BobCat ind Historical Spacecraft Dept. Present

"SOYUZ-U" LAUNCH VEHICLE AND "SOYUZ" MANNED SPACECRAFTS (USSR)

Assembly and flight manual

DISCLAIMER

HISTORICAL BACKGROUND

SOYUZ SPACECRAFT

The manned Soyuz (rus. – Союз, eng. -"union") spacecraft was originally conceived by Sergei Korolev in 1961 as a component of the "Soyuz complex" that also included unmanned booster modules and orbiting fuel tankers and was geared toward a manned mission to the Moon. When this plan was abandoned, only the crewed vessel remained: its new primary task that of a space station ferry.

Soyuz first carried a cosmonaut in April 1967. Since then the original Soyuz ("union") craft and its subsequent generations – the Soyuz T, TM, and TMA – have flown scores of manned missions. Although modifications have made the spacecraft more efficient and reliable, the basic structure remains the same. The Soyuz spacecraft is composed of three modules: Orbital Module, Descent Module, and Instrument-Service Module. The three modules remain connected throughout the mission until after the deorbit maneuver. During ascent and orbital flight, a form-fitted thermal insulation blanket covers all three modules except for the radiator, solar arrays, and antennas.

The Soyuz spacecraft transports crews to and from the space station Salyut, Mir and ISS.

Depending upon the orbital mission, the crew of the Soyuz can consist of two or three people:
- vehicle commander in the center seat
- flight engineer in the left seat
- cosmonaut-researcher in the right seat (on three-person crews)

The vehicle commander is responsible for leadership of crew activities and overall mission success. The flight engineer is responsible for operation of spacecraft systems and implementation of flight procedures. The cosmonaut-researcher executes instructions from the commander for spacecraft systems operations, communicates with ground control, and conducts photography, videotaping and television broadcast sessions.

SOYUZ-U

Soyuz-U is orbital launch vehicle. The Soyuz-U is of the R-7 rocket family, originally developed from the R-7 ballistic missile, which first flew in 1957. The Soyuz rockets launch both the Progress cargo ships and manned Soyuz spacecraft. The Soyuz LV was put into operation in 1966 (Soyuz-U LV – in 1973). Since its capabilities ensure modern spacecraft insertion into orbit the LV is widely used at present. In terms of the number of launches and reliability, it is an indisputable world leader among medium-class launch vehicles.

INTRODUCTION

The package contents parts for assembling a launch rocket " Soyuz" and manned "Soyuz"+ "Soyuz-TMA. "

Папки	Название в VAB	Имя файла
Parts	Soyuz Payload Base Адаптер	Soyuz_cargoholder_decoupler
	Soyuz Decoupler Soyuz TMA Decoupler Разделитель СА и ПАО	Soyuz_Decoupler SoyuzTMA_Decoupler
	Soyuz Docking Mechanism Soyuz TMA Docking Mechanism Стыковочный узел	Soyuz_Docking_Mechanism SoyuzTMA_Docking_Mechanism
	Soyuz Heat Shield Экран теплозащиты	Soyuz_Heatshield
	Soyuz Instrument-Service Module (ISM) Soyuz TMA Instrument-Service Module Приборно-агрегатный отсек (ПАО)	Soyuz_Instrument_Servis_module SoyuzTMA_Instrument_Servis_module
	Soyuz Orbital Module (OM) Soyuz TMA Orbital Module (OM) Бытовой отсек (БО)	Soyuz_Orbital_module SoyuzTMA_Orbital_module
	Soyuz Main Parachute Soyuz TMA Orbital Module (OM) Основной парашют	Soyuz_Para SoyuzTMA_Para
	Soyuz Payload Shroud Створки головного обтекателя	Soyuz_payload
	Soyuz Payload Shroud top Верх створок головного обтекателя	Soyuz_payload_top
	Soyuz Descent Module (DM) Soyuz TMA Descent Module (DM) Спускаемый аппарат	Soyuz_Descent_module Soyuz_Descent_module
	Soyuz RCS Thruster Block Блок двигателей маневрирования и ориентации	Soyuz_RCS
	Soyuz Solar Panel Солнечная панель	Soyuz_SolarPanel
	Soyuz-U Second Stage Вторая ступень	Soyuz_U_Second_stage
	Soyuz-U Third Stage Третья ступень	Soyuz_U_Third_stage
	Soyuz-U Third Stage Decoupler Разделитель третьей ступени	Soyuz_U_Thirdstage_decoupler
	Soyuz-U LES Система аварийного спасения	Soyuz_U_LES
	Soyuz-U First Stage Lateral Boosters Боковые блоки первой ступени	Soyuz_U_firststagelateral_booster

Internals	Soyuz Orbital Module	SoyuzOrbital
	Soyuz Descent Module	SoyuzPod
	Soyuz TMA Orbital Module	SoyuzTMAOrbital

For proper operation of the docking camera requires a plugin **Lazor System.**
For proper operation of ASAS requires a plugin **Toggle-capable ASAS**.
Make sure that these plugins are located in the Plugins folder.

SPECIFICATION

ITEM	SPECIFICATION	
Soyuz-U First Stage Lateral Boosters (each)	Liquid Fuel	1000
	Oxidizer	1223
	Engine Max Power	400
	Isp at Sea Level	280
	Isp in Vacuum	330
	Vectoring Range	0.50
	Total Mass	15.11
	Dry Mass	4
Soyuz-U Second Stage	Liquid Fuel	4000
	Oxidizer	4889
	Engine Max Power	800
	Isp at Sea Level	280
	Isp in Vacuum	330
	Vectoring Range	0.50
	Total Mass	50.445
	Dry Mass	6
Soyuz-U Third Stage	Liquid Fuel	700
	Oxidizer	856
	Engine Max Power	280
	Isp at Sea Level	280
	Isp in Vacuum	330
	Total Mass	10.78
	Dry Mass	3
Soyuz Instrumental Module	Liquid Fuel	135
	Oxidizer	165
	Engine Max Power	30
	Isp at Sea Level	320
	Isp in Vacuum	370
	Monopropellant	350
	Electric Charge	1000
	Vectoring Range	1.00
	Total Mass	4.9
	Dry Mass	2

All parameters can be changed in the configuration files.

Soyuz-U launch vehicle is designed and configured to raise the spacecraft Soyuz to a height of 70 kilometers. 70 kilometers per the KSP is a minimum stable orbit, which is 200 kilometers in real life.

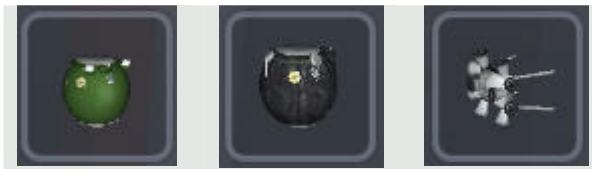
INSTALLATION

To install you should unpack the zip file to the directory in which the executable file (ksp.exe) is located.

If the installation is successful, you will find parts in VAB in these sections:

PODS

CONTROL



STRUCTURAL

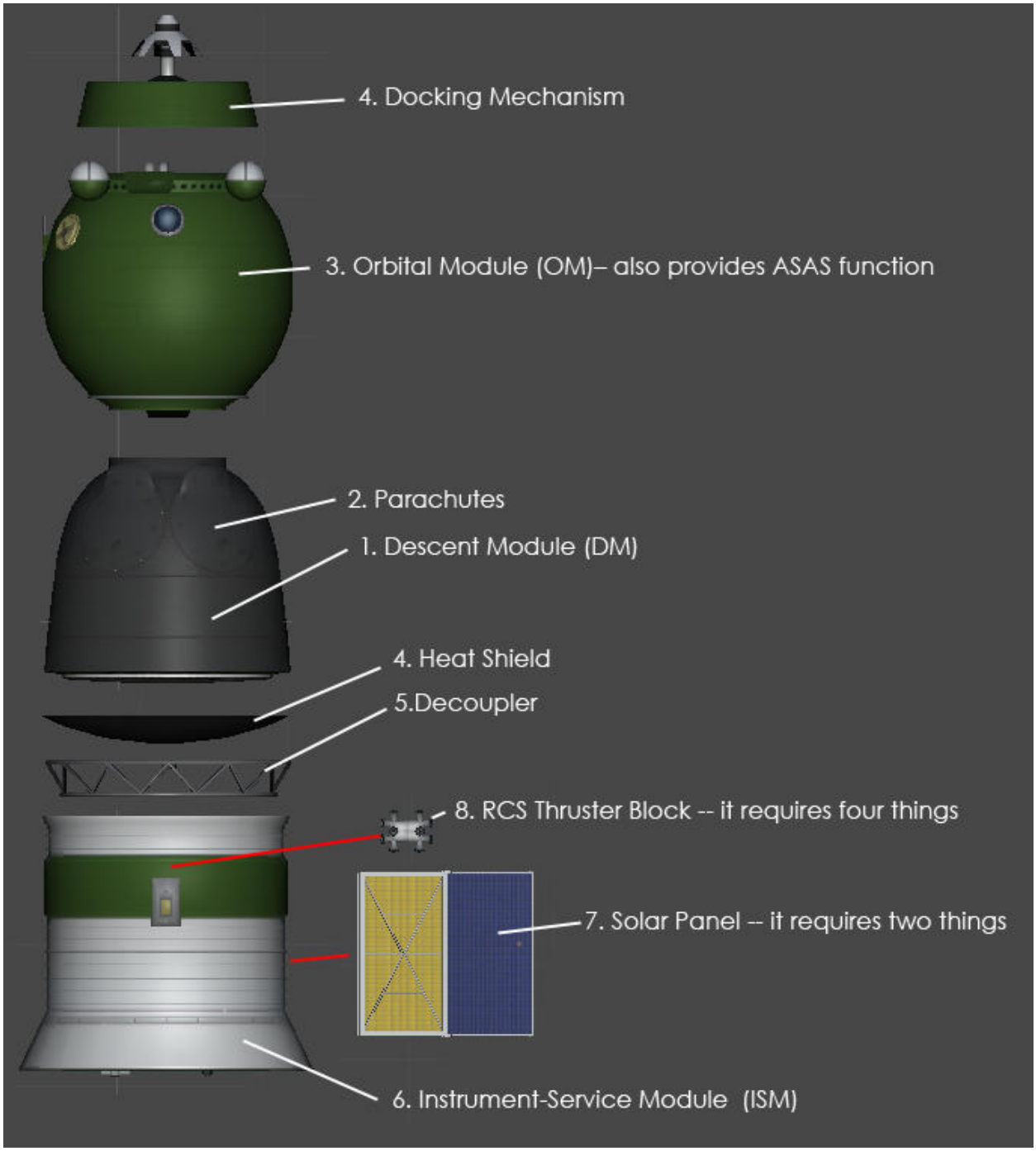
UTILITY

PROPULSION

Make sure that the Plugins folder contains the following files:
- AdvSASModuleToggle.dll
- Romfarer.dll

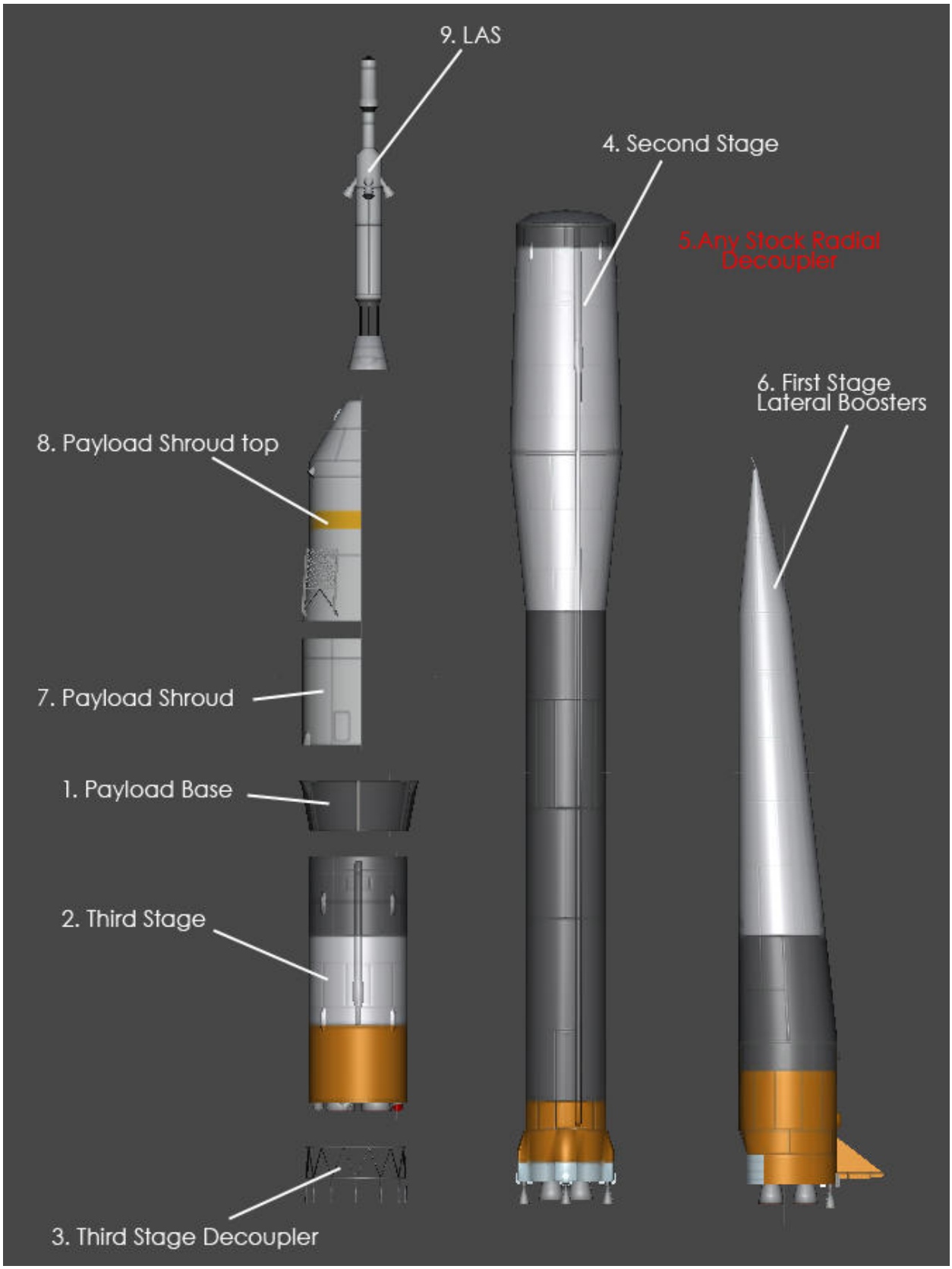
ASSEMBLY

SOYUZ MANNED SPACECRAFT



Assembly of "Soyuz TMA "is similarly.

