

Sensor Stream Pipe

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Contents

Chapter 1

[Checkout the Sensor Stream Pipe gitbook for full documentation](<https://moetsi.gitbook.io/sensor-stream-pipe/>)

What is Sensor Stream Pipe?

Moetsi's Sensor Stream Pipe (SSP) is the first open-source C++ modular kit-of-parts that compresses, streams, and processes sensor data (RGB-D). It does this by efficiently compressing raw data streams, allowing developers to send multiple video types over the network in real time. Frame data can be sent in its raw form (JPG/PNG frames), or compressed using a myriad of codecs, leveraged on FFmpeg/LibAV and NV Codec to considerably reduce bandwidth strain.

SSP is designed to help overcome the limitations of on-device sensor data processing. By taking data processing off device, you will be able to run far more powerful computations on your sensor data and make the most of the tools at your disposal.

The Moetsi Sensor Stream Pipe is designed to overcome the limitations of on-device sensor data processing. It does this by encoding and compressing your device's color or depth frames, and transmitting them to a remote server where they can be decoded and processed at scale.

Currently, Moetsi's Sensor Stream Pipe supports:

- .mkv (matroska) RGB-D recordings
- [Azure Kinect DK](#) RGB-D camera
- seminal computer vision/spatial computing datasets (e.g. [BundleFusion](#), [MS RGB-D 7 scenes](#) and [VSFS](#))
- iOS ARKit data (streams [ARFrame data](#))

We're planning to support other cameras and devices (e.g. Kinect v2 and Structure Core) in the near future. At the same time, we've made the Moetsi SSP totally open source so that anyone can build out support for any device.

[Checkout the Sensor Stream Pipe gitbook for full documentation](#)

Features include:

- Synchronized streaming of color, depth and IR frames
- Support for Azure Kinect DK (live and recorded video streaming) and image datasets (e.g. [BundleFusion](#), [MS RGB-D 7 scenes](#) and [VSFS](#)) and .mkv (matroska) files
- Hardware-accelerated encoding (e.g. Nvidia codec), providing you with the lowest possible latency and bandwidth without compromising on quality
- Interoperability with Libav and FFmpeg creates a hyperflexible framework for all the use cases you brilliant developers can come up with!
- Access to the calibration data for each of the sensors on the Kinect, enabling you to build a point cloud from the color and depth images, perform body tracking, etc.

But why though...?

- If you have 4 sensor streams and want to do an environment reconstruction using their data feeds
- If you have a couple of sensors and want to find where they are relative to each other
- You want to run pose detection algorithms on a dozen sensors and synthesize the results into a single 3D model
- Basically if you want to do any spatial computing/computer vision on multiple incoming data streams

You can use Sensor Stream Server to send compressed sensor data to reduce bandwidth requirements and Sensor Stream Client to receive these streams as an ingestion step for a computer vision/spatial computing pipeline.

If you want to synthesize RGB-D+ data from multiple feeds in real-time, you will probably need something like Sensor Stream Pipe.

Component parts

[Checkout the Sensor Stream Pipe gitbook for full documentation](#)

Sensor Stream Server

The `ssp_server` is the frame encoder and sender.

"Frames" are a sample of data from a frame source. For example, the Azure Kinect collects: RGB (color), depth, and IR data. If we want to stream RGB-D and IR, we sample our frame source (the Azure Kinect), and create 3 frames, one for each frame type: 1 for color data, 1 for depth data, and 1 for ir data. We then package these 3 frames as a zmq message and send through a zmq socket.

Sensor Stream Server reads its configurations from a yaml file (examples in `/configs`). The config file provides Sensor Stream Server: a destination for its frames, the frame source (video, Azure Kinect, or dataset), and how each frame type should be encoded.

Sensor Stream Client

The `ssp_clients` are the frame receiver and decoder. They run on the remote processing server and receive the frames from the `ssp_server` for further processing.

There are a few templates for how you can use Sensor Stream Client in

Sensor Stream Client with OpenCV processing

If you run Sensor Stream Client with OpenCV visualization:

You can see it's receiving real-time data from a Kinect DK and rendering it for on-screen display. In this scenario we achieved a substantial 20x data compression, reducing the stream size from 400 Mbps to just 20 Mbps, along with a PSNR of ~ 39 dB and a processing overhead of ~ 10 -15 ms .

Sensor Stream Client is built so it can be an ingestion step for a spatial computing/computer vision pipeline.

Sensor Stream Tester

A reproducible tester for measuring SSP compression and quality. You can use this to measure how different encodings and settings affect bandwidth/compression.

Getting started

We recommend going through [Streaming a Video from our Gitbook](#)

to get up to speed quickly. You will stream using Sensor Stream Server and receive on Sensor Stream Client a pre-recorded RGB-D+ stream to get a quick feel of what Sensor Stream Pipe does.

Sensor Stream Pipe Development

Feedback

Moetsi's Sensor Stream Pipe is currently in alpha. Features will probably change, bugs will probably be found. It's a work in progress after all! That said, we welcome both feedback and pull requests.

We would also love to hear more about how you plan to use the Moetsi Sensor Stream Pipe! So if you have any problems, questions, feature requests, or ideas for improvement, please feel free to reach out at olenka@moetsi.com.

The better we understand how you're using the Moetsi SSP, the better we can plan future developments!

About Moetsi

At Moetsi we are super excited about the idea of digitizing reality. Creating a seamless interface between the world as we know it, and a world augmented, improved and expressed through new technologies is plain cool. But we think there's a problem. On-device computation is limited, platform-specific frameworks are restrictive, and sorting raw depth data is seriously challenging.

To address the first problem, we've created the Moetsi Sensor Stream Pipe; to make it easier to process off-device without throttling bandwidth. It means you are no longer confined to the computational limits of your local device, and you don't have to make a massive trade-off on time-to-computation because our pipeline is super fast (latency is less than 30 ms for Kinect data).

But it doesn't end here.

Our pipeline is just one of the first pieces of the puzzle. To develop a robust enough infrastructure to support a true digital twin of the physical world, a lot more needs to be done. This includes creating algorithms that can turn this raw depth data into real, usable applications.

How to Contribute

We're always excited to work with like-minded people, and invite you to experiment with our pipeline however you like! If you enjoy our work and think you can help take this project to the next level, feel free to drop us a message on olenka@moetsi.com to get involved.

If you happen to discover any bugs in our code, we'd really appreciate knowing about them. Please just create an issue here on GitHub.

In terms of related projects that fall outside of this repo's scope, we'd be super excited to see, and think the community could benefit from development on:

****More devices****

Working with the Kinect v2, and other sensors such as the Structure Core sensor.

****Integrations****

Any other sort of output that you can imagine!

****Encoding****

Improve encoding performance on AMD/Intel graphic cards, by using the AMD Media Codec/Intel Quick Sync Video instead of relying on libav (VAAPI or OpenCL) for hardware accelerated encoding. Feel free to do the same for Intel cards using Intel Quick Sync Video too!

Moetsi's Permissive License

Moetsi's Sensor Stream Pipe is licensed under the MIT license. That means that we don't require attribution, but we'd really like to know what cool things you're using our pipe for. Drop us a message on olenka@moetsi.com or post on our [forum](#) to tell us all about it!

Support Moetsi!

Our Sensor Stream Pipe is always going to be free, but it has taken a lot of blood, sweat and tears to get to this point. If you love what we've made, please consider reaching out to olenka@moetsi.com.

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Chapter 2

Sensor Stream Pipe Instalation

[Linux instructions](#)

[Windows instructions](#)

Linux

To get our Sensor Stream Pipe up and running, you will require the following:

The following steps were tested on Ubuntu 18.04. Installing on other recent Linux distributions should be pretty similar, but please check the installation instructions for OpenCV and Kinect DK on your respective platform first. Installation instructions for Windows should be ready soon. If you encounter any problems or have any suggestions, please let us know by emailing contact@moetsi.com or post on our [forum](#).

Dependencies

To get our Sensor Stream Pipe up and running, you will require the following:

- [OpenCV](#) 3.2.0 (tested on version available on Ubuntu 18.04 repo) is used for image processing.
- [libav](#) 3.4.6 (tested on version available on Ubuntu 18.04 repo) encodes, decodes and processes image frames.
- [Cereal](#) 1.2.2 (headers only) serializes data for network transmission.
- [ZeroMQ](#) and [cppzmq](#) (libzmq3 4.3.1, cppzmq 4.3.0) perform network and low-level I/O operations.
- [spdlog](#) 1.4.1 Logging library.
- [yaml-cpp](#) 0.6.0 reads server configuration files.
- [Zdepth](#): compresses depth data.
- [NvPipe](#) (*optional*, but **recommended if you have an NVidia GPU**) encodes and decodes frames. This is optional, but recommended for users with Nvidia GPUs.
- [Azure Kinect SDK](#) 1.3 (to support the Azure Kinect Body Tracking SDK), 1.4 otherwise (*optional*) accesses Kinect DK data.
- [Azure Kinect Body Tracking SDK](#) 1.0 (*optional*) SSP Body Tracking client.

Download and install repo libraries

OpenCV 3.2.0

```
sudo apt install libopencv-dev libopencv-core-dev uuid-dev
```

Libav 3.4.6

```
sudo apt install libavformat-dev libavutil-dev libavcodec-dev libavfilter-dev
```

Download and extract "out-of-repo" libraries

First, create a folder where local libs are to be installed:

```
mkdir ~/libs  
mkdir ~/libs/srcOriginal
```

Cereal 1.2.2

```
cd ~/libs/srcOriginal  
wget https://codeload.github.com/USCiLab/cereal/tar.gz/v1.2.2  
tar xf v1.2.2  
cp -r cereal-1.2.2/include ~/libs
```

ZeroMQ

libzmq3 4.3.1

```
cd ~/libs/srcOriginal  
wget https://github.com/zeromq/libzmq/releases/download/v4.3.1/zeromq-4.3.1.tar.gz  
tar xf zeromq-4.3.1.tar.gz  
cd zeromq-4.3.1  
mkdir build  
cd build  
cmake .. -DCMAKE_INSTALL_PREFIX=~/libs  
make install -j4
```

If you want to take advantage of ZMQ pulling support to check for new frames, compile ZMQ and CPPZMQ with the **draft API support**. Replace the cmake line with:

```
cmake .. -DENABLE_DRAFTS=ON -DCMAKE_INSTALL_PREFIX=~/libs
```

Also, you must set `SSP_WITH_ZMQ_POLLING` at SSP build time.

cppzmq 4.3.0

```
cd ~/libs/srcOriginal  
wget https://github.com/zeromq/cppzmq/archive/v4.3.0.tar.gz  
tar xf v4.3.0.tar.gz  
cd cppzmq-4.3.0  
cp *.hpp ~/libs/include
```

yaml-cpp 0.6.0

```
cd ~/libs/srcOriginal
wget https://github.com/jbeder/yaml-cpp/archive/yaml-cpp-0.6.0.tar.gz
tar xf yaml-cpp-0.6.0.tar.gz
cd yaml-cpp-yaml-cpp-0.6.0
mkdir build
cd build
cmake .. -DCMAKE_INSTALL_PREFIX=~/.libs
make install
```

Zdepth

```
cd ~/libs/srcOriginal
git clone https://github.com/catid/Zdepth.git
cd Zdepth
mkdir build
cd build
cmake .. -DCMAKE_INSTALL_PREFIX=~/.libs
make install
cp libzdepth.a ~/.libs/lib/
cp zstd/libzstd.a ~/.libs/lib/
```

spdlog

```
cd ~/libs/srcOriginal
wget https://github.com/gabime/spdlog/archive/v1.4.1.tar.gz
tar xf v1.4.1.tar.gz
cd spdlog-1.4.1 && mkdir build && cd build
cmake .. -DCMAKE_INSTALL_PREFIX=~/.libs
make -j
make install
```

NVPipe (optional, recommended for users with Nvidia GPU)

```
cd ~/libs/srcOriginal
git clone https://github.com/NVIDIA/NvPipe.git
cd NvPipe/
mkdir build && cd build
cmake .. -DCMAKE_INSTALL_PREFIX=~/.libs
make
make install
```

Azure Kinect SDK 1.3/4 (optional)

Note: to avoid getting a password prompt, run any command as sudo before starting this section of the tutorial

1) Add the Linux Software Repository for Microsoft Products.

```
curl https://packages.microsoft.com/keys/microsoft.asc | sudo apt-key add -
sudo apt-add-repository https://packages.microsoft.com/ubuntu/18.04/prod
sudo apt-get update
```

2) Install Azure Kinect SDK 1.3 (change 1.3 to 1.4 if you do not need body tracking)

```
sudo apt install libk4a1.3 libk4a1.3-dev
```

3) To be able to use the Kinect as non-root, please run the following:

```
wget https://raw.githubusercontent.com/microsoft/Azure-Kinect-Sensor-SDK/develop/scripts/99-k4a.rules
sudo cp 99-k4a.rules /etc/udev/rules.d/
```

4 a) If using 1.4, in the current package, the link to the canonical version of the depth lib is missing. You can create it by running the following command:

```
sudo ln -s /usr/lib/x86_64-linux-gnu/libk4a1.4/libdepthengine.so.2.0
/usr/lib/x86_64-linux-gnu/libdepthengine.so
```

4 a) If using 1.3, the depth engine is missing from the package. Microsoft is aware of the problem, but it only corrected it in 1.4.

<https://github.com/microsoft/Azure-Kinect-Sensor-SDK/blob/develop/docs/depthengine.md>

You can get the libdepthengine.so.2.0 file from the package at https://packages.microsoft.com/ubuntu/18.04/prod/pool/main/libk/libk4a1.4/libk4a1.4_1.4.1_amd64.deb. Open with Archive Manager (or equivalent), the file is in (data/./usr/lib/x86_64-linux-gnu/libk4a1.4/), and extract it to ~/libs/lib. You can then perform an equivalent command as above.

```
cd ~/libs/lib
ln -s libdepthengine.so.2.0 libdepthengine.so
```

Azure Kinect Body Tracking SDK (optional)

Check instructions above to add the Linux Software Repository for Microsoft Products and then do:

```
sudo apt install libk4abt1.0-dev
```

Building Sensor Stream Pipe

Download and build the project (the ssp_server, ssp_client and ssp_tester):

```
git clone git@github.com:moetsi/Sensor-Stream-Pipe.git
cd Sensor-Stream-Pipe
mkdir build
cd build
cmake .. -DSSP_WITH_KINECT_SUPPORT=OFF -DSSP_WITH_K4A_BODYTRACK=OFF -DSSP_WITH_NVPIPE_SUPPORT=OFF
make
```

You can turn on Kinect, Bodytrack and NVPipe support by adding the following to the `cmake ..` line respectively:

```
-DSSP_WITH_KINECT_SUPPORT=ON
-DSSP_WITH_K4A_BODYTRACK=ON
-DSSP_WITH_NVPIPE_SUPPORT=ON
```

Windows

Windows installation process was performed using [vcpkg](#) to install most dependencies. Tested on Windows 10 Build 19041, Visual Studio 2019 Community Edition (VS).

This process may also work for Linux, but this was not tested.

Install vcpkg

Follow vcpkg installation instructions available [here](#)

Install dependencies available on vcpkg

Install dependencies using vcpkg.

```
vcpkg install azure-kinect-sensor-sdk:x64-windows cereal:x64-windows cppzmq:x64-windows ffmpeg:x64-windows
opencv3:x64-windows spdlog:x64-windows yaml-cpp:x64-windows zeromq:x64-windows
```

Build and install remaining dependencies

Prepare a directory to place the remaining dependencies lib and include files (referred henceforth as \$LIBS). This directory should have a lib and include subfolders with the corresponding .lib and headers respectively.

Zdepth

Clone Zdepth repo

```
git clone https://github.com/catid/Zdepth.git
```

Open CMakeLists file in VS and build according to your desired profile (x86 or x64; Debug or Release).

If you did not specify an install dir during the CMake configuration, copy the Zdepth\include and output lib folders (e.g. ZDepth\out*) to \$LIBS.

Azure Kinect Body Tracking SDK (optional)

Install Azure Body Tracker SDK from the instructions available [here](#).

Copy the SDK include and lib files from the SDK install list to \$LIBS, or add the SDK path to SSP CMakeLists (see below)

Building Sensor Stream Pipe

Clone the SSP repo

```
git clone git@github.com:moetsi/Sensor-Stream-Pipe.git
```

Due to the differences in the build process, the Windows CMake file is named CMakeListsWindows.txt at the root of the SSP repo.

Thus, you should delete CMakeLists.txt and rename CMakeListsWindows.txt to CMakeLists.txt.

Open CMakeLists.txt in VS.

Replace/Add the include ("C://Users//Andre//source//repos//vcpkg//installed//x64-windows//include") and link paths ("C://Users//Andre//source//repos//vcpkg//installed//x64-windows//lib") at the top of the file with your \$LIBS paths

```
include_directories("C://Users//Andre//source//repos//vcpkg//installed//x64-windows//include")
link_directories("C://Users//Andre//source//repos//vcpkg//installed//x64-windows//lib")
```

You can also add your vcpkg//installed// dir to the include and link paths.

After replacing the paths, set the desired compile options (SSP_WITH_KINECT_SUPPORT, SSP_WITH_K4A_BODY_TRACKING, ...), regenerate CMakeCache and build the project.

Linking errors?

If you have linking errors (missing .lib files), try replacing the short lib name with the full lib path in CMake: "libzmq" -> "C://Users//Andre//source//repos//vcpkg//installed//x64-windows//lib//libzmq.lib"

Chapter 3

Namespace Index

3.1 Namespace List

Here is a list of all documented namespaces with brief descriptions:

moetsi	Moetsi creations	??
moetsi::ssp	Sensor Stream Pipe	??

Chapter 4

Hierarchical Index

4.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

_custom_k4abt_body_t	??
<ARSessionDelegate>	
SessionDelegate	??
moetsi::ssp::AVCodecContextDeleter	??
moetsi::ssp::AVCodecDeleter	??
moetsi::ssp::AVCodecParametersDeleter	??
moetsi::ssp::AVCodecParametersNullDeleter	??
moetsi::ssp::AVFormatContextDeleter	??
moetsi::ssp::AVFrameDeleter	??
moetsi::ssp::AVIOContextDeleter	??
moetsi::ssp::AVPacketDeleter	??
BodyTracker	??
moetsi::ssp::buffer_data	??
moetsi::ssp::CameraCalibrationStruct	??
moetsi::ssp::CodecParamsStruct	??
color_point_t	??
moetsi::ssp::ExtendedAzureConfig	??
moetsi::ssp::FrameStruct	??
moetsi::ssp::IDecoder	??
moetsi::ssp::LibAvDecoder	??
moetsi::ssp::NvDecoder	??
moetsi::ssp::ZDepthDecoder	??
moetsi::ssp::IEncoder	??
moetsi::ssp::LibAvEncoder	??
moetsi::ssp::NullEncoder	??
moetsi::ssp::NvEncoder	??
moetsi::ssp::ZDepthEncoder	??
moetsi::ssp::ImageDecoder	??
moetsi::ssp::iPhoneReaderImpl	??
moetsi::ssp::IReader	??
moetsi::ssp::DummyBodyReader	??
moetsi::ssp::ImageReader	??
moetsi::ssp::iPhoneReader	??
moetsi::ssp::KinectReader	??
moetsi::ssp::MultiImageReader	??

moetsi::ssp::VideoFileReader	??
moetsi::ssp::XlinkReader	??
moetsi::ssp::NetworkReader	??
NSObject	
SessionDelegate	??
moetsi::ssp::NVPipeDeleter	??
moetsi::ssp::object_human_t	??
moetsi::ssp::SwsContextDeleter	??
UnityXRNativeSessionPtr	??

Chapter 5

Class Index

5.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

_custom_k4abt_body_t	??
moetsi::ssp::AVCodecContextDeleter	??
moetsi::ssp::AVCodecDeleter	??
moetsi::ssp::AVCodecParametersDeleter	??
moetsi::ssp::AVCodecParametersNullDeleter	??
moetsi::ssp::AVFormatContextDeleter	??
moetsi::ssp::AVFrameDeleter	??
moetsi::ssp::AVIOContextDeleter	??
moetsi::ssp::AVPacketDeleter	??
BodyTracker	??
moetsi::ssp::buffer_data	??
moetsi::ssp::CameraCalibrationStruct	
Camera calibration data	??
moetsi::ssp::CodecParamsStruct	
Codec parameters	??
color_point_t	??
moetsi::ssp::DummyBodyReader	??
moetsi::ssp::ExtendedAzureConfig	
Azure Kinect configuration	??
moetsi::ssp::FrameStruct	
Frame struct: SSP frame	??
moetsi::ssp::IDecoder	
IDecoder abstract decoder interface	??
moetsi::ssp::IEncoder	
IEncoder abstract encoder class	??
moetsi::ssp::ImageDecoder	
Decode image to AV frame	??
moetsi::ssp::ImageReader	??
moetsi::ssp::iPhoneReader	??
moetsi::ssp::iPhoneReaderImpl	??
moetsi::ssp::IReader	
SSP reader interface - abstract class	??
moetsi::ssp::KinectReader	??
moetsi::ssp::LibAvDecoder	
AV (Jpeg/Mpeg) decoder	??

moetsi::ssp::LibAvEncoder	
LibAV encoder for Jpeg/Mpeg	??
moetsi::ssp::MultiImageReader	??
moetsi::ssp::NetworkReader	
Network reader	??
moetsi::ssp::NullEncoder	
Nullencoder Straight pipe encoder	??
moetsi::ssp::NvDecoder	
NvPipe decoder	??
moetsi::ssp::NvEncoder	
NvPipe encoder	??
moetsi::ssp::NVPipeDeleter	??
moetsi::ssp::object_human_t	??
SessionDelegate	??
moetsi::ssp::SwsContextDeleter	??
UnityXRNativeSessionPtr	??
moetsi::ssp::VideoFileReader	??
moetsi::ssp::XlinkReader	??
moetsi::ssp::ZDepthDecoder	
ZDepthDecoder ZDepth format decoder	??
moetsi::ssp::ZDepthEncoder	
ZDepth encoder	??

Chapter 6

File Index

6.1 File List

Here is a list of all documented files with brief descriptions:

include/structs/body_struct.h	??
structs/body_struct.h	??
dummy_body_reader.cc	
Dumy Body Reader	??
dummy_body_reader.h	
Dumy Body Reader	??
include/structs/frame_struct.h	??
structs/frame_struct.h	??
idecoder.cc	
IDecoder factory	??
decoders/idecoder.h	??
include/decoders/idecoder.h	
Frame decoder interface	??
iencoder.cc	
IEncoder factory	??
encoders/iencoder.h	??
include/encoders/iencoder.h	
IEncoder factory	??
image_converter.cc	
Image converter from frame struct to opencv image	??
include/utlis/image_converter.h	??
utlis/image_converter.h	??
image_decoder.cc	
Mpeg/jpeg image decoder	??
image_decoder.h	
AV Image decoder	??
image_reader.cc	
Image reader	??
image_reader.h	
Image reader	??
iphone_reader.h	
IPhone driver	??
iphone_reader.mm	
IPhone driver	??
ireader.cc	
IReader factory	??

include/readers/ireader.h	??
readers/ireader.h	??
kinect_reader.cc	
Kinect driver	??
kinect_reader.h	
Kinect driver	??
kinect_utils.cc	
Utils for Kinect RT integration	??
kinect_utils.h	
Utils for Kinect RT integration	??
libav_decoder.cc	
Jpeg/Mpeg decoder	??
libav_decoder.h	
Jpeg/Mpeg decoder	??
libav_encoder.cc	
Jpeg/Mpeg encoder	??
libav_encoder.h	
Jpeg/Mpeg encoder	??
libav_types.h	??
logger.h	
Logger header	??
multi_image_reader.cc	
Multi image reader	??
multi_image_reader.h	
Multi image reader	??
network_reader.cc	
Network reader	??
network_reader.h	
Network reader	??
null_encoder.cc	
Straight pipe encoder	??
null_encoder.h	??
nv_decoder.cc	
NvPipe decoder	??
nv_decoder.h	
NvPipe decoder	??
nv_encoder.cc	
NvPipe encoder	??
nv_encoder.h	
NvPipe encoder	??
nvpipe_types.h	
Types for NvPipe support	??
similarity_measures.h	
Similarity measures	??
include/ssp.h	??
ssp.h	??
ssp_client_k4a.cc	
SSP client with lib k4a	??
ssp_client_opencv.cc	
OpenCV based ssp client client	??
ssp_client_template.cc	
Template for an SSP client	??
ssp_server.cc	
SSP, server side	??
ssp_tester.cc	
SSP test program	??
utils.h	
Utilities	??

video_file_reader.cc	
Video file reader	??
video_file_reader.h	
Video file reader support	??
video_utils.h	
Video utilities	??
xlink_reader.cc	
XLink reader	??
xlink_reader.h	??
zdepth_decoder.cc	
ZDepth decoder	??
zdepth_decoder.h	
ZDepth decoder	??
zdepth_encoder.cc	
ZDepth encoder	??
zdepth_encoder.h	
Encoder	??

Chapter 7

Namespace Documentation

7.1 moetsi Namespace Reference

Moetsi creations.

Namespaces

- [ssp](#)
Sensor Stream Pipe.

7.1.1 Detailed Description

Moetsi creations.

7.2 moetsi::ssp Namespace Reference

Sensor Stream Pipe.

