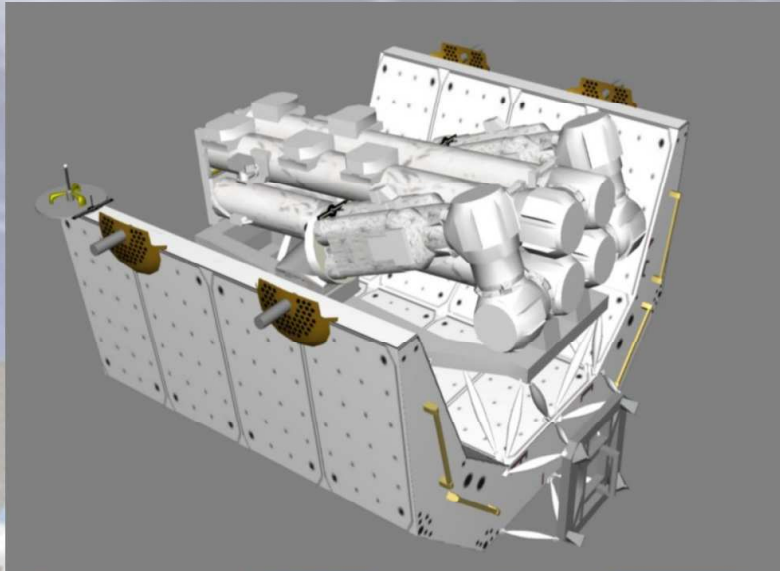# Canadarm2

Coding by SiameseCat

Mesh and Textures by Donamy

SSRMS Dialog box by David413

The Canadarm2 was launched aboard Space Shuttle Endeavour, STS-100 on 19 April 2001.

Weighing 1640 kg (3620 lb), Canadarm2 is 17.6 meters (57.7 feet) long when fully extended and has seven motorized joints. It's capable of handling large payloads. It played a key role in construction and continuing support, for the International Space Station (ISS).
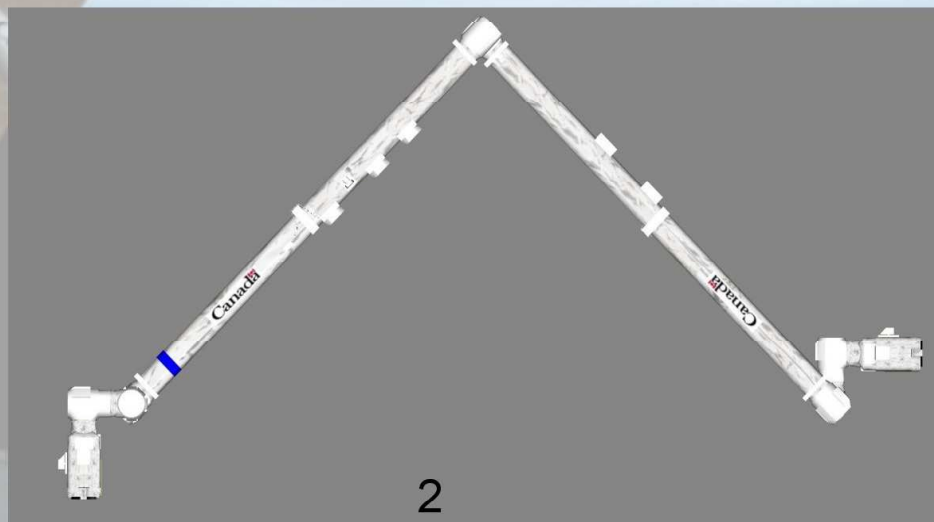
The Space Station Remote Manipulator System (SSRMS), along with the Mobile Base System (MBS), and the Special Purpose Dexterous Manipulator (SPDM), makes up the Mobile Service System (MSS). The MSS was manufactured by MDA Space Missions for the Canadian Space Agency.

