Manual of Gazebo-SpaceDyn Simulation

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Abstract

Chapter 1

Introduction

This document intends to serve as a brief description and manual of the tools and routines developed within the context of Master Thesis titled: **Development of a Simulation Testbed for Evaluation of Impact/Contact Dynamics and Control of Non Cooperative Tumbling Satellites** in the Space Robotics Laboratory in Tohoku University in Sendai.

Chapter 2

Installation of the software and setup

The main software that need to be installed is:

- ROS Kinetic Kame (`http://wiki.ros.org/kinetic/Installation/Ubuntu`)
- Gazebo 7 (`http://gazebosim.org/blog/gazebo7`)
- Ubuntu 16 (`http://releases.ubuntu.com/16.04/`)
- GNU Scientific Library (sudo apt-get install libgsl-dev)

Please follow the instructions of installation of each of them.
Create a new catkin space:

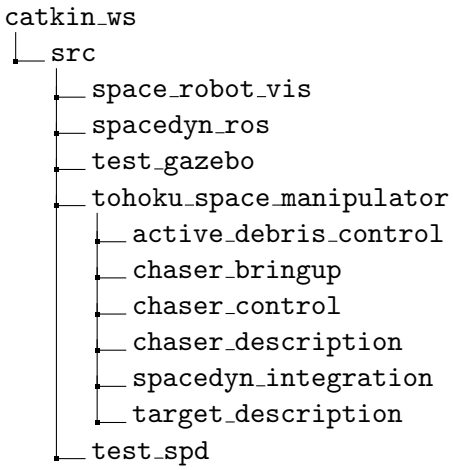
```
$ source /opt/ros/kinetic/setup.bash

$ mkdir -p ~/catkin_ws/src
$ cd ~/catkin_ws/
$ catkin_make
```

Chapter 3

Organization of Packages in the Catkin_Workspace

The following is an overall overview of the packages and meta-packages created in the catkin workspace to have an idea of the structure when referring to the different components of the project.



3.1 Package: space_robot_vis

This package had the purpose to serve as a visualization interface between the results obtained from SpaceDyn Matlab in .dat and Gazebo Robotics Simulator. Hence, it is important to note the following implications:

1. The physics engine is de-activated.
2. Hence, the inertial parameters in the description of the robot are not relevant.
3. The only thing that matters is the geometry and making sure that the joints' type and geometries avoid self-collision.
4.

3.1.1 URDF description

3.2 Package: spacedyn_ros

3.2.1 New functions

3.3 Package: test_gazebo

3.4 Metapackage: tohoku_space_manipulator

3.4.1 Package: active_debris_control

3.4.2 Package: chaser_bringup

3.4.3 Package: chaser_control

3.4.4 Package: chaser_description

3.4.5 Package: spacedyn_integration

3.4.6 Package: target_description

3.5 test_spd

3.5.1

Please consider that this program was developed using gazebo-7

List of things to cover in this document:

- Reference to the thesis - List of plugins for the robot - Important considerations in the