

LVLHFrameModel

5.3

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Module Index

1.1 Modules

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Chapter 2

Namespace Index

2.1 Namespace List

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Chapter 3

Data Structure Index

3.1 Data Structures

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File Index

4.1 File List

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Chapter 5

Module Documentation

5.1 Models

Modules

- [Utils](#)

5.1.1 Detailed Description

5.2 Utils

Modules

- [Lv1hFrame](#)

5.2.1 Detailed Description

5.3 LvlhFrame

Files

- file [lvlh_frame.hh](#)
Define the class LvlhFrame, the class used to represent a local-vertical, local-horizontal reference frame associated with a subject DynBody.
- file [lvlh_frame_messages.hh](#)
Define the class LvlhFrameMessages, the class that specifies the message IDs used in the LvlhFrame model.
- file [lvlh_type.hh](#)
Define the class LvlhType, which identifies the type of LVLH desired to be calculated.
- file [lvlh_frame.cc](#)
Define methods for the LVLH reference frame class.
- file [lvlh_frame_messages.cc](#)
Implement the class LvlhFrameMessages.

Namespaces

- [jeod](#)
Namespace jeod.

5.3.1 Detailed Description

Chapter 6

Namespace Documentation

6.1 jeod Namespace Reference

Namespace jeod.

Data Structures

- class [Lv1hFrame](#)
The class used to represent an LVLH reference frame associated with a subject DynBody.
- class [Lv1hFrameMessages](#)
The class that specifies the message IDs used in the [Lv1hFrame](#) model.
- class [Lv1hType](#)
The class used to identify the type of LVLH desired.

6.1.1 Detailed Description

Namespace jeod.

Chapter 7

Data Structure Documentation

7.1 jeod::LvlhFrame Class Reference

The class used to represent an LVLH reference frame associated with a subject DynBody.

```
#include <lvlh_frame.hh>
```

Public Member Functions

- [LvlhFrame](#) ()=default
- [~LvlhFrame](#) ()
Destruct an [LvlhFrame](#) object.
- [LvlhFrame](#) (const [LvlhFrame](#) &)=delete
- [LvlhFrame](#) & [operator=](#) (const [LvlhFrame](#) &)=delete
- void [initialize](#) (DynManager &dyn_manager)
Begin initialization of an [LvlhFrame](#).
- void [update](#) ()
Update the state.
- void [set_subject_name](#) (const std::string &new_name)
Set the `subject_name` to the supplied value.
- void [set_planet_name](#) (const std::string &new_name)
Set the `planet_name` to the supplied value.
- void [set_subject_frame](#) (RefFrame &new_frame)
Set the `subject_frame` to the supplied value.
- void [set_planet](#) (BasePlanet &new_planet)
Set the planet whose PCI frame will be the reference for LVLH.

Data Fields

- RefFrame [frame](#)
The LVLH frame defined by the subject frame's motion with respect to the reference planet.
- std::string [subject_name](#) {""}
The frame whose motion defines LVLH.
- std::string [planet_name](#) {""}
The planet used as reference for the LVLH frame.

Protected Member Functions

- void `compute_lvih_frame` (const RefFrameTrans &rel_trans)
Update the state of the LVLH frame wrt its parent.

Protected Attributes

- RefFrame * `subject_frame` {}
The (moving) frame specified with subject_name.
- RefFrame * `planet_centered_inertial` {}
The inertial frame with origin at the center of the specified planet.

Private Attributes

- DynManager * `local_dm` {}
A local pointer to the dynamics manager needed for clean-up.
- bool `initialized` {}
trick_units(-)

Friends

- class `InputProcessor`
- void `init_attrjeod__LvihFrame` ()

7.1.1 Detailed Description

The class used to represent an LVLH reference frame associated with a subject DynBody.

Definition at line 82 of file `lvih_frame.hh`.

7.1.2 Constructor & Destructor Documentation

7.1.2.1 LvlhFrame() [1/2]

```
jeod::LvlhFrame::LvlhFrame ( ) [default]
```

7.1.2.2 ~LvlhFrame()

```
jeod::LvlhFrame::~~LvlhFrame ( )
```

Destruct an `LvlhFrame` object.