MBS   SPDM
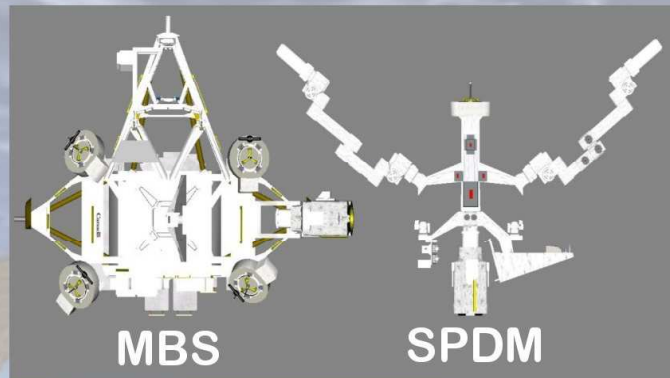
The unique thing about the SSRMS is that it can self-relocate and move end-over-end to reach different areas of the station. It is only limited by the number of Power Date Grapple Fixture (PDGFs). PDGFs are located around the station and provide power, data and video to the arm through its Latching End Effectors (LEEs). The arm can also travel the entire X Axis, of the space station truss using the Mobile Base System.

PDGF

Astronauts control the SSRMS from a Robotic Work Station (RWS), of which there are two. One in the Destiny module and the other in the Cupola.
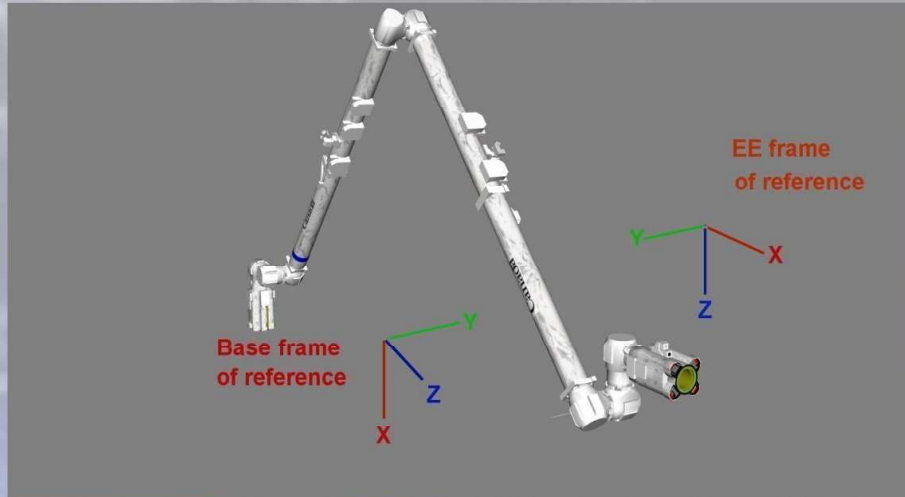

Note: the RWS in the Destiny module is not used.

View from the Cupola

Controlling the SSRMS

The SSRMS uses two "Frames of Reference"
Base and EE. Pressing cntrl+F will change between the two.

There are seven rotational joint mechanisms.
Each has an angle limit of +/- 270 deg.

γ_1 = Shoulder Roll Joint = SR
γ_2 = Shoulder Yaw Joint = SY
γ_3 = Shoulder Pitch Joint = SP
γ_4 = Elbow Pitch Joint = EP
γ_5 = Wrist Pitch Joint = WP
γ_6 = Wrist Yaw Joint = WY
γ_7 = Wrist Roll Joint = WR

All joints at 0° position
Joint Angle Limits (all joints) = ± 270°

Single joint rotation is possible using the standard number keys.

1 = shoulder roll   SR+ $\boxed{S}$ increases joint speed.
2 = shoulder yaw   SY+
3 = shoulder pitch   SP+
4 = elbow pitch   EP+
5 = wrist pitch   WP+
6 = wrist yaw   WY+
7 = wrist roll   WR+

Pressing $\boxed{cntrl}$ +'n'moves that joint in the - direction.

Use the standard numkeys in rotation mode for kinematic rotation.

Translational motion along the chosen reference frame,
is achieved using the cursor arrows, along with the delete
and insert keys.

$\boxed{\rightarrow}$ = +Y motion $\boxed{\textbf{Delete}}$ = +X motion

$\boxed{\leftarrow}$ = -Y motion $\boxed{\textbf{Insert}}$ = -X motion

$\boxed{\uparrow}$ = +Z motion

$\boxed{\downarrow}$ = -Z motion

Press $\boxed{/}$ numkey for tranlation mode to use the standard RCS
keys for both translation and rotation.