Classes

- struct [AVCodecContextDeleter](#)
- struct [AVCodecDeleter](#)
- struct [AVCodecParametersDeleter](#)
- struct [AVCodecParametersNullDeleter](#)
- struct [AVFormatContextDeleter](#)
- struct [AVFrameDeleter](#)
- struct [AVIOContextDeleter](#)
- struct [AVPacketDeleter](#)
- struct [buffer_data](#)
- struct [CameraCalibrationStruct](#)
Camera calibration data.
- struct [CodecParamsStruct](#)

- *Codec parameters.*
- class [DummyBodyReader](#)
- struct [ExtendedAzureConfig](#)
 - *Azure Kinect configuration.*
- struct [FrameStruct](#)
 - *Frame struct: SSP frame.*
- class [IDecoder](#)
 - *IDecoder abstract decoder interface.*
- class [IEncoder](#)
 - *IEncoder abstract encoder class.*
- class [ImageDecoder](#)
 - *Decode image to AV frame.*
- class [ImageReader](#)
- class [iPhoneReader](#)
- class [iPhoneReaderImpl](#)
- class [IReader](#)
 - *SSP reader interface - abstract class.*
- class [KinectReader](#)
- class [LibAvDecoder](#)
 - *AV (Jpeg/Mpeg) decoder.*
- class [LibAvEncoder](#)
 - *LibAV encoder for Jpeg/Mpeg.*
- class [MultImageReader](#)
- class [NetworkReader](#)
 - *Network reader.*
- class [NullEncoder](#)
 - *Nullencoder Straight pipe encoder.*
- class [NvDecoder](#)
 - *NvPipe decoder.*
- class [NvEncoder](#)
 - *NvPipe encoder.*
- struct [NVPipeDeleter](#)
- struct [object_human_t](#)
- struct [SwsContextDeleter](#)
- class [VideoFileReader](#)
- class [XlinkReader](#)
- class [ZDepthDecoder](#)
 - *ZDepthDecoder ZDepth format decoder.*
- class [ZDepthEncoder](#)
 - *ZDepth encoder.*

Typedefs

- typedef std::unique_ptr< AVFrame, [AVFrameDeleter](#) > **AVFrameSafeP**
- typedef std::shared_ptr< AVFrame > **AVFrameSharedP**
- typedef std::unique_ptr< AVCodecContext, [AVCodecContextDeleter](#) > **AVCodecContextSafeP**
- typedef std::unique_ptr< AVPacket, [AVPacketDeleter](#) > **AVPacketSafeP**
- typedef std::shared_ptr< AVPacket > **AVPacketSharedP**
- typedef std::unique_ptr< AVCodecParameters, [AVCodecParametersDeleter](#) > **AVCodecParametersSafeP**
- typedef std::unique_ptr< AVCodecParameters, [AVCodecParametersNullDeleter](#) > **AVCodecParametersSafePNullDelete**
- typedef std::unique_ptr< struct SwsContext, [SwsContextDeleter](#) > **SwsContextSafeP**
- typedef std::unique_ptr< AVFormatContext, [AVFormatContextDeleter](#) > **AVFormatContextSafeP**
- typedef std::unique_ptr< AVCodec, [AVCodecDeleter](#) > **AVCodecSafeP**
- typedef std::unique_ptr< AVIOContext, [AVIOContextDeleter](#) > **AVIOContextSafeP**
- typedef std::unique_ptr< NvPipe, [NVPipeDeleter](#) > **NvPipeSafeP**

Enumerations

- enum `CameraCalibrationType` : short { `CameraCalibrationType::CameraCalibrationTypeDefault` = -1, `CameraCalibrationType::CameraCalibrationTypeKinect` = 0, `CameraCalibrationType::CameraCalibrationTypeDefault` = -1, `CameraCalibrationType::CameraCalibrationTypeKinect` = 0 }
Camera calibration type i.e. the kind of sensor calibration data present.
- enum `FrameType` : short { `FrameType::FrameTypeColor` = 0, `FrameType::FrameTypeDepth` = 1, `FrameType::FrameTypeIR` = 2, `FrameType::FrameTypeConfidence` = 3, `FrameType::FrameTypeHumanPose` = 4, `FrameType::FrameTypeColor` = 0, `FrameType::FrameTypeDepth` = 1, `FrameType::FrameTypeIR` = 2, `FrameType::FrameTypeConfidence` = 3, `FrameType::FrameTypeHumanPose` = 4 }
Frame type: color, depth, IR as well as confidence matrices.
- enum `CodecParamsType` : short { `CodecParamsType::CodecParamsTypeDefault` = -1, `CodecParamsType::CodecParamsTypeAv` = 0, `CodecParamsType::CodecParamsTypeNvPipe` = 1, `CodecParamsType::CodecParamsTypeZDepth` = 2, `CodecParamsType::CodecParamsTypeDefault` = -1, `CodecParamsType::CodecParamsTypeAv` = 0, `CodecParamsType::CodecParamsTypeNvPipe` = 1, `CodecParamsType::CodecParamsTypeZDepth` = 2 }
Codec parameters type.
- enum `SSPMessageType` : short { `SSPMessageType::MessageTypeDefault` = 0, `SSPMessageType::MessageTypeDefault` = 0 }
- enum `SSPMessage` : short { `SSPMessage::MessageDefault` = 0, `SSPMessage::MessageDefault` = 0 }
SSP Message type.
- enum `FrameDataType` : short { `FrameDataType::FrameDataTypeImageFrame` = 0, `FrameDataType::FrameDataTypeLibavPackets` = 1, `FrameDataType::FrameDataTypeRawRGBA` = 2, `FrameDataType::FrameDataTypeGRAY16LE` = 3, `FrameDataType::FrameDataTypeNvPipePacket` = 4, `FrameDataType::FrameDataTypeRaw32FC1` = 5, `FrameDataType::FrameDataTypeYUV` = 6, `FrameDataType::FrameDataTypeU8C1` = 7, `FrameDataType::FrameDataTypeObjectHumanData` = 8, `FrameDataType::FrameDataTypeImageFrame` = 0, `FrameDataType::FrameDataTypeLibavPackets` = 1, `FrameDataType::FrameDataTypeRawRGBA` = 2, `FrameDataType::FrameDataTypeGRAY16LE` = 3, `FrameDataType::FrameDataTypeNvPipePacket` = 4, `FrameDataType::FrameDataTypeRaw32FC1` = 5, `FrameDataType::FrameDataTypeYUV` = 6, `FrameDataType::FrameDataTypeU8C1` = 7, `FrameDataType::FrameDataTypeObjectHumanData` = 8 }
Frame data type. This is a precise binary format information.
- enum `SensorType` : short { `SensorType::SensorTypeColor` = 0, `SensorType::SensorTypeDepth` = 1, `SensorType::SensorTypeIR` = 2, `SensorType::SensorTypeConfidence` = 3, `SensorType::SensorTypeColor` = 0, `SensorType::SensorTypeDepth` = 1, `SensorType::SensorTypeIR` = 2, `SensorType::SensorTypeConfidence` = 3 }
Sensor type: color or depth.
- enum `video_reader_k4a_depth_mode_t` { `VIDEO_READER_K4A_DEPTH_MODE_OFF`, `VIDEO_READER_K4A_DEPTH_MODE_NFOV_2X2BINNED`, `VIDEO_READER_K4A_DEPTH_MODE_NFOV_UNBINNED`, `VIDEO_READER_K4A_DEPTH_MODE_WFOV_2X2BINNED`, `VIDEO_READER_K4A_DEPTH_MODE_WFOV_UNBINNED`, `VIDEO_READER_K4A_DEPTH_MODE_PASSIVE_IR` }
- enum `video_reader_k4a_color_resolution_t` { `VIDEO_READER_K4A_COLOR_RESOLUTION_OFF`, `VIDEO_READER_K4A_COLOR_RESOLUTION_720P`, `VIDEO_READER_K4A_COLOR_RESOLUTION_1080P`, `VIDEO_READER_K4A_COLOR_RESOLUTION_1440P`, `VIDEO_READER_K4A_COLOR_RESOLUTION_1536P`, `VIDEO_READER_K4A_COLOR_RESOLUTION_2160P`, `VIDEO_READER_K4A_COLOR_RESOLUTION_3072P` }
- enum `CameraCalibrationType` : short { `CameraCalibrationType::CameraCalibrationTypeDefault` = -1, `CameraCalibrationType::CameraCalibrationTypeKinect` = 0, `CameraCalibrationType::CameraCalibrationTypeDefault` = -1, `CameraCalibrationType::CameraCalibrationTypeKinect` = 0 }
Camera calibration type i.e. the kind of sensor calibration data present.

- enum `FrameType` : short {
`FrameType::FrameTypeColor` = 0, `FrameType::FrameTypeDepth` = 1, `FrameType::FrameTypeIR` = 2, `FrameType::FrameTypeConfidence` = 3,
`FrameType::FrameTypeHumanPose` = 4, `FrameType::FrameTypeColor` = 0, `FrameType::FrameTypeDepth` = 1, `FrameType::FrameTypeIR` = 2,
`FrameType::FrameTypeConfidence` = 3, `FrameType::FrameTypeHumanPose` = 4 }
Frame type: color, depth, IR as well as confidence matrices.
- enum `CodecParamsType` : short {
`CodecParamsType::CodecParamsTypeDefault` = -1, `CodecParamsType::CodecParamsTypeAv` = 0, `CodecParamsType::CodecParamsTypeNvPipe` = 1, `CodecParamsType::CodecParamsTypeZDepth` = 2,
`CodecParamsType::CodecParamsTypeDefault` = -1, `CodecParamsType::CodecParamsTypeAv` = 0, `CodecParamsType::CodecParamsTypeNvPipe` = 1, `CodecParamsType::CodecParamsTypeZDepth` = 2 }
Codec parameters type.
- enum `SSPMessageType` : short { `SSPMessageType::MessageTypeDefault` = 0, `SSPMessageType::MessageTypeDefault` = 0 }
SSP Message type.
- enum `FrameDataType` : short {
`FrameDataType::FrameDataTypeImageFrame` = 0, `FrameDataType::FrameDataTypeLibavPackets` = 1, `FrameDataType::FrameDataTypeRawRGBA` = 2, `FrameDataType::FrameDataTypeGRAY16LE` = 3,
`FrameDataType::FrameDataTypeNvPipePacket` = 4, `FrameDataType::FrameDataTypeRaw32FC1` = 5, `FrameDataType::FrameDataTypeYUV` = 6, `FrameDataType::FrameDataTypeU8C1` = 7,
`FrameDataType::FrameDataTypeObjectHumanData` = 8, `FrameDataType::FrameDataTypeImageFrame` = 0, `FrameDataType::FrameDataTypeLibavPackets` = 1, `FrameDataType::FrameDataTypeRawRGBA` = 2,
`FrameDataType::FrameDataTypeGRAY16LE` = 3, `FrameDataType::FrameDataTypeNvPipePacket` = 4, `FrameDataType::FrameDataTypeRaw32FC1` = 5, `FrameDataType::FrameDataTypeYUV` = 6,
`FrameDataType::FrameDataTypeU8C1` = 7, `FrameDataType::FrameDataTypeObjectHumanData` = 8 }
Frame data type. This is a precise binary format information.
- enum `SensorType` : short {
`SensorType::SensorTypeColor` = 0, `SensorType::SensorTypeDepth` = 1, `SensorType::SensorTypeIR` = 2, `SensorType::SensorTypeConfidence` = 3,
`SensorType::SensorTypeColor` = 0, `SensorType::SensorTypeDepth` = 1, `SensorType::SensorTypeIR` = 2, `SensorType::SensorTypeConfidence` = 3 }
Sensor type: color or depth.

Functions

- `std::shared_ptr< IDecoder > IDecoderFactory` (const std::string &config)
IDecoder factory.
- `std::unordered_map< FrameType, std::shared_ptr< IEncoder > > IEncoderFactory` (const std::string &config, const std::vector< FrameType > &types)
IEncoder factory.
- void `SetupLogging` (const std::string &level, const std::string &file)
Setup logging.
- `std::shared_ptr< IReader > IReaderFactory` (const std::string &config)
IReader factory.
- void `inplace_hton` (uint32_t &h)
- void `inplace_hton` (int32_t &h)
- void `inplace_ntoh` (uint32_t &h)
- void `inplace_ntoh` (int32_t &h)
- bool `FrameStructToMat` (FrameStruct &f, cv::Mat &img, std::unordered_map< std::string, std::shared_ptr< IDecoder > > &decoders)
Convert frame struct to opencv matrix.
- std::atomic_bool `exiting` (false)
- unsigned long `elapsed` (unsigned long start, unsigned long end)

- [ExtendedAzureConfig BuildKinectConfigFromYAML](#) (YAML::Node config)
Build Kinect configuration from YAML configuration.
- void [FrameStructToK4A](#) (std::vector< [FrameStruct](#) > &f, k4a::capture &sensor_capture, std::unordered_map< std::string, std::shared_ptr< [IDecoder](#) >> &decoders)
Transform frame structure to K4A format Update decoder dictionary.
- double [GetMSE](#) (const Mat &l1, const Mat &l2)
Get Mean Square Error (distance) between images.
- double [GetPSNR](#) (const Mat &l1, const Mat &l2, double max_value)
Get Peak Signal to Noise Ration similarity.
- Scalar [GetMSSIM](#) (const Mat &i1, const Mat &i2)
Get Structural Similarity between 2 images cf. for instance http://amroamroamro.github.io/mexopencv/opencv/image_similarity_demo.html for a simple SSIM introduction.
- uint64_t [CurrentTimeMs](#) ()
Get current time in ms.
- uint64_t [CurrentTimeUs](#) ()
Get current time in usec/microseconds.
- uint64_t [CurrentTimeNs](#) ()
Get current time in ns/nanoseconds.
- std::string [RandomString](#) (size_t length)
Build a random string.
- void [SetupLogging](#) (YAML::Node &general_parameters)
Setup SSP logging.
- void [SetupLogging](#) (std::string &level, std::string &file)
Setup SSP logging.
- void [AVFrameToMatYUV](#) (AVFrameSharedP &frame, cv::Mat &image)
Convert an AVFrame to YUV image.
- void [AVFrameToMatGray](#) (AVFrameSharedP &frame, cv::Mat &image)
Convert an AVFrame to grayscale image.
- AVCodecParameters * [getParams](#) ([FrameStruct](#) &frame_struct)
Get AVCodec parameters from a [FrameStruct](#).
- template<typename T >
void [MinMaxFilter](#) (cv::Mat &in_mat, cv::Mat &out_mat, double min, double max)

Variables

- std::atomic_bool **exiting**

7.2.1 Detailed Description

Sensor Stream Pipe.

Video utilities.

Types for libav support.

MOETSI_RAAS

Namespace [libav_types.h](#)

Namespace video_utils.cc

7.2.2 Enumeration Type Documentation

7.2.2.1 CameraCalibrationType [1/2]

```
enum moetsi::ssp::CameraCalibrationType : short [strong]
```

Camera calibration type i.e. the kind of sensor calibration data present.

Enumerator

CameraCalibrationTypeDefault	Default camera calibration type.
CameraCalibrationTypeKinect	Kinect format calibration type
CameraCalibrationTypeDefault	Default camera calibration type.
CameraCalibrationTypeKinect	Kinect format calibration type

7.2.2.2 CameraCalibrationType [2/2]

```
enum moetsi::ssp::CameraCalibrationType : short [strong]
```

Camera calibration type i.e. the kind of sensor calibration data present.

Enumerator

CameraCalibrationTypeDefault	Default camera calibration type.
CameraCalibrationTypeKinect	Kinect format calibration type
CameraCalibrationTypeDefault	Default camera calibration type.
CameraCalibrationTypeKinect	Kinect format calibration type

7.2.2.3 CodecParamsType [1/2]

```
enum moetsi::ssp::CodecParamsType : short [strong]
```

Codec parameters type.

Enumerator

CodecParamsTypeDefault	Default type
CodecParamsTypeAv	Libav codec configuration
CodecParamsTypeNvPipe	NvPipe configuration
CodecParamsTypeZDepth	ZDepth compression configuration
CodecParamsTypeDefault	Default type

Enumerator

CodecParamsTypeAv	Libav codec configuration
CodecParamsTypeNvPipe	NvPipe configuration
CodecParamsTypeZDepth	ZDepth compression configuration

7.2.2.4 CodecParamsType [2/2]

```
enum moetsi::ssp::CodecParamsType : short [strong]
```

Codec parameters type.

Enumerator

CodecParamsTypeDefault	Default type
CodecParamsTypeAv	Libav codec configuration
CodecParamsTypeNvPipe	NvPipe configuration
CodecParamsTypeZDepth	ZDepth compression configuration
CodecParamsTypeDefault	Default type
CodecParamsTypeAv	Libav codec configuration
CodecParamsTypeNvPipe	NvPipe configuration
CodecParamsTypeZDepth	ZDepth compression configuration

7.2.2.5 FrameDataType [1/2]

```
enum moetsi::ssp::FrameDataType : short [strong]
```

Frame data type. This is a precise binary format information.

Enumerator

FrameDataTypeImageFrame	Image frame
FrameDataTypeLibavPackets	Libav packets
FrameDataTypeRawRGBA	Raw RGBA data
FrameDataTypeGRAY16LE	GRAY16LE data
FrameDataTypeNvPipePacket	NvPipe packet
FrameDataTypeRaw32FC1	Raw 32FC1 data
FrameDataTypeYUV	YUV data
FrameDataTypeU8C1	U8C1 data
FrameDataTypeImageFrame	Image frame
FrameDataTypeLibavPackets	Libav packets
FrameDataTypeRawRGBA	Raw RGBA data
FrameDataTypeGRAY16LE	GRAY16LE data

Enumerator

FrameDataTypeNvPipePacket	NvPipe packet
FrameDataTypeRaw32FC1	Raw 32FC1 data
FrameDataTypeYUV	YUV data
FrameDataTypeU8C1	U8C1 data

7.2.2.6 FrameDataType [2/2]

```
enum moetsi::ssp::FrameDataType : short [strong]
```

Frame data type. This is a precise binary format information.

Enumerator

FrameDataTypeImageFrame	Image frame
FrameDataTypeLibavPackets	Libav packets
FrameDataTypeRawRGBA	Raw RGBA data
FrameDataTypeGRAY16LE	GRAY16LE data
FrameDataTypeNvPipePacket	NvPipe packet
FrameDataTypeRaw32FC1	Raw 32FC1 data
FrameDataTypeYUV	YUV data
FrameDataTypeU8C1	U8C1 data
FrameDataTypeImageFrame	Image frame
FrameDataTypeLibavPackets	Libav packets
FrameDataTypeRawRGBA	Raw RGBA data
FrameDataTypeGRAY16LE	GRAY16LE data
FrameDataTypeNvPipePacket	NvPipe packet
FrameDataTypeRaw32FC1	Raw 32FC1 data
FrameDataTypeYUV	YUV data
FrameDataTypeU8C1	U8C1 data

7.2.2.7 FrameType [1/2]

```
enum moetsi::ssp::FrameType : short [strong]
```

Frame type: color, depth, IR as well as confidence matrices.

Enumerator

FrameTypeColor	Color/BGR frame type
FrameTypeDepth	Int16 depth type in mm
FrameTypeIR	IR sensor frame type

Enumerator

FrameTypeConfidence	Confidence levels
FrameTypeHumanPose	Human pose
FrameTypeColor	Color/BGR frame type
FrameTypeDepth	Int16 depth type in mm
FrameTypeIR	IR sensor frame type
FrameTypeConfidence	Confidence levels
FrameTypeHumanPose	Human pose

7.2.2.8 FrameType [2/2]

```
enum moetsi::ssp::FrameType : short [strong]
```

Frame type: color, depth, IR as well as confidence matrices.

Enumerator

FrameTypeColor	Color/BGR frame type
FrameTypeDepth	Int16 depth type in mm
FrameTypeIR	IR sensor frame type
FrameTypeConfidence	Confidence levels
FrameTypeHumanPose	Human pose
FrameTypeColor	Color/BGR frame type
FrameTypeDepth	Int16 depth type in mm
FrameTypeIR	IR sensor frame type
FrameTypeConfidence	Confidence levels
FrameTypeHumanPose	Human pose

7.2.2.9 SensorType [1/2]

```
enum moetsi::ssp::SensorType : short [strong]
```

Sensor type: color or depth.

Enumerator

SensorTypeColor	Color sensor
SensorTypeDepth	Depth sensor
SensorTypeIR	IR sensor
SensorTypeConfidence	Confidence
SensorTypeColor	Color sensor
SensorTypeDepth	Depth sensor
SensorTypeIR	IR sensor
SensorTypeConfidence	Confidence

7.2.2.10 SensorType [2/2]

```
enum moetsi::ssp::SensorType : short [strong]
```

Sensor type: color or depth.

Enumerator

SensorTypeColor	Color sensor
SensorTypeDepth	Depth sensor
SensorTypeIR	IR sensor
SensorTypeConfidence	Confidence
SensorTypeColor	Color sensor
SensorTypeDepth	Depth sensor
SensorTypeIR	IR sensor
SensorTypeConfidence	Confidence

7.2.2.11 SSPMessageType [1/2]

```
enum moetsi::ssp::SSPMessageType : short [strong]
```

SSP Message type.

Enumerator

MessageTypeDefault	Default only
MessageTypeDefault	Default only

7.2.2.12 SSPMessageType [2/2]

```
enum moetsi::ssp::SSPMessageType : short [strong]
```

SSP Message type.

Enumerator

MessageTypeDefault	Default only
MessageTypeDefault	Default only

7.2.2.13 video_reader_k4a_color_resolution_t

```
enum moetsi::ssp::video_reader_k4a_color_resolution_t
```

Enumerator

VIDEO_READER_K4A_COLOR_RESOLUTION_OFF	Color camera will be turned off with this setting
VIDEO_READER_K4A_COLOR_RESOLUTION_720P	1280 * 720 16:9
VIDEO_READER_K4A_COLOR_RESOLUTION_1080P	1920 * 1080 16:9
VIDEO_READER_K4A_COLOR_RESOLUTION_1440P	2560 * 1440 16:9
VIDEO_READER_K4A_COLOR_RESOLUTION_1536P	2048 * 1536 4:3
VIDEO_READER_K4A_COLOR_RESOLUTION_2160P	3840 * 2160 16:9
VIDEO_READER_K4A_COLOR_RESOLUTION_3072P	4096 * 3072 4:3

7.2.2.14 video_reader_k4a_depth_mode_t

```
enum moetsi::ssp::video_reader_k4a_depth_mode_t
```

Enumerator

VIDEO_READER_K4A_DEPTH_MODE_OFF	Depth sensor will be turned off with this setting.
VIDEO_READER_K4A_DEPTH_MODE_NFOV_2↔ X2BINNED	Depth captured at 320x288. Passive IR is also captured at 320x288.
VIDEO_READER_K4A_DEPTH_MODE_NFOV_U↔ NBINNED	Depth captured at 640x576. Passive IR is also captured at 640x576.
VIDEO_READER_K4A_DEPTH_MODE_WFOV_2↔ X2BINNED	Depth captured at 512x512. Passive IR is also captured at 512x512.
VIDEO_READER_K4A_DEPTH_MODE_WFOV_U↔ NBINNED	Depth captured at 1024x1024. Passive IR is also captured at 1024x1024.
VIDEO_READER_K4A_DEPTH_MODE_PASSIVE↔ _IR	Passive IR only, captured at 1024x1024.

7.2.3 Function Documentation

7.2.3.1 AVFrameToMatGray()

```
void moetsi::ssp::AVFrameToMatGray (
    AVFrameSharedP & frame,
    cv::Mat & image )
```

Convert an AVFrame to grayscale image.

Parameters

<i>frame</i>	AVFrame
<i>image</i>	dest opencv image

7.2.3.2 AVFrameToMatYUV()

```
void moetsi::ssp::AVFrameToMatYUV (
    AVFrameSharedP & frame,
    cv::Mat & image )
```

Convert an AVFrame to YUV image.

Parameters

<i>frame</i>	AVFrame
<i>image</i>	dest opencv image

7.2.3.3 BuildKinectConfigFromYAML()

```
ExtendedAzureConfig moetsi::ssp::BuildKinectConfigFromYAML (
    YAML::Node config )
```

Build Kinect configuration from YAML configuration.

Parameters

<i>config</i>	yaml configuration
---------------	--------------------

Returns

Azure Kinect configuration

7.2.3.4 CurrentTimeMs()

```
uint64_t moetsi::ssp::CurrentTimeMs ( )
```

Get current time in ms.

Returns

ms since UTC epoch

7.2.3.5 CurrentTimeNs()

```
uint64_t moetsi::ssp::CurrentTimeNs ( )
```

Get current time in ns/nanoseconds.

Returns

nsec since UTC epoch

7.2.3.6 CurrentTimeUs()

```
uint64_t moetsi::ssp::CurrentTimeUs ( )
```

Get current time in usec/microseconds.

Returns

usec since UTC epoch

7.2.3.7 FrameStructToK4A()

```
void moetsi::ssp::FrameStructToK4A (
    std::vector< FrameStruct > & f,
    k4a::capture & sensor_capture,
    std::unordered_map< std::string, std::shared_ptr< IDecoder >> & decoders )
```

Transform frame structure to K4A format Update decoder dictionary.

Parameters

<i>f</i>	source frame structure
<i>sensor_capture</i>	destination "capture" structure
<i>decoders</i>	decoders map - updated

7.2.3.8 FrameStructToMat()

```
bool moetsi::ssp::FrameStructToMat (
    FrameStruct & f,
    cv::Mat & img,
    std::unordered_map< std::string, std::shared_ptr< IDecoder >> & decoders )
```

Convert frame struct to opencv matrix.

Parameters

<i>f</i>	Frame struct
<i>img</i>	Target opencv image
<i>decoders</i>	decoder dictionary

7.2.3.9 GetMSE()

```
double moetsi::ssp::GetMSE (
    const Mat & I1,
    const Mat & I2 )
```

Get Mean Square Error (distance) between images.

Parameters

<i>I1</i>	image 1
<i>I2</i>	image 2

Returns

MSE between these 2 images

7.2.3.10 GetMSSIM()

```
Scalar moetsi::ssp::GetMSSIM (
    const Mat & i1,
    const Mat & i2 )
```

Get Structural Similarity between 2 images cf. for instance http://amroamroamro.github.io/mexopencv/opencv/image_similarity_demo.html for a simple SSIM introduction.

Parameters

<i>I1</i>	image 1
<i>I2</i>	image 2

Returns

3 channel similarity measure

7.2.3.11 getParams()

```
AVCodecParameters * moetsi::ssp::getParams (
    FrameStruct & frame_struct )
```

Get AVCodec parameters from a [FrameStruct](#).