Definition at line 49 of file `lvih_frame.cc`.

References `frame`, `local_dm`, `planet_centered_inertial`, and `subject_frame`.

7.1.2.3 LvlhFrame() [2/2]

```
jeod::LvlhFrame::LvlhFrame (
    const LvlhFrame & ) [delete]
```

7.1.3 Member Function Documentation

7.1.3.1 compute_lvlh_frame()

```
void jeod::LvlhFrame::compute_lvlh_frame (
    const RefFrameTrans & rel_trans ) [protected]
```

Update the state of the LVLH frame wrt its parent.

Parameters

in	<i>rel_trans</i>	Planet relative state
----	------------------	-----------------------

Definition at line 247 of file `lvlh_frame.cc`.

References `frame`.

Referenced by `update()`.

7.1.3.2 initialize()

```
void jeod::LvlhFrame::initialize (
    DynManager & dyn_manager )
```

Begin initialization of an [LvlhFrame](#).

Parameters

in, out	<i>dyn_manager</i>	Dynamics manager
---------	--------------------	------------------

Definition at line 75 of file `lvlh_frame.cc`.

References `frame`, `initialized`, `jeod::LvlhFrameMessages::invalid_configuration`, `jeod::LvlhFrameMessages::invalid_name`, `local_dm`, `planet_centered_inertial`, `planet_name`, `subject_frame`, and `subject_name`.

7.1.3.3 operator=()

```
LvlhFrame& jeod::LvlhFrame::operator= (
    const LvlhFrame & ) [delete]
```

7.1.3.4 set_planet()

```
void jeod::LvlhFrame::set_planet (
    BasePlanet & new_planet )
```

Set the planet whose PCI frame will be the reference for LVLH.

Parameters

in	<i>new_planet</i>	new planet.
----	-------------------	-------------

Definition at line 238 of file lvlh_frame.cc.

References planet_centered_inertial.

7.1.3.5 set_planet_name()

```
void jeod::LvlhFrame::set_planet_name (
    const std::string & new_name )
```

Set the planet_name to the supplied value.

Parameters

in	<i>new_name</i>	new name.
----	-----------------	-----------

Definition at line 229 of file lvlh_frame.cc.

References planet_name.

7.1.3.6 set_subject_frame()

```
void jeod::LvlhFrame::set_subject_frame (
    RefFrame & new_frame )
```

Set the subject_frame to the supplied value.

Parameters

in	<i>new_frame</i>	new frame.
----	------------------	------------

Definition at line 220 of file lvlh_frame.cc.

References `subject_frame`.

7.1.3.7 set_subject_name()

```
void jeod::LvlhFrame::set_subject_name (
    const std::string & new_name )
```

Set the `subject_name` to the supplied value.

Parameters

in	<i>new_name</i>	new name.
----	-----------------	-----------

Definition at line 211 of file lvlh_frame.cc.

References `subject_name`.

7.1.3.8 update()

```
void jeod::LvlhFrame::update ( )
```

Update the state.

Definition at line 184 of file lvlh_frame.cc.

References `compute_lvlh_frame()`, `frame`, `planet_centered_inertial`, and `subject_frame`.

7.1.4 Friends And Related Function Documentation**7.1.4.1 init_attrjeod__LvlhFrame**

```
void init_attrjeod__LvlhFrame ( ) [friend]
```

7.1.4.2 InputProcessor

```
friend class InputProcessor [friend]
```

Definition at line 84 of file lvlh_frame.hh.

7.1.5 Field Documentation

7.1.5.1 frame

```
RefFrame jeod::LvlhFrame::frame
```

The LVLH frame defined by the subject frame's motion with respect to the reference planet.

trick_units(-)

Definition at line 90 of file lvlh_frame.hh.

Referenced by compute_lvlh_frame(), initialize(), update(), and ~LvlhFrame().

7.1.5.2 initialized

```
bool jeod::LvlhFrame::initialized {} [private]
```

trick_units(-)

Definition at line 122 of file lvlh_frame.hh.

Referenced by initialize().

7.1.5.3 local_dm

```
DynManager* jeod::LvlhFrame::local_dm {} [private]
```

A local pointer to the dynamics manager needed for clean-up.

trick_units(-)

Definition at line 117 of file lvlh_frame.hh.