To grapple a payload, maneuver the EE to the grapple fixture
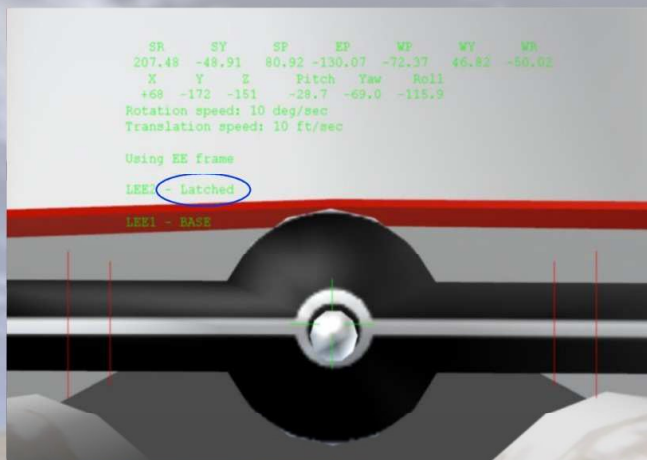and line up with the fixtures target.

Line up the EE with the grapple pin, by centering the target
post inside the white circle. Move toward the grapple fixture
until your view matches roughly to the screenshot below.
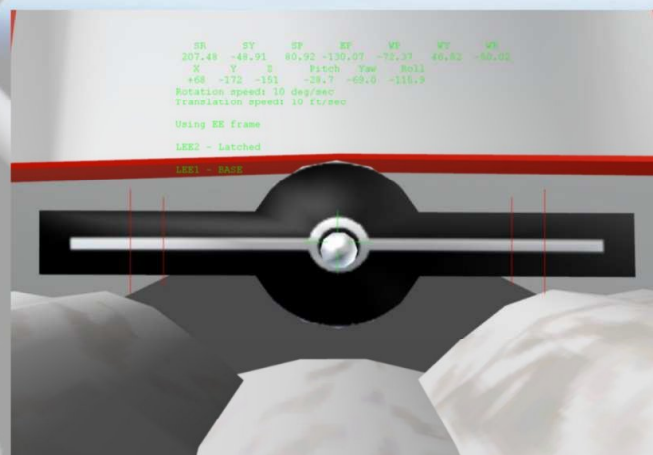
Capture the payload by pressing [Cntrl]+[G] to latch the LEE snare.

Note: you can **only** capture a child attachment.

To relocate the arm or 'walk-off', move the active LEE to a parent PDGF. Pressing [G] will idenify the parent attachments, by showing a blue arrows for parents red arrows for children.

Latch it as above, the press [Cntrl]+[A] to make that PDGF the new base. Press [Cntrl]+[G] again to unlatch from the old PDGF.
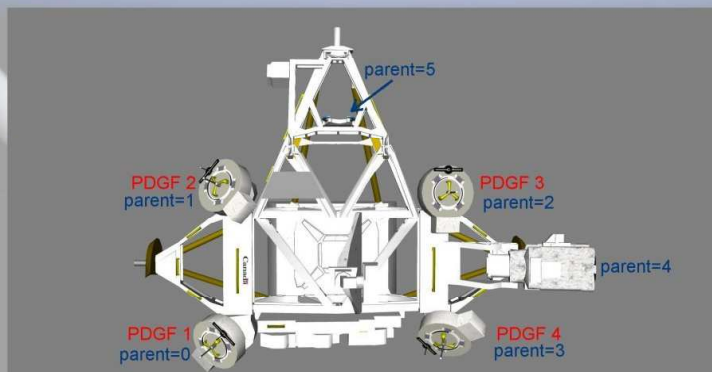
the PDGFs of the MBS

Credits:

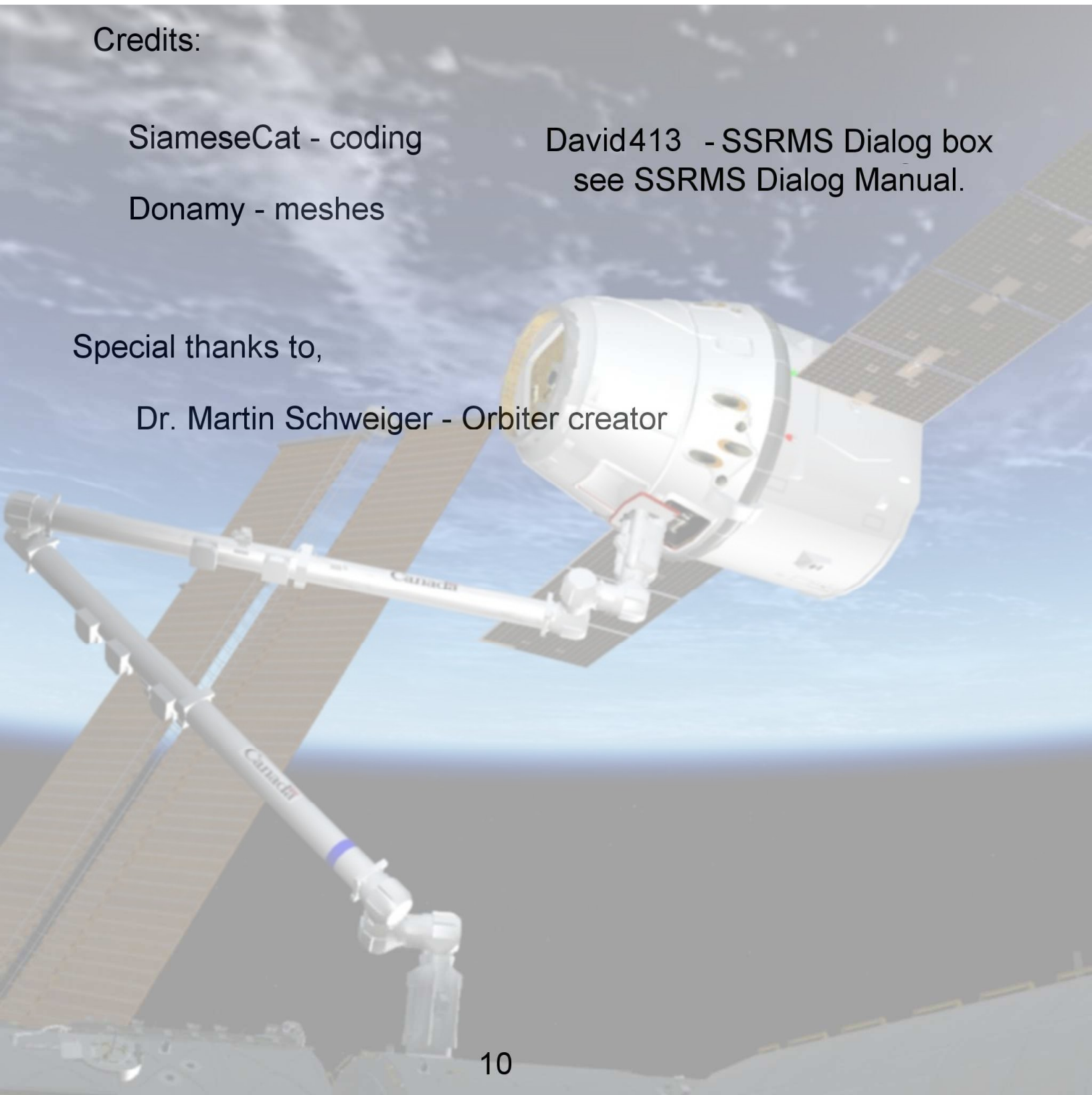SiameseCat - coding

Donamy - meshes

David413 - SSRMS Dialog box
see SSRMS Dialog Manual.

Special thanks to,

Dr. Martin Schweiger - Orbiter creator

Recommended addons:

Note: Install these addons first in order of listing.

International Space Station 3.2
http://www.orbithangar.com/searchid.php?ID=3737

ISS AtoZ
http://orbithangar.com/searchid.php?ID=5633

SpaceX Launch Vehicles and Dragon
http://www.orbithangar.com/searchid.php?ID=5442

Dragon Update
http://www.orbithangar.com/searchid.php?ID=5775

Dragon Update 2
http://www.orbithangar.com/searchid.php?ID=5871

HTV-3
http://www.orbithangar.com/searchid.php?ID=5756

Antares/Cygnus
http://www.orbithangar.com/searchid.php?ID=6419