Parameters

<i>frame_struct</i>	frame struct
---------------------	--------------

Returns

AVCodec parameters

7.2.3.12 GetPSNR()

```
double moetsi::ssp::GetPSNR (
    const Mat & I1,
    const Mat & I2,
    double max_value )
```

Get Peak Signal to Noise Ration similarity.

Parameters

<i>I1</i>	image 1
<i>I2</i>	image 2
<i>max_value</i>	max value in the PSNR formula

Returns

PSNR image similarity

7.2.3.13 IDecoderFactory()

```
std::shared_ptr< IDecoder > moetsi::ssp::IDecoderFactory (
    const std::string & config )
```

[IDecoder](#) factory.

Parameters

<i>config</i>	configuration
---------------	---------------

Returns

[IDecoder](#) instance

7.2.3.14 IEncoderFactory()

```
std::unordered_map< FrameType, std::shared_ptr< IEncoder > > moetsi::ssp::IEncoderFactory (
    const std::string & config,
    const std::vector< FrameType > & types )
```

[IEncoder](#) factory.

Parameters

<i>config</i>	configuration
<i>types</i>	type to support

Returns

[IEncoder](#) instances

7.2.3.15 IReaderFactory()

```
std::shared_ptr< IReader > moetsi::ssp::IReaderFactory (
    const std::string & config )
```

[IReader](#) factory.

Parameters

<i>config</i>	configuration
---------------	---------------

Returns

an [IReader](#) instance

7.2.3.16 SetupLogging() [1/3]

```
void moetsi::ssp::SetupLogging (
    const std::string & level,
    const std::string & file )
```

Setup logging.

Parameters

<i>level</i>	logging level
<i>file</i>	logging file

7.2.3.17 SetupLogging() [2/3]

```
void moetsi::ssp::SetupLogging (
    YAML::Node & general_parameters )
```

Setup SSP logging.

Parameters

<i>general_parameters</i>	configuration
---------------------------	---------------

7.2.3.18 SetupLogging() [3/3]

```
void moetsi::ssp::SetupLogging (
    std::string & level,
    std::string & file )
```

Setup SSP logging.

Parameters

<i>level</i>	logging level
<i>file</i>	log file

Chapter 8

Class Documentation

8.1 `_custom_k4abt_body_t` Struct Reference

Public Attributes

- `int32_t` **ld**
- `float` **pelvis_x**
- `float` **pelvis_y**
- `float` **pelvis_z**
- `float` **pelvis_QX**
- `float` **pelvis_QY**
- `float` **pelvis_QZ**
- `float` **pelvis_QW**
- `unsigned char` **pelvis_conf**
- `float` **spine_navel_x**
- `float` **spine_navel_y**
- `float` **spine_navel_z**
- `float` **spine_navel_QX**
- `float` **spine_navel_QY**
- `float` **spine_navel_QZ**
- `float` **spine_navel_QW**
- `unsigned char` **spine_navel_conf**
- `float` **spine_chest_x**
- `float` **spine_chest_y**
- `float` **spine_chest_z**
- `float` **spine_chest_QX**
- `float` **spine_chest_QY**
- `float` **spine_chest_QZ**
- `float` **spine_chest_QW**
- `unsigned char` **spine_chest_conf**
- `float` **neck_x**
- `float` **neck_y**
- `float` **neck_z**
- `float` **neck_QX**
- `float` **neck_QY**
- `float` **neck_QZ**
- `float` **neck_QW**
- `unsigned char` **neck_conf**

- float **clavicle_left_x**
- float **clavicle_left_y**
- float **clavicle_left_z**
- float **clavicle_left_QX**
- float **clavicle_left_QY**
- float **clavicle_left_QZ**
- float **clavicle_left_QW**
- unsigned char **clavicle_left_conf**
- float **shoulder_left_x**
- float **shoulder_left_y**
- float **shoulder_left_z**
- float **shoulder_left_QX**
- float **shoulder_left_QY**
- float **shoulder_left_QZ**
- float **shoulder_left_QW**
- unsigned char **shoulder_left_conf**
- float **elbow_left_x**
- float **elbow_left_y**
- float **elbow_left_z**
- float **elbow_left_QX**
- float **elbow_left_QY**
- float **elbow_left_QZ**
- float **elbow_left_QW**
- unsigned char **elbow_left_conf**
- float **wrist_left_x**
- float **wrist_left_y**
- float **wrist_left_z**
- float **wrist_left_QX**
- float **wrist_left_QY**
- float **wrist_left_QZ**
- float **wrist_left_QW**
- unsigned char **wrist_left_conf**
- float **hand_left_x**
- float **hand_left_y**
- float **hand_left_z**
- float **hand_left_QX**
- float **hand_left_QY**
- float **hand_left_QZ**
- float **hand_left_QW**
- unsigned char **hand_left_conf**
- float **handtip_left_x**
- float **handtip_left_y**
- float **handtip_left_z**
- float **handtip_left_QX**
- float **handtip_left_QY**
- float **handtip_left_QZ**
- float **handtip_left_QW**
- unsigned char **handtip_left_conf**
- float **thumb_left_x**
- float **thumb_left_y**
- float **thumb_left_z**
- float **thumb_left_QX**
- float **thumb_left_QY**
- float **thumb_left_QZ**
- float **thumb_left_QW**

- unsigned char **thumb_left_conf**
- float **clavicle_right_x**
- float **clavicle_right_y**
- float **clavicle_right_z**
- float **clavicle_right_QX**
- float **clavicle_right_QY**
- float **clavicle_right_QZ**
- float **clavicle_right_QW**
- unsigned char **clavicle_right_conf**
- float **shoulder_right_x**
- float **shoulder_right_y**
- float **shoulder_right_z**
- float **shoulder_right_QX**
- float **shoulder_right_QY**
- float **shoulder_right_QZ**
- float **shoulder_right_QW**
- unsigned char **shoulder_right_conf**
- float **elbow_right_x**
- float **elbow_right_y**
- float **elbow_right_z**
- float **elbow_right_QX**
- float **elbow_right_QY**
- float **elbow_right_QZ**
- float **elbow_right_QW**
- unsigned char **elbow_right_conf**
- float **wrist_right_x**
- float **wrist_right_y**
- float **wrist_right_z**
- float **wrist_right_QX**
- float **wrist_right_QY**
- float **wrist_right_QZ**
- float **wrist_right_QW**
- unsigned char **wrist_right_conf**
- float **hand_right_x**
- float **hand_right_y**
- float **hand_right_z**
- float **hand_right_QX**
- float **hand_right_QY**
- float **hand_right_QZ**
- float **hand_right_QW**
- unsigned char **hand_right_conf**
- float **handtip_right_x**
- float **handtip_right_y**
- float **handtip_right_z**
- float **handtip_right_QX**
- float **handtip_right_QY**
- float **handtip_right_QZ**
- float **handtip_right_QW**
- unsigned char **handtip_right_conf**
- float **thumb_right_x**
- float **thumb_right_y**
- float **thumb_right_z**
- float **thumb_right_QX**
- float **thumb_right_QY**
- float **thumb_right_QZ**

- float **thumb_right_QW**
- unsigned char **thumb_right_conf**
- float **hip_left_x**
- float **hip_left_y**
- float **hip_left_z**
- float **hip_left_QX**
- float **hip_left_QY**
- float **hip_left_QZ**
- float **hip_left_QW**
- unsigned char **hip_left_conf**
- float **knee_left_x**
- float **knee_left_y**
- float **knee_left_z**
- float **knee_left_QX**
- float **knee_left_QY**
- float **knee_left_QZ**
- float **knee_left_QW**
- unsigned char **knee_left_conf**
- float **ankle_left_x**
- float **ankle_left_y**
- float **ankle_left_z**
- float **ankle_left_QX**
- float **ankle_left_QY**
- float **ankle_left_QZ**
- float **ankle_left_QW**
- unsigned char **ankle_left_conf**
- float **foot_left_x**
- float **foot_left_y**
- float **foot_left_z**
- float **foot_left_QX**
- float **foot_left_QY**
- float **foot_left_QZ**
- float **foot_left_QW**
- unsigned char **foot_left_conf**
- float **hip_right_x**
- float **hip_right_y**
- float **hip_right_z**
- float **hip_right_QX**
- float **hip_right_QY**
- float **hip_right_QZ**
- float **hip_right_QW**
- unsigned char **hip_right_conf**
- float **knee_right_x**
- float **knee_right_y**
- float **knee_right_z**
- float **knee_right_QX**
- float **knee_right_QY**
- float **knee_right_QZ**
- float **knee_right_QW**
- unsigned char **knee_right_conf**
- float **ankle_right_x**
- float **ankle_right_y**
- float **ankle_right_z**
- float **ankle_right_QX**
- float **ankle_right_QY**

- float **ankle_right_QZ**
- float **ankle_right_QW**
- unsigned char **ankle_right_conf**
- float **foot_right_x**
- float **foot_right_y**
- float **foot_right_z**
- float **foot_right_QX**
- float **foot_right_QY**
- float **foot_right_QZ**
- float **foot_right_QW**
- unsigned char **foot_right_conf**
- float **head_x**
- float **head_y**
- float **head_z**
- float **head_QX**
- float **head_QY**
- float **head_QZ**
- float **head_QW**
- unsigned char **head_conf**
- float **nose_x**
- float **nose_y**
- float **nose_z**
- float **nose_QX**
- float **nose_QY**
- float **nose_QZ**
- float **nose_QW**
- unsigned char **nose_conf**
- float **eye_left_x**
- float **eye_left_y**
- float **eye_left_z**
- float **eye_left_QX**
- float **eye_left_QY**
- float **eye_left_QZ**
- float **eye_left_QW**
- unsigned char **eye_left_conf**
- float **ear_left_x**
- float **ear_left_y**
- float **ear_left_z**
- float **ear_left_QX**
- float **ear_left_QY**
- float **ear_left_QZ**
- float **ear_left_QW**
- unsigned char **ear_left_conf**
- float **eye_right_x**
- float **eye_right_y**
- float **eye_right_z**
- float **eye_right_QX**
- float **eye_right_QY**
- float **eye_right_QZ**
- float **eye_right_QW**
- unsigned char **eye_right_conf**
- float **ear_right_x**
- float **ear_right_y**
- float **ear_right_z**
- float **ear_right_QX**

- float **ear_right_QY**
- float **ear_right_QZ**
- float **ear_right_QW**
- unsigned char **ear_right_conf**

The documentation for this struct was generated from the following file:

- [ssp_client_k4a.cc](#)

8.2 moetsi::ssp::AVCodecContextDeleter Struct Reference

Public Member Functions

- void **operator()** (AVCodecContext *ptr) const

The documentation for this struct was generated from the following file:

- libav_types.h

8.3 moetsi::ssp::AVCodecDeleter Struct Reference

Public Member Functions

- void **operator()** (AVCodec *ptr) const

The documentation for this struct was generated from the following file:

- libav_types.h

8.4 moetsi::ssp::AVCodecParametersDeleter Struct Reference

Public Member Functions

- void **operator()** (AVCodecParameters *ptr) const

The documentation for this struct was generated from the following file:

- libav_types.h

8.5 moetsi::ssp::AVCodecParametersNullDeleter Struct Reference

Public Member Functions

- void **operator()** (AVCodecParameters *ptr) const

The documentation for this struct was generated from the following file:

- libav_types.h

8.6 moetsi::ssp::AVFormatContextDeleter Struct Reference

Public Member Functions

- void **operator()** (AVFormatContext *ptr) const

The documentation for this struct was generated from the following file:

- libav_types.h

8.7 moetsi::ssp::AVFrameDeleter Struct Reference

Public Member Functions

- void **operator()** (AVFrame *ptr) const

The documentation for this struct was generated from the following file:

- libav_types.h

8.8 moetsi::ssp::AVIOContextDeleter Struct Reference

Public Member Functions

- void **operator()** (AVIOContext *ptr) const

The documentation for this struct was generated from the following file:

- libav_types.h

8.9 moetsi::ssp::AVPacketDeleter Struct Reference

Public Member Functions

- void **operator()** (AVPacket *ptr) const

The documentation for this struct was generated from the following file:

- [libav_types.h](#)

8.10 BodyTracker Class Reference

Public Member Functions

- **BodyTracker** (int port)
- int **update** ()
- int **getBodyCount** () const
- int **getBodiesStruct** (k4abt_body_t *pBodies, int n) const
- [custom_k4abt_body_t](#) **getCustomBodiesStruct** (int n) const
- int **getBodies** (k4abt_skeleton_t *pSkeletons, int *pIds, int n) const

The documentation for this class was generated from the following file:

- [ssp_client_k4a.cc](#)

8.11 moetsi::ssp::buffer_data Struct Reference

Public Attributes

- uint8_t * **ptr**
- size_t [size](#)
size left in the buffer

The documentation for this struct was generated from the following file:

- [image_decoder.cc](#)

8.12 moetsi::ssp::CameraCalibrationStruct Struct Reference

Camera calibration data.

```
#include <frame_struct.h>
```

Public Member Functions

- [CameraCalibrationStruct](#) ()
- [CameraCalibrationStruct](#) ([CameraCalibrationType](#) t, std::vector< unsigned char > d, std::vector< unsigned char > ed)
- template<class Archive >
void **serialize** (Archive &ar)
- [CameraCalibrationStruct](#) ()
- [CameraCalibrationStruct](#) ([CameraCalibrationType](#) t, std::vector< unsigned char > d, std::vector< unsigned char > ed)
- template<class Archive >
void **serialize** (Archive &ar)

Public Attributes

- [CameraCalibrationType](#) type = [CameraCalibrationType::CameraCalibrationTypeDefault](#)
- std::vector< unsigned char > [data](#)
- std::vector< unsigned char > [extra_data](#)

8.12.1 Detailed Description

Camera calibration data.

8.12.2 Constructor & Destructor Documentation

8.12.2.1 [CameraCalibrationStruct\(\)](#) [1/4]

```
moetsi::ssp::CameraCalibrationStruct::CameraCalibrationStruct ( ) [inline]
```

Default constructor

8.12.2.2 [CameraCalibrationStruct\(\)](#) [2/4]

```
moetsi::ssp::CameraCalibrationStruct::CameraCalibrationStruct (
    CameraCalibrationType t,
    std::vector< unsigned char > d,
    std::vector< unsigned char > ed ) [inline]
```

Structure constructor

Parameters

<i>t</i>	camera calibration type
<i>d</i>	opaque data blob #1
<i>ed</i>	opaque data blob #2

8.12.2.3 CameraCalibrationStruct() [3/4]

```
moetsi::ssp::CameraCalibrationStruct::CameraCalibrationStruct ( ) [inline]
```

Default constructor

8.12.2.4 CameraCalibrationStruct() [4/4]

```
moetsi::ssp::CameraCalibrationStruct::CameraCalibrationStruct (
    CameraCalibrationType t,
    std::vector< unsigned char > d,
    std::vector< unsigned char > ed ) [inline]
```

Structure constructor

Parameters

<i>t</i>	camera calibration type
<i>d</i>	opaque data blob #1
<i>ed</i>	opaque data blob #2

8.12.3 Member Data Documentation

8.12.3.1 data

```
std::vector< unsigned char > moetsi::ssp::CameraCalibrationStruct::data
```

Opaque data blob #1

8.12.3.2 extra_data

```
std::vector< unsigned char > moetsi::ssp::CameraCalibrationStruct::extra_data
```

Opaque data blob #2

8.12.3.3 type

```
CameraCalibrationType moetsi::ssp::CameraCalibrationStruct::type = CameraCalibrationType::↔
CameraCalibrationTypeDefault
```

Camera calibration type

The documentation for this struct was generated from the following file:

- include/structs/frame_struct.h

8.13 moetsi::ssp::CodecParamsStruct Struct Reference

Codec parameters.

```
#include <frame_struct.h>
```

Public Member Functions

- [CodecParamsStruct](#) ()
- [CodecParamsStruct](#) ([CodecParamsType](#) t, std::vector< unsigned char > d, std::vector< unsigned char > ed)
- template<class Archive >
void **serialize** (Archive &ar)
- [CodecParamsStruct](#) ()
- [CodecParamsStruct](#) ([CodecParamsType](#) t, std::vector< unsigned char > d, std::vector< unsigned char > ed)
- template<class Archive >
void **serialize** (Archive &ar)

Public Attributes

- [CodecParamsType](#) type = [CodecParamsType::CodecParamsTypeDefault](#)
- std::vector< unsigned char > [data](#)
- std::vector< unsigned char > [extra_data](#)

8.13.1 Detailed Description

Codec parameters.

8.13.2 Constructor & Destructor Documentation

8.13.2.1 CodecParamsStruct() [1/4]

```
moetsi::ssp::CodecParamsStruct::CodecParamsStruct ( ) [inline]
```

Default constructor

8.13.2.2 CodecParamsStruct() [2/4]

```
moetsi::ssp::CodecParamsStruct::CodecParamsStruct (
    CodecParamsType t,
    std::vector< unsigned char > d,
    std::vector< unsigned char > ed ) [inline]
```

Structural constructor

Parameters

<i>t</i>	codec type
<i>d</i>	opaque data blob #1
<i>ed</i>	opaque data blob #2

8.13.2.3 CodecParamsStruct() [3/4]

```
moetsi::ssp::CodecParamsStruct::CodecParamsStruct ( ) [inline]
```

Default constructor

8.13.2.4 CodecParamsStruct() [4/4]

```
moetsi::ssp::CodecParamsStruct::CodecParamsStruct (
    CodecParamsType t,
    std::vector< unsigned char > d,
    std::vector< unsigned char > ed ) [inline]
```

Structural constructor

Parameters

<i>t</i>	codec type
<i>d</i>	opaque data blob #1
<i>ed</i>	opaque data blob #2

8.13.3 Member Data Documentation**8.13.3.1 data**

```
std::vector< unsigned char > moetsi::ssp::CodecParamsStruct::data
```

Opaque data blob #1

8.13.3.2 extra_data

```
std::vector< unsigned char > moetsi::ssp::CodecParamsStruct::extra_data
```

Opaque data blob #2

8.13.3.3 type

```
CodecParamsType moetsi::ssp::CodecParamsStruct::type = CodecParamsType::CodecParamsTypeDefault
```

Codec parameters type

The documentation for this struct was generated from the following file:

- include/structs/frame_struct.h

8.14 color_point_t Struct Reference

Public Attributes

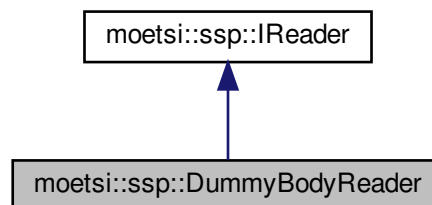
- int16_t **xyz** [3]
- uint8_t **rgb** [3]

The documentation for this struct was generated from the following file:

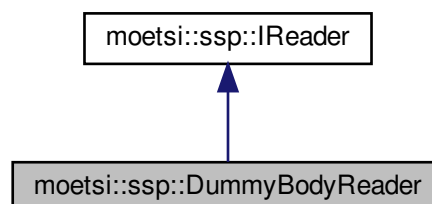
- ssp_client_pointcloud.cc

8.15 moetsi::ssp::DummyBodyReader Class Reference

Inheritance diagram for moetsi::ssp::DummyBodyReader:



Collaboration diagram for moetsi::ssp::DummyBodyReader:



Public Member Functions

- virtual std::vector< std::shared_ptr< [FrameStruct](#) > > [GetCurrentFrame](#) ()
Get current frame data.
- virtual std::vector< [FrameType](#) > [GetType](#) ()
Get frame types.
- virtual bool [HasNextFrame](#) ()
Check if there is a next frame.
- virtual void [NextFrame](#) ()
Go to next frame.
- virtual void [Reset](#) ()
Reset this reader.
- virtual void [GoToFrame](#) (unsigned int frame_id)
Go to a given frame.
- virtual unsigned int [GetCurrentFrameId](#) ()
Get current frame number.
- virtual unsigned int [GetFps](#) ()
Get indicative FPS in frame per second.

8.15.1 Member Function Documentation

8.15.1.1 [GetCurrentFrameId\(\)](#)

```
unsigned int moetsi::ssp::DummyBodyReader::GetCurrentFrameId ( ) [virtual]
```

Get current frame number.

Returns

current frame number.

Implements [moetsi::ssp::IReader](#).

8.15.1.2 [GetFps\(\)](#)

```
unsigned int moetsi::ssp::DummyBodyReader::GetFps ( ) [virtual]
```

Get indicative FPS in frame per second.

Returns

the FPS number

Implements [moetsi::ssp::IReader](#).

8.15.1.3 GetType()

```
std::vector< FrameType > moetsi::ssp::DummyBodyReader::GetType ( ) [virtual]
```

Get frame types.

Returns

a vector of [FrameType](#), listing available data types

Implements [moetsi::ssp::IReader](#).

8.15.1.4 GoToFrame()

```
void moetsi::ssp::DummyBodyReader::GoToFrame (
    unsigned int frame_id ) [virtual]
```

Go to a given frame.

Parameters

<i>frame_id</i>	target frame number
-----------------	---------------------

Implements [moetsi::ssp::IReader](#).

8.15.1.5 HasNextFrame()

```
bool moetsi::ssp::DummyBodyReader::HasNextFrame ( ) [virtual]
```

Check if there is a next frame.

Returns

true if there is a next frame

Implements [moetsi::ssp::IReader](#).

The documentation for this class was generated from the following files:

- [dummy_body_reader.h](#)
- [dummy_body_reader.cc](#)

8.16 moetsi::ssp::ExtendedAzureConfig Struct Reference

Azure Kinect configuration.

```
#include <kinect_utils.h>
```

Public Attributes

- `k4a_device_configuration_t` [device_config](#)
- `bool` [stream_color](#)
- `bool` [stream_depth](#)
- `bool` [stream_ir](#)
- `int` [absolute_exposure_value](#)

8.16.1 Detailed Description

Azure Kinect configuration.

8.16.2 Member Data Documentation

8.16.2.1 `absolute_exposure_value`

```
int moetsi::ssp::ExtendedAzureConfig::absolute_exposure_value
```

Absolute exposure value

8.16.2.2 `device_config`

```
k4a_device_configuration_t moetsi::ssp::ExtendedAzureConfig::device_config
```

Device configuration

8.16.2.3 `stream_color`

```
bool moetsi::ssp::ExtendedAzureConfig::stream_color
```

If true, stream color frames

8.16.2.4 `stream_depth`

```
bool moetsi::ssp::ExtendedAzureConfig::stream_depth
```

If true, stream depth frames

8.16.2.5 stream_ir

```
bool moetsi::ssp::ExtendedAzureConfig::stream_ir
```

If true, stream infrared frames

The documentation for this struct was generated from the following file:

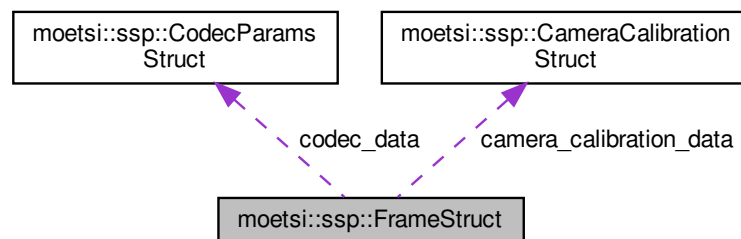
- [kinect_utils.h](#)

8.17 moetsi::ssp::FrameStruct Struct Reference

Frame struct: SSP frame.

```
#include <frame_struct.h>
```

Collaboration diagram for moetsi::ssp::FrameStruct:



Public Member Functions

- `template<class Archive >`
void **serialize** (Archive &ar)
- `template<class Archive >`
void **serialize** (Archive &ar)

Public Attributes

- [SSPMessageType](#) message_type
- [FrameType](#) frame_type
- [FrameDataType](#) frame_data_type
- `std::string` stream_id
- `std::vector< unsigned char >` frame
- [CodecParamsStruct](#) codec_data
- [CameraCalibrationStruct](#) camera_calibration_data
- `std::string` scene_desc
- `unsigned int` sensor_id
- `unsigned int` device_id
- `unsigned int` frame_id
- `std::vector< uint64_t >` timestamps

8.17.1 Detailed Description

Frame struct: SSP frame.

8.17.2 Member Data Documentation

8.17.2.1 camera_calibration_data

```
CameraCalibrationStruct moetsi::ssp::FrameStruct::camera_calibration_data
```

Codec info for video frames, null for image frames

8.17.2.2 codec_data

```
CodecParamsStruct moetsi::ssp::FrameStruct::codec_data
```

Codec info for video frames, null for image frames Video decoder needs to know about the last receive frame
Requires to know the codec as well as additional parameters

8.17.2.3 device_id

```
unsigned int moetsi::ssp::FrameStruct::device_id
```

Integer device id: distinguish between devices in the same scene Can be set by user.

8.17.2.4 frame

```
std::vector< unsigned char > moetsi::ssp::FrameStruct::frame
```

Frame binary data We use a vector to know the size, basically a vector of bytes to store binary data

8.17.2.5 frame_data_type

```
FrameDataType moetsi::ssp::FrameStruct::frame_data_type
```

Frame data type

8.17.2.6 frame_id

```
unsigned int moetsi::ssp::FrameStruct::frame_id
```

Current frame number (increases over time) Increases by 1 for each frame automatically when SSP server starts

8.17.2.7 frame_type

`FrameType moetsi::ssp::FrameStruct::frame_type`

Frame type

8.17.2.8 message_type

`SSPMessageType moetsi::ssp::FrameStruct::message_type`

SSP message type

8.17.2.9 scene_desc

`std::string moetsi::ssp::FrameStruct::scene_desc`

Optional: scene description

8.17.2.10 sensor_id

`unsigned int moetsi::ssp::FrameStruct::sensor_id`

Sensor id

8.17.2.11 stream_id

`std::string moetsi::ssp::FrameStruct::stream_id`

Random 16 char string that uniquely ids the frame stream. Some decoders (like video) are stateful and so must keep track of streams. This is automatically generated.