Referenced by initialize(), and ~LvlhFrame().

7.1.5.4 planet_centered_inertial

```
RefFrame* jeod::LvlhFrame::planet_centered_inertial {} [protected]
```

The inertial frame with origin at the center of the specified planet.

trick_units(–)

Definition at line 111 of file lvlh_frame.hh.

Referenced by initialize(), set_planet(), update(), and ~LvlhFrame().

7.1.5.5 planet_name

```
std::string jeod::LvlhFrame::planet_name {""}
```

The planet used as reference for the LVLH frame.

trick_units(–)

Definition at line 100 of file lvlh_frame.hh.

Referenced by initialize(), and set_planet_name().

7.1.5.6 subject_frame

```
RefFrame* jeod::LvlhFrame::subject_frame {} [protected]
```

The (moving) frame specified with subject_name.

trick_units(–)

Definition at line 106 of file lvlh_frame.hh.

Referenced by initialize(), set_subject_frame(), update(), and ~LvlhFrame().

7.1.5.7 subject_name

```
std::string jeod::LvlhFrame::subject_name {""}
```

The frame whose motion defines LVLH.

Can be on a vehicle or not.trick_units(–)

Definition at line 95 of file lvlh_frame.hh.

Referenced by initialize(), and set_subject_name().

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

- [lvlh_frame.hh](#)
- [lvlh_frame.cc](#)

7.2 jeod::LvlhFrameMessages Class Reference

The class that specifies the message IDs used in the [LvlhFrame](#) model.

```
#include <lvlh_frame_messages.hh>
```

Public Member Functions

- [LvlhFrameMessages](#) ()=delete
- [LvlhFrameMessages](#) (const [LvlhFrameMessages](#) &)=delete
- [LvlhFrameMessages](#) & operator= (const [LvlhFrameMessages](#) &)=delete

Static Public Attributes

- static const char * [fatal_error](#) = "utils/lvlh_frame/" "fatal_error"
Issued when performing an action results in an error return from the method performing the action.
- static const char * [illegal_value](#) = "utils/lvlh_frame/" "illegal_value"
Issued when a simple type (e.g.
- static const char * [invalid_name](#) = "utils/lvlh_frame/" "invalid_name"
Issued when a name is invalid (NULL, empty, or does not name an object of the specified type).
- static const char * [invalid_configuration](#) = "utils/lvlh_frame/" "invalid_configuration"
Issued when insufficient information has been specified prior to initialization.
- static const char * [invalid_object](#) = "utils/lvlh_frame/" "invalid_object"
Issued when a pointer points to an object of the wrong type.
- static const char * [null_pointer](#) = "utils/lvlh_frame/" "null_pointer"
Error issued when a pointer is required but was not provided.
- static const char * [trace](#) = "utils/lvlh_frame/" "trace"
Debug message issued to trace [LvlhFrame](#) actions.
- static const char * [divide_by_zero](#) = "utils/lvlh_frame/" "divide_by_zero"
Fatal message when a divide by zero is encountered.

Friends

- class [InputProcessor](#)
- void [init_attrjeod__LvlhFrameMessages](#) ()

7.2.1 Detailed Description

The class that specifies the message IDs used in the [LvlhFrame](#) model.

Definition at line 81 of file [lvlh_frame_messages.hh](#).

7.2.2 Constructor & Destructor Documentation

7.2.2.1 LvlhFrameMessages() [1/2]

```
jeod::LvlhFrameMessages::LvlhFrameMessages ( ) [delete]
```

7.2.2.2 LvlhFrameMessages() [2/2]

```
jeod::LvlhFrameMessages::LvlhFrameMessages (
    const LvlhFrameMessages & ) [delete]
```

7.2.3 Member Function Documentation

7.2.3.1 operator=()

```
LvlhFrameMessages& jeod::LvlhFrameMessages::operator= (
    const LvlhFrameMessages & ) [delete]
```

7.2.4 Friends And Related Function Documentation

7.2.4.1 init_attrjeod__LvlhFrameMessages

```
void init_attrjeod__LvlhFrameMessages ( ) [friend]
```

7.2.4.2 InputProcessor

```
friend class InputProcessor [friend]
```

Definition at line 83 of file lvlh_frame_messages.hh.

