviceInfo(uint32_t deviceIndex, DeviceInfo* gDevice)

This function returns the information of the devices at the index mentioned in deviceIndex connected to the host PC. The information is contained in a *DeviceInfo* structure**.** DeviceInfo structure holds the device name, VID, PID, device path and the serial number of the camera.

Parameters	Description
`uint32_t deviceIndex`	[IN] device index whose device information is to be known
`DeviceInfo *gDevicesList`	[OUT] DeviceInfo struct that contains the information of the device at index deviceIndex

Member Description:

- char deviceName[50]: This member holds the deviceName of the camera.
- char pid[5]: This member holds the Product ID specific for DepthVista.
- char vid[5]: This member holds the Vendor ID specific for e-con Systems.
- char devicePath[250]: This member holds the path in which the device is enumerated.
- char serialNo[50]: This holds the serial number of the device.

Return:

- Returns **Ok** when the information of all the devices connected was obtained.
- Returns **NotInitialized** when the device is not initialized.
- Returns **NoDeviceConnected** when there are no devices connected.
- Returns **InvalidDeviceIndex** when the device index in invalid.

Sample Code:

```
void GetDeviceInfo_()
{
     uint32_t deviceIndex; // 0 to gDeviceCount -1
```

```
	DeviceInfo *gDevicesInfo;
	if(GetDeviceInfo(deviceIndex, gDevicesInfo )>0 )
	{
		printf("GetDeviceInfo Success\r\n");
	}
	else
	{
		printf("GetDevicetInfo failed\r\n");
	}
}
```

Result OpenDevice(uint32_t deviceIndex)

This function opens the device specified by deviceIndex. The device must be subsequently closed using CloseDevice().

Parameters	Description
`uint32_t deviceIndex`	[IN] device index of the device which is to be opened

Return:

- Returns **Ok** when the information of all the devices connected was obtained.
- Returns **NotInitialized** when the device is not initialized.
- Returns **NoDeviceConnected** when there are no devices connected.
- Returns **InvalidDeviceIndex** when the device index in invalid.

Sample Code:

```
void OpenDevice_()
{
	uint32_t deviceIndex; // 0 to gDeviceCount -1
	if(OpenDevice(deviceIndex) >0)
	{
		printf("OpenDevice Success\r\n");
	}
	else
	{
		printf("OpenDevice failed\r\n");
	}
}
```

Result CloseDevice()

This function closes the device that was opened using OpenDevice().

Parameter	Description
Nil	N/A

Return:

- Returns **Ok** when the device is closed successfully.
- Returns **CameraNotOpened** when the device is not initialized.

Sample Code:

```
void CloseDevice_()
{
      if(CloseDevice()>0 )
      {
            printf("CloseDevice Success\r\n");
      }
      else
      {
            printf("CloseDevice failed\r\n");
      }
}
```

Result IsOpened()

This function return whether the device is opened or not.

Parameter	Description
Nil	N/A

Return:

- Returns **Ok** when the device is opened.
- Returns **CameraNotOpened** when the camera is not opened.

Sample Code:

```
void IsOpened_()
{
      if(IsOpened()>0 )
      {
            printf("Device is opened\r\n");
      }
      else
```

```
        {
                printf("Device is closed \r\n");
        }
}
```

Result GetNextFrame()

This function retrieves the image frame from the device that was opened using OpenDevice(). This API must be invoked before retrieving frame data using GetToFFrame().

Parameter	Description
Nil	N/A

Return:

- Returns **Ok** when the image frame is retrieved successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **TimeoutError** when the wait event timed out.

Sample Code:

```
void GetNextFrame_()
{
        if(GetNextFrame ()>0)
        {
                printf("GetNextFrame success\r\n");
                // call to GetToFFrame();
        }
        else
        {
                printf("GetNextFrame failed\r\n");
        }
}
```

Result GetToFFrame(FrameType frameType, ToFFrame* frame)

This function returns the image data of *ToFFrame* structure for the current frame specified by *FrameType* from the device that was opened using OpenDevice(). Before invoking this API, invoke GetNextFrame() to capture one image frame from the device.

Parameters	Description
`FrameType frameType`	[IN]Type of frame for which the image data is needed. The frame types supported are as follows:

- **IRPreviewFrame:** Separate IR frame.
- **DepthColorMap:** Depth data that is applied with Color map for preview purpose.
- **RGBFrame:** Separate RGB frame.
- **DepthRawFrame:** Raw depth frame without applying color map. Hence this frame cannot be used for preview.

`ToFFrame* Frame`	[OUT]Address of the ToFFrame structure in which the image data is filled. The structure member are as follows: • **unsigned char* frame_data**: This unsigned char pointer holds the address of the memory that holds the frame data. • **uint16_t width**: This holds the width of the frame. • **uint16_t height**: This holds the height of the frame. • **uint8_t pixel_format**: 0 for UYVY, 1 for Y16 and 2 for RGB pixel format. • **uint32_t size**: This holds the size of the image buffer in bytes.

Return:

- Returns **Ok** when the TOFFrame structure is retrieved successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **InvalidFrameType** when the mentioned frame type is invalid.

Sample Code:

```
void GetToFFrame_()
{
      ToFFrame* frame;
      uint8_t frameType;
      if(GetToFFrame(frameType, frame)>0)
      {
         // Usage of ToFFrame struct
        uint16_t* image_buf =
(uint16_t*)malloc(frame.size);
        memcpy(image_buf, frame.frame_data, frame.size);
        printf("frame width is %d\r\n”, frame.width);
        printf("frame height is %d\r\n”, frame.height);
            switch(frame.pixel_format)
```

```
            {
              Case 0:
                printf("Pixel format is UYVY");
              Case 1:
                printf("Pixel format is Y16");
              Case 2:
                printf("Pixel format is RGB");
            }
      }
      else
      {
            printf("GetTofFrame failed\r\n");
      }
}
```

int getFramesPerSecond()

This function returns the number of frames obtained per second.

Parameters	Description
Nil	N/A

Return:

Int: returns the frames per second.

Sample Code:

```
void GetFramesPerSecond_()
{
      printf("FPS : %d\r\n", getFramesPerSecond());
}
```

Result SetDataMode(DataMode sDataMode)

This function sets the stream mode specified sDataMode. All the supported data modes are listed in the enum *DataMode*.

Parameters	Description
`DataMode sDataMode`	[IN]Stream Mode that is to be set. Can we any value from the enum *DataMode*. The datamodes supported are as follows: • **ModeUnknown:** This datamode is used as default in the application.

- **Depth_IR_Mode:** Output depth frame (640 x 480) and IR frame (640 x 480) at 30 FPS.
- **Depth_Mode:** Output depth frame(640x480) at 30 FPS.
- **IR_Mode:** Output IR frame (640 x 480) at 30 FPS.
- **Depth_IR_RGB_VGA_Mode:** Output depth frame (640 x 480), IR frame (640 x 480) and RGB frame (640 x 480) at 30 FPS.
- **Depth_IR_RGB_HD_Mode:** Output depth frame (640 x 480), IR frame (640 x 480) and RGB frame (1280 x 720) at 30 FPS.
- **RGB_VGA_Mode:** Output RGB frame (640 x 480) at 60 FPS.
- **RGB_HD_Mode:** Output RGB frame (1280 x 720) at 60 FPS.
- **RGB_Full_HD_Mode:** Output RGB frame (1920 x 1080) at 30 FPS.
- **RGB_1200p_Mode:** Output RGB frame (1920 x 1200) at 30 FPS.

Return:

- Returns **Ok** when the Data mode is set successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **SysCallFail** when the system call API failed.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void SetDataMode_()
{
      DataMode sDataMode;
      if(SetDataMode(sDataMode)>0)
      {
            printf("SetDataMode success\r\n");
      }
      else
      {
            printf("SetDataMode failed\r\n");
      }
}
```

Result GetDataMode(DataMode* gDataMode)

This function gets the stream mode in which the device is streaming currently. All the supported data modes are listed in the enum *DataMode*.

Parameters	Description
`DataMode* gDataMode`	[OUT]gDataMode is filled with the stream mode in which the device is streaming currently.

Return:

- Returns **Ok** when the Data mode is obtained successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **SysCallFail** when the system call API failed.

Sample Code:

```
void GetDataMode_()
{
      DataMode *gDataMode;
      if(GetDataMode(gDataMode)>0)
      {
        switch(gDataMode)
        {
            case ModeUnknown:
              printf("Current data modes is
ModeUnkown\r\n");
            case Depth_IR_Mode:
              printf("Current data modes is
Depth_IR_Mode\r\n");
            case Depth_Mode:
              printf("Current data modes is
Depth_Mode\r\n");
            case IR_Mode:
              printf("Current data modes is IR_Mode\r\n");
            case Depth_IR_RGB_VGA_Mode:
              printf("Current data modes is
Depth_IR_RGB_VGA_Mode\r\n");
            case Depth_IR_RGB_HD_Mode:
              printf("Current data modes is
Depth_IR_RGB_HD_Mode\r\n");
            case RGB_VGA_Mode:
              printf("Current data modes is
RGB_VGA_Mode\r\n");
```

```
            case Depth_Mode:
              printf("Current data modes is
RGB_HD_Mode\r\n");
            case Depth_Mode:
              printf("Current data modes is
RGB_Full_HD_Mode\r\n");
            case Depth_Mode:
              printf("Current data modes is
RGB_1200p_Mode\r\n");
          }
      }
      else
      {
            printf("GetDataMode failed\r\n");
      }
}
```

Result SetDepthRange(uint16_t sDepthRange)

This function sets the depth range specified by sDepthRange. The device supports two depth range as follows:

- **Far Mode:** Effective depth range in this mode is between 1000 mm to 6500 mm.
- **Near Mode**: Effective depth range in this mode is between 200 mm to 1200 mm.

Parameters	Description
`uint16_t sDepthRange`	[IN]Depth Range that is to be set. 0 for Near mode. 1 for Far mode.

Return:

- Returns **Ok** when the depth range is set successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **SysCallFail** when the system call API failed.

Sample Code:

```
void SetDepthMode_()
{
      uint16_t sDepthRange;
      if(SetDepthRange(sDepthRange)>0)
      {
            printf("SetDepthRange success\r\n");
```

```
        }
        else
        {
                printf("SetDepthRange failed\r\n");
        }
}
```

Result GetDepthRange(uint16_t *gDepthRange)

This function gets the depth range in which the device is streaming currently. The device supports two depth range as follows:

- **Far Mode:** Effective depth range in this mode is between 1000 mm to 6500 mm.
- **Near Mode**: Effective depth range in this mode is between 200 mm to 1200 mm.

Parameters	Description
`uint16_t* gDepthRange`	[OUT]gDepthRange is filled with the depth range in which the device is streaming currently. 0 for Near mode. 1 for Far mode.

Return:

- Returns **Ok** when the depth range is obtained successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **SysCallFail** when the system call API failed.

Sample Code:

```
void GetDepthMode_()
{
        uint16_t* gDepthRange;
        if(GetDepthRange(gDepthRange)>0)
        {
                if(gDepthRange == 0)
                printf("The depth range is near mode\r\n");
                else
                printf("The depth range is fat mode\r\n");
        }
        else
        {
                printf("GetDepthRange failed\r\n");
```

```
        }
}
```

Result SetTOFCoring(uint16_t sTOFCore)

This function sets the TOF coring value specified by sTOFCore.

Coring is function API that facilitates removal of signal values if they are less than the threshold value. This is used to random optical noises or pixel noises.

Parameters	Description
`uint16_t sTOFCore`	[IN]Coring value that is to be set. The range is from 0 to 16383.

Return:

- Returns **Ok** when the TOF Coring value is set successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **SysCallFail** when the system call API failed.

Sample Code:

```
void SetTOFCoring_()
{
      uint16_t sTOFCore;
      if(SetTOFCoring(sTOFCore)>0)
      {
            printf("SetTOFCoring success\r\n");
      }
      else
      {
            printf("SetTOFCoring failed\r\n");
      }
}
```

Result GetTOFCoring(uint16_t* gTOFCore)

This function gets the TOF coring value from the device.

Coring is a function that facilitates removal of signal values if they are less than the threshold value. This is used to random optical noises or pixel noises.

Parameters	Description
`uint16_t* gTOFCore`	[OUT]gTOFCore is filled with the TOF coring value. It ranges from 0 to 16383.

Return Type:

- Returns **Ok** when the TOF Coring value is obtained successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **SysCallFail** when the system call API failed.

Sample API:

```
void GetTOFCoring_()
{
	uint16_t gTOFCore;
	if(GetTOFCoring(&gTOFCore)>0)
	{
		printf("The Coring value is %d\r\n",gTOFCore);
	}
	else
	{
		printf("GetTOFCoring failed\r\n");
	}
}
```

Result SetTOFIRGain(uint16_t sTOFIRGain)

This function sets the TOF IR gain value specified by sTOFIRGain.

TOF gain is **a** software gain added to the IR display to increase the brightness of the IR scene.

Parameters	Description
`uint16_t sTOFIRGain`	[IN]IR Gain value that is to be set. It ranges from 1 to 100.

Return:

- Returns **Ok** when the TOF IR Gain value is set successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **InvalidValue** when the given value is an invalid one.

Sample Code:

```
void SetTOFIRGain_()
{
	uint16_t sTOFIRGain;
	if(SetTOFIRGain(sTOFIRGain)>0)
	{
		printf("SetTOFIRGain success\r\n");
```

```
	}
	else
	{
		printf("SetTOFIRGain failed\r\n");
	}
}
```

Result GetTOFIRGain(uint16_t* gTOFIRGain)

This function gets the TOF IR gain value. The default value is 16.

TOF gain is **a** software gain added to the IR display to increase the brightness of the IR scene.

Parameters	Description
`uint16_t* gTOFIRGain`	[OUT] gTOFIRGain is filled with the TOF IR Gain value.

Return:

- Returns **Ok** when the TOF IR Gain value is obtained successfully.
- Returns **CameraNotOpened** when the device is not opened.

Sample Code:

```
void GetTOFIRGain_()
{
	uint16_t* gTOFIRGain;
	if(GetTOFIRGain(gTOFIRGain)>0)
	{
		printf("TOF IR Gain value is %d\r\n", gTOFIRGain);
	}
	else
	{
		printf("GetTOFIRGain failed\r\n");
	}
}
```

Result GetUVCControl(int32_t gControlID, UVCProp* gControlValue)

This function gets the UVC control value gControlValue of control specified by gControlID. UVC controls supported by DepthVista are as follows:

- Brightness

- Contrast
- Saturation
- Gamma
- Gain
- Sharpness
- White Balance
- Exposure
- Power line frequency

Parameters	Description
`int32_t gControlID`	[IN] gControlID for the specific UVC Control. Each UVC control have a specific control ID listed in *UVCPropID* enum.
`UVCProp* gControlValue`	[OUT] pointer to the *UVCPropID* structure. *UVCPropID* structure contains ID, minimum value, maximum value, current value, step value and the default value.

Return:

- Returns **Ok** when the UVC property is obtained successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.

Sample Code:

```
void GetUVCControl_()
{
      int32_t gControlID;
      UVCProp gControlValue;
      if(GetUVCControl(gControlID, &gControlValue)>0 )
      {
            printf("gControlValue.id : %d\r\n",
gControlValue.id);
            printf("gControlValue.cur : %d\r\n",
gControlValue.cur);
            printf("gControlValue.min : %d\r\n",
gControlValue.min);
            printf("gControlValue.max : %d\r\n",
gControlValue.max);
            printf("gControlValue.step : %d\r\n",
gControlValue.step);
            printf("gControlValue.default_val : %d\r\n",
gControlValue.Default_val);
      }
```

```
      else
      {
            printf("GetUVCControl failed\r\n");
      }
}
```

Result SetUVCControl(int32_t sControlID, int32_t sControlValue)

This function sets the current value of the UVC control specified by sControlID. UVC controls supported by DepthVista are as follows:

- Brightness
- Contrast
- Saturation
- Gamma
- Gain
- Sharpness
- White Balance
- Exposure
- Power line frequency

Parameters	Description
`int32_t sControlID`	[IN] sControlID for the specific UVC control. Each UVC control have a specific control ID listed in *UVCPropID* enum.
`int32_t sControlValue`	[IN] current value that is to be set for the UVC control.

Return Type:

- Returns **Ok** when UVC property is set successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueSet** when the specified control cannot be set.

Sample Code:

```
void SetUVCControl_()
{
int32_t sControlID;
int32_t sControlValue;
      if(SetUVCControl(sControlID, sControlValue)>0 )
      {
            printf("SetUVCControl success\r\n”);
      }
```

```
      else
      {
            printf("SetUVCControl failed\r\n");
      }
}
```

Result SetIMUConfig(IMUCONFIG_TypeDef lIMUConfig)

This function sets the IMU Configuration mode of the IMU in the device.

Parameters	Description
`IMUCONFIG_TypeDef lIMUConfig`	[IN] pointer to the *IMUCONFIG_TypeDef* structure.

Return:

- Returns **Ok** when the IMU Configuration mode is set successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **SysCallFail** when the system call API failed.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void SetIMUConfig_()
{
      IMUCONFIG_TypeDef lIMUConfig;
      //Set the lIMUConfig to the required Configuration
      if(SetIMUConfig(lIMUConfig)>0 )
      {
            printf("SetIMUConfig success\r\n”);
      }
      else
      {
            printf("SetIMUConfig Failed\r\n”);
      }

}
```

Result GetIMUConfig(IMUCONFIG_TypeDef* lIMUConfig)

This function gets the IMU Configuration mode of the IMU from the device.

Parameters	Description
`IMUCONFIG_TypeDef* lIMUConfig`	[OUT] pointer to the *IMUCONFIG_TypeDef* structure.

Return:

- Returns **Ok** when the IMU Configuration mode is obtained successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **SysCallFail** when the system call API failed.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void GetIMUConfig_()
{
      IMUCONFIG_TypeDef lIMUConfig;
      if(GetIMUConfig(&lIMUConfig)>0 )
      {
            printf("GetIMUConfig success\r\n”);
      }
      else
      {
            printf("GetIMUConfig Failed\r\n”);
      }

}
```

Result ControlIMUCapture(IMUDATAINPUT_TypeDef* lIMUInput)

This function sets the IMU Value update in the device.

Parameters	Description
`IMUDATAINPUT_TypeDef* lIMUInput`	[IN] pointer to the *IMUDATAINPUT_TypeDef* structure.

Return:

- Returns **Ok** when the IMU Value update is set successfully.
- Returns **CameraNotOpened** when the device is not opened.

- Returns **SysCallFail** when the system call API failed.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void ControlIMUCapture_()
{
      IMUDATAINPUT_TypeDef lIMUInput;
      //Set the lIMUInput to the required Mode
      if(ControlIMUCapture(&lIMUInput)>0 )
      {
            printf("ControlIMUCapture success\r\n”);
      }
      else
      {
            printf("ControlIMUCapture Failed\r\n”);
      }

}
```

GetIMUValue(pthread_mutex_t *lIMUDataReadyEvent, IMUDATAINPUT_Typedef* lIMUAxes)

This function gets the IMU axis data from the device.

(Note: The below parameters are of Linux)

Parameters	Description
`pthread_mutex_t *lIMUDataReadyEvent`	Event to be passed to API and will be updated for each value
`IMUDATAINPUT_Typedef* lIMUAxes`	[OUT] pointer to the *IMUDATAINPUT_Typedef* structure.

(Note: The below parameters are of Windows)

Parameters	Description
`HANDLE lIMUDataReadyEvent`	Event to be passed to API and will be updated for each value
`IMUDATAINPUT_Typedef* lIMUAxes`	[OUT] pointer to the *IMUDATAINPUT_Typedef* structure.

Return:

- Returns **Ok** when the IMU axis data is received successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **SysCallFail** when the system call API failed.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void GetIMUValue_()
{
      IMUDATAINPUT_Typedef lIMUAxes;
      if(GetIMUValue(&lIMUAxes)>0 )
      {
            printf("GetIMUValue success\r\n”);
      }
      else
      {
            printf("GetIMUValue Failed\r\n”);
      }

}
```

Result GetAntiFlickerDetection(uint8_t* gAFDetect)

This function gets the anti-flicker detection mode from the device. The flicker detection is used to avoid flicker in the video preview due to AC light source. There are 3 modes of Anti-Flicker detection. There are off mode for flicker avoidance, auto mode, or manual mode (50 Hz and 60 Hz).

Parameters	Description
`uint8_t* gAFDetect`	[OUT] pointer to uint8_t variable that is filled with the Anti-Flicker detection mode on success of the API. The resultant value is between 0 to 3. • 0 represents Auto Mode • 1 represents Manual 50 Hz • 2 represents Manual 60 Hz • 3 represents Disabled

Return:

- Returns **Ok** when the Anti-Flicker detection was obtained successfully.

- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void GetAntiFlickerDetection_()
{
uint8_t gAFDetect;
      if(GetAntiFlickerDetection(&gAFDetect)>0 )
      {
        switch(gAFDetect)
   {
     case 0:
        printf("Anti_flicker detection is in Auto
Mode\r\n");
     case 1:
        printf("Anti_flicker detection is in Manual 50 Hz
mode\r\n");
     case 2:
        printf("Anti_flicker detection is in Manual 60 Hz
mode\r\n");
     case 3:
        printf("Anti_flicker detection is in Disabled
mode\r\n");
       }
      }
   else
{
        printf("GetAntiFlickerDetection failed\r\n");
}
}
```

Result SetAntiFlickerDetection(uint8_t sAFDetect)

This function sets an anti-flicker detection mode specified by sAFDetect to the device. The flicker detection is used to avoid flicker in the video preview due to AC light source. There are 3 modes of anti-flicker detection. There are off mode for flicker avoidance, auto mode, or manual mode (50 Hz and 60 Hz).

Parameters	Description
`uint8_t sAFDetect`	[IN] uint8_t variable containing the Anti-Flicker mode to be set. The input values are between 0 to 3. • 0 represents Auto Mode • 1 represents Manual 50 Hz • 2 represents Manual 60 Hz • 3 represents Disabled

Return:

- Returns **Ok** when the Anti-Flicker detection is set successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void SetAntiFlickerDetection_()
{
      uint8_t sAFDetect;
      if(SetAntiFlickerDetection(sAFDetect)>0 )
      {
        printf("SetAntiFlickerDetection success\r\n");
      }
   else
{
        printf("SetAntiFlickerDetection failed\r\n");
}
}
```

Result GetSceneMode(uint8_t* gSceneMode)

<content>

Parameters	Description
`uint8_t* gSceneMode`	<content>

Return:

- <content>

Sample Code:

```
void GetSceneMode_()
```

```
{<content>
```

Result SetSceneMode(uint8_t sSceneMode)

<content>

Parameters	Description
`uint8_t sSceneMode`	<content>

Return:

- <content>

Sample Code:

```
void SetSceneMode_()
{<content>
```

Result GetSpecialEffect(uint8_t* gSplEffect)

This function gets the processed image special effect filters applied to the preview. The four special effects are normal, black and white, grayscale, negative and sketch.

Parameters	Description
`uint8_t* gSplEffect`	[OUT] pointer to uint8_t variable that is filled with the special effect mode on success of the API. The resultant values are: • 1 for Normal Mode • 4 for Black and White • 7 for Grayscale • 8 for Negative • 16 for Sketch

Return:

- Returns **Ok** when the special effect was obtained successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void GetSpecialEffect_()
{
uint8_t gSplEffect;
     if(GetSpecialEffect(&gSplEffect)>0 )
```

```
      {
        switch(gSplEffect)
   {
     case 1:
        printf("Preview is in Normal mode. It doesn't have
any added processing. \r\n");
     case 4:
        printf("Black and White special effect is applied
to the preview. The image stream is composed of black and
white pixels \r\n");
     case 7:
        printf("Grayscale special effect is applied to the
preview. The image stream is composed of gray shades.
r\n");
     case 8:
        printf("Negative special effect is applied to the
preview. The normal preview is color inverted. \r\n");
     case 16:
        printf("Sketch special effect is applied to the
preview. r\n");
      }
      }
   else
{
        printf("GetSpecialEffect failed\r\n");
}
}
```

Result SetSpecialEffect(uint8_t sSplEffect)

This function applies the special effect filter specified by sSplEffect to the preview. The four special effects are normal, black and white, grayscale, negative and sketch.

Parameters	Description
`uint8_t sSplEffect`	[IN] uint8_t variable containing the special effect to be set. • 1 for Normal Mode • 4 for Black and White • 7 for Grayscale • 8 for Negative • 16 for Sketch.

Return:

- Returns **Ok** when the special effect was set successfully.

- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void SetSpecialEffect_()
{
      uint8_t sSplEffect;
      if(SetSpecialEffect(sSplEffect)>0 )
      {
        printf("SetSpecialEffect failed\r\n");
      }
   else
{
        printf("SetSpecialEffect failed\r\n");
}
}
```

Result GetDenoise(uint8_t* gDenoise)

This function gets the De-noise value from the device.

De-Noise is to blur the effect of noise in the image preview.

Parameters	Description
`uint8_t* gDenoise`	[OUT] address of a uint8_t variable in which the De-noise value is filled. The range is 0 to 15.

Return:

- Returns **Ok** when the De-noise value is obtained successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void GetDenoise_()
{
```

```
      uint8_t gDenoise;
      if(GetDenoise(&gDenoise)>0)
      {
        printf("De-noise value is %d\r\n", gDenoise);
      }
   else
{
        printf("GetDenoise failed\r\n");
}
}
```

Result SetDenoise(uint8_t sDenoise)

This function sets the De-noise value specified by the sDenoise.

De-Noise is to blur the effect of noise in the image preview.

Parameters	Description
`uint8_t sDenoise`	[IN] uint8_t variable with De-noise value that is to be set. The range is 0 to 15.

Return:

- Returns **Ok** when the De-noise value is set successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void SetDenoise_()
{
      uint8_t sDenoise;
      if(SetDenoise(sDenoise)>0)
      {
        printf("SetDenoise success\r\n");
      }
   else
{
        printf("SetDenoise failed\r\n");
}
```

```
}
```

Result GetAutoExposureROI(uint8_t* gROIMode, uint8_t* gWinSize)

This function gets an auto exposure algorithm from the device.

The modes in auto exposure ROI are as follows:

- **Full ROI**: In this mode, full region-based exposure value will be applied to the frame.
- **Manual ROI**: In this mode, you can select the ROI and at that region, the exposure value will be applied to the entire frame.

Parameters	Description
`uint8_t* gROIMode`	[OUT] pointer to uint8_t variable which is filled with the Auto Exposure ROI Mode on success of this API. The values obtained are: • 1 for Face ROI • 2 for Full ROI • 3 for Manual ROI • 4 for Disabled Auto Exposure
`uint8_t* gWinSize`	[OUT] pointer to uint8_t variable, which is filled with the window size, on success of this API. The values can be from 1 to 8.

For frame size 1280 x 720, the exposure region based on the window size is listed in below table.

Table 1: Window Size vs Exposure Region

Window Size	Exposure Region (1280 x 720)
1	1/8 (160 x 90)
2	2/8 (320 x 180)
3	3/8 (480 x 270)
4	4/8 (640 x 360)
5	5/8 (800 x 450)
6	6/8 (960 x 540)
7	7/8 (1120 x 630)
8	1 (1280 x 720)

Return:

- Returns **Ok** when the Auto-Exposure ROI mode and the window size is obtained successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void GetAutoExposureROI_()
{
uint8_t gROIMode;
uint8_t gWinSize;
if(GetAutoExposureROI(&gROIMode, &gWinSize)>0)
      {
     switch(gROIMode)
        {
            case 0:
              printf("Auto Exposure ROI Mode is Face
ROI\r\n”);
            case 1:
              printf("Auto Exposure ROI Mode is Full
ROI\r\n”);
            case 2:
              printf("Auto Exposure ROI Mode is Manual
ROI\r\n
      case 3:
              printf("Auto Exposure ROI Mode is
Disbaled\r\n”);
        }
        printf("Window size is %d\r\n", gWinSize);
      }
   else
{
        printf("GetAutoExposureROI failed\r\n");
}
}
```

Result SetAutoExposureROI(uint8_t sROIMode, uint32_t sWidth, uint32_t sHeight, uint32_t sXCor, uint32_t sYCor, uint8_t sWinSize)

This function sets an auto exposure algorithm specified by sROIMode and the window size specified by sWinSize**.**

The modes in auto exposure ROI are as follows:

- **Full ROI**: In this mode, full region-based exposure value will be applied to the frame.

- **Manual ROI**: In this mode, you can select the ROI and at that region, the exposure value will be applied to the entire frame.

Parameters	Description
`uint8_t sROIMode`	[IN] uint8_t variable with an auto exposure ROI Mode that is to be set. The values can be: • 1 for Face ROI • 2 for Full ROI • 3 for Manual ROI • 4 for Disabled Auto Exposure
`uint32_t sWidth`	[IN] This parameter is valid only when the sROIMode parameter is in Manual ROI. Specifies the width of the ROI.
`uint32_t sHeight`	[IN] This parameter is valid only when the sROIMode parameter is in Manual ROI. Specifies the height of the ROI.
`uint32_t sXCor`	[IN] This parameter is valid only when the sROIMode parameter is in Manual ROI. Specifies the x co-ordinate of the top left corner in ROI.
`uint32_t sYCor`	[IN] This parameter is valid only when the sROIMode parameter is in Manual ROI. Specifies the y co-ordinate of the top left corner in ROI.
`uint8_t* gWinSize`	[OUT] pointer to uint8_t variable which is filled with the window size, on success of this API. The values can be from 1 to 8.

Return:

- Returns **Ok** when the Auto-Exposure ROI mode and the window size along with the width, height, x and y co-ordinates of the top left corner of the ROI is set successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void SetAutoExposureROI_()
{
uint8_t sROIMode = 3, sWinSize = 1;
uint32_t sWidth = 160, sHeight = 90;
uint32_t sXCor = 100, sYCor =200;
if(SetAutoExposureROI(sROIMode, sWidth, sHeight, sXCor,
sYCor, gWinSize)>0)
```

```
      {
        printf("SetAutoExposureROI success\r\n");
      }
   else
{
        printf("SetAutoExposureROI failed\r\n");
}
}
```

Result GetOrientation(uint8_t* gOrientation)

This function gets the orientation of the scene from the camera. Horizontal flip, vertical flip and both flips simultaneously are supported.

Parameters	Description
`uint8_t* gOrientation`	[OUT] pointer to uint8_t variable which is filled with the type of orientation, on success of this API. The values obtained are • 1 for Horizontal Flip • 2 for Vertical Flip • 3 for both Horizontal and Vertical Flip

Return:

- Returns **Ok** when the Orientation is obtained successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void GetOrientation_()
{
uint8_t gOrientation;
if(GetOrientation(&gOrientation)>0)
      {
        switch(gOrientation)
        {
            case 1;
              printf("Scene is flipped Horizontally\r\n");
            case 2;
```

```
            printf("Scene is flipped Vertically\r\n");
          case 3;
            printf("Scene is flipped Horizontally and
Vertically\r\n");
        }
      }
   else
{
        printf("GetOrientation failed\r\n");
}
}
```

Result SetOrientation(uint8_t sOrientation)

This function sets the orientation of the scene specified by sOrientation. Horizontal flip, vertical flip and both flips simultaneously are supported.

Parameters	Description
`uint8_t sOrientation`	[IN] uint8_t variable with the type of orientation that is to be set. The values can be: • 1 for Horizontal Flip • 2 for Vertical Flip • 3 for both Horizontal and Vertical Flip

Return:

- Returns **Ok** when the Orientation is set successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void SetOrientation_()
{
uint8_t sOrientation = 2;
if(SetOrientation(sOrientation)>0)
      {
        printf("SetOrientation success\r\n");
      }
   else
```

```
{
        printf("SetOrientation failed\r\n");
}
}
```

Result GetFaceDetection(uint8_t* gFacedet, uint8_t* gStatusStruct, uint8_t* gOverlayRect)

This function gets the face detection option from the device.

Parameters	Description
`uint8_t* gFacedet`	[OUT] pointer to uint8_t variable which is filled with the face detection option, on success of this API. The values obtained are • 0 for face detection disabled • 1 for face detection enabled
`uint8_t* gStatusStruct`	[OUT] pointer to uint8_t variable which is filled with status structure option, on success of this API. The values obtained are • 0 for status structure disabled • 1 for status structure enabled
`uint8_t* gOverlayRect`	[OUT] pointer to uint8_t variable which is filled overlay rectangle option, on success of this API. The values obtained are • 0 for overlay rectangle disabled • 1 for overlay rectangle enabled

The Overlay Rectangle option allows you to enable or disable the overlay rectangle around the faces during face detection, and when Embed Data option is enabled, the last part of the frame will be replaced with face details.

Return:

- Returns **Ok** when the face detection option is obtained successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void GetFaceDetection_()
{
uint8_t gFacedet, gStatusStruct, gOverlayRect;
```

```
if(GetFaceDetection(&gFacedet, &gStatusStruct,
&gOverlayRect)>0)
      {
         if(!gFacedet)
           printf("Face detection mode is disabled\r\n");
         else
      printf("Face detection mode is enabled\r\n");
         if(!gStatusStruct)
           printf("Status structure mode is
disabled\r\n");
         else
      printf("Status structure mode is enabled\r\n");
         if(!gOverlayRect)
           printf("Overlay rectangle mode is
disabled\r\n");
         else
      printf("Overlay rectangle mode is enabled\r\n");
      }
   else
        printf("GetFaceDetection failed\r\n");
}
```

Result SetFaceDetection(uint8_t sFacedet, uint8_t sStatusStruct, uint8_t sOverlayRect)

This function sets the face detection option specified by sFacedet, sStatusStruct and sOverlayRect.

Parameters	Description
`uint8_t sFacedet`	[IN] uint8_t variable with the face detection option that is to be set. The values can be: • 0 for face detection disabled • 1 for face detection enabled
`uint8_t sStatusStruct`	[IN] uint8_t variable with the status structure option that is to be set. The values can be: • 0 for status structure disabled • 1 for status structure enabled
`uint8_t sOverlayRect`	[IN] uint8_t variable with the overlay rectangle option that is to be set. The values can be: • 0 for overlay rectangle disabled • 1 for overlay rectangle enabled

The Overlay Rectangle option allows you to enable or disable the overlay rectangle around the faces during face detection, and when Embed Data option is enabled, the last part of the frame will be replaced with face details.

Return:

- Returns **Ok** when the face detection option is set successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void SetFaceDetection_()
{
uint8_t sFacedet = 1, sStatusStruct = 0, sOverlayRect = 1;
if(SetFaceDetection(sFacedet, sStatusStruct, sOverlayRect)>0)
      {
        printf("SetFaceDetection success\r\n");
      }
   else
{
        printf("SetFaceDetection failed\r\n");
}
}
```

Result GetSmileDetection(uint8_t* gSmiledet, uint8_t* gStatusStruct)

This function gets the smile detection option from the device.

Parameters	Description
`uint8_t* gSmiledet`	[OUT] pointer to uint8_t variable which is filled with the smile detection option, on success of this API. The values obtained are • 0 for smile detection disabled • 1 for smile detection enabled
`uint8_t* gStatusStruct`	[OUT] pointer to uint8_t variable which is filled with status structure option, on success of this API. The values obtained are

- 0 for status structure disabled
- 1 for status structure enabled

When status structure option is enabled, the last part of the frame will be replaced with face details.

Return:

- Returns **Ok** when the smile detection option is obtained successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void GetSmileDetection_()
{
uint8_t gSmiledet, gStatusStruct;
if(GetSmileDetection(&gSmiledet, &gStatusStruct)>0)
      {
         if(!gSmiledet)
           printf("Smile detection mode is
disabled\r\n");
         else
      printf("Smile detection mode is enabled\r\n");
         if(!gStatusStruct)
           printf("Status structure mode is
disabled\r\n");
         else
      printf("Status structure mode is enabled\r\n");
}
   else
{
        printf("GetSmileDetection failed\r\n");
}
}
```

Result SetSmileDetection(uint8_t sSmiledet, uint8_t sStatusStruct)

This function sets the smile detection option specified by sSmiledet, sStatusStruct**.**

Parameters	Description
`uint8_t sSmiledet`	[IN] uint8_t variable with the smile detection option that is to be set. The values can be: • 0 for face detection disabled • 1 for face detection enabled
`uint8_t sStatusStruct`	[IN] uint8_t variable with the status structure option that is to be set. The values can be: • 0 for status structure disabled • 1 for status structure enabled

When status structure option is enabled, the last part of the frame will be replaced with face details.

Return:

- Returns **Ok** when the smile detection option is set successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void SetSmileDetection_()
{
uint8_t sSmiledet = 1, sStatusStruct = 0;
if(SetSmileDetection(sSmiledet, sStatusStruct)>0)
      {
        printf("SetSmileDetection success\r\n");
      }
   else
{
        printf("SetSmileDetection failed\r\n");
}
}
```

Result GetIMUEmbeddedData(uint8_t* gIMUData)

Returns the IMU embedded option from the device.

Parameters	Description
`uint8_t* gIMUData`	[OUT] pointer to uint8_t data, that will be filled based on whether the IMU Embedded Data is enabled or disabled.

- 0 for face detection disabled
- 1 for face detection enabled

When IMU embedded data option is enabled, the last part of the frame will be replaced with IMU data.

Return:

- Returns **Ok** when the smile detection option is obtained successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void GetIMUEmbeddedData_()
{
   uint8_t gIMUData;
if(GetIMUEmbeddedData(&gIMUData)>0)
      {
        printf("GetIMUEmbeddedData success\n");
        if(gIMUData == 1)
          printf("IMU Embedded data is enabled \r\n");
        else
          printf("IMU Embedded data is disabled\r\n");
      }
   else
      {
        printf("GetIMUEmbeddedData failed\r\n");
      }
}
```

Result SetIMUEmbeddedData(uint8_t sIMUData)

This function sets the IMU embedded option to the device.

Parameters	Description
`uint8_t sIMUData`	[IN] uint8_t data, that is to be set for IMU Embedded Data. • 0 for face detection disabled • 1 for face detection enabled

When IMU embedded data option is enabled, the last part of the frame will be replaced with IMU data.

Return:

- Returns **Ok** when the smile detection option is obtained successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void SetIMUEmbeddedData_()
{
    uint8_t sIMUData;
    if(SetIMUEmbeddedData(sIMUData)>0)
      {
        printf("SetIMUEmbeddedData success\r\n”);
      }
   else
      {
        printf("SetIMUEmbeddedData failed\r\n");
      }
}
```

Result GetExposureCompensation(uint32_t* gExpoComp)

This function gets the exposure compensation from the device.

Parameters	Description
`uint32_t* gExpoComp`	[OUT] pointer to uint32_t variable which is filled with the exposure compensation value, on success of this API.

Return:

- Returns **Ok** when the Exposure compensation value is obtained successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void GetExposureCompensation_()
{
uint32_t gExpoComp;
if(GetExposureCompensation(&gExpoComp)>0)
      {
            printf("Exposure compensation value is
%d\r\n", gExpoComp);
      }
   else
{
        printf("GetExposureCompensation failed\r\n");
}
}
```

Result SetExposureCompensation(uint32_t sExpoComp)

This function sets the exposure compensation specified by sExpoComp**.**

Parameters	Description
`uint32_t sExpoComp`	[IN] uint32_t variable with the exposure compensation value that is to be set.

Return:

- Returns **Ok** when the Exposure compensation value is set successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void SetExposureCompensation_()
{
uint32_t sExpoComp;
if(SetExposureCompensation(sExpoComp)>0)
      {
  printf("SetExposureCompensation failed\r\n");
      }
   else
```

```
{
        printf("SetExposureCompensation failed\r\n");
}
}
```

Result GetFrameRateCtrl(uint8_t* gFrameRateCtrl)

This function gets the frame rate control value from the device.

Parameters	Description
uint8_t* gFrameRateCtrl	[OUT] pointer to uint8_t variable which is filled with the frame rate control value, on success of this API.

Return:

- Returns **Ok** when the Frame Rate Control value is obtained successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void GetFrameRateCtrl_()
{
uint8_t gFrameRateCtrl;
if(GetFrameRateCtrl(&gFrameRateCtrl)>0)
      {
            printf("Frame Rate control value is %d\r\n",
gFrameRateCtrl);
      }
   else
{
        printf("GetFrameRateCtrl failed\r\n");
}
}
```

Result SetFrameRateCtrl(uint8_t sFrameRateCtrl)

This function sets the frame rate control value that is specified by sFrameRateCtrl.

Parameters	Description
`uint8_t sFrameRateCtrl`	[IN] uint8_t variable with the frame rate control value that is to be set.

Return:

- Returns **Ok** when the Frame Rate Control value is set successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void SetFrameRateCtrl_()
{
uint8_t sFrameRateCtrl;
if(SetFrameRateCtrl(sFrameRateCtrl)>0)
        printf("SetFrameRateCtrl success\r\n");
   else
        printf("SetFrameRateCtrl failed\r\n");
}
```

Result SetDefault()

This function sets all the HID control to default values on the device.

Parameters	Description
Nil	N/A

Return:

- Returns **Ok** when all the HID controls are set to default successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void SetDefault_()
{
```

```
if(SetDefault()>0)
        printf("SetDefault success\r\n");
   else
        printf("SetDefault failed\r\n");
}
```

Result GetUniqueID(uint64_t* gUniqueID)

This function gets the unique ID from the device.

Parameters	Description
uint64_t* gUniqueID	[OUT] pointer to uint64_t variable which is filled with the unique ID, on success of this API.

Return:

- Returns **Ok** when Unique ID is obtained successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void GetUniqueID_()
{
   uint64_t gUniqueID;
if(GetUniqueID(&gUniqueID)>0)
        printf("Unique ID of this device is %d\r\n",
gUniqueID);
   else
        printf("GetUniqueID failed\r\n");
}
```

Result SetAvgRegion(AvgRegion region)

This function sets the average depth and IR calculation area specified by region.

Parameters	Description
AvgRegion region	[IN] *AvgRegion* variable with the region at which the average depth and IR is to be calculated.

- **Center -** Tells that the average depth and IR is calculated at the center of the scene.

- **MouseLivePtr –** Tells that the average depth and IR is calculated along the mouse pointer.

Return:

- Returns **Ok** when the region at which the average depth and IR is to be calculated is set successfully.
- Returns **CameraNotOpened** when the device is not opened.

Sample Code:

```
void SetAvgRegion_()
{
   AvgRegion region = MouseLivePtr;
if(SetAvgRegion(region)>0)
        printf("SetAvgRegion success\r\n");
   else
        printf("SetAvgRegion failed\r\n");
}
```

Result SetFilterType(int ctrlID, bool selected)

This function sets or resets the type of filter specified by **filterID,** based on **selected.**

Parameters	Description
`int ctrlID`	[IN] int variable with specific filter ID which is to be enabled or disabled. Filter ID is mentioned below • 0 for Spatial Filter • 1 for Temporal Filter • 2 for Edge detection
`bool selected`	[IN] **true** when the filter mentioned by ctrlID is to be enabled **False** when the filter mentioned by ctrlID is to be disabled.

Return:

- Returns **Ok** when the filter type mentioned in **ctrlID** is enabled or disabled based on **selected** is success.
- Returns **CameraNotOpened** when the device is not opened.

Sample Code:

```
void SetAvgRegion_()
{
   AvgRegion region = MouseLivePtr;
if(SetAvgRegion(region)>0)
```

```
      {
        printf("SetAvgRegion success\r\n");
      }
   else
{
        printf("SetAvgRegion failed\r\n");
}
}
```

Result SetMousePos(MousePtr pos)

This function sets the average depth and IR calculation area specified by pos**.**

Parameters	Description
`MousePtr pos`	[IN] Object of the structure *MousePtr*, containing the x and y co-ordinates

Return:

- Returns **Ok** when the average Depth and IR calculation area specified by **pos** is success.
- Returns **CameraNotOpened** when the device is not opened.

Sample Code:

```
void SetMousePos_()
{
   MousePtr pos;
   pos.X = pos.Y  = 100;
if(SetMousePos(pos)>0)
      {
        printf("SetMousePos success\r\n");
      }
   else
{
        printf("SetMousePos failed\r\n");
}
}
```

Result SetCursorColor(int color)

This function sets the cursor color to the white or black specified by color parameter.

Parameters	Description
`int color`	[IN] Non-Zero value for black cursor color. Zero for white cursor color.

Return:

- Returns **Ok** when the cursor color specified by color parameter is set successfully.
- Returns **CameraNotOpened** when the device is not opened.

Sample Code:

```
void SetCursorColor_()
{
if(SetCursorColor(0)>0)
  printf("Cursor color set to white\r\n");
   else
        printf("SetMousePos failed\r\n");
}
```

Result SetUnDistortion(int undistort)

This function enables or disables undistortion based on the undistort parameter.

Parameters	Description
`int undistort`	[IN] Non-Zero value to enable undistortion. Zero to disable undistortion.

Return:

- Returns **Ok** when undistortion is disabled or enabled based on undistort parameter is success.
- Returns **CameraNotOpened** when the device is not opened.

Sample Code:

```
void SetUnDistortion()
{
if(SetUnDistortion(0)>0)
      {
        printf("Undistortion is disbaled\r\n");
      }
   else
{
        printf("SetUnDistortion failed\r\n");
}
}
```

Result SetRGBDMapping(int rgbDMapping)

This function enables or disables rgbDMapping based on the rgbDMapping parameter.

Parameters	Description
`int rgbDMapping`	[IN] Non-Zero value to enable rgbDMapping. Zero to disable rgbDMapping.

<content>

Return:

- Returns **Ok** when rgbDMapping is disabled or enabled based on rgbDMapping parameter is success.
- Returns **CameraNotOpened** when the device is not opened.

Sample Code:

```
void SetRGBDMapping_()
{
if(SetRGBDMapping(0)>0)
      {
        printf("RGBDMapping is disbaled\r\n");
      }
   else
{
        printf("SetRGBDMapping failed\r\n");
}
}
```

Result SetPlanarization(int planarize)

This function enables or disables planarization based on the planarize parameter.

Parameters	Description
`int planarize`	[IN] Non-Zero value to enable planarization. Zero to disable planarization.

TOF camera gets the distance between a target object and the camera as depth. The depth data from the targets in the center of the frame is correct, but depth data for the targets away from the center of the frame is the diagonal distance from the target to the camera, but we should know the distance based on the world co-ordinates. Hence depth planarization is used.

Return:

- Returns **Ok** when planarization is disabled or enabled based on **planarize** parameter is success.
- Returns **CameraNotOpened** when the device is not opened.

Sample Code:

```
void SetPlanarization_()
{
if(SetPlanarization(0)>0)
      {
        printf("Planarization is disbaled\r\n");
      }
   else
{
        printf("SetPlanarization failed\r\n");
}
}
```

Result GetDepthIRValues(int *gAvgDepth, int *gStdDepth, int *gAvgIR, int *gStdIR)

This function gets the average depth and IR and sigma depth and IR.

Parameters	Description
`int *gAvgDepth`	[OUT] pointer to int variable that is to be filled with the average depth value.
`int * gStdDepth`	[OUT] pointer to int variable that is to be filled with the sigma depth value.
`int * gAvgIR`	[OUT] pointer to int variable that is to be filled with the average IR value.
`int * gStdIR`	[OUT] pointer to int variable that is to be filled with the sigma IR value.

Return:

- Returns **Ok** when average depth and IR, and sigma depth and IR is obtained successfully.
- Returns **CameraNotOpened** when the device is not opened.

Sample Code:

```
void GetDepthIRValues_()
{
   int gAvgDepth, gStdDepth, gAvgIR, gStdIR;
if(GetDepthIRValues(&gAvgDepth, &gStdDepth, &gAvgIR,
&gStdIR)>0)
```

```
      {
        printf("Average depth value is %d\r\n",
gAvgDepth);
        printf("sigma depth value is %d\r\n", gStdDepth);
        printf("Average IR value is %d\r\n", gAvgIR);
  printf("sigma IR value is %d\r\n", gStdIR);
      }
   else
{
        printf("GetDepthIRValues failed\r\n");
}
}
```

void RegisterFrameCallback(function<void(int)> cb)

Register a callback function specified by cb when frame is received from the device.

Parameters	Description
`function<void(int)> cb`	[IN] Function pointer of the callback function

Sample Code

```
void callback_func(int a)
{
printf("Frames received from device\r\n");
}
void RegisterFrameCallback_()
{
RegisterFrameCallback(&callback_func);
}
```

void RegisterNotificationCallback(function<void(int)> cb)

This function registers a callback function specified by cb when notification is received from the device. This is used to receive device removal notification.

Parameters	Description
`function<void(int)> cb`	[IN] Function pointer of the callback function

Sample Code :

```
void callback_func(int a)
{
```

```
printf("Device removed notification received from
device\r\n");
}
void RegisterNotificationCallback_()
{
RegisterNotificationCallback(&callback_func);
}
```

Result UpdateAvgXandY(int avg_x, int avg_y)

This function updates the ROI for which the average depth and IR is being calculated.

Parameters	Description
`int avg_x`	[IN] width of the average depth calculating ROI
`int avg_y`	[IN] height of the average depth calculating ROI

Return:

- Returns **Ok** when the ROI for average depth and IR is set successfully.
- Returns **CameraNotOpened** when the device is not opened.

Sample Code:

```
void UpdateAvgXandY_()
{
   int avg_x = 64, avg_y = 64;
if(UpdateAvgXandY(avg_x, avg_y)>0)
      {
        printf("UpdateAvgXandY success\r\n");
      }
   else
{
        printf("UpdateAvgXandY failed\r\n");
}
}
```

Result UpdateColorMap(int min, int max, int colormap)

This function updates the colormap that is being applied on the raw depth data, along with the minimum and maximum limit of depth data to be covered in the depth colormap scene.

Parameters	Description
`int min`	[IN] minimum limit of depth data that is to be included in the colormap image.

`int max`	[IN] maximum limit of depth data that is to be included in the colormap image.
`int colormap`	[IN] specific number for a colormap. There are 12 colormap and the values are from 0 to 11.

Return:

- Returns **Ok** when the minimum and maximum limit of depth, and the colormap is updated successfully.
- Returns **CameraNotOpened** when the device is not opened.

Sample Code:

```
void UpdateColorMap_()
{
   int min = 200, max = 1200, colormap = 4;
if(UpdateColorMap(min, max, colormap)>0)
      {
        printf("UpdateColorMap success\r\n”);
      }
   else
{
        printf("UpdateColorMap failed\r\n");
}
}
```

Result SetAvgIRDisplay(uint8_t avgIRDisplay)

<content>

Parameters	Description
`uint8_t avgIRDisplay`	<content>

Return:

- <content>

Sample Code:

```
void SetAvgIRDisplay_()
{<content>
```

Void pError(std::string message = “”)

This function produces an error message on standard error describing the last error encountered during a call to the TOF library function.

Parameters	Description
std::string message	[IN] Error message string to be printed during failure condition

Sample Code:

```
void pError_()
{<content>
```

Result readFirmwareVersion(uint8_t* gMajorVersion, uint8_t* gMinorVersion1, uint16_t* gMinorVersion2, uint16_t* gMinorVersion3)

This function gets the firmware version from the device.

Parameters	Description
uint8_t* gMajorVersion	[OUT] pointer to uint8_t variable to store the Major version of firmware.
uint8_t* gMinorVersion1	[OUT] pointer to uint8_t variable to store the Minor version 1 of firmware.
uint16_t* gMinorVersion2	[OUT] pointer to uint16_t variable to store the Minor version 2 of firmware.
Uint16_t* gMinorVersion3	[OUT] pointer to uint16_t variable to store the Minor version 3 of firmware.

Return:

- Returns **Ok** when the firmware version is read successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void readFirmwareVersion_()
{
  uint8_t gMajorVersion = 0, gMinorVersion1 = 0;
  uint16_t gMinorVersion2 = 0, gMinorVersion3 = 0;
  if(readFirmwareVersion(&gMajorVersion, &gMinorVersion1,
&gMinorVersion2, &gMinorVersion3)>0)
{
       printf("Firmware version is %d.%d.%d.%d\r\n”,
gMajorVersion, gMinorVersion1, gMinorVersion2,
gMinorVersion3);
     }
   else
```

```
{
        printf("readFirmwareVersion failed\r\n");
}
}
```

Result calibReadReqDepthInstrinsic(int* lDepthIntFileLength)

This function requests the device to read intrinsic calibration data of the depth camera.

Parameters	Description
`int* lDepthIntFileLength`	[OUT] Pointer to int data that contains the length of the valid calibration Data on success

Return:

- Returns **Ok** when the request to read intrinsic calibration data of the depth camera is success.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void calibReadReqDepthInstrinsic_()
{
    int lDepthIntFileLength;

if(calibReadReqDepthInstrinsic(&lDepthIntFileLength)>0)
      {
        printf("calibReadReqDepthInstrinsic success\r\n”);
      }
   else
      {
        printf("calibReadReqDepthInstrinsic failed\r\n");
      }
}
```

Result calibReadDepthInstrinsic(int* lDepthIntFileLength, unsigned char* DepthIntrinsicBuffer)

This function reads the intrinsic calibration data of the depth camera.

Parameters	Description
`int* lDepthIntFileLength`	[OUT] Pointer to int data that contains the length of the valid calibration Data that is read.
`unsigned char* DepthIntrinsicBuffer`	[OUT] Pointer to an unsigned char that will contain the intrinsic calibration Data of depth camera on success of the API

Return:

- Returns **Ok** when the intrinsic calibration data of the depth camera is read successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void calibReadDepthInstrinsic_()
{
    int lDepthIntFileLength;
    unsigned char* DepthIntrinsicBuffer;
    int read_length_depth; //read_length_data must be the
length requested using calibReadReqDepthInstrinsic API
    DepthIntrinsicBuffer = (unsigned
char*)malloc(read_length_depth);
    if(calibReadDepthInstrinsic(&lDepthIntFileLength,
DepthIntrinsicBuffer)>0)
      {
        printf("calibReadDepthInstrinsic success\r\n”);
      }
   else
      {
        printf("calibReadDepthInstrinsic failed\r\n");
      }
      free(DepthIntrinsicBuffer);
}
```

Result calibReadReqRGBInstrinsic (int* lRGBIntFileLength)

This function requests the device to read intrinsic calibration data of the RGB camera.

Parameters	Description
`int* lRGBIntFileLength`	[OUT] Pointer to int data that contains the length of the valid calibration Data on success

Return:

- Returns **Ok** when the request to read intrinsic calibration data of the RGB camera is success.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void calibReadReqRGBInstrinsic_()
{
    int lRGBIntFileLength;
    if(calibReadReqRGBInstrinsic(&lRGBIntFileLength)>0)
      {
        printf("calibReadReqRGBInstrinsic success\r\n”);
      }
   else
      {
        printf("calibReadReqRGBInstrinsic failed\r\n");
      }
}
```

Result calibReadRGBInstrinsic(int* lRGBIntFileLength, unsigned char* RGBIntrinsicBuffer)

This function reads the intrinsic calibration data of the RGB camera.

Parameters	Description
`int* lRGBIntFileLength`	[OUT] Pointer to int data that contains the length of the valid calibration Data that is read.

`unsigned char* RGBIntrinsicBuffer`	[OUT] Pointer to an unsigned char that will contain the intrinsic calibration Data of RGB camera on success of the API

Return:

- Returns **Ok** when the intrinsic calibration data of the RGB camera is read successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void calibReadRGBInstrinsic_()
{
    int lRGBIntFileLength;
    unsigned char* RGBIntrinsicBuffer;
    int read_length_depth; //read_length_data must be the
length requested using calibReadReqRGBInstrinsic API
    RGBIntrinsicBuffer = (unsigned
char*)malloc(read_length_depth);
    if(calibReadRGBInstrinsic(&lRGBIntFileLength,
RGBIntrinsicBuffer)>0)
      {
        printf("calibReadRGBInstrinsic success\r\n”);
      }
   else
      {
        printf("calibReadRGBInstrinsic failed\r\n");
      }
      free(RGBIntrinsicBuffer);
}
```

Result calibReadReqExtrinsic (int* lExtFileLength)

This function requests the device to read extrinsic calibration data of the device.

Parameters	Description
`int* lExtFileLength`	[OUT] Pointer to int data that contains the length of the valid calibration Data on success

Return:

- Returns **Ok** when the request to extrinsic calibration data of the device is success.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.
- Returns **Others** when an unknown error occurred.

Sample Code:

```
void calibReadReqExtrinsic_()
{
    int lExtFileLength;
    if(calibReadReqExtrinsic(&lExtFileLength)>0)
      {
        printf("calibReadReqExtrinsic success\r\n”);
      }
   else
      {
        printf("calibReadReqExtrinsic failed\r\n");
      }
}
```

Result calibReadExtrinsic(int* lExtFileLength, unsigned char* ExtrinsicBuffer)

This function reads the extrinsic calibration data of the device.

Parameters	Description
`int* lExtFileLength`	[OUT] Pointer to int data that contains the length of the valid calibration Data that is read.
`unsigned char* ExtrinsicBuffer`	[OUT] Pointer to an unsigned char that will contain the extrinsic calibration Data of the device on success of the API

Return:

- Returns **Ok** when the extrinsic calibration Data of the device is read successfully.
- Returns **CameraNotOpened** when the device is not opened.
- Returns **NoPropertyValueGet** when the specified control cannot be obtained.
- Returns **HidWriteFail** when the buffer cannot be written to the hid handle.
- Returns **TimeoutError** when the wait event timed out.
- Returns **InvalidHidHandle** when the buffer obtained is invalid.

- Returns **Others** when an unknown error occurred.

Sample Code:

```
void calibReadExtrinsic_()
{
    int lExtFileLength;
    unsigned char* ExtrinsicBuffer;
    int read_length_depth; //read_length_data must be the
length requested using calibReadReqExtrinsic API
    ExtrinsicBuffer = (unsigned
char*)malloc(read_length_depth);
    if(calibReadExtrinsic(&lExtFileLength,
ExtrinsicBuffer)>0)
      {
        printf("calibReadExtrinsic success\r\n”);
      }
   else
      {
        printf("calibReadExtrinsic failed\r\n");
      }
      free(ExtrinsicBuffer);
}
```

void SleepMilliSec()

This function calls sleep for 10 milliseconds.

Sample Code:

```
void SleepMilliSec_()
{
      usleep(10);
}
```

The details regarding the enum used will be discussed below.

Result

Description: Contains the error values that can be returned from supported APIs.

```
typedef enum {
      Ok = 1,
      NotInitialized = -1,
      NotDeInitialized = -2,
      InvalidFrameType = -3,
      NoStreaming = -4,
      AlreadyStreaming = -5,
      InvalidNode = -6,
      CameraNotOpened = -7,
      InvalidDeviceIndex = -8,
      NoDeviceConnected = -9,
      NoPropertyValueGet = -10,
      NoPropertyValueSet = -11,
      SysCallFail = -12,
      InvalidValue = -13,
      HidWriteFail = -14,
      HidReadFail = -15,
      UVCOpenFail = -16,
      TimeoutError = -17,
      InvalidBuffer = -18
      InvalidHidHandle = -19,
      Others = -255,
}Result;
```

Where,

Ok: The API completed successfully.

NotInitialized: The APIs are not initialized.

NotDeInitialized: The APIs are not deinitialized.

InvalidFrameType: The input frame type is invalid.

NoStreaming: The camera is not streaming.

AlreadyStreaming: The camera is already streaming.

InvalidNode: The device Node is invalid.

CameraNotOpened: The camera has not been opened.

I**nvalidDeviceIndex**: The input device index is invalid.

NoDeviceConnected: There is no depth camera connected or the camera has not been connected correctly.

NoPropertyValueGet: Cannot get the value for the specified property.

NoPropertyValueSet: Cannot set the value for the specified property.

SysCallFail: System call API failed.

InvalidValue: One or more of the parameter values provided are invalid.

HidWriteFail: Cannot write the buffer to the hid handle.

HidReadFail: Cannot read the buffer from the hid handle.

UVCOpenFail: Open UVC Failed.

TimeoutError: Read on file descriptor timed out.

InvalidBuffer: Frame from the camera is invalid.

InvalidHidHandle: Invalid HID Handle.

Others: An unknown error occurred.

UVCPropID

UVC controls for DepthVista is contained within the following enum.

```
typedef enum {
      TOF_UVC_CID_BRIGHTNESS,
      TOF_UVC_CID_CONTRAST,
      TOF_UVC_CID_SATURATION,
      TOF_UVC_CID_WB_AUTO,
      TOF_UVC_CID_GAMMA,
      TOF_UVC_CID_GAIN,
      TOF_UVC_CID_PWR_LINE_FREQ,
      TOF_UVC_CID_WB_TEMP,
      TOF_UVC_CID_SHARPNESS,
```

```
      TOF_UVC_CID_EXPOSURE_AUTO,
      TOF_UVC_CID_EXPSOURE_ABS,
}UVCPropID;
```

FrameType

Types of frames that can be obtained from DepthVista is contained within the following enum.

```
typedef enum {
      IRPreviewFrame = 2,
      DepthColorMap = 3,
      RGBFrame = 4,
      DepthRawFrame = 7     ,
}FrameType;
```

Where,

IRPreviewFrame: Separate IR frame.

DepthColorMap: Depth data that is applied with Color map for preview purpose.

RGBFrame: Separate RGB frame.

DepthRawFrame: Raw depth frame without applying color map. Hence this frame cannot be used for preview.

DataMode

Different datamode supported by DepthVista is listed in the DataMode enum.

```
typedef enum {
      ModeUnknown = 255,
      Depth_IR_Mode = 0,
      Depth_Mode = 2,
      IR_Mode = 3,
      Depth_IR_RGB_VGA_Mode = 4,
      Depth_IR_RGB_HD_Mode = 5,
      RGB_VGA_Mode = 6,
      RGB_HD_Mode = 7,
      RGB_Full_HD_Mode = 8,
      RGB_1200p_Mode = 9,
}DataMode;
```

Where,

ModeUnknown: This data mode is used as default in the application.

Depth_IR_Mode: Output depth frame (640 x 480) and IR frame (640 x 480) at 30 FPS.

Depth_Mode: Output depth frame (640 x 480) at 30 FPS.

IR_Mode: Output IR frame (640 x 480) at 30 FPS.

Depth_IR_RGB_VGA_Mode: Output depth frame (640 x 480), IR frame (640 x 480) and RGB frame (640 x 480) at 30 FPS.

Depth_IR_RGB_HD_Mode: Output depth frame (640 x 480), IR frame (640 x 480) and RGB frame (1280 x 720) at 30 FPS.

RGB_VGA_Mode: Output RGB frame (640 x 480) at 60 FPS.

RGB_HD_Mode: Output RGB frame (1280 x 720) at 60 FPS.

RGB_Full_HD_Mode: Output RGB frame (1920 x 1080) at 30 FPS.

RGB_1200p_Mode: Output RGB frame (1920 x 1200) at 30 FPS.

AvgRegion

Contains two members that tells whether the Average of Depth and IR is calculated at the center of the scene or along the mouse pointer.

```
typedef enum {
      Center = 0,
      MouseLivePtr = 1,
}AvgRegion;
```

Where,

Center: Tells that the average depth and IR is calculated at the center of the scene.