8.17.2.12 timestamps

`std::vector< uint64_t > moetsi::ssp::FrameStruct::timestamps`

Use for logging and timing to understand processing speeds. Times are in ns

The documentation for this struct was generated from the following file:

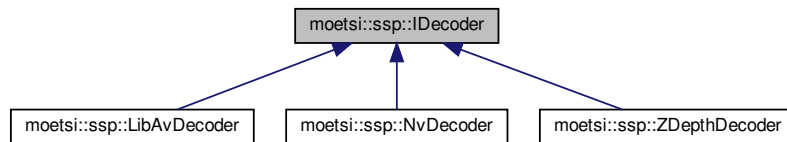
- `include/structs/frame_struct.h`

8.18 moetsi::ssp::IDecoder Class Reference

[IDecoder](#) abstract decoder interface.

```
#include <idecoder.h>
```

Inheritance diagram for moetsi::ssp::IDecoder:



Public Member Functions

- virtual [~IDecoder](#) ()
Virtual destructor.
- virtual cv::Mat [Decode](#) ([FrameStruct](#) &data)=0
Extract an opencv image from a [FrameStruct](#).
- virtual [~IDecoder](#) ()
Virtual destructor.
- virtual cv::Mat [Decode](#) ([FrameStruct](#) &data)=0
Extract an opencv image from a [FrameStruct](#).

8.18.1 Detailed Description

[IDecoder](#) abstract decoder interface.

8.18.2 Member Function Documentation

8.18.2.1 [Decode\(\)](#) [1/2]

```
virtual cv::Mat moetsi::ssp::IDecoder::Decode (
    FrameStruct & data ) [pure virtual]
```

Extract an opencv image from a [FrameStruct](#).

Parameters

<i>data</i>	FrameStruct
-------------	-----------------------------

Returns

OpenCV matrix/image

Implemented in [moetsi::ssp::LibAvDecoder](#), [moetsi::ssp::NvDecoder](#), and [moetsi::ssp::ZDepthDecoder](#).

8.18.2.2 Decode() [2/2]

```
virtual cv::Mat moetsi::ssp::IDecoder::Decode (
    FrameStruct & data ) [pure virtual]
```

Extract an opencv image from a [FrameStruct](#).

Parameters

<i>data</i>	FrameStruct
-------------	-----------------------------

Returns

OpenCV matrix/image

Implemented in [moetsi::ssp::LibAvDecoder](#), [moetsi::ssp::NvDecoder](#), and [moetsi::ssp::ZDepthDecoder](#).

The documentation for this class was generated from the following file:

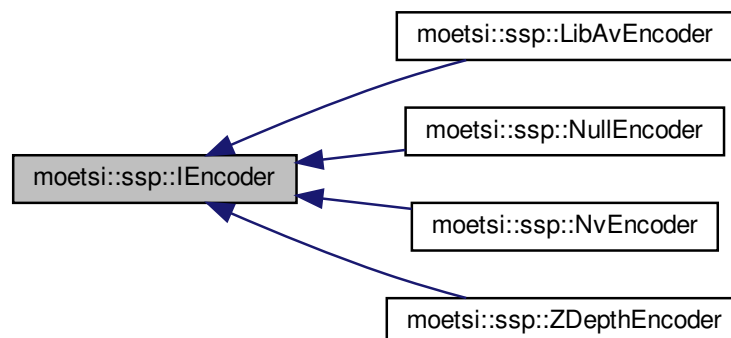
- decoders/idecoder.h

8.19 moetsi::ssp::IEncoder Class Reference

[IEncoder](#) abstract encoder class.

```
#include <iencoder.h>
```

Inheritance diagram for moetsi::ssp::IEncoder:



Public Member Functions

- virtual [~IEncoder](#) ()
Virtual destructor.
- virtual void [AddFrameStruct](#) (std::shared_ptr< [FrameStruct](#) > &frame_struct)=0
Add a frame struct.
- virtual void [NextPacket](#) ()=0
Go to next packet.
- virtual bool [HasNextPacket](#) ()=0
Check if there is a next packet.
- virtual std::shared_ptr< [FrameStruct](#) > [CurrentFrameEncoded](#) ()=0
Get current encoded frame.
- virtual std::shared_ptr< [FrameStruct](#) > [CurrentFrameOriginal](#) ()=0
Get current frame in its original format.
- virtual std::shared_ptr< [CodecParamsStruct](#) > [GetCodecParamsStruct](#) ()=0
Get codec parameters.
- virtual unsigned int [GetFps](#) ()=0
Get FPS.
- virtual [~IEncoder](#) ()
Virtual destructor.
- virtual void [AddFrameStruct](#) (std::shared_ptr< [FrameStruct](#) > &frame_struct)=0
Add a frame struct.
- virtual void [NextPacket](#) ()=0
Go to next packet.
- virtual bool [HasNextPacket](#) ()=0
Check if there is a next packet.
- virtual std::shared_ptr< [FrameStruct](#) > [CurrentFrameEncoded](#) ()=0
Get current encoded frame.
- virtual std::shared_ptr< [FrameStruct](#) > [CurrentFrameOriginal](#) ()=0
Get current frame in its original format.
- virtual std::shared_ptr< [CodecParamsStruct](#) > [GetCodecParamsStruct](#) ()=0
Get codec parameters.
- virtual unsigned int [GetFps](#) ()=0
Get FPS.

8.19.1 Detailed Description

[IEncoder](#) abstract encoder class.

8.19.2 Member Function Documentation

8.19.2.1 AddFrameStruct() [1/2]

```
virtual void moetsi::ssp::IEncoder::AddFrameStruct (
    std::shared_ptr< FrameStruct > & frame_struct ) [pure virtual]
```

Add a frame struct.

Parameters

<i>frame_struct</i>	FrameStruct to add
---------------------	------------------------------------

Implemented in [moetsi::ssp::LibAvEncoder](#), [moetsi::ssp::NvEncoder](#), [moetsi::ssp::ZDepthEncoder](#), and [moetsi::ssp::NullEncoder](#).

8.19.2.2 AddFrameStruct() [2/2]

```
virtual void moetsi::ssp::IEncoder::AddFrameStruct (
    std::shared_ptr< FrameStruct > & frame_struct ) [pure virtual]
```

Add a frame struct.

Parameters

<i>frame_struct</i>	FrameStruct to add
---------------------	------------------------------------

Implemented in [moetsi::ssp::LibAvEncoder](#), [moetsi::ssp::NvEncoder](#), [moetsi::ssp::ZDepthEncoder](#), and [moetsi::ssp::NullEncoder](#).

8.19.2.3 CurrentFrameEncoded() [1/2]

```
virtual std::shared_ptr<FrameStruct> moetsi::ssp::IEncoder::CurrentFrameEncoded ( ) [pure virtual]
```

Get current encoded frame.

Returns

current encoded frame

Implemented in [moetsi::ssp::LibAvEncoder](#), [moetsi::ssp::NvEncoder](#), [moetsi::ssp::ZDepthEncoder](#), and [moetsi::ssp::NullEncoder](#).

8.19.2.4 CurrentFrameEncoded() [2/2]

```
virtual std::shared_ptr<FrameStruct> moetsi::ssp::IEncoder::CurrentFrameEncoded ( ) [pure virtual]
```

Get current encoded frame.

Returns

current encoded frame

Implemented in [moetsi::ssp::LibAvEncoder](#), [moetsi::ssp::NvEncoder](#), [moetsi::ssp::ZDepthEncoder](#), and [moetsi::ssp::NullEncoder](#).

8.19.2.5 CurrentFrameOriginal() [1/2]

```
virtual std::shared_ptr<FrameStruct> moetsi::ssp::IEncoder::CurrentFrameOriginal ( ) [pure virtual]
```

Get current frame in its original format.

Returns

current frame in its original format

Implemented in [moetsi::ssp::LibAvEncoder](#), [moetsi::ssp::NvEncoder](#), [moetsi::ssp::ZDepthEncoder](#), and [moetsi::ssp::NullEncoder](#).

8.19.2.6 CurrentFrameOriginal() [2/2]

```
virtual std::shared_ptr<FrameStruct> moetsi::ssp::IEncoder::CurrentFrameOriginal ( ) [pure virtual]
```

Get current frame in its original format.

Returns

current frame in its original format

Implemented in [moetsi::ssp::LibAvEncoder](#), [moetsi::ssp::NvEncoder](#), [moetsi::ssp::ZDepthEncoder](#), and [moetsi::ssp::NullEncoder](#).

8.19.2.7 GetCodecParamsStruct() [1/2]

```
virtual std::shared_ptr<CodecParamsStruct> moetsi::ssp::IEncoder::GetCodecParamsStruct ( ) [pure virtual]
```

Get codec parameters.

Returns

codec parameters

Implemented in [moetsi::ssp::LibAvEncoder](#), [moetsi::ssp::NvEncoder](#), [moetsi::ssp::ZDepthEncoder](#), and [moetsi::ssp::NullEncoder](#).

8.19.2.8 GetCodecParamsStruct() [2/2]

```
virtual std::shared_ptr<CodecParamsStruct> moetsi::ssp::IEncoder::GetCodecParamsStruct ( )  
[pure virtual]
```

Get codec parameters.

Returns

codec parameters

Implemented in [moetsi::ssp::LibAvEncoder](#), [moetsi::ssp::NvEncoder](#), [moetsi::ssp::ZDepthEncoder](#), and [moetsi::ssp::NullEncoder](#).

8.19.2.9 GetFps() [1/2]

```
virtual unsigned int moetsi::ssp::IEncoder::GetFps ( ) [pure virtual]
```

Get FPS.

Returns

FPS in frame per second

Implemented in [moetsi::ssp::LibAvEncoder](#), [moetsi::ssp::NvEncoder](#), [moetsi::ssp::ZDepthEncoder](#), and [moetsi::ssp::NullEncoder](#).

8.19.2.10 GetFps() [2/2]

```
virtual unsigned int moetsi::ssp::IEncoder::GetFps ( ) [pure virtual]
```

Get FPS.

Returns

FPS in frame per second

Implemented in [moetsi::ssp::LibAvEncoder](#), [moetsi::ssp::NvEncoder](#), [moetsi::ssp::ZDepthEncoder](#), and [moetsi::ssp::NullEncoder](#).

8.19.2.11 `HasNextPacket()` [1/2]

```
virtual bool moetsi::ssp::IEncoder::HasNextPacket ( ) [pure virtual]
```

Check if there is a next packet.

Returns

true if there is a next packet

Implemented in [moetsi::ssp::LibAvEncoder](#), [moetsi::ssp::NvEncoder](#), [moetsi::ssp::ZDepthEncoder](#), and [moetsi::ssp::NullEncoder](#).

8.19.2.12 `HasNextPacket()` [2/2]

```
virtual bool moetsi::ssp::IEncoder::HasNextPacket ( ) [pure virtual]
```

Check if there is a next packet.

Returns

true if there is a next packet

Implemented in [moetsi::ssp::LibAvEncoder](#), [moetsi::ssp::NvEncoder](#), [moetsi::ssp::ZDepthEncoder](#), and [moetsi::ssp::NullEncoder](#).

The documentation for this class was generated from the following file:

- `encoders/iencoder.h`

8.20 `moetsi::ssp::ImageDecoder` Class Reference

Decode image to AV frame.

```
#include <image_decoder.h>
```

Public Member Functions

- [ImageDecoder](#) ()
Constructor.
- [~ImageDecoder](#) ()
Destructor.
- void [ImageBufferToAVFrame](#) (std::shared_ptr< [FrameStruct](#) > &fs, AVFrameSharedP pFrame)
Read frame structs to AVFrame.s.

8.20.1 Detailed Description

Decode image to AV frame.

8.20.2 Member Function Documentation

8.20.2.1 ImageBufferToAVFrame()

```
void moetsi::ssp::ImageDecoder::ImageBufferToAVFrame (
    std::shared_ptr< FrameStruct > & fs,
    AVFrameSharedP pFrame )
```

Read frame structs to AVFrame.s.

Parameters

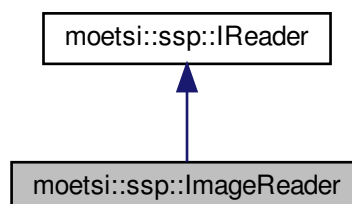
<i>fs</i>	frame structs
<i>pFrame</i>	destination AVFrame

The documentation for this class was generated from the following files:

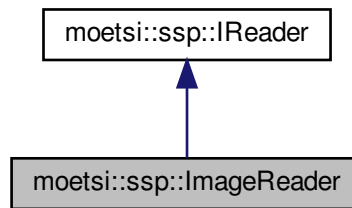
- [image_decoder.h](#)
- [image_decoder.cc](#)

8.21 moetsi::ssp::ImageReader Class Reference

Inheritance diagram for moetsi::ssp::ImageReader:



Collaboration diagram for `moetsi::ssp::ImageReader`:



Public Member Functions

- **ImageReader** (std::string filename)
- virtual std::vector< std::shared_ptr< [FrameStruct](#) > > [GetCurrentFrame](#) ()
Get current frame data.
- virtual std::vector< [FrameType](#) > [GetType](#) ()
Get frame types.
- virtual bool [HasNextFrame](#) ()
Check if there is a next frame.
- virtual void [NextFrame](#) ()
Go to next frame.
- virtual void [Reset](#) ()
Reset this reader.
- virtual void [GoToFrame](#) (unsigned int frame_id)
Go to a given frame.
- virtual unsigned int [GetCurrentFrameId](#) ()
Get current frame number.
- virtual unsigned int [GetFps](#) ()
Get indicative FPS in frame per second.

8.21.1 Member Function Documentation

8.21.1.1 GetCurrentFrameId()

```
unsigned int moetsi::ssp::ImageReader::GetCurrentFrameId ( ) [virtual]
```

Get current frame number.

Returns

current frame number.

Implements [moetsi::ssp::IReader](#).

8.21.1.2 GetFps()

```
unsigned int moetsi::ssp::ImageReader::GetFps ( ) [virtual]
```

Get indicative FPS in frame per second.

Returns

the FPS number

Implements [moetsi::ssp::IReader](#).

8.21.1.3 GetType()

```
std::vector< FrameType > moetsi::ssp::ImageReader::GetType ( ) [virtual]
```

Get frame types.

Returns

a vector of FrameType, listing available data types

Implements [moetsi::ssp::IReader](#).

8.21.1.4 GoToFrame()

```
void moetsi::ssp::ImageReader::GoToFrame (
    unsigned int frame_id ) [virtual]
```

Go to a given frame.

Parameters

<i>frame_id</i>	target frame number
-----------------	---------------------

Implements [moetsi::ssp::IReader](#).

8.21.1.5 HasNextFrame()

```
bool moetsi::ssp::ImageReader::HasNextFrame ( ) [virtual]
```

Check if there is a next frame.

Returns

true if there is a next frame

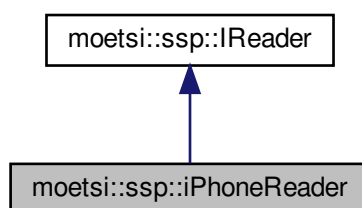
Implements [moetsi::ssp::IReader](#).

The documentation for this class was generated from the following files:

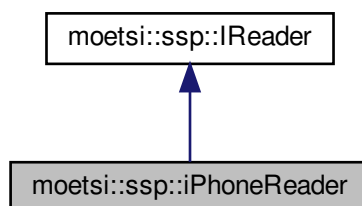
- [image_reader.h](#)
- [image_reader.cc](#)

8.22 moetsi::ssp::iPhoneReader Class Reference

Inheritance diagram for moetsi::ssp::iPhoneReader:



Collaboration diagram for moetsi::ssp::iPhoneReader:



Public Member Functions

- void [Reset](#) () override
Reset this reader.
- bool [HasNextFrame](#) () override
Check if there is a next frame.
- void [NextFrame](#) () override
Go to next frame.
- std::vector< std::shared_ptr< [FrameStruct](#) > > [GetCurrentFrame](#) () override
Get current frame data.
- unsigned int [GetCurrentFrameId](#) () override
Get current frame number.
- void [GoToFrame](#) (unsigned int frame_id) override
Go to a given frame.
- unsigned int [GetFps](#) () override
Get indicative FPS in frame per second.
- std::vector< [FrameType](#) > [GetType](#) () override
Get frame types.

8.22.1 Member Function Documentation

8.22.1.1 GetCurrentFrameId()

```
unsigned int moetsi::ssp::iPhoneReader::GetCurrentFrameId ( ) [override], [virtual]
```

Get current frame number.

Returns

current frame number.

Implements [moetsi::ssp::IReader](#).

8.22.1.2 GetFps()

```
unsigned int moetsi::ssp::iPhoneReader::GetFps ( ) [override], [virtual]
```

Get indicative FPS in frame per second.

Returns

the FPS number

Implements [moetsi::ssp::IReader](#).

8.22.1.3 GetType()

```
vector< FrameType > moetsi::ssp::iPhoneReader::GetType ( ) [override], [virtual]
```

Get frame types.

Returns

a vector of [FrameType](#), listing available data types

Implements [moetsi::ssp::IReader](#).

8.22.1.4 GoToFrame()

```
void moetsi::ssp::iPhoneReader::GoToFrame (
    unsigned int frame_id ) [override], [virtual]
```

Go to a given frame.

Parameters

<i>frame_id</i>	target frame number
-----------------	---------------------

Implements [moetsi::ssp::IReader](#).

8.22.1.5 HasNextFrame()

```
bool moetsi::ssp::iPhoneReader::HasNextFrame ( ) [override], [virtual]
```

Check if there is a next frame.

Returns

true if there is a next frame

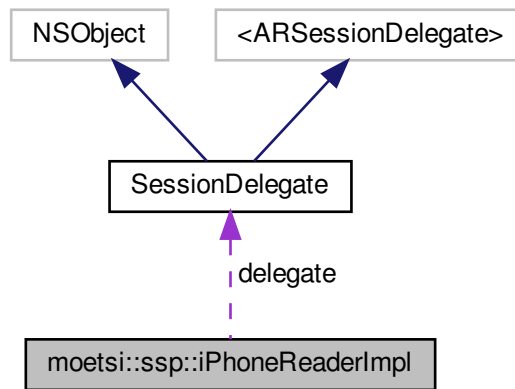
Implements [moetsi::ssp::IReader](#).

The documentation for this class was generated from the following files:

- [iphone_reader.h](#)
- [iphone_reader.mm](#)

8.23 moetsi::ssp::iPhoneReaderImpl Class Reference

Collaboration diagram for moetsi::ssp::iPhoneReaderImpl:



Public Attributes

- ARSession * **session**
- [SessionDelegate](#) * **delegate**
- unsigned int **fps**
- std::shared_ptr< [FrameStruct](#) > **image**
- std::shared_ptr< [FrameStruct](#) > **depth**
- std::shared_ptr< [FrameStruct](#) > **confidence**

The documentation for this class was generated from the following file:

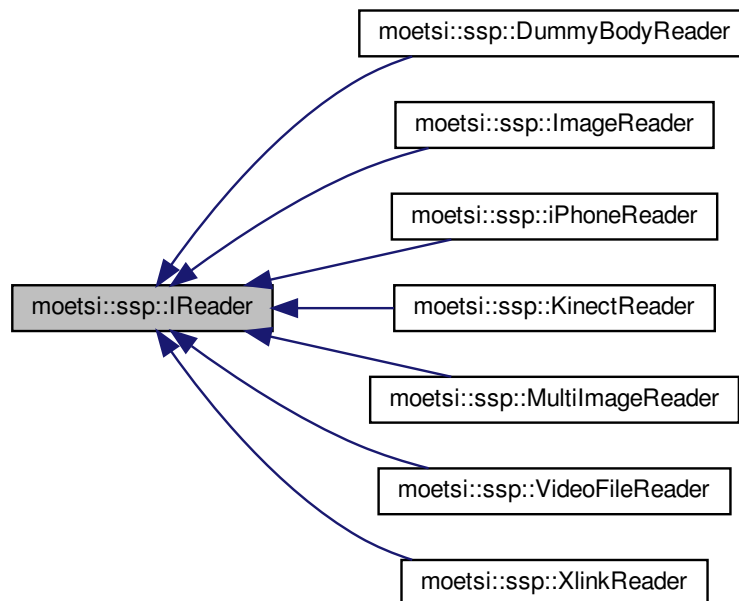
- [iphone_reader.mm](#)

8.24 moetsi::ssp::IReader Class Reference

SSP reader interface - abstract class.

```
#include <ireader.h>
```

Inheritance diagram for moetsi::ssp::IReader:



Public Member Functions

- virtual [~IReader](#) ()
Destructor.
- virtual std::vector< std::shared_ptr< [FrameStruct](#) > > [GetCurrentFrame](#) ()=0
Get current frame data.
- virtual std::vector< [FrameType](#) > [GetType](#) ()=0
Get frame types.
- virtual bool [HasNextFrame](#) ()=0
Check if there is a next frame.
- virtual void [NextFrame](#) ()=0
Go to next frame.
- virtual void [Reset](#) ()=0
Reset this reader.
- virtual void [GoToFrame](#) (unsigned int frame_id)=0
Go to a given frame.
- virtual unsigned int [GetCurrentFrameId](#) ()=0
Get current frame number.
- virtual unsigned int [GetFps](#) ()=0
Get indicative FPS in frame per second.
- virtual [~IReader](#) ()
Destructor.
- virtual std::vector< std::shared_ptr< [FrameStruct](#) > > [GetCurrentFrame](#) ()=0
Get current frame data.
- virtual std::vector< [FrameType](#) > [GetType](#) ()=0

- Get frame types.*
- virtual bool [HasNextFrame](#) ()=0
Check if there is a next frame.
- virtual void [NextFrame](#) ()=0
Go to next frame.
- virtual void [Reset](#) ()=0
Reset this reader.
- virtual void [GoToFrame](#) (unsigned int frame_id)=0
Go to a given frame.
- virtual unsigned int [GetCurrentFrameId](#) ()=0
Get current frame number.
- virtual unsigned int [GetFps](#) ()=0
Get indicative FPS in frame per second.

8.24.1 Detailed Description

SSP reader interface - abstract class.

8.24.2 Member Function Documentation

8.24.2.1 [GetCurrentFrameId\(\)](#) [1/2]

```
virtual unsigned int moetsi::ssp::IReader::GetCurrentFrameId ( ) [pure virtual]
```

Get current frame number.

Returns

current frame number.

Implemented in [moetsi::ssp::KinectReader](#), [moetsi::ssp::VideoFileReader](#), [moetsi::ssp::XlinkReader](#), [moetsi::ssp::ImageReader](#), [moetsi::ssp::DummyBodyReader](#), [moetsi::ssp::MultiImageReader](#), and [moetsi::ssp::iPhoneReader](#).

8.24.2.2 [GetCurrentFrameId\(\)](#) [2/2]

```
virtual unsigned int moetsi::ssp::IReader::GetCurrentFrameId ( ) [pure virtual]
```

Get current frame number.

Returns

current frame number.

Implemented in [moetsi::ssp::KinectReader](#), [moetsi::ssp::VideoFileReader](#), [moetsi::ssp::XlinkReader](#), [moetsi::ssp::ImageReader](#), [moetsi::ssp::DummyBodyReader](#), [moetsi::ssp::MultiImageReader](#), and [moetsi::ssp::iPhoneReader](#).

8.24.2.3 GetFps() [1/2]

```
virtual unsigned int moetsi::ssp::IReader::GetFps ( ) [pure virtual]
```

Get indicative FPS in frame per second.

Returns

the FPS number

Implemented in [moetsi::ssp::KinectReader](#), [moetsi::ssp::VideoFileReader](#), [moetsi::ssp::XlinkReader](#), [moetsi::ssp::ImageReader](#), [moetsi::ssp::DummyBodyReader](#), [moetsi::ssp::MultiImageReader](#), and [moetsi::ssp::iPhoneReader](#).

8.24.2.4 GetFps() [2/2]

```
virtual unsigned int moetsi::ssp::IReader::GetFps ( ) [pure virtual]
```

Get indicative FPS in frame per second.

Returns

the FPS number

Implemented in [moetsi::ssp::KinectReader](#), [moetsi::ssp::VideoFileReader](#), [moetsi::ssp::XlinkReader](#), [moetsi::ssp::ImageReader](#), [moetsi::ssp::DummyBodyReader](#), [moetsi::ssp::MultiImageReader](#), and [moetsi::ssp::iPhoneReader](#).

8.24.2.5 GetType() [1/2]

```
virtual std::vector<FrameType> moetsi::ssp::IReader::GetType ( ) [pure virtual]
```

Get frame types.

Returns

a vector of FrameType, listing available data types

Implemented in [moetsi::ssp::KinectReader](#), [moetsi::ssp::VideoFileReader](#), [moetsi::ssp::XlinkReader](#), [moetsi::ssp::ImageReader](#), [moetsi::ssp::DummyBodyReader](#), [moetsi::ssp::MultiImageReader](#), and [moetsi::ssp::iPhoneReader](#).

8.24.2.6 GetType() [2/2]

```
virtual std::vector<FrameType> moetsi::ssp::IReader::GetType ( ) [pure virtual]
```

Get frame types.

Returns

a vector of FrameType, listing available data types

Implemented in [moetsi::ssp::KinectReader](#), [moetsi::ssp::VideoFileReader](#), [moetsi::ssp::XlinkReader](#), [moetsi::ssp::ImageReader](#), [moetsi::ssp::DummyBodyReader](#), [moetsi::ssp::MultiImageReader](#), and [moetsi::ssp::iPhoneReader](#).

8.24.2.7 GoToFrame() [1/2]

```
virtual void moetsi::ssp::IReader::GoToFrame (
    unsigned int frame_id ) [pure virtual]
```

Go to a given frame.

Parameters

<i>frame_id</i>	target frame number
-----------------	---------------------

Implemented in [moetsi::ssp::KinectReader](#), [moetsi::ssp::VideoFileReader](#), [moetsi::ssp::XlinkReader](#), [moetsi::ssp::ImageReader](#), [moetsi::ssp::DummyBodyReader](#), [moetsi::ssp::MultiImageReader](#), and [moetsi::ssp::iPhoneReader](#).

8.24.2.8 GoToFrame() [2/2]

```
virtual void moetsi::ssp::IReader::GoToFrame (
    unsigned int frame_id ) [pure virtual]
```

Go to a given frame.