7.2.5 Field Documentation

7.2.5.1 divide_by_zero

```
char const * jeod::LvlhFrameMessages::divide_by_zero = "utils/lvlh_frame/" "divide_by_zero"  
[static]
```

Fatal message when a divide by zero is encountered.

trick_units(-)

Definition at line 126 of file lvlh_frame_messages.hh.

7.2.5.2 fatal_error

```
char const * jeod::LvlhFrameMessages::fatal_error = "utils/lvlh_frame/" "fatal_error" [static]
```

Issued when performing an action results in an error return from the method performing the action.

trick_units(-)

Definition at line 89 of file lvlh_frame_messages.hh.

7.2.5.3 illegal_value

```
char const * jeod::LvlhFrameMessages::illegal_value = "utils/lvlh_frame/" "illegal_value"  
[static]
```

Issued when a simple type (e.g.

an enum) has an illegal value.trick_units(-)

Definition at line 94 of file lvlh_frame_messages.hh.

7.2.5.4 invalid_configuration

```
char const * jeod::LvlhFrameMessages::invalid_configuration = "utils/lvlh_frame/" "invalid_↵  
configuration" [static]
```

Issued when insufficient information has been specified prior to initialization.

trick_units(-)

Definition at line 106 of file lvlh_frame_messages.hh.

Referenced by jeod::LvlhFrame::initialize().

7.2.5.5 invalid_name

```
char const * jeod::LvlhFrameMessages::invalid_name = "utils/lvlh_frame/" "invalid_name" [static]
```

Issued when a name is invalid (NULL, empty, or does not name an object of the specified type).

trick_units(-)

Definition at line 100 of file lvlh_frame_messages.hh.

Referenced by jeod::LvlhFrame::initialize().

7.2.5.6 invalid_object

```
char const * jeod::LvlhFrameMessages::invalid_object = "utils/lvlh_frame/" "invalid_object" [static]
```

Issued when a pointer points to an object of the wrong type.

trick_units(-)

Definition at line 111 of file lvlh_frame_messages.hh.

7.2.5.7 null_pointer

```
char const * jeod::LvlhFrameMessages::null_pointer = "utils/lvlh_frame/" "null_pointer" [static]
```

Error issued when a pointer is required but was not provided.

trick_units(-)

Definition at line 116 of file lvlh_frame_messages.hh.

7.2.5.8 trace

```
char const * jeod::LvlhFrameMessages::trace = "utils/lvlh_frame/" "trace" [static]
```

Debug message issued to trace [LvlhFrame](#) actions.

trick_units(-)

Definition at line 121 of file lvlh_frame_messages.hh.

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

- [lvlh_frame_messages.hh](#)
- [lvlh_frame_messages.cc](#)

7.3 jeod::LvlhType Class Reference

The class used to identify the type of LVLH desired.

```
#include <lvlh_type.hh>
```

Public Types

- enum [Type](#) { [Rectilinear](#) = 0, [CircularCurvilinear](#) = 1, [EllipticalCurvilinear](#) = 2 }
An enumeration to specify the type of LVLH coordinates to use, whether rectilinear, circular curvilinear, or elliptical curvilinear.

Public Member Functions

- [LvlhType](#) ()
Default constructor.

Data Fields

- [Type](#) value
Indicates type of LVLH coordinates desired.

Friends

- class [InputProcessor](#)
- void [init_attrjeod__LvlhType](#) ()

7.3.1 Detailed Description

The class used to identify the type of LVLH desired.

Definition at line 76 of file lvlh_type.hh.

7.3.2 Member Enumeration Documentation

7.3.2.1 Type

```
enum jeod::LvlhType::Type
```

An enumeration to specify the type of LVLH coordinates to use, whether rectilinear, circular curvilinear, or elliptical curvilinear.

As of March 2015, elliptical is not implemented.

Enumerator

Rectilinear	
CircularCurvilinear	
EllipticalCurvilinear	

Definition at line 85 of file lvlh_type.hh.

7.3.3 Constructor & Destructor Documentation

7.3.3.1 LvlhType()

```
jeod::LvlhType::LvlhType ( ) [inline]
```

Default constructor.