MouseLivePtr: Tells that the average depth and IR is calculated along the mouse pointer.

The details regarding Structures used will be discussed below.

ToFFrame

Description: This structure contains the details of the frame obtained from camera. It holds the frame buffer, width, height, and size of the frame along with the pixel format.

Members:

```
typedef struct
{
      unsigned char* frame_data;
      uint16_t width;
      uint16_t height;
      uint8_t pixel_format;
      uint32_t total_size;
}ToFFrame;
```

Member Description:

- **unsigned char* frame_data**: This unsigned char pointer holds the address of the memory that holds the frame data.
- **uint16_t width**: This holds the width of the frame.
- **uint16_t height**: This holds the height of the frame.
- **uint8_t pixel_format**: 0 for UYVY, 1 for Y16 and 2 for RGB pixel format.
- **uint32_t size**: This holds the size of the image buffer in bytes.

UVCProp

Description: This structure contains the details of the UVC properties queried form the device. It holds the UVC Property ID, minimum, maximum, current, step and the default value of the particular UVC property.

Members:

```
typedef struct
{
      int id;
      int min;
      int max;
```

```
    int cur;
    int step;
    int default_val;
}UVCProp;
```

Member Description:

- **int id**: UVC Property ID.
- **int min**: Minimum value of that particular UVC property.
- **int max**: Maximum value of that particular UVC property.
- **int cur**: Current value of that particular UVC property.
- **int step**: Step value of that particular UVC property.
- **int default_val**: Default value of that particular UVC property.

DeviceInfo

Description: This structure contains the information of a device that is connected to the host PC. It holds device name, VID, PID, device path and the serial number of the camera.

Members:

```
typedef struct
{
  char deviceName[50];
  char vid[5];
  char pid[5];
  char devicePath[500];
  char serialNo[50];
}DeviceInfo;
```

Member Description:

- **deviceName**: This member holds the deviceName of the camera.
- **pid**: This member holds the Product ID specific for DepthVista.
- **vid**: This member holds the Vendor ID specific for e-con Systems.
- **devicePath**: This member holds the path in which the device is enumerated.
- **serialNo**: This holds the serial number of the device.

MousePtr

Description: This structure contains the x co-ordinate and y co-ordinate of the mouse position.

Members:

```
typedef struct
{
      int X;
      int Y;
}MousePtr;
```

Member Description:

- **X**: This member holds the x co-ordinate of the mouse position.
- **Y**: This member holds the y co-ordinate of the mouse position.

IMUCONFIG_TypeDef

Description: This structure contains the configuration details for IMU.

Members:

```
typedef struct
{
      uint8_t IMU_MODE;
      uint8_t ACC_AXIS_CONFIG;
      uint8_t ACC_SENSITIVITY_CONFIG;
      uint8_t GYRO_AXIS_CONFIG;
      uint8_t GYRO_SENSITIVITY_CONFIG;
      uint8_t IMU_ODR_CONFIG;
} IMUCONFIG_TypeDef;
```

Member Description:

1. **IMU_MODE** – The operating mode of the IMU
    - IMU_ACC_GYRO_DISABLE (0x00) - Accelerometer and Gyroscope Disabled.
    - IMU_ACC_ENABLE (0x01) - Accelerometer Enabled and Gyroscope Disabled.
    - IMU_GYRO_ENABLE (0x02) - Accelerometer Disabled and Gyroscope Enabled.
    - IMU_ACC_GYRO_ENABLE (0x03) - Accelerometer and Gyroscope Enabled
2. **ACC_AXIS_CONFIG** - The configuration for enabling/disabling an axis of Accelerometer, it is a bitmap. For example, to enable X axis alone use the code 0x01, to enable X and Z axis use 0x05 (0x01 | 0x04).

- IMU_ACC_X_Y_Z_ENABLE (0x07) - All 3 axis (X, Y, Z) enabled
- IMU_ACC_X_ENABLE (0x01) - Enable X Axis
- IMU_ACC_Y_ENABLE (0x02) - Enable Y Axis
- IMU_ACC_Z_ENABLE (0x04) - Enable Z Axis

3. **ACC_SENSITIVITY_CONFIG** - The configuration to set the sensitivity of the Accelerometer.
   - IMU_ACC_SENS_2G (0x00) - Set sensitivity of 2g
   - IMU_ACC_SENS_4G (0x02) - Set sensitivity of 4g
   - IMU_ACC_SENS_8G (0x03) - Set sensitivity of 8g
   - IMU_ACC_SENS_16G (0x01) - Set sensitivity of 16g
4. **GYRO_AXIS_CONFIG** - The configuration for enabling/disabling an axis of Gyroscope, it is a bitmap. For example, to enable X axis alone use the code 0x01, to enable X and Z axis use 0x05 (0x01 | 0x04).
   - IMU_GYRO_X_Y_Z_ENABLE (0x07) - All 3 axis (X, Y, Z) enabled
   - IMU_GYRO_X_ENABLE (0x01) - Enable X Axis
   - IMU_GYRO_Y_ENABLE (0x02) - Enable Y Axis
   - IMU_GYRO_Z_ENABLE (0x04) - Enable Z Axis
5. **GYRO_SENSITIVITY_CONFIG** - The configuration to set the sensitivity of the Gyroscope.
   - IMU_GYRO_SENS_245DPS (0x00) - Set sensitivity of 245 degrees per second
   - IMU_GYRO_SENS_500DPS (0x02) - Set sensitivity of 500 degrees per second
   - IMU_GYRO_SENS_2000DPS (0x03) - Set sensitivity of 2000 degrees per second
6. **IMU_ODR_CONFIG** - The configuration of Output Data Rate (ODR) of the IMU.
   - IMU_ODR_12_5HZ (0x01) - ODR is 12.5 Hz
   - IMU_ODR_26HZ (0x02) - ODR is 26 Hz
   - IMU_ODR_52HZ (0x03) - ODR is 52 Hz

- IMU_ODR_104HZ (0x04) - ODR is 104 Hz
- IMU_ODR_208HZ (0x05) - ODR is 208 Hz
- IMU_ODR_416HZ (0x06) - ODR is 416 Hz
- IMU_ODR_833HZ (0X07) – ODR is 833 Hz
- IMU_ODR_1666HZ (0X08) – ODR is 1666 Hz

IMUDATAINPUT_TypeDef

Description: This structure contains the configuration details of IMU for Control IMU Capture.

```
typedef struct
{
      uint8_t imu_update_mode;
      uint16_t imu_num_of_values;
}IMUDATAINPUT_TypeDef;
```

Member Description:

1. **IMU_UPDATE_MODE** – The value update mode of the IMU
   - IMU_CONT_UPDT_EN (0x01) - Continuous Update of IMU Values Enabled.
   - IMU_CONT_UPDT_DIS (0x02) - Continuous Update of IMU Values Disabled.
2. **IMU_NUM_OF_VALUES** – The number of values required, currently need to be set to one, other values support will be added later.

IMUDATAOUTPUT_TypeDef

Description: This structure contains the output data from IMU.

```
typedef struct
{
      uint16_t imu_value_id;
      double accX;
      double accY;
      double accZ;
      double gyroX;
      double gyroY;
```

```
    double gyroZ;
} IMUDATAOUTPUT_TypeDef;
```

Member Description:

- **IMU_VALUE_ID** – The ID for each set of values generated from the IMU, range 1-65535 with reload.
- **accX** – The accelerometer g value for the X axis.
- **accY** – The accelerometer g value for the Y axis.
- **accZ** – The accelerometer g value for the Z axis.
- **gyroX**– The gyroscope DPS(Degree per second) value for the X axis.
- **gyroY**– The gyroscope DPS value for the Y axis.
- **gyroZ**– The gyroscope DPS value for the Z axis.

FAQ

1. **Already installed OpenCV version in PC, will it make conflict with the DepthVista SDK?**

    - Pre-installed OpenCV version will not make any conflict with DepthVistaSDK, because the libs and header files required by DepthVistaSDK will be added in the installation steps itself.

    - Since DepthVistaSDK is developed with OpenCV version 4.2.0, make sure any application using DepthVistaSDK also uses OpenCV version 4.2.0.

Support

Contact Us

If you need any support on DepthVista product, please contact us using the Live Chat option available on our website - https://www.e-consystems.com/

Creating a Ticket

If you need to create a ticket for any type of issue, please visit the ticketing page on our website - https://www.e-consystems.com/create-ticket.asp

RMA

To know about our Return Material Authorization (RMA) policy, please visit the RMA Policy page on our website - https://www.e-consystems.com/RMA-Policy.asp

General Product Warranty Terms

To know about our General Product Warranty Terms, please visit the General Warranty Terms page on our website - https://www.e-consystems.com/warranty.asp

Revision History

Rev	Date	Description	Author
1.0	21-April-2022	Initial Draft	Camera Products
1.1	13-May-2022	Application name changed	Camera Products
1.2	25-August-2022	Added IMU embedded data control API's.	Camera Products
1.3	30-September-2022	Added calibration read API's	Camera Products
1.4	02-November-2022	Added IMU APIs	Camera Products
1.5	04-November-2022	Added FAQ	Camera Products