Parameters

<i>frame_id</i>	target frame number
-----------------	---------------------

Implemented in [moetsi::ssp::KinectReader](#), [moetsi::ssp::VideoFileReader](#), [moetsi::ssp::XlinkReader](#), [moetsi::ssp::ImageReader](#), [moetsi::ssp::DummyBodyReader](#), [moetsi::ssp::MultiImageReader](#), and [moetsi::ssp::iPhoneReader](#).

8.24.2.9 HasNextFrame() [1/2]

```
virtual bool moetsi::ssp::IReader::HasNextFrame ( ) [pure virtual]
```

Check if there is a next frame.

Returns

true if there is a next frame

Implemented in [moetsi::ssp::KinectReader](#), [moetsi::ssp::VideoFileReader](#), [moetsi::ssp::XlinkReader](#), [moetsi::ssp::ImageReader](#), [moetsi::ssp::DummyBodyReader](#), [moetsi::ssp::MultiImageReader](#), and [moetsi::ssp::iPhoneReader](#).

8.24.2.10 HasNextFrame() [2/2]

```
virtual bool moetsi::ssp::IReader::HasNextFrame ( ) [pure virtual]
```

Check if there is a next frame.

Returns

true if there is a next frame

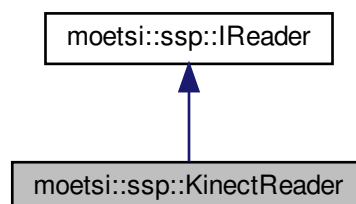
Implemented in [moetsi::ssp::KinectReader](#), [moetsi::ssp::VideoFileReader](#), [moetsi::ssp::XlinkReader](#), [moetsi::ssp::ImageReader](#), [moetsi::ssp::DummyBodyReader](#), [moetsi::ssp::MultiImageReader](#), and [moetsi::ssp::iPhoneReader](#).

The documentation for this class was generated from the following file:

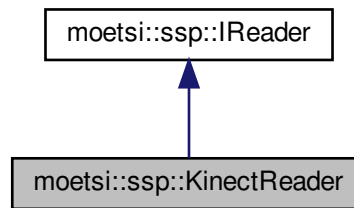
- include/readers/ireader.h

8.25 moetsi::ssp::KinectReader Class Reference

Inheritance diagram for moetsi::ssp::KinectReader:



Collaboration diagram for moetsi::ssp::KinectReader:



Public Member Functions

- **KinectReader** (uint8_t device_index, [ExtendedAzureConfig](#) device_config)
- virtual std::vector< std::shared_ptr< [FrameStruct](#) > > [GetCurrentFrame](#) ()
Get current frame data.
- virtual std::vector< [FrameType](#) > [GetType](#) ()
Get frame types.
- virtual bool [HasNextFrame](#) ()
Check if there is a next frame.
- virtual void [NextFrame](#) ()
Go to next frame.
- virtual void [Reset](#) ()
Reset this reader.
- virtual void [GoToFrame](#) (unsigned int frame_id)
Go to a given frame.
- virtual unsigned int [GetCurrentFrameId](#) ()
Get current frame number.
- virtual unsigned int [GetFps](#) ()
Get indicative FPS in frame per second.

8.25.1 Member Function Documentation

8.25.1.1 GetCurrentFrameId()

```
unsigned int moetsi::ssp::KinectReader::GetCurrentFrameId ( ) [virtual]
```

Get current frame number.

Returns

current frame number.

Implements [moetsi::ssp::IReader](#).

8.25.1.2 GetFps()

```
unsigned int moetsi::ssp::KinectReader::GetFps ( ) [virtual]
```

Get indicative FPS in frame per second.

Returns

the FPS number

Implements [moetsi::ssp::IReader](#).

8.25.1.3 GetType()

```
std::vector< FrameType > moetsi::ssp::KinectReader::GetType ( ) [virtual]
```

Get frame types.

Returns

a vector of FrameType, listing available data types

Implements [moetsi::ssp::IReader](#).

8.25.1.4 GoToFrame()

```
void moetsi::ssp::KinectReader::GoToFrame (
    unsigned int frame_id ) [virtual]
```

Go to a given frame.

Parameters

<i>frame_id</i>	target frame number
-----------------	---------------------

Implements [moetsi::ssp::IReader](#).

8.25.1.5 HasNextFrame()

```
bool moetsi::ssp::KinectReader::HasNextFrame ( ) [virtual]
```

Check if there is a next frame.

Returns

true if there is a next frame

Implements [moetsi::ssp::IReader](#).

The documentation for this class was generated from the following files:

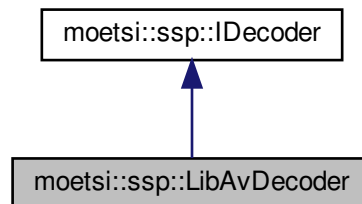
- [kinect_reader.h](#)
- [kinect_reader.cc](#)

8.26 moetsi::ssp::LibAvDecoder Class Reference

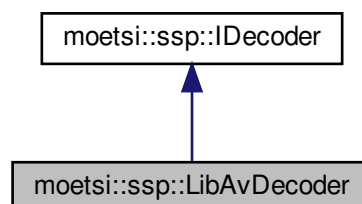
AV (Jpeg/Mpeg) decoder.

```
#include <libav_decoder.h>
```

Inheritance diagram for moetsi::ssp::LibAvDecoder:



Collaboration diagram for moetsi::ssp::LibAvDecoder:



Public Member Functions

- [LibAvDecoder](#) ()
constructor
- [~LibAvDecoder](#) ()
destructor
- void [Init](#) (AVCodecParameters *codec_parameters)
Initialize.
- cv::Mat [Decode](#) ([FrameStruct](#) &frame_struct)
Extract an opencv image from a [FrameStruct](#).
- AVFrameSharedP [DecodeFrame](#) ([FrameStruct](#) &frame_struct)
Decode frame to libav AVFrame structure.

8.26.1 Detailed Description

AV (Jpeg/Mpeg) decoder.

8.26.2 Member Function Documentation

8.26.2.1 Decode()

```
cv::Mat moetsi::ssp::LibAvDecoder::Decode (
    FrameStruct & frame_struct ) [virtual]
```

Extract an opencv image from a [FrameStruct](#).

Parameters

<i>data</i>	FrameStruct
-------------	-----------------------------

Returns

OpenCV matrix/image

Implements [moetsi::ssp::IDecoder](#).

8.26.2.2 DecodeFrame()

```
AVFrameSharedP moetsi::ssp::LibAvDecoder::DecodeFrame (
    FrameStruct & frame_struct )
```

Decode frame to libav AVFrame structure.

Parameters

<i>frame_struct</i>	SSP FrameStruct
---------------------	---------------------------------

Returns

Libav AVFrame structure

8.26.2.3 Init()

```
void moetsi::ssp::LibAvDecoder::Init (
    AVCodecParameters * codec_parameters )
```

Initialize.

Parameters

<i>codec_parameters</i>	<i>parameters</i>
-------------------------	-------------------

The documentation for this class was generated from the following files:

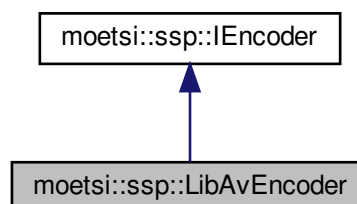
- [libav_decoder.h](#)
- [libav_decoder.cc](#)

8.27 moetsi::ssp::LibAvEncoder Class Reference

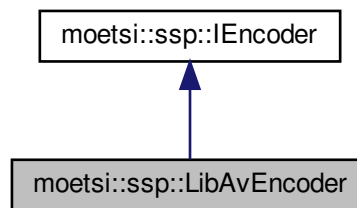
LibAV encoder for Jpeg/Mpeg.

```
#include <libav_encoder.h>
```

Inheritance diagram for moetsi::ssp::LibAvEncoder:



Collaboration diagram for moetsi::ssp::LibAvEncoder:



Public Member Functions

- [LibAvEncoder](#) (std::string codec_parameters_file, unsigned int fps)
Constructor.
- [LibAvEncoder](#) (YAML::Node &_codec_parameters, unsigned int fps)
Constructor.
- virtual [~LibAvEncoder](#) ()
Destructor.
- virtual void [AddFrameStruct](#) (std::shared_ptr< [FrameStruct](#) > &frame_struct)
Add a frame struct.
- virtual void [NextPacket](#) ()
Go to next packet.
- virtual bool [HasNextPacket](#) ()
Check if there is a next packet.
- virtual std::shared_ptr< [FrameStruct](#) > [CurrentFrameEncoded](#) ()
Get current encoded frame.
- virtual std::shared_ptr< [FrameStruct](#) > [CurrentFrameOriginal](#) ()
Get current frame in its original format.
- virtual std::shared_ptr< [CodecParamsStruct](#) > [GetCodecParamsStruct](#) ()
Get codec parameters.
- virtual unsigned int [GetFps](#) ()
Get FPS.

8.27.1 Detailed Description

LibAV encoder for Jpeg/Mpeg.

8.27.2 Constructor & Destructor Documentation

8.27.2.1 LibAvEncoder() [1/2]

```
moetsi::ssp::LibAvEncoder::LibAvEncoder (
    std::string codec_parameters_file,
    unsigned int fps )
```

Constructor.

Parameters

<i>codec_parameters_file</i>	File with codec parameters
<i>fps</i>	Frame per second

8.27.2.2 LibAvEncoder() [2/2]

```
moetsi::ssp::LibAvEncoder::LibAvEncoder (
    YAML::Node & _codec_parameters,
    unsigned int fps )
```

Constructor.

Parameters

<i>_codec_parameters</i>	Yaml codec parameters
<i>fps</i>	Frame per second

8.27.3 Member Function Documentation

8.27.3.1 AddFrameStruct()

```
void moetsi::ssp::LibAvEncoder::AddFrameStruct (
    std::shared_ptr< FrameStruct > & frame_struct ) [virtual]
```

Add a frame struct.

Parameters

<i>frame_struct</i>	FrameStruct to add
---------------------	------------------------------------

Implements [moetsi::ssp::IEncoder](#).

8.27.3.2 CurrentFrameEncoded()

```
std::shared_ptr< FrameStruct > moetsi::ssp::LibAvEncoder::CurrentFrameEncoded ( ) [virtual]
```

Get current encoded frame.

Returns

current encoded frame

Implements [moetsi::ssp::IEncoder](#).

8.27.3.3 CurrentFrameOriginal()

```
std::shared_ptr< FrameStruct > moetsi::ssp::LibAvEncoder::CurrentFrameOriginal ( ) [virtual]
```

Get current frame in its original format.

Returns

current frame in its original format

Implements [moetsi::ssp::IEncoder](#).

8.27.3.4 GetCodecParamsStruct()

```
std::shared_ptr< CodecParamsStruct > moetsi::ssp::LibAvEncoder::GetCodecParamsStruct ( )  
[virtual]
```

Get codec parameters.

Returns

codec parameters

Implements [moetsi::ssp::IEncoder](#).

8.27.3.5 GetFps()

```
unsigned int moetsi::ssp::LibAvEncoder::GetFps ( ) [virtual]
```

Get FPS.

Returns

FPS in frame per second

Implements [moetsi::ssp::IEncoder](#).

8.27.3.6 HasNextPacket()

```
bool moetsi::ssp::LibAvEncoder::HasNextPacket ( ) [virtual]
```

Check if there is a next packet.

Returns

true if there is a next packet

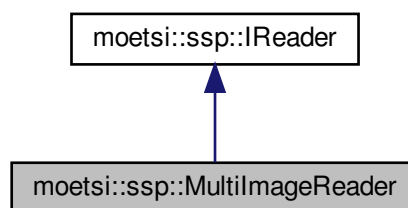
Implements [moetsi::ssp::IEncoder](#).

The documentation for this class was generated from the following files:

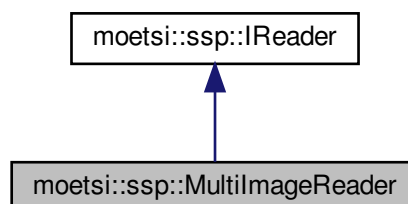
- [libav_encoder.h](#)
- [libav_encoder.cc](#)

8.28 moetsi::ssp::MultiImageReader Class Reference

Inheritance diagram for moetsi::ssp::MultiImageReader:



Collaboration diagram for moetsi::ssp::MultiImageReader:



Public Member Functions

- **MultiImageReader** (std::vector< std::string > filename)
- virtual std::vector< std::shared_ptr< [FrameStruct](#) > > [GetCurrentFrame](#) ()
Get current frame data.
- virtual std::vector< [FrameType](#) > [GetType](#) ()
Get frame types.
- virtual bool [HasNextFrame](#) ()
Check if there is a next frame.
- virtual void [NextFrame](#) ()
Go to next frame.
- virtual void [Reset](#) ()
Reset this reader.
- virtual void [GoToFrame](#) (unsigned int frame_id)
Go to a given frame.
- virtual unsigned int [GetCurrentFrameId](#) ()
Get current frame number.
- virtual unsigned int [GetFps](#) ()
Get indicative FPS in frame per second.

8.28.1 Member Function Documentation

8.28.1.1 GetCurrentFrameId()

```
unsigned int moetsi::ssp::MultiImageReader::GetCurrentFrameId ( ) [virtual]
```

Get current frame number.

Returns

current frame number.

Implements [moetsi::ssp::IReader](#).

8.28.1.2 GetFps()

```
unsigned int moetsi::ssp::MultiImageReader::GetFps ( ) [virtual]
```

Get indicative FPS in frame per second.

Returns

the FPS number

Implements [moetsi::ssp::IReader](#).

8.28.1.3 GetType()

```
std::vector< FrameType > moetsi::ssp::MultiImageReader::GetType ( ) [virtual]
```

Get frame types.

Returns

a vector of [FrameType](#), listing available data types

Implements [moetsi::ssp::IReader](#).

8.28.1.4 GoToFrame()

```
void moetsi::ssp::MultiImageReader::GoToFrame (
    unsigned int frame_id ) [virtual]
```

Go to a given frame.

Parameters

<i>frame_id</i>	target frame number
-----------------	---------------------

Implements [moetsi::ssp::IReader](#).

8.28.1.5 HasNextFrame()

```
bool moetsi::ssp::MultiImageReader::HasNextFrame ( ) [virtual]
```

Check if there is a next frame.

Returns

true if there is a next frame

Implements [moetsi::ssp::IReader](#).

The documentation for this class was generated from the following files:

- [multi_image_reader.h](#)
- [multi_image_reader.cc](#)

8.29 moetsi::ssp::NetworkReader Class Reference

Network reader.

```
#include <network_reader.h>
```

Public Member Functions

- **NetworkReader** (int port)
- void **init** ()
- bool **HasNextFrame** ()
- void **NextFrame** ()
- std::vector< [FrameStruct](#) > **GetCurrentFrame** ()
- unsigned int **GetCurrentFrameId** ()

8.29.1 Detailed Description

Network reader.

The documentation for this class was generated from the following files:

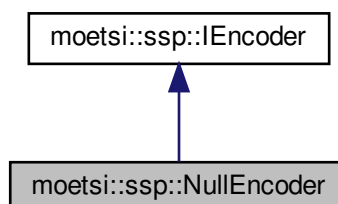
- [network_reader.h](#)
- [network_reader.cc](#)

8.30 moetsi::ssp::NullEncoder Class Reference

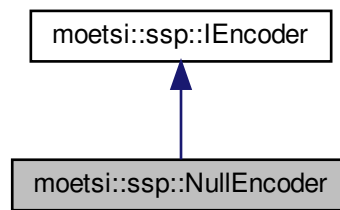
Nullencoder Straight pipe encoder.

```
#include <null_encoder.h>
```

Inheritance diagram for moetsi::ssp::NullEncoder:



Collaboration diagram for moetsi::ssp::NullEncoder:



Public Member Functions

- [NullEncoder](#) (int _fps)
Constructor.
- virtual [~NullEncoder](#) ()
Destructor.
- virtual void [AddFrameStruct](#) (std::shared_ptr< [FrameStruct](#) > &frame_struct)
Add a frame struct.
- virtual void [NextPacket](#) ()
Go to next packet.
- virtual bool [HasNextPacket](#) ()
Check if there is a next packet.
- virtual std::shared_ptr< [FrameStruct](#) > [CurrentFrameEncoded](#) ()
Get current encoded frame.
- virtual std::shared_ptr< [FrameStruct](#) > [CurrentFrameOriginal](#) ()
Get current frame in its original format.
- virtual std::shared_ptr< [CodecParamsStruct](#) > [GetCodecParamsStruct](#) ()
Get codec parameters.
- virtual unsigned int [GetFps](#) ()
Get FPS.

8.30.1 Detailed Description

Nullencoder Straight pipe encoder.

8.30.2 Constructor & Destructor Documentation

8.30.2.1 NullEncoder()

```
moetsi::ssp::NullEncoder::NullEncoder (
    int _fps )
```

Constructor.

Parameters

<code>_fps</code>	frame per seconds
-------------------	-------------------

8.30.3 Member Function Documentation

8.30.3.1 AddFrameStruct()

```
void moetsi::ssp::NullEncoder::AddFrameStruct (
    std::shared_ptr< FrameStruct > & frame_struct ) [virtual]
```

Add a frame struct.

Parameters

<code>frame_struct</code>	FrameStruct to add
---------------------------	------------------------------------

Implements [moetsi::ssp::IEncoder](#).

8.30.3.2 CurrentFrameEncoded()

```
std::shared_ptr< FrameStruct > moetsi::ssp::NullEncoder::CurrentFrameEncoded ( ) [virtual]
```

Get current encoded frame.

Returns

current encoded frame

Implements [moetsi::ssp::IEncoder](#).

8.30.3.3 CurrentFrameOriginal()

```
std::shared_ptr< FrameStruct > moetsi::ssp::NullEncoder::CurrentFrameOriginal ( ) [virtual]
```

Get current frame in its original format.

Returns

current frame in its original format

Implements [moetsi::ssp::IEncoder](#).

8.30.3.4 GetCodecParamsStruct()

```
std::shared_ptr< CodecParamsStruct > moetsi::ssp::NullEncoder::GetCodecParamsStruct ( ) [virtual]
```

Get codec parameters.

Returns

codec parameters

Implements [moetsi::ssp::IEncoder](#).

8.30.3.5 GetFps()

```
unsigned int moetsi::ssp::NullEncoder::GetFps ( ) [virtual]
```

Get FPS.

Returns

FPS in frame per second

Implements [moetsi::ssp::IEncoder](#).

8.30.3.6 HasNextPacket()

```
bool moetsi::ssp::NullEncoder::HasNextPacket ( ) [virtual]
```

Check if there is a next packet.

Returns

true if there is a next packet

Implements [moetsi::ssp::IEncoder](#).

The documentation for this class was generated from the following files:

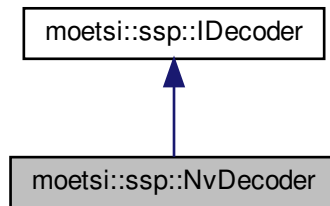
- [null_encoder.h](#)
- [null_encoder.cc](#)

8.31 moetsi::ssp::NvDecoder Class Reference

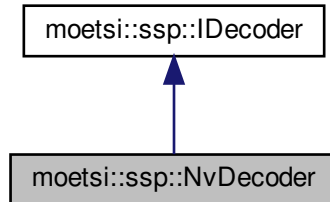
NvPipe decoder.

```
#include <nv_decoder.h>
```

Inheritance diagram for moetsi::ssp::NvDecoder:



Collaboration diagram for moetsi::ssp::NvDecoder:



Public Member Functions

- [NvDecoder](#) ()
Constructor.
- [~NvDecoder](#) ()
Destructor.
- void [Init](#) (std::vector< unsigned char > parameter_data)
Initialize.
- cv::Mat [Decode](#) ([FrameStruct](#) &frame)
Extract an opencv image from a [FrameStruct](#).

8.31.1 Detailed Description

NvPipe decoder.

8.31.2 Member Function Documentation

8.31.2.1 Decode()

```
cv::Mat moetsi::ssp::NvDecoder::Decode (
    FrameStruct & frame ) [virtual]
```

Extract an opencv image from a [FrameStruct](#).

Parameters

<i>data</i>	FrameStruct
-------------	-----------------------------

Returns

OpenCV matrix/image

Implements [moetsi::ssp::IDecoder](#).

8.31.2.2 Init()

```
void moetsi::ssp::NvDecoder::Init (
    std::vector< unsigned char > parameter_data )
```

Initialize.

Parameters

<i>parameter_data</i>	parameters
-----------------------	------------

The documentation for this class was generated from the following files:

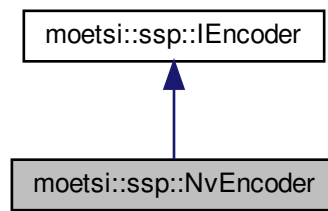
- [nv_decoder.h](#)
- [nv_decoder.cc](#)

8.32 moetsi::ssp::NvEncoder Class Reference

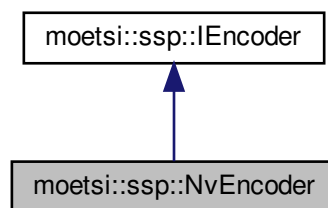
NvPipe encoder.

```
#include <nv_encoder.h>
```

Inheritance diagram for moetsi::ssp::NvEncoder:



Collaboration diagram for moetsi::ssp::NvEncoder:



Public Member Functions

- [NvEncoder](#) (YAML::Node _codec_parameters, unsigned int _fps)
Constructor.
- [~NvEncoder](#) ()
Destructor.
- virtual void [AddFrameStruct](#) (std::shared_ptr< [FrameStruct](#) > &frame_struct)=0
Add a frame struct.
- virtual void [NextPacket](#) ()
Go to next packet.
- virtual bool [HasNextPacket](#) ()
Check if there is a next packet.
- virtual std::shared_ptr< [FrameStruct](#) > [CurrentFrameEncoded](#) ()
Get current encoded frame.
- virtual std::shared_ptr< [FrameStruct](#) > [CurrentFrameOriginal](#) ()
Get current frame in its original format.
- virtual std::shared_ptr< [CodecParamsStruct](#) > [GetCodecParamsStruct](#) ()
Get codec parameters.
- virtual unsigned int [GetFps](#) ()
Get FPS.

8.32.1 Detailed Description

NvPipe encoder.

8.32.2 Constructor & Destructor Documentation

8.32.2.1 NvEncoder()

```
moetsi::ssp::NvEncoder::NvEncoder (
    YAML::Node _codec_parameters,
    unsigned int _fps )
```

Constructor.

Parameters

<code>_codec_parameters</code>	Yaml parameters
<code>_fps</code>	Frame per second

8.32.3 Member Function Documentation

8.32.3.1 AddFrameStruct()

```
void moetsi::ssp::NvEncoder::AddFrameStruct (
    std::shared_ptr< FrameStruct > & frame_struct ) [pure virtual]
```

Add a frame struct.

Parameters

<code>frame_struct</code>	FrameStruct to add
---------------------------	------------------------------------

Implements [moetsi::ssp::IEncoder](#).

8.32.3.2 CurrentFrameEncoded()

```
std::shared_ptr< FrameStruct > moetsi::ssp::NvEncoder::CurrentFrameEncoded ( ) [virtual]
```

Get current encoded frame.

Returns

current encoded frame

Implements [moetsi::ssp::IEncoder](#).

8.32.3.3 CurrentFrameOriginal()

```
std::shared_ptr< FrameStruct > moetsi::ssp::NvEncoder::CurrentFrameOriginal ( ) [virtual]
```

Get current frame in its original format.

Returns

current frame in its original format

Implements [moetsi::ssp::IEncoder](#).

8.32.3.4 GetCodecParamsStruct()

```
std::shared_ptr< CodecParamsStruct > moetsi::ssp::NvEncoder::GetCodecParamsStruct ( ) [virtual]
```

Get codec parameters.

Returns

codec parameters

Implements [moetsi::ssp::IEncoder](#).

8.32.3.5 GetFps()

```
unsigned int moetsi::ssp::NvEncoder::GetFps ( ) [virtual]
```

Get FPS.

Returns

FPS in frame per second

Implements [moetsi::ssp::IEncoder](#).

8.32.3.6 HasNextPacket()

```
bool moetsi::ssp::NvEncoder::HasNextPacket ( ) [virtual]
```

Check if there is a next packet.

Returns

true if there is a next packet

Implements [moetsi::ssp::IEncoder](#).

The documentation for this class was generated from the following files:

- [nv_encoder.h](#)
- [nv_encoder.cc](#)

8.33 moetsi::ssp::NVPipeDeleter Struct Reference

Public Member Functions

- void **operator()** (NvPipe *ptr) const

The documentation for this struct was generated from the following file:

- [nvpipe_types.h](#)

8.34 moetsi::ssp::object_human_t Struct Reference

Public Member Functions

- void **ntoh** ()
- void **hton** ()
- template<class Archive >
void **serialize** (Archive &ar)
- void **ntoh** ()
- void **hton** ()
- template<class Archive >
void **serialize** (Archive &ar)

Public Attributes

- `int32_t` **ld**
- `float` **pelvis_x**
- `float` **pelvis_y**
- `float` **pelvis_z**
- `float` **pelvis_QX**
- `float` **pelvis_QY**
- `float` **pelvis_QZ**
- `float` **pelvis_QW**
- `uint8_t` **pelvis_conf**
- `float` **spine_navel_x**
- `float` **spine_navel_y**
- `float` **spine_navel_z**
- `float` **spine_navel_QX**
- `float` **spine_navel_QY**
- `float` **spine_navel_QZ**
- `float` **spine_navel_QW**
- `uint8_t` **spine_navel_conf**
- `float` **spine_chest_x**
- `float` **spine_chest_y**
- `float` **spine_chest_z**
- `float` **spine_chest_QX**
- `float` **spine_chest_QY**
- `float` **spine_chest_QZ**
- `float` **spine_chest_QW**
- `uint8_t` **spine_chest_conf**
- `float` **neck_x**
- `float` **neck_y**
- `float` **neck_z**
- `float` **neck_QX**
- `float` **neck_QY**
- `float` **neck_QZ**
- `float` **neck_QW**
- `uint8_t` **neck_conf**
- `float` **clavicle_left_x**
- `float` **clavicle_left_y**
- `float` **clavicle_left_z**
- `float` **clavicle_left_QX**
- `float` **clavicle_left_QY**
- `float` **clavicle_left_QZ**
- `float` **clavicle_left_QW**
- `uint8_t` **clavicle_left_conf**
- `float` **shoulder_left_x**
- `float` **shoulder_left_y**
- `float` **shoulder_left_z**
- `float` **shoulder_left_QX**
- `float` **shoulder_left_QY**
- `float` **shoulder_left_QZ**
- `float` **shoulder_left_QW**
- `uint8_t` **shoulder_left_conf**
- `float` **elbow_left_x**
- `float` **elbow_left_y**
- `float` **elbow_left_z**
- `float` **elbow_left_QX**

- float **elbow_left_QY**
- float **elbow_left_QZ**
- float **elbow_left_QW**
- uint8_t **elbow_left_conf**
- float **wrist_left_x**
- float **wrist_left_y**
- float **wrist_left_z**
- float **wrist_left_QX**
- float **wrist_left_QY**
- float **wrist_left_QZ**
- float **wrist_left_QW**
- uint8_t **wrist_left_conf**
- float **hand_left_x**
- float **hand_left_y**
- float **hand_left_z**
- float **hand_left_QX**
- float **hand_left_QY**
- float **hand_left_QZ**
- float **hand_left_QW**
- uint8_t **hand_left_conf**
- float **handtip_left_x**
- float **handtip_left_y**
- float **handtip_left_z**
- float **handtip_left_QX**
- float **handtip_left_QY**
- float **handtip_left_QZ**
- float **handtip_left_QW**
- uint8_t **handtip_left_conf**
- float **thumb_left_x**
- float **thumb_left_y**
- float **thumb_left_z**
- float **thumb_left_QX**
- float **thumb_left_QY**
- float **thumb_left_QZ**
- float **thumb_left_QW**
- uint8_t **thumb_left_conf**
- float **clavicle_right_x**
- float **clavicle_right_y**
- float **clavicle_right_z**
- float **clavicle_right_QX**
- float **clavicle_right_QY**
- float **clavicle_right_QZ**
- float **clavicle_right_QW**
- uint8_t **clavicle_right_conf**
- float **shoulder_right_x**
- float **shoulder_right_y**
- float **shoulder_right_z**
- float **shoulder_right_QX**
- float **shoulder_right_QY**
- float **shoulder_right_QZ**
- float **shoulder_right_QW**
- uint8_t **shoulder_right_conf**
- float **elbow_right_x**
- float **elbow_right_y**
- float **elbow_right_z**

- float **elbow_right_QX**
- float **elbow_right_QY**
- float **elbow_right_QZ**
- float **elbow_right_QW**
- uint8_t **elbow_right_conf**
- float **wrist_right_x**
- float **wrist_right_y**
- float **wrist_right_z**
- float **wrist_right_QX**
- float **wrist_right_QY**
- float **wrist_right_QZ**
- float **wrist_right_QW**
- uint8_t **wrist_right_conf**
- float **hand_right_x**
- float **hand_right_y**
- float **hand_right_z**
- float **hand_right_QX**
- float **hand_right_QY**
- float **hand_right_QZ**
- float **hand_right_QW**
- uint8_t **hand_right_conf**
- float **handtip_right_x**
- float **handtip_right_y**
- float **handtip_right_z**
- float **handtip_right_QX**
- float **handtip_right_QY**
- float **handtip_right_QZ**
- float **handtip_right_QW**
- uint8_t **handtip_right_conf**
- float **thumb_right_x**
- float **thumb_right_y**
- float **thumb_right_z**
- float **thumb_right_QX**
- float **thumb_right_QY**
- float **thumb_right_QZ**
- float **thumb_right_QW**
- uint8_t **thumb_right_conf**
- float **hip_left_x**
- float **hip_left_y**
- float **hip_left_z**
- float **hip_left_QX**
- float **hip_left_QY**
- float **hip_left_QZ**
- float **hip_left_QW**
- uint8_t **hip_left_conf**
- float **knee_left_x**
- float **knee_left_y**
- float **knee_left_z**
- float **knee_left_QX**
- float **knee_left_QY**
- float **knee_left_QZ**
- float **knee_left_QW**
- uint8_t **knee_left_conf**
- float **ankle_left_x**
- float **ankle_left_y**

- float **ankle_left_z**
- float **ankle_left_QX**
- float **ankle_left_QY**
- float **ankle_left_QZ**
- float **ankle_left_QW**
- uint8_t **ankle_left_conf**
- float **foot_left_x**
- float **foot_left_y**
- float **foot_left_z**
- float **foot_left_QX**
- float **foot_left_QY**
- float **foot_left_QZ**
- float **foot_left_QW**
- uint8_t **foot_left_conf**
- float **hip_right_x**
- float **hip_right_y**
- float **hip_right_z**
- float **hip_right_QX**
- float **hip_right_QY**
- float **hip_right_QZ**
- float **hip_right_QW**
- uint8_t **hip_right_conf**
- float **knee_right_x**
- float **knee_right_y**
- float **knee_right_z**
- float **knee_right_QX**
- float **knee_right_QY**
- float **knee_right_QZ**
- float **knee_right_QW**
- uint8_t **knee_right_conf**
- float **ankle_right_x**
- float **ankle_right_y**
- float **ankle_right_z**
- float **ankle_right_QX**
- float **ankle_right_QY**
- float **ankle_right_QZ**
- float **ankle_right_QW**
- uint8_t **ankle_right_conf**
- float **foot_right_x**
- float **foot_right_y**
- float **foot_right_z**
- float **foot_right_QX**
- float **foot_right_QY**
- float **foot_right_QZ**
- float **foot_right_QW**
- uint8_t **foot_right_conf**
- float **head_x**
- float **head_y**
- float **head_z**
- float **head_QX**
- float **head_QY**
- float **head_QZ**
- float **head_QW**
- uint8_t **head_conf**
- float **nose_x**

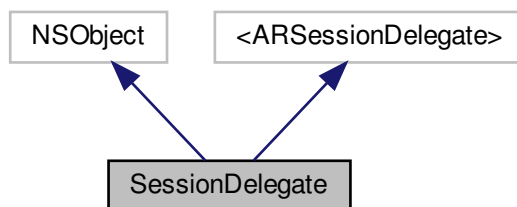
- float **nose_y**
- float **nose_z**
- float **nose_QX**
- float **nose_QY**
- float **nose_QZ**
- float **nose_QW**
- uint8_t **nose_conf**
- float **eye_left_x**
- float **eye_left_y**
- float **eye_left_z**
- float **eye_left_QX**
- float **eye_left_QY**
- float **eye_left_QZ**
- float **eye_left_QW**
- uint8_t **eye_left_conf**
- float **ear_left_x**
- float **ear_left_y**
- float **ear_left_z**
- float **ear_left_QX**
- float **ear_left_QY**
- float **ear_left_QZ**
- float **ear_left_QW**
- uint8_t **ear_left_conf**
- float **eye_right_x**
- float **eye_right_y**
- float **eye_right_z**
- float **eye_right_QX**
- float **eye_right_QY**
- float **eye_right_QZ**
- float **eye_right_QW**
- uint8_t **eye_right_conf**
- float **ear_right_x**
- float **ear_right_y**
- float **ear_right_z**
- float **ear_right_QX**
- float **ear_right_QY**
- float **ear_right_QZ**
- float **ear_right_QW**
- uint8_t **ear_right_conf**

The documentation for this struct was generated from the following file:

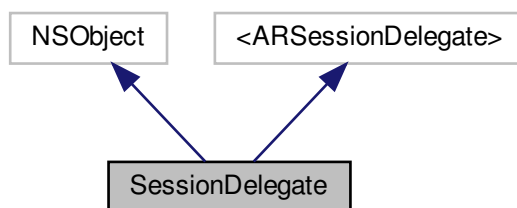
- include/structs/body_struct.h

8.35 SessionDelegate Class Reference

Inheritance diagram for SessionDelegate:



Collaboration diagram for SessionDelegate:



Public Attributes

- semaphore_t **_semaphore**
- pthread_mutex_t **_mutex**
- CVPixelBufferRef **_pixelBuffer**
- CVPixelBufferRef **_depthBuffer**
- CVPixelBufferRef **_confidenceBuffer**
- unsigned long **_timestamp**

The documentation for this class was generated from the following file:

- [iphone_reader.mm](#)

8.36 moetsi::ssp::SwsContextDeleter Struct Reference

Public Member Functions

- void **operator()** (SwsContext *ptr) const

The documentation for this struct was generated from the following file:

- [libav_types.h](#)

8.37 UnityXRNativeSessionPtr Struct Reference

Public Attributes

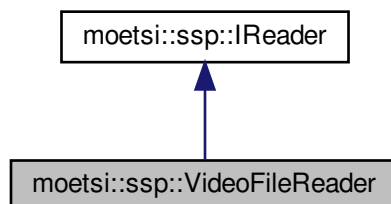
- int **version**
- void * **session**

The documentation for this struct was generated from the following file:

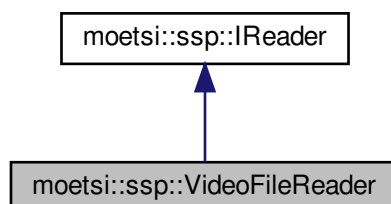
- [iphone_reader.mm](#)

8.38 moetsi::ssp::VideoFileReader Class Reference

Inheritance diagram for moetsi::ssp::VideoFileReader:



Collaboration diagram for moetsi::ssp::VideoFileReader:



Public Member Functions

- **VideoFileReader** (std::string &filename)
- **VideoFileReader** (std::string &filename, std::vector< unsigned int > &video_stream_indexes)
- virtual std::vector< std::shared_ptr< [FrameStruct](#) > > [GetCurrentFrame](#) ()
Get current frame data.
- virtual std::vector< [FrameType](#) > [GetType](#) ()
Get frame types.
- virtual bool [HasNextFrame](#) ()
Check if there is a next frame.
- virtual void [NextFrame](#) ()
Go to next frame.
- virtual void [Reset](#) ()
Reset this reader.
- virtual void [GoToFrame](#) (unsigned int frame_id)
Go to a given frame.
- virtual unsigned int [GetCurrentFrameId](#) ()
Get current frame number.
- virtual unsigned int [GetFps](#) ()
Get indicative FPS in frame per second.

8.38.1 Member Function Documentation

8.38.1.1 GetCurrentFrameId()

```
unsigned int moetsi::ssp::VideoFileReader::GetCurrentFrameId ( ) [virtual]
```

Get current frame number.

Returns

current frame number.

Implements [moetsi::ssp::IReader](#).

8.38.1.2 GetFps()

```
unsigned int moetsi::ssp::VideoFileReader::GetFps ( ) [virtual]
```

Get indicative FPS in frame per second.

Returns

the FPS number

Implements [moetsi::ssp::IReader](#).

8.38.1.3 GetType()

```
std::vector< FrameType > moetsi::ssp::VideoFileReader::GetType ( ) [virtual]
```

Get frame types.

Returns

a vector of `FrameType`, listing available data types

Implements [moetsi::ssp::IReader](#).

8.38.1.4 GoToFrame()

```
void moetsi::ssp::VideoFileReader::GoToFrame (
    unsigned int frame_id ) [virtual]
```

Go to a given frame.

Parameters

<i>frame</i> ↔ _id	target frame number
-----------------------	---------------------

Implements [moetsi::ssp::IReader](#).

8.38.1.5 HasNextFrame()

```
bool moetsi::ssp::VideoFileReader::HasNextFrame ( ) [virtual]
```

Check if there is a next frame.

Returns

true if there is a next frame

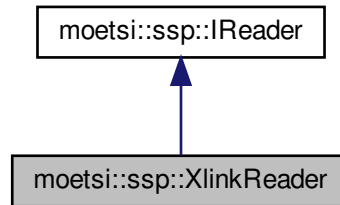
Implements [moetsi::ssp::IReader](#).

The documentation for this class was generated from the following files:

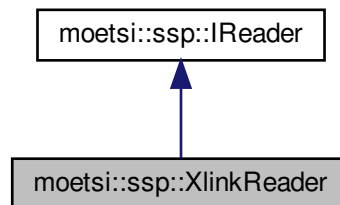
- [video_file_reader.h](#)
- [video_file_reader.cc](#)

8.39 moetsi::ssp::XlinkReader Class Reference

Inheritance diagram for moetsi::ssp::XlinkReader:



Collaboration diagram for moetsi::ssp::XlinkReader:



Public Member Functions

- **XlinkReader** (uint8_t device_index, [ExtendedAzureConfig](#) device_config)
- virtual std::vector< std::shared_ptr< [FrameStruct](#) > > [GetCurrentFrame](#) ()
Get current frame data.
- virtual std::vector< [FrameType](#) > [GetType](#) ()
Get frame types.
- virtual bool [HasNextFrame](#) ()
Check if there is a next frame.
- virtual void [NextFrame](#) ()
Go to next frame.
- virtual void [Reset](#) ()
Reset this reader.
- virtual void [GoToFrame](#) (unsigned int frame_id)
Go to a given frame.
- virtual unsigned int [GetCurrentFrameId](#) ()
Get current frame number.
- virtual unsigned int [GetFps](#) ()
Get indicative FPS in frame per second.

8.39.1 Member Function Documentation

8.39.1.1 GetCurrentFrameId()

```
unsigned int moetsi::ssp::XlinkReader::GetCurrentFrameId ( ) [virtual]
```

Get current frame number.

Returns

current frame number.

Implements [moetsi::ssp::IReader](#).

8.39.1.2 GetFps()

```
unsigned int moetsi::ssp::XlinkReader::GetFps ( ) [virtual]
```

Get indicative FPS in frame per second.

Returns

the FPS number

Implements [moetsi::ssp::IReader](#).

8.39.1.3 GetType()

```
std::vector< unsigned int > moetsi::ssp::XlinkReader::GetType ( ) [virtual]
```

Get frame types.

Returns

a vector of `FrameType`, listing available data types

Implements [moetsi::ssp::IReader](#).

8.39.1.4 GoToFrame()

```
void moetsi::ssp::XlinkReader::GoToFrame (
    unsigned int frame_id ) [virtual]
```

Go to a given frame.

Parameters

<i>frame</i> ↔ _id	target frame number
-----------------------	---------------------

Implements [moetsi::ssp::IReader](#).

8.39.1.5 HasNextFrame()

```
bool moetsi::ssp::XlinkReader::HasNextFrame ( ) [virtual]
```

Check if there is a next frame.

Returns

true if there is a next frame

Implements [moetsi::ssp::IReader](#).

The documentation for this class was generated from the following files:

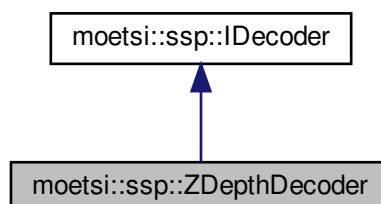
- xlink_reader.h
- [xlink_reader.cc](#)

8.40 moetsi::ssp::ZDepthDecoder Class Reference

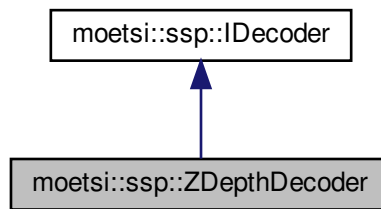
[ZDepthDecoder](#) ZDepth format decoder.

```
#include <zdepth_decoder.h>
```

Inheritance diagram for moetsi::ssp::ZDepthDecoder:



Collaboration diagram for `moetsi::ssp::ZDepthDecoder`:



Public Member Functions

- [ZDepthDecoder](#) ()
Constructor.
- [~ZDepthDecoder](#) ()
Destructor.
- void [Init](#) (std::vector< unsigned char > parameter_data)
Initialize.
- cv::Mat [Decode](#) ([FrameStruct](#) &frame)
Extract an opencv image from a [FrameStruct](#).

8.40.1 Detailed Description

[ZDepthDecoder](#) ZDepth format decoder.

8.40.2 Member Function Documentation

8.40.2.1 Decode()

```
cv::Mat moetsi::ssp::ZDepthDecoder::Decode (
    FrameStruct & frame ) [virtual]
```

Extract an opencv image from a [FrameStruct](#).

Parameters

<i>data</i>	FrameStruct
-------------	-----------------------------

Returns

OpenCV matrix/image

Implements [moetsi::ssp::IDecoder](#).

8.40.2.2 Init()

```
void moetsi::ssp::ZDepthDecoder::Init (
    std::vector< unsigned char > parameter_data )
```

Initialize.

Parameters

<i>parameter_data</i>	parameters
-----------------------	------------

The documentation for this class was generated from the following files:

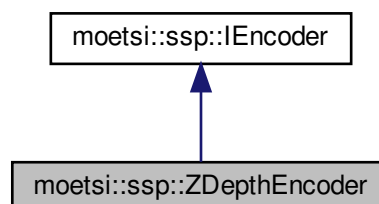
- [zdepth_decoder.h](#)
- [zdepth_decoder.cc](#)

8.41 moetsi::ssp::ZDepthEncoder Class Reference

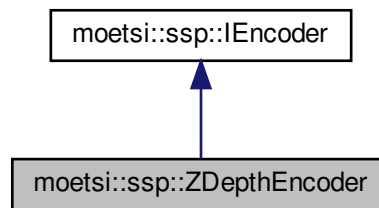
ZDepth encoder.

```
#include <zdepth_encoder.h>
```

Inheritance diagram for moetsi::ssp::ZDepthEncoder:



Collaboration diagram for moetsi::ssp::ZDepthEncoder:



Public Member Functions

- [ZDepthEncoder](#) (YAML::Node &_codec_parameters, int _fps)
Constructor.
- [~ZDepthEncoder](#) ()
Destructor.
- virtual void [AddFrameStruct](#) (std::shared_ptr< [FrameStruct](#) > &frame_struct)
Add a frame struct.
- virtual void [NextPacket](#) ()
Go to next packet.
- virtual bool [HasNextPacket](#) ()
Check if there is a next packet.
- virtual std::shared_ptr< [FrameStruct](#) > [CurrentFrameEncoded](#) ()
Get current encoded frame.
- virtual std::shared_ptr< [FrameStruct](#) > [CurrentFrameOriginal](#) ()
Get current frame in its original format.
- virtual std::shared_ptr< [CodecParamsStruct](#) > [GetCodecParamsStruct](#) ()
Get codec parameters.
- virtual unsigned int [GetFps](#) ()
Get FPS.

8.41.1 Detailed Description

ZDepth encoder.

8.41.2 Constructor & Destructor Documentation

8.41.2.1 ZDepthEncoder()

```

moetsi::ssp::ZDepthEncoder::ZDepthEncoder (
    YAML::Node & _codec_parameters,
    int _fps )

```

Constructor.

Parameters

<code>_codec_parameters</code>	
<code>_fps</code>	Frame per second

8.41.3 Member Function Documentation

8.41.3.1 AddFrameStruct()

```
void moetsi::ssp::ZDepthEncoder::AddFrameStruct (
    std::shared_ptr< FrameStruct > & frame_struct ) [virtual]
```

Add a frame struct.

Parameters

<code>frame_struct</code>	FrameStruct to add
---------------------------	------------------------------------

Implements [moetsi::ssp::IEncoder](#).

8.41.3.2 CurrentFrameEncoded()

```
std::shared_ptr< FrameStruct > moetsi::ssp::ZDepthEncoder::CurrentFrameEncoded ( ) [virtual]
```

Get current encoded frame.

Returns

current encoded frame

Implements [moetsi::ssp::IEncoder](#).

8.41.3.3 CurrentFrameOriginal()

```
std::shared_ptr< FrameStruct > moetsi::ssp::ZDepthEncoder::CurrentFrameOriginal ( ) [virtual]
```

Get current frame in its original format.

Returns

current frame in its original format

Implements [moetsi::ssp::IEncoder](#).

8.41.3.4 GetCodecParamsStruct()

```
std::shared_ptr< CodecParamsStruct > moetsi::ssp::ZDepthEncoder::GetCodecParamsStruct ( )  
[virtual]
```

Get codec parameters.

Returns

codec parameters

Implements [moetsi::ssp::IEncoder](#).

8.41.3.5 GetFps()

```
unsigned int moetsi::ssp::ZDepthEncoder::GetFps ( ) [virtual]
```

Get FPS.

Returns

FPS in frame per second

Implements [moetsi::ssp::IEncoder](#).

8.41.3.6 HasNextPacket()

```
bool moetsi::ssp::ZDepthEncoder::HasNextPacket ( ) [virtual]
```

Check if there is a next packet.

Returns

true if there is a next packet

Implements [moetsi::ssp::IEncoder](#).

The documentation for this class was generated from the following files:

- [zdepth_encoder.h](#)
- [zdepth_encoder.cc](#)

Chapter 9

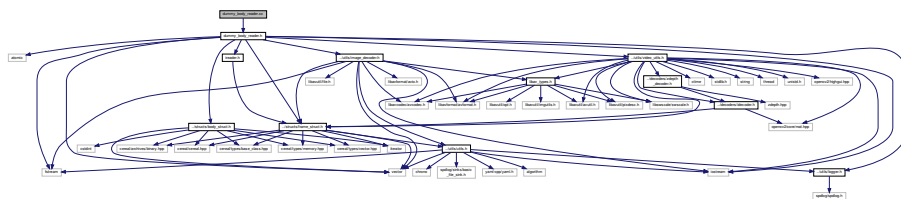
File Documentation

9.1 dummy_body_reader.cc File Reference

Dumy Body Reader.

```
#include "dummy_body_reader.h"
```

Include dependency graph for dummy_body_reader.cc:



Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

9.1.1 Detailed Description

Dumy Body Reader.

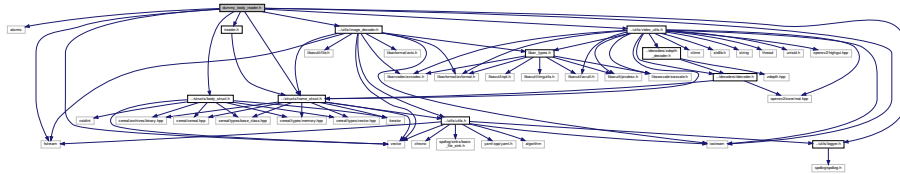
9.2 dummy_body_reader.h File Reference

Dumy Body Reader.

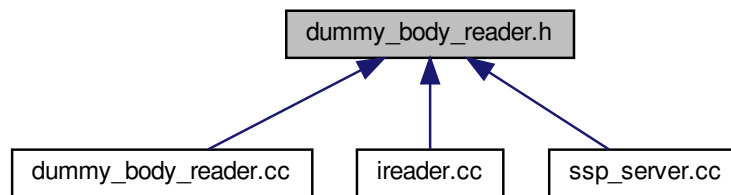
```
#include <atomic>
#include <fstream>
#include <iostream>
#include <vector>
```

```
#include "../utils/logger.h"
#include "../structs/frame_struct.h"
#include "../utils/image_decoder.h"
#include "../structs/body_struct.h"
#include "../utils/video_utils.h"
#include "ireader.h"
```

Include dependency graph for dummy_body_reader.h:



This graph shows which files directly or indirectly include this file:



Classes

- class [moetsi::ssp::DummyBodyReader](#)

Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

9.2.1 Detailed Description

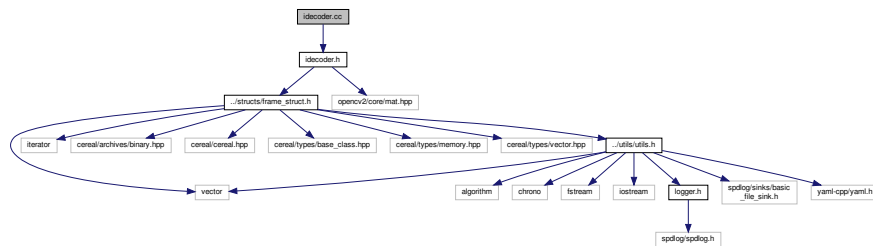
Dumy Body Reader.

9.3 idecoder.cc File Reference

IDecoder factory.

```
#include "idecoder.h"
```

Include dependency graph for idecoder.cc:



Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

Functions

- `std::shared_ptr< IDecoder > moetsi::ssp::IDecoderFactory (const std::string &config)`
IDecoder factory.

9.3.1 Detailed Description

IDecoder factory.

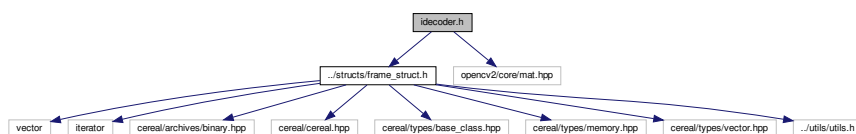
9.4 idecoder.h File Reference

Frame decoder interface.

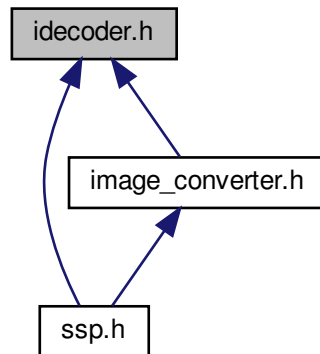
```
#include "../structs/frame_struct.h"
```

```
#include <opencv2/core/mat.hpp>
```

Include dependency graph for include/decoders/idecoder.h:



This graph shows which files directly or indirectly include this file:



Classes

- class [moetsi::ssp::IDecoder](#)
IDecoder abstract decoder interface.

Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

Functions

- `std::shared_ptr< IDecoder > moetsi::ssp::IDecoderFactory (const std::string &config)`
IDecoder factory.

9.4.1 Detailed Description

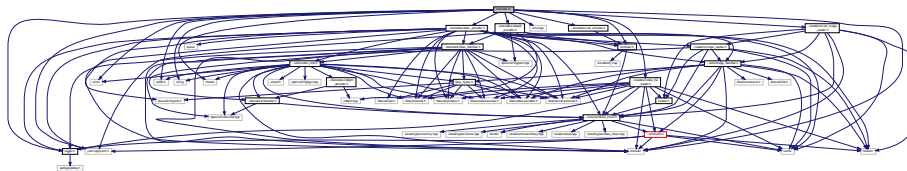
Frame decoder interface.

9.5 iencoder.cc File Reference

IEncoder factory.

```
#include "iencoder.h"
#include "../utils/logger.h"
#include <ctime>
#include <iostream>
#include <stdlib.h>
#include <string>
#include <thread>
#include <yaml-cpp/yaml.h>
#include <zmq.hpp>
#include "../encoders/libav_encoder.h"
#include "../encoders/null_encoder.h"
#include "../encoders/zdepth_encoder.h"
#include "../readers/video_file_reader.h"
#include "../readers/multi_image_reader.h"
```

Include dependency graph for iencoder.cc:



Namespaces

- [moetsi::ssp](#)

Sensor Stream Pipe.

Functions

- `std::unordered_map< FrameType, std::shared_ptr< IEncoder > > moetsi::ssp::IEncoderFactory (const std::string &config, const std::vector< FrameType > &types)`

[IEncoder](#) factory.

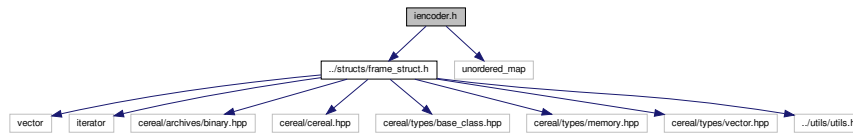
9.5.1 Detailed Description

IEncoder factory.

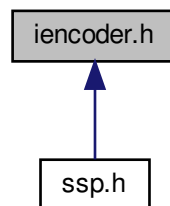
9.6 iencoder.h File Reference

IEncoder factory.

```
#include "../structs/frame_struct.h"
#include <unordered_map>
Include dependency graph for include/encoders/iencoder.h:
```



This graph shows which files directly or indirectly include this file:



Classes

- class [moetsi::ssp::IEncoder](#)
IEncoder abstract encoder class.

Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

Functions

- `std::unordered_map< FrameType, std::shared_ptr< IEncoder > >` [moetsi::ssp::IEncoderFactory](#) (const std::string &config, const std::vector< FrameType > &types)
IEncoder factory.

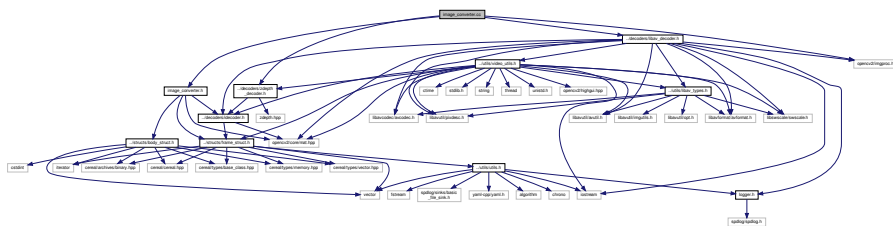
9.6.1 Detailed Description

LEncoder factory.

9.7 image_converter.cc File Reference

Image converter from frame struct to opencv image.

```
#include "image_converter.h"
#include "../decoders/libav_decoder.h"
#include "../decoders/zdepth_decoder.h"
#include <opencv2/imgproc.hpp>
Include dependency graph for image_converter.cc:
```



Namespaces

- `moetsi::ssp`
Sensor Stream Pipe.

Functions

- bool `moetsi::ssp::FrameStructToMat` (FrameStruct &f, cv::Mat &img, std::unordered_map< std::string, std::shared_ptr< IDecoder >> &decoders)
Convert frame struct to opencv matrix.

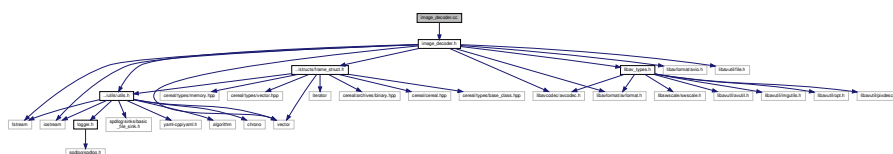
9.7.1 Detailed Description

Image converter from frame struct to opencv image.

9.8 image_decoder.cc File Reference

mpeg/jpeg image decoder

```
#include "image_decoder.h"
Include dependency graph for image_decoder.cc:
```



Classes

- struct [moetsi::ssp::buffer_data](#)

Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

9.8.1 Detailed Description

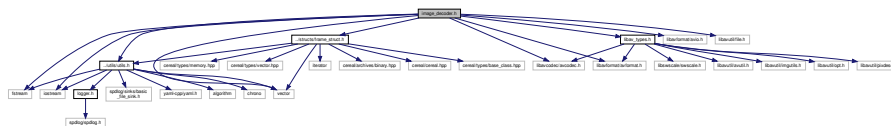
mpeg/jpeg image decoder

9.9 image_decoder.h File Reference

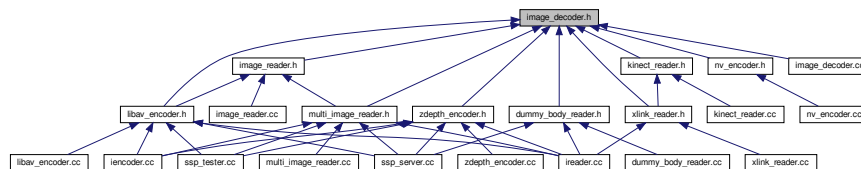
AV Image decoder.

```
#include <fstream>
#include <iostream>
#include <vector>
#include <libavcodec/avcodec.h>
#include <libavformat/avformat.h>
#include <libavformat/avio.h>
#include <libavutil/file.h>
#include "../structs/frame_struct.h"
#include "libav_types.h"
#include "utils.h"
```

Include dependency graph for image_decoder.h:



This graph shows which files directly or indirectly include this file:

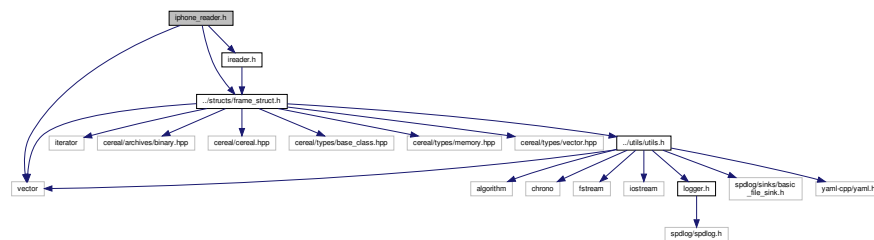


Classes

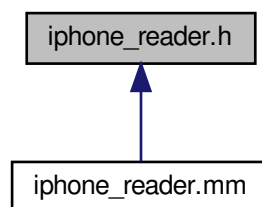
- class [moetsi::ssp::ImageDecoder](#)
Decode image to AV frame.


```
#include "ireader.h"
```

Include dependency graph for iphone_reader.h:



This graph shows which files directly or indirectly include this file:



Classes

- class [moetsi::ssp::iPhoneReader](#)

Namespaces

- [moetsi::ssp](#)

Sensor Stream Pipe.

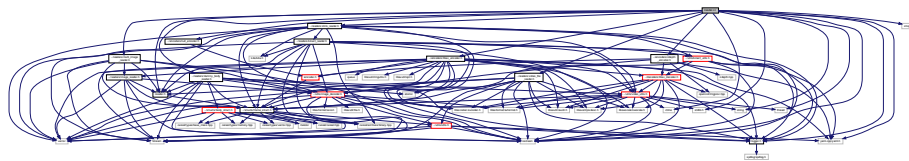
9.12.1 Detailed Description

iPhone driver

9.14 ireader.cc File Reference

IReader factory.

```
#include "ireader.h"
#include "../utils/logger.h"
#include <ctime>
#include <iostream>
#include <stdlib.h>
#include <string>
#include <thread>
#include <yaml-cpp/yaml.h>
#include <zmq.hpp>
#include "../encoders/libav_encoder.h"
#include "../encoders/null_encoder.h"
#include "../encoders/zdepth_encoder.h"
#include "../readers/video_file_reader.h"
#include "../readers/multi_image_reader.h"
#include "../readers/xlink_reader.h"
#include "../readers/dummy_body_reader.h"
Include dependency graph for ireader.cc:
```



Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

Functions

- `std::shared_ptr< IReader > moetsi::ssp::IReaderFactory (const std::string &config)`
IReader factory.

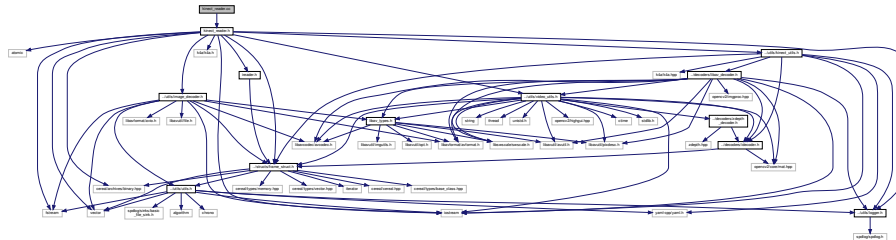
9.14.1 Detailed Description

IReader factory.

9.15 kinect_reader.cc File Reference

Kinect driver.

```
#include "kinect_reader.h"
Include dependency graph for kinect_reader.cc:
```



Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

Functions

- `std::atomic_bool moetsi::ssp::exiting` (false)

9.15.1 Detailed Description

Kinect driver.

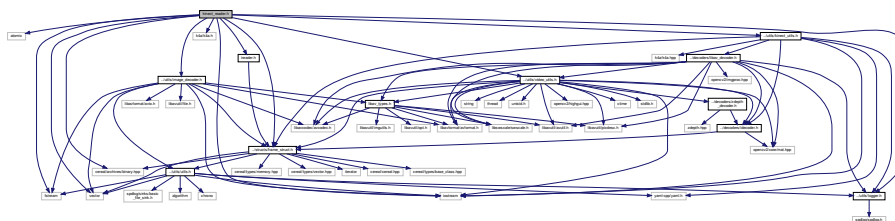
9.16 kinect_reader.h File Reference

Kinect driver.

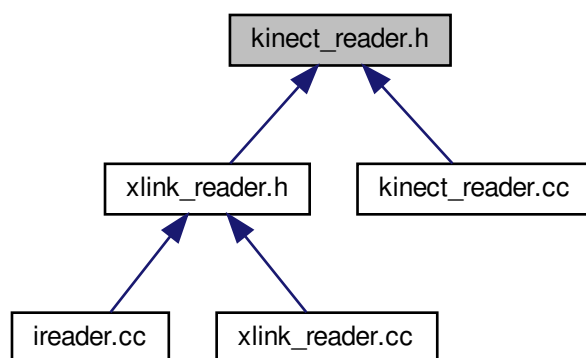
```
#include <atomic>
#include <fstream>
#include <iostream>
#include <vector>
#include "../utils/logger.h"
#include <k4a/k4a.h>
#include <cereal/archives/binary.hpp>
#include "../structs/frame_struct.h"
#include "../utils/image_decoder.h"
#include "../utils/kinect_utils.h"
#include "../utils/video_utils.h"
```

```
#include "ireader.h"
```

Include dependency graph for kinect_reader.h:



This graph shows which files directly or indirectly include this file:



Classes

- class [moetsi::ssp::KinectReader](#)

Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

Macros

- `#define CHECK(x, device)`

Variables

- `std::atomic_bool moetsi::ssp::exiting`

9.16.1 Detailed Description

Kinect driver.

9.16.2 Macro Definition Documentation

9.16.2.1 CHECK

```
#define CHECK(
    x,
    device )
```

Value:

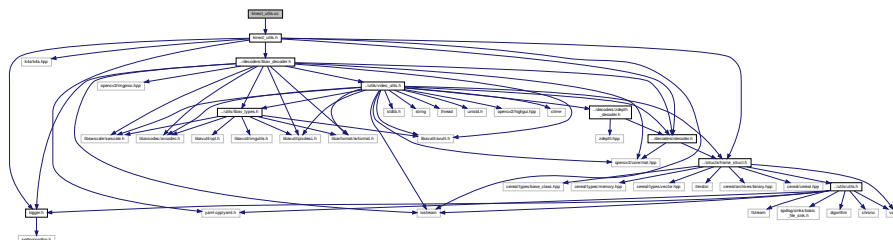
```
{
    auto retval = (x);
    if (retval) {
        spdlog::error("\nRuntime error: {} returned {} ", #x, retval);
        k4a_device_close(device);
        exit(1);
    }
}
```

9.17 kinect_utils.cc File Reference

Utils for Kinect RT integration.

```
#include "kinect_utils.h"
```

Include dependency graph for kinect_utils.cc:



Namespaces

- [moetsi::ssp](#)

Sensor Stream Pipe.

Functions

- ExtendedAzureConfig [moetsi::ssp::BuildKinectConfigFromYAML](#) (YAML::Node config)
Build Kinect configuration from YAML configuration.
- void [moetsi::ssp::FrameStructToK4A](#) (std::vector< FrameStruct > &f, k4a::capture &sensor_capture, std::unordered_map< std::string, std::shared_ptr< IDecoder >> &decoders)
Transform frame structure to K4A format Update decoder dictionary.

9.17.1 Detailed Description

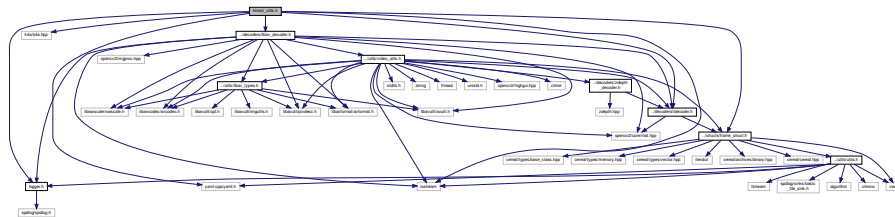
Utils for Kinect RT integration.

9.18 kinect_utils.h File Reference

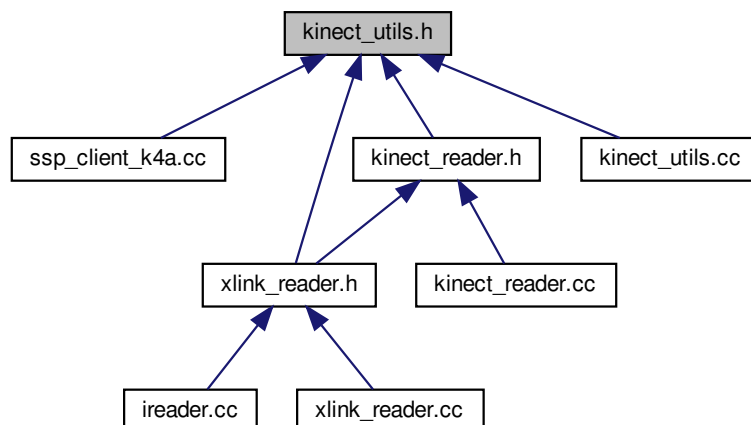
Utils for Kinect RT integration.

```
#include <iostream>
#include <k4a/k4a.hpp>
#include <yaml-cpp/yaml.h>
#include "../decoders/idecoder.h"
#include "../decoders/libav_decoder.h"
#include "../structs/frame_struct.h"
#include "logger.h"
```

Include dependency graph for kinect_utils.h:



This graph shows which files directly or indirectly include this file:

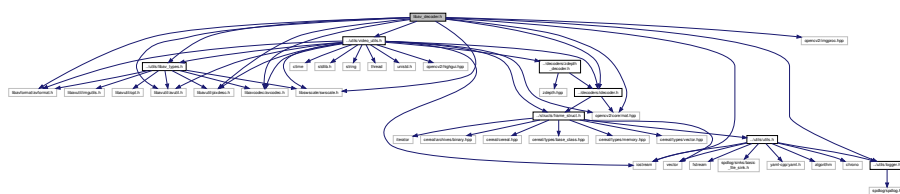


9.20 libav_decoder.h File Reference

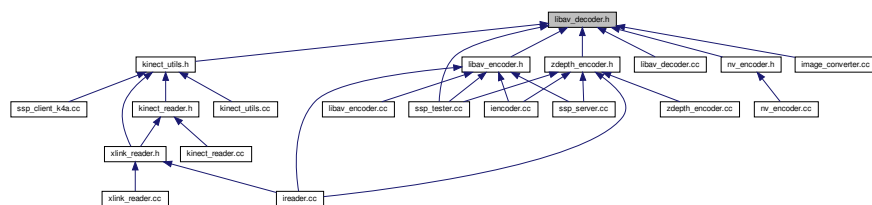
Jpeg/Mpeg decoder.

```
#include <libavcodec/avcodec.h>
#include <libavformat/avformat.h>
#include <libavutil/avutil.h>
#include <libavutil/pixdesc.h>
#include <libswscale/swscale.h>
#include "../utils/logger.h"
#include <iostream>
#include <opencv2/core/mat.hpp>
#include <opencv2/imgproc.hpp>
#include "../utils/video_utils.h"
#include "../utils/libav_types.h"
#include "idecoder.h"
```

Include dependency graph for libav_decoder.h:



This graph shows which files directly or indirectly include this file:



Classes

- class [moetsi::ssp::LibAvDecoder](#)
AV (Jpeg/Mpeg) decoder.

Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

9.20.1 Detailed Description

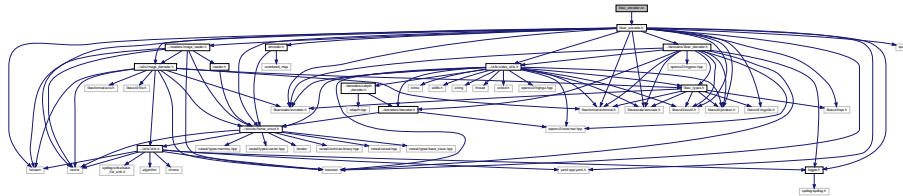
Jpeg/Mpeg decoder.

9.21 libav_encoder.cc File Reference

Jpef/Mpeg encoder.

```
#include "libav_encoder.h"
```

Include dependency graph for libav_encoder.cc:



Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

9.21.1 Detailed Description

Jpef/Mpeg encoder.

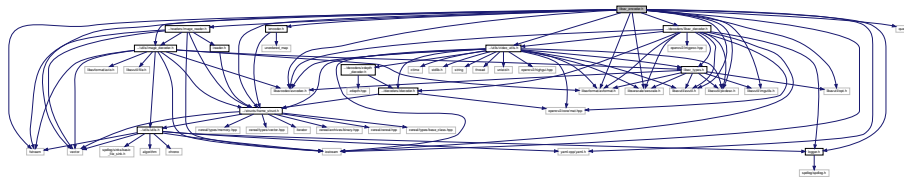
9.22 libav_encoder.h File Reference

Jpeg/Mpeg encoder.

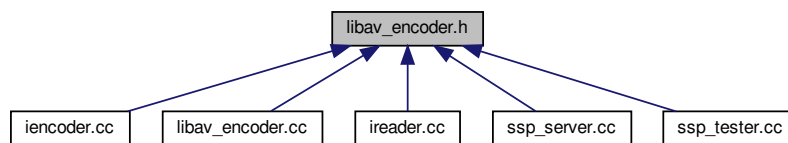
```
#include <fstream>
#include <iostream>
#include <queue>
#include <vector>
#include <yaml-cpp/yaml.h>
#include <libavcodec/avcodec.h>
#include <libavformat/avformat.h>
#include <libavutil/avutil.h>
#include <libavutil/imgutils.h>
#include <libavutil/opt.h>
#include <libavutil/pixdesc.h>
#include <libswscale/swscale.h>
#include "../readers/image_reader.h"
#include "../structs/frame_struct.h"
#include "../utils/image_decoder.h"
#include "../utils/video_utils.h"
#include "iencoder.h"
#include "../decoders/libav_decoder.h"
```

```
#include "../utils/logger.h"
```

Include dependency graph for libav_encoder.h:



This graph shows which files directly or indirectly include this file:



Classes

- class [moetsi::ssp::LibAvEncoder](#)
LibAV encoder for Jpeg/Mpeg.

Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

9.22.1 Detailed Description

Jpeg/Mpeg encoder.

9.23 logger.h File Reference

Logger header.

9.24.1 Detailed Description

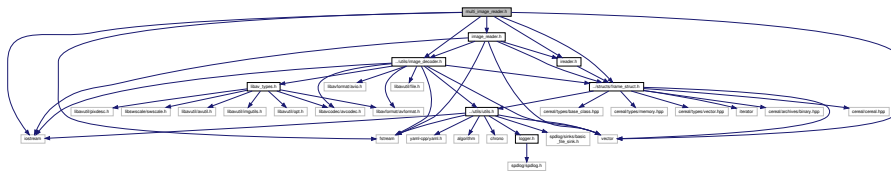
Multi image reader.

9.25 multi_image_reader.h File Reference

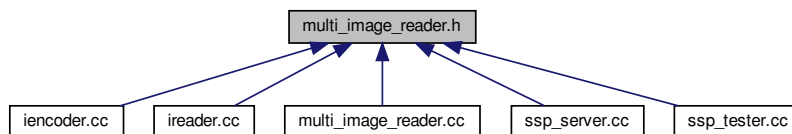
Multi image reader.

```
#include <fstream>
#include <iostream>
#include <vector>
#include "../structs/frame_struct.h"
#include "../utils/image_decoder.h"
#include "image_reader.h"
#include "ireader.h"
```

Include dependency graph for multi_image_reader.h:



This graph shows which files directly or indirectly include this file:



Classes

- class [moetsi::ssp::MultiImageReader](#)

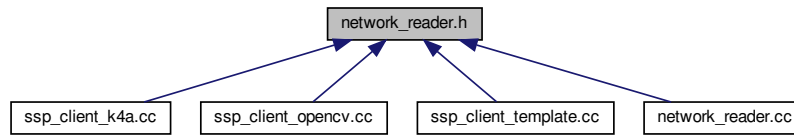
Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

9.25.1 Detailed Description

Multi image reader.

This graph shows which files directly or indirectly include this file:



Classes

- class [moetsi::ssp::NetworkReader](#)
Network reader.

Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

Macros

- `#define POLL_TIMEOUT_MS 500`

9.27.1 Detailed Description

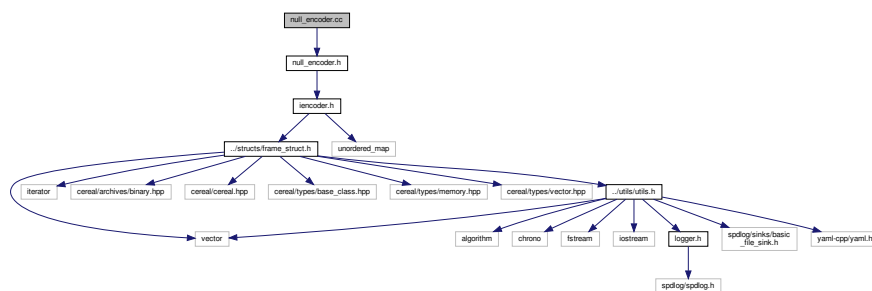
Network reader.

9.28 null_encoder.cc File Reference

Straight pipe encoder.

```
#include "null_encoder.h"
```

Include dependency graph for null_encoder.cc:



Namespaces

- [moetsi::ssp](#)

Sensor Stream Pipe.

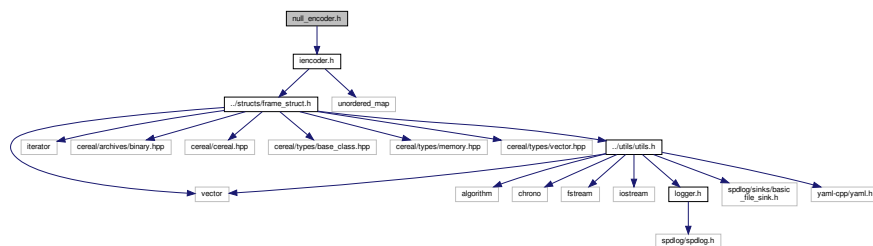
9.28.1 Detailed Description

Straight pipe encoder.

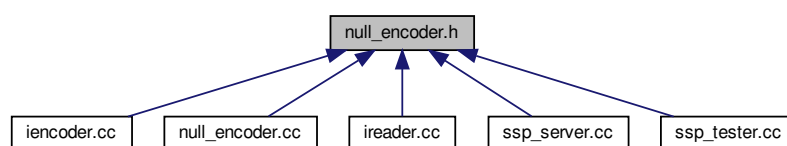
9.29 null_encoder.h File Reference

```
#include "iencoder.h"
```

Include dependency graph for null_encoder.h:



This graph shows which files directly or indirectly include this file:



Classes

- class [moetsi::ssp::NullEncoder](#)

Nullencoder Straight pipe encoder.

Namespaces

- [moetsi::ssp](#)

Sensor Stream Pipe.

9.29.1 Detailed Description

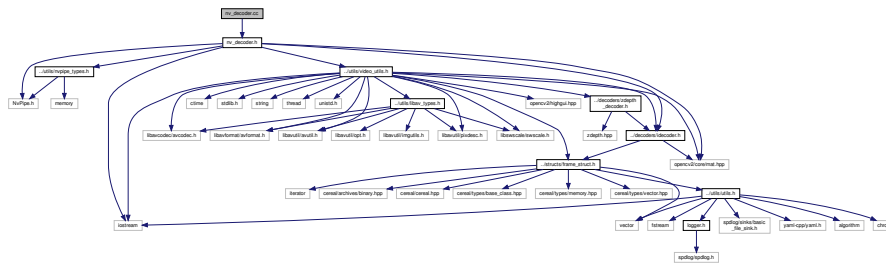
Straight pipe encoder

9.30 nv_decoder.cc File Reference

NvPipe decoder.

```
#include "nv_decoder.h"
```

Include dependency graph for nv_decoder.cc:



Namespaces

- `moetsi::ssp`
Sensor Stream Pipe.

9.30.1 Detailed Description

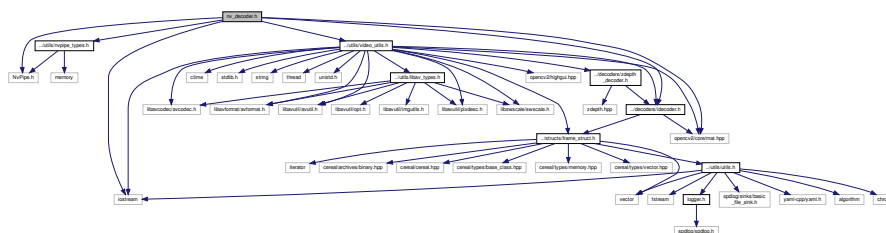
NvPipe decoder.

9.31 nv_decoder.h File Reference

NvPipe decoder.

```
#include <NvPipe.h>
#include <iostream>
#include <opencv2/core/mat.hpp>
#include "../utils/nvpipe_types.h"
#include "../utils/video_utils.h"
#include "idecoder.h"
```

Include dependency graph for nv_decoder.h:



Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

9.32.1 Detailed Description

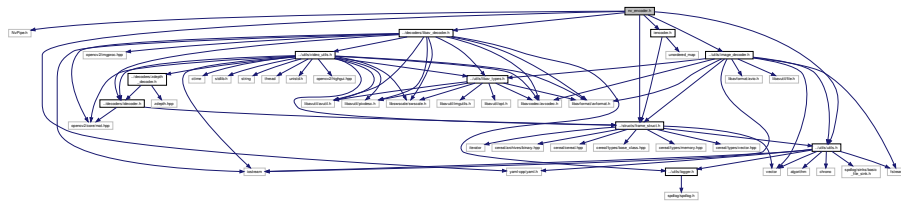
NvPipe encoder.

9.33 nv_encoder.h File Reference

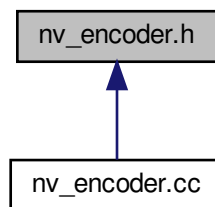
NvPipe encoder.

```
#include <NvPipe.h>
#include <yaml-cpp/yaml.h>
#include "../decoders/libav_decoder.h"
#include "../utils/image_decoder.h"
#include "iencoder.h"
#include "../structs/frame_struct.h"
#include "../utils/utils.h"
```

Include dependency graph for nv_encoder.h:



This graph shows which files directly or indirectly include this file:



Classes

- class [moetsi::ssp::NvEncoder](#)
NvPipe encoder.

Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

9.33.1 Detailed Description

NvPipe encoder.

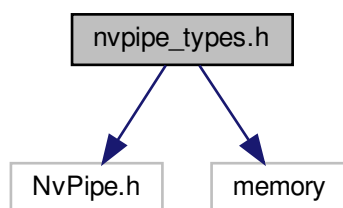
9.34 nvpipe_types.h File Reference

Types for NvPipe support.

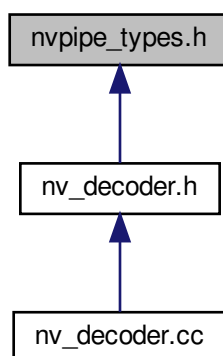
```
#include <NvPipe.h>
```

```
#include <memory>
```

Include dependency graph for nvpipe_types.h:



This graph shows which files directly or indirectly include this file:



Classes

- struct [moetsi::ssp::NVPipeDeleter](#)

Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

Typedefs

- typedef std::unique_ptr< NVPipe, NVPipeDeleter > **moetsi::ssp::NVPipeSafeP**

9.34.1 Detailed Description

Types for NVPipe support.

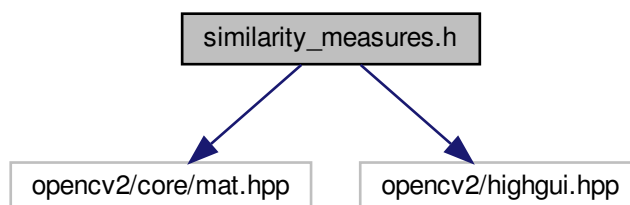
9.35 similarity_measures.h File Reference

Similarity measures.

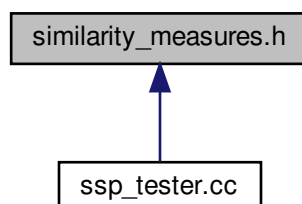
```
#include <opencv2/core/mat.hpp>
```

```
#include <opencv2/highgui.hpp>
```

Include dependency graph for similarity_measures.h:



This graph shows which files directly or indirectly include this file:



Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

Functions

- double [moetsi::ssp::GetPSNR](#) (const Mat &l1, const Mat &l2, double max_value)
Get Peak Signal to Noise Ration similarity.
- double [moetsi::ssp::GetMSE](#) (const Mat &l1, const Mat &l2)
Get Mean Square Error (distance) between images.
- Scalar [moetsi::ssp::GetMSSIM](#) (const Mat &i1, const Mat &i2)
Get Structural Similarity between 2 images cf. for instance http://amroamroamro.github.io/mexopencv/opencv/image_similarity_demo.html for a simple SSIM introduction.

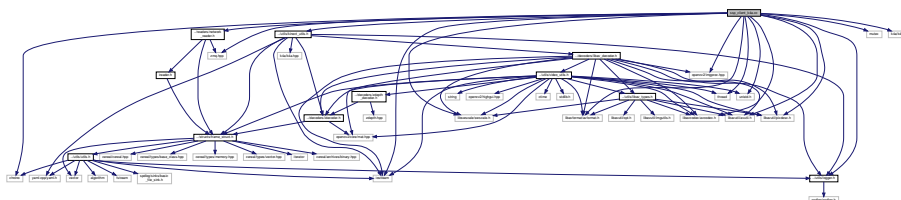
9.35.1 Detailed Description

Similarity measures.

9.36 ssp_client_k4a.cc File Reference

SSP client with lib k4a.

```
#include <chrono>
#include <iostream>
#include <mutex>
#include <thread>
#include <unistd.h>
#include <k4a/k4a.h>
#include <opencv2/imgproc.hpp>
#include <zmq.hpp>
#include <libavcodec/avcodec.h>
#include <libavformat/avformat.h>
#include <libavutil/avutil.h>
#include <libavutil/pixdesc.h>
#include <libswscale/swscale.h>
#include "../utils/logger.h"
#include "../readers/network_reader.h"
#include "../utils/kinect_utils.h"
Include dependency graph for ssp_client_k4a.cc:
```



Classes

- struct [_custom_k4abt_body_t](#)
- class [BodyTracker](#)

Typedefs

- typedef struct [_custom_k4abt_body_t](#) **custom_k4abt_body_t**

Functions

- SSP_EXPORT int **open_k4a** (int port)
- SSP_EXPORT int **close_k4a** ()
- void **update** ()
- SSP_EXPORT int **start_k4a** (int port)
- SSP_EXPORT int **stop_k4a** ()
- SSP_EXPORT int **update_k4a** ()
- SSP_EXPORT int **getBodyCount** ()
- SSP_EXPORT int **getBodiesStruct** (k4abt_body_t *pBodies, int n)
- SSP_EXPORT [custom_k4abt_body_t](#) **getCustomBodiesStruct** (int n)
- SSP_EXPORT int **getBodies** (k4abt_skeleton_t *pSkeletons, int *plds, int n)
- void **PrintBodyInformation** (k4abt_body_t body)
- void **PrintBodyIndexMapMiddleLine** (k4a::image body_index_map)
- int **main** (int argc, char *argv[])

Variables

- [BodyTracker](#) * **gTracker** = NULL
- std::thread **gUpdateThread**
- bool **gStop** = false

9.36.1 Detailed Description

SSP client with lib k4a.

9.37 ssp_client_opencv.cc File Reference

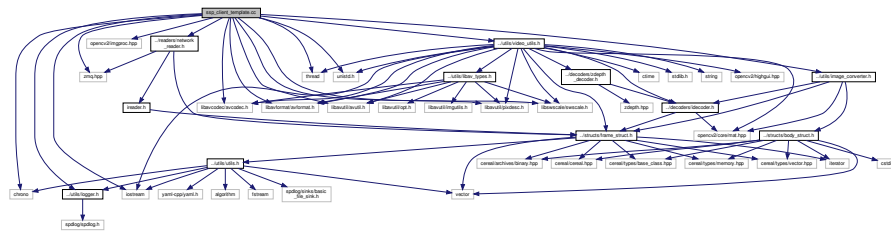
OpenCV based ssp client client.

```
#include <chrono>
#include <iostream>
#include <thread>
#include <unistd.h>
#include <opencv2/imgproc.hpp>
#include <zmq.hpp>
#include <libavcodec/avcodec.h>
#include <libavformat/avformat.h>
#include <libavutil/avutil.h>
#include <libavutil/pixdesc.h>
```



```
#include "../utils/image_converter.h"
```

Include dependency graph for ssp_client_template.cc:



Functions

- SSP_EXPORT int **ssp_client_template** (int port)
- int **main** (int argc, char *argv[])

9.38.1 Detailed Description

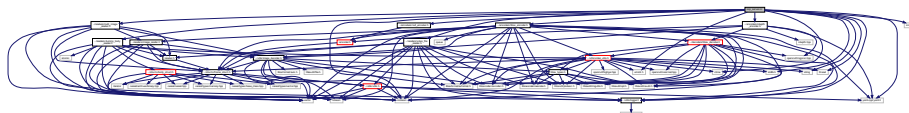
Template for an SSP client.

9.39 ssp_server.cc File Reference

SSP, server side.

```
#include <unistd.h>
#include "../utils/logger.h"
#include <ctime>
#include <iostream>
#include <stdlib.h>
#include <string>
#include <thread>
#include <yaml-cpp/yaml.h>
#include <zmq.hpp>
#include "../encoders/libav_encoder.h"
#include "../encoders/null_encoder.h"
#include "../encoders/zdepth_encoder.h"
#include "../readers/video_file_reader.h"
#include "../readers/multi_image_reader.h"
#include "../readers/dummy_body_reader.h"
#include <string>
#include <thread>
#include <yaml-cpp/yaml.h>
#include <zmq.hpp>
#include "../encoders/libav_encoder.h"
#include "../encoders/null_encoder.h"
#include "../encoders/zdepth_encoder.h"
#include "../readers/video_file_reader.h"
#include "../readers/multi_image_reader.h"
#include "../readers/dummy_body_reader.h"
```

Include dependency graph for ssp_server.cc:



Functions

- SSP_EXPORT int **ssp_server** (const char *filename)
- int **main** (int argc, char *argv[])

9.39.1 Detailed Description

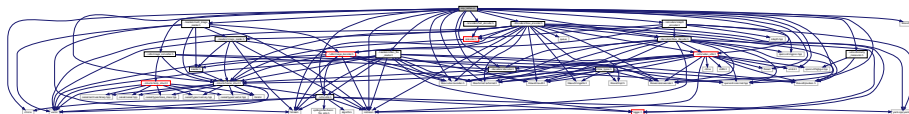
SSP, server side.

9.40 ssp_tester.cc File Reference

SSP test program.

```
#include <chrono>
#include <iostream>
#include <thread>
#include <unistd.h>
#include <libavcodec/avcodec.h>
#include <libavformat/avformat.h>
#include <libavutil/avutil.h>
#include <libavutil/log.h>
#include <libavutil/pixdesc.h>
#include <libswscale/swscale.h>
#include "../encoders/libav_encoder.h"
#include "../structs/frame_struct.h"
#include "../decoders/idecoder.h"
#include "../decoders/libav_decoder.h"
#include "../encoders/null_encoder.h"
#include "../encoders/zdepth_encoder.h"
#include "../readers/video_file_reader.h"
#include "../readers/multi_image_reader.h"
#include "../utils/image_converter.h"
#include "../utils/similarity_measures.h"
#include "../utils/utils.h"
#include "../utils/video_utils.h"
```

Include dependency graph for ssp_tester.cc:



Functions

- int **main** (int argc, char *argv[])

9.40.1 Detailed Description

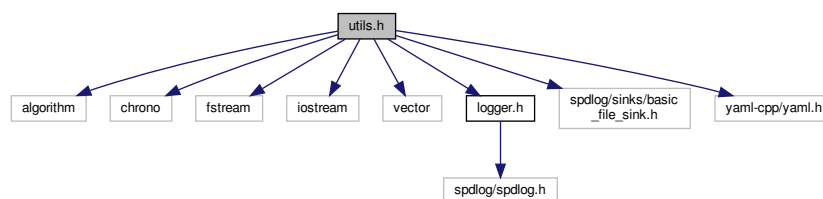
SSP test program.

9.41 utils.h File Reference

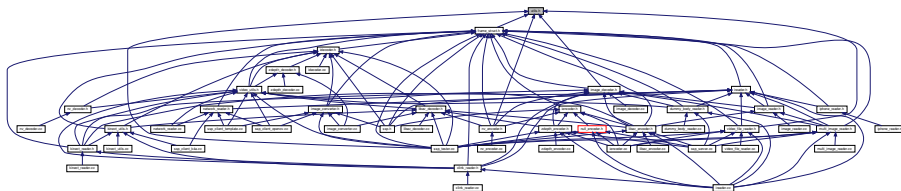
Utilities.

```
#include <algorithm>
#include <chrono>
#include <fstream>
#include <iostream>
#include <vector>
#include "logger.h"
#include "spdlog/sinks/basic_file_sink.h"
#include <yaml-cpp/yaml.h>
```

Include dependency graph for utils.h:



This graph shows which files directly or indirectly include this file:



Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

Macros

- `#define _av_err2str(errno)`

Functions

- `uint64_t moetsi::ssp::CurrentTimeMs ()`
Get current time in ms.
- `uint64_t moetsi::ssp::CurrentTimeUs ()`
Get current time in usec/microseconds.
- `uint64_t moetsi::ssp::CurrentTimeNs ()`

Get current time in ns/nanoseconds.

- `std::string moetsi::ssp::RandomString` (size_t length)
Build a random string.
- void `moetsi::ssp::SetupLogging` (YAML::Node &general_parameters)
Setup SSP logging.
- void `moetsi::ssp::SetupLogging` (std::string &level, std::string &file)
Setup SSP logging.

9.41.1 Detailed Description

Utilities.

9.41.2 Macro Definition Documentation

9.41.2.1 _av_err2str

```
#define _av_err2str(  
    errnum )
```

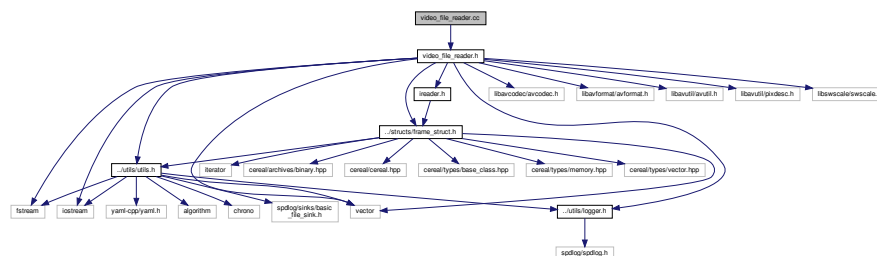
Value:

```
av_make_error_string((char *)__builtin_alloca(AV_ERROR_MAX_STRING_SIZE),  
    AV_ERROR_MAX_STRING_SIZE, errnum) \
```

9.42 video_file_reader.cc File Reference

Video file reader.

```
#include "video_file_reader.h"  
Include dependency graph for video_file_reader.cc:
```



Namespaces

- `moetsi::ssp`
Sensor Stream Pipe.

Enumerations

- enum moetsi::ssp::video_reader_k4a_depth_mode_t {
moetsi::ssp::VIDEO_READER_K4A_DEPTH_MODE_OFF, moetsi::ssp::VIDEO_READER_K4A_DEPTH_MODE_NFOV_2X2BINNED, moetsi::ssp::VIDEO_READER_K4A_DEPTH_MODE_NFOV_UNBINNED, moetsi::ssp::VIDEO_READER_K4A_DEPTH_MODE_WFOV_2X2BINNED, moetsi::ssp::VIDEO_READER_K4A_DEPTH_MODE_WFOV_UNBINNED, moetsi::ssp::VIDEO_READER_K4A_DEPTH_MODE_PASSIVE_IR }
- enum moetsi::ssp::video_reader_k4a_color_resolution_t {
moetsi::ssp::VIDEO_READER_K4A_COLOR_RESOLUTION_OFF, moetsi::ssp::VIDEO_READER_K4A_COLOR_RESOLUTION_720P, moetsi::ssp::VIDEO_READER_K4A_COLOR_RESOLUTION_1080P, moetsi::ssp::VIDEO_READER_K4A_COLOR_RESOLUTION_1440P, moetsi::ssp::VIDEO_READER_K4A_COLOR_RESOLUTION_1536P, moetsi::ssp::VIDEO_READER_K4A_COLOR_RESOLUTION_2160P, moetsi::ssp::VIDEO_READER_K4A_COLOR_RESOLUTION_3072P }

9.42.1 Detailed Description

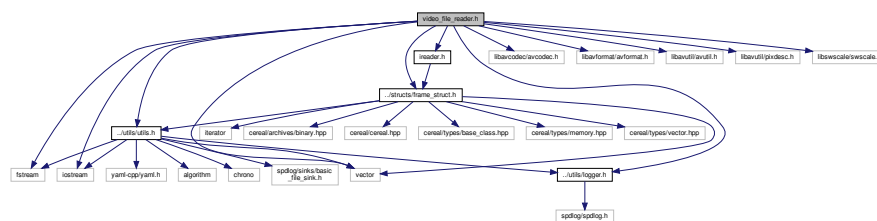
Video file reader.

9.43 video_file_reader.h File Reference

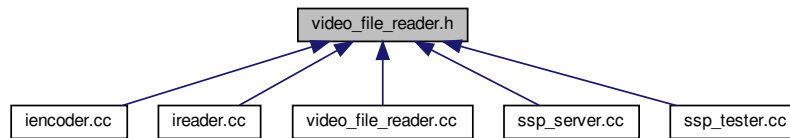
Video file reader support.

```
#include <fstream>
#include <iostream>
#include <vector>
#include "../utils/logger.h"
#include <libavcodec/avcodec.h>
#include <libavformat/avformat.h>
#include <libavutil/avutil.h>
#include <libavutil/pixdesc.h>
#include <libswscale/swscale.h>
#include "../structs/frame_struct.h"
#include "../utils/Utils.h"
#include "ireader.h"
```

Include dependency graph for video_file_reader.h:



This graph shows which files directly or indirectly include this file:



Classes

- class [moetsi::ssp::VideoFileReader](#)

Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

9.43.1 Detailed Description

Video file reader support.

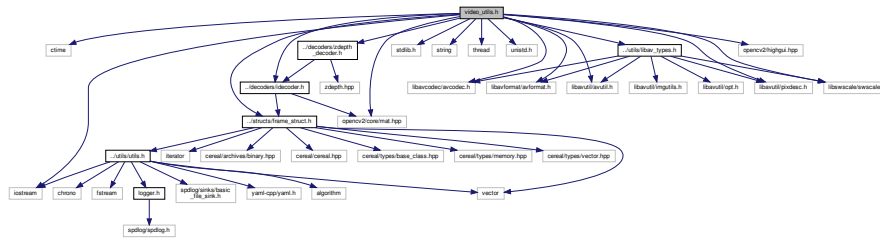
9.44 video_utils.h File Reference

Video utilities.

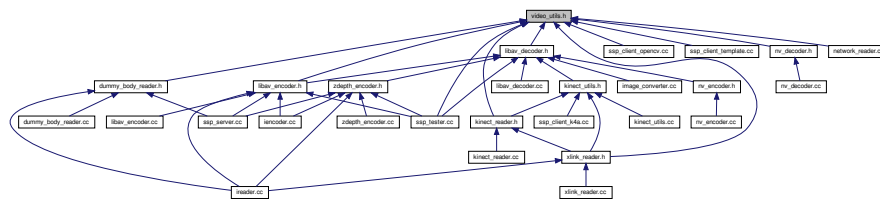
```

#include <ctime>
#include <iostream>
#include <stdlib.h>
#include <string>
#include <thread>
#include <unistd.h>
#include <libavcodec/avcodec.h>
#include <libavformat/avformat.h>
#include <libavutil/avutil.h>
#include <libavutil/pixdesc.h>
#include <libswscale/swscale.h>
#include <opencv2/core/mat.hpp>
#include <opencv2/highgui.hpp>
#include "../decoders/idecoder.h"
#include "../decoders/zdepth_decoder.h"
#include "../structs/frame_struct.h"
  
```

```
#include "../utils/libav_types.h"
Include dependency graph for video_utils.h:
```



This graph shows which files directly or indirectly include this file:



Namespaces

- `moetsi::ssp`
Sensor Stream Pipe.

Macros

- #define **MAX_DEPTH_VALUE_16_BITS** 65536
- #define **MAX_DEPTH_VALUE_14_BITS** 16384
- #define **MAX_DEPTH_VALUE_13_BITS** 8192
- #define **MAX_DEPTH_VALUE_12_BITS** 4096
- #define **MAX_DEPTH_VALUE_11_BITS** 2048
- #define **MAX_DEPTH_VALUE_8_BITS** 256

Functions

- void **moetsi::ssp::AVFrameToMatYUV** (AVFrameSharedP &frame, cv::Mat &image)
Convert an AVFrame to YUV image.
- void **moetsi::ssp::AVFrameToMatGray** (AVFrameSharedP &frame, cv::Mat &image)
Convert an AVFrame to grayscale image.
- AVCodecParameters * **moetsi::ssp::getParams** (FrameStruct &frame_struct)
Get AVCodec parameters from a [FrameStruct](#).
- template<typename T >
void **moetsi::ssp::MinMaxFilter** (cv::Mat &in_mat, cv::Mat &out_mat, double min, double max)

9.44.1 Detailed Description

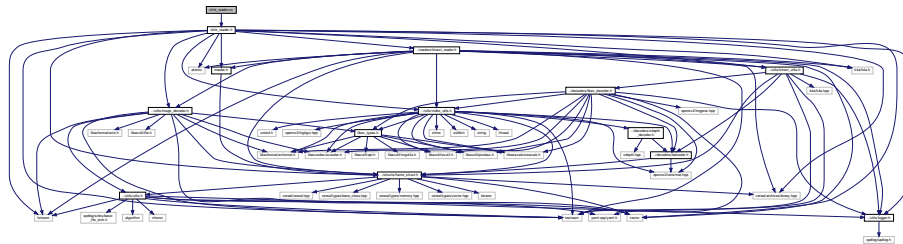
Video utilities.

9.45 xlink_reader.cc File Reference

XLink reader.

```
#include "xlink_reader.h"
```

Include dependency graph for xlink_reader.cc:



Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

Functions

- `std::atomic_bool moetsi::ssp::exiting` (false)

9.45.1 Detailed Description

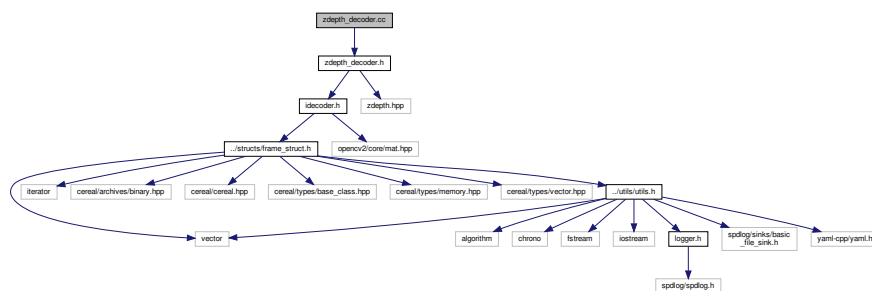
XLink reader.

9.46 zdepth_decoder.cc File Reference

ZDepth decoder.

```
#include "zdepth_decoder.h"
```

Include dependency graph for zdepth_decoder.cc:



Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

9.46.1 Detailed Description

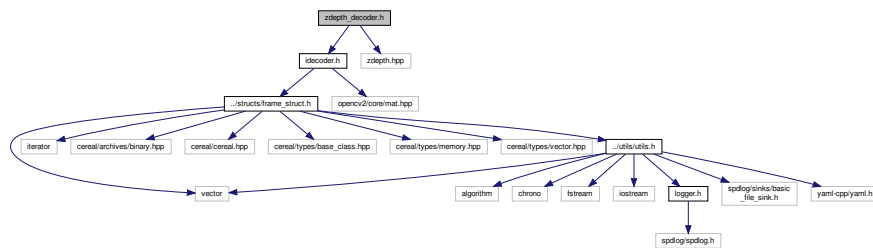
ZDepth decoder.

9.47 zdepth_decoder.h File Reference

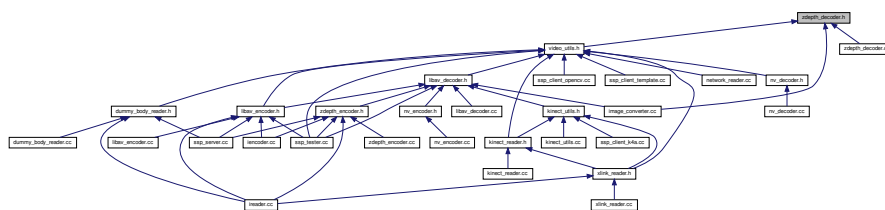
ZDepth decoder.

```
#include "idecoder.h"
#include "zdepth.hpp"
```

Include dependency graph for zdepth_decoder.h:



This graph shows which files directly or indirectly include this file:



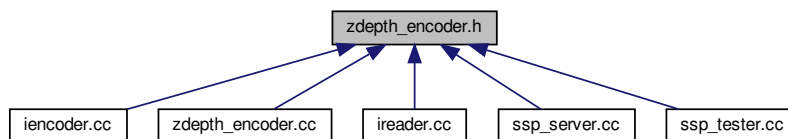
Classes

- class [moetsi::ssp::ZDepthDecoder](#)
ZDepthDecoder ZDepth format decoder.

Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

This graph shows which files directly or indirectly include this file:



Classes

- class [moetsi::ssp::ZDepthEncoder](#)
ZDepth encoder.

Namespaces

- [moetsi::ssp](#)
Sensor Stream Pipe.

9.49.1 Detailed Description

encoder

ZDepth