Definition at line 110 of file lvlh_type.hh.

7.3.4 Friends And Related Function Documentation

7.3.4.1 init_attrjeod__LvlhType

```
void init_attrjeod__LvlhType ( ) [friend]
```

7.3.4.2 InputProcessor

```
friend class InputProcessor [friend]
```

Definition at line 78 of file lvlh_type.hh.

7.3.5 Field Documentation

7.3.5.1 value

Type jeod::LvlhType::value

Indicates type of LVLH coordinates desired.

Default is rectilinear.trick_units(-)

Definition at line 103 of file lvlh_type.hh.

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

- [lvlh_type.hh](#)

Chapter 8

File Documentation

8.1 `lvlh_frame.cc` File Reference

Define methods for the LVLH reference frame class.

```
#include <cstdint>
#include "dynamics/dyn_manager/include/dyn_manager.hh"
#include "environment/planet/include/base_planet.hh"
#include "utils/math/include/vector3.hh"
#include "utils/message/include/message_handler.hh"
#include "utils/named_item/include/named_item.hh"
#include "../include/lvlh_frame.hh"
#include "../include/lvlh_frame_messages.hh"
```

Namespaces

- [jeod](#)
Namespace jeod.

8.1.1 Detailed Description

Define methods for the LVLH reference frame class.

8.2 `lvlh_frame.hh` File Reference

Define the class `LvlhFrame`, the class used to represent a local-vertical, local-horizontal reference frame associated with a subject `DynBody`.

```
#include <string>
#include "dynamics/dyn_manager/include/class_declarations.hh"
#include "environment/planet/include/class_declarations.hh"
#include "utils/ref_frames/include/ref_frame.hh"
#include "utils/sim_interface/include/jeod_class.hh"
```

Data Structures

- class [jeod::LvlhFrame](#)

The class used to represent an LVLH reference frame associated with a subject DynBody.

Namespaces

- [jeod](#)

Namespace jeod.

8.2.1 Detailed Description

Define the class LvlhFrame, the class used to represent a local-vertical, local-horizontal reference frame associated with a subject DynBody.

8.3 lvlh_frame_messages.cc File Reference

Implement the class LvlhFrameMessages.

```
#include "utils/message/include/make_message_code.hh"  
#include "../include/lvlh_frame_messages.hh"
```

Namespaces

- [jeod](#)

Namespace jeod.

Macros

- #define [MAKE_LVLHFRAME_MESSAGE_CODE](#)(id) JEOD_MAKE_MESSAGE_CODE(LvlhFrameMessages, "utils/lvlh_frame/", id)

8.3.1 Detailed Description

Implement the class LvlhFrameMessages.

8.3.2 Macro Definition Documentation

8.3.2.1 MAKE_LVLHFRAME_MESSAGE_CODE

```
#define MAKE_LVLHFRAME_MESSAGE_CODE(  
    id ) JEOD_MAKE_MESSAGE_CODE(LvlhFrameMessages, "utils/lvlh_frame/", id)
```

Definition at line 37 of file `lvlh_frame_messages.cc`.

8.4 lvlh_frame_messages.hh File Reference

Define the class `LvlhFrameMessages`, the class that specifies the message IDs used in the `LvlhFrame` model.

```
#include "utils/sim_interface/include/jeod_class.hh"
```

Data Structures

- class [jeod::LvlhFrameMessages](#)
The class that specifies the message IDs used in the [LvlhFrame](#) model.

Namespaces

- [jeod](#)
Namespace `jeod`.

8.4.1 Detailed Description

Define the class `LvlhFrameMessages`, the class that specifies the message IDs used in the `LvlhFrame` model.

8.5 lvlh_type.hh File Reference

Define the class `LvlhType`, which identifies the type of LVLH desired to be calculated.

```
#include "utils/sim_interface/include/jeod_class.hh"
```

Data Structures

- class [jeod::LvlhType](#)
The class used to identify the type of LVLH desired.

Namespaces

- [jeod](#)
Namespace `jeod`.

8.5.1 Detailed Description

Define the class `LvlhType`, which identifies the type of LVLH desired to be calculated.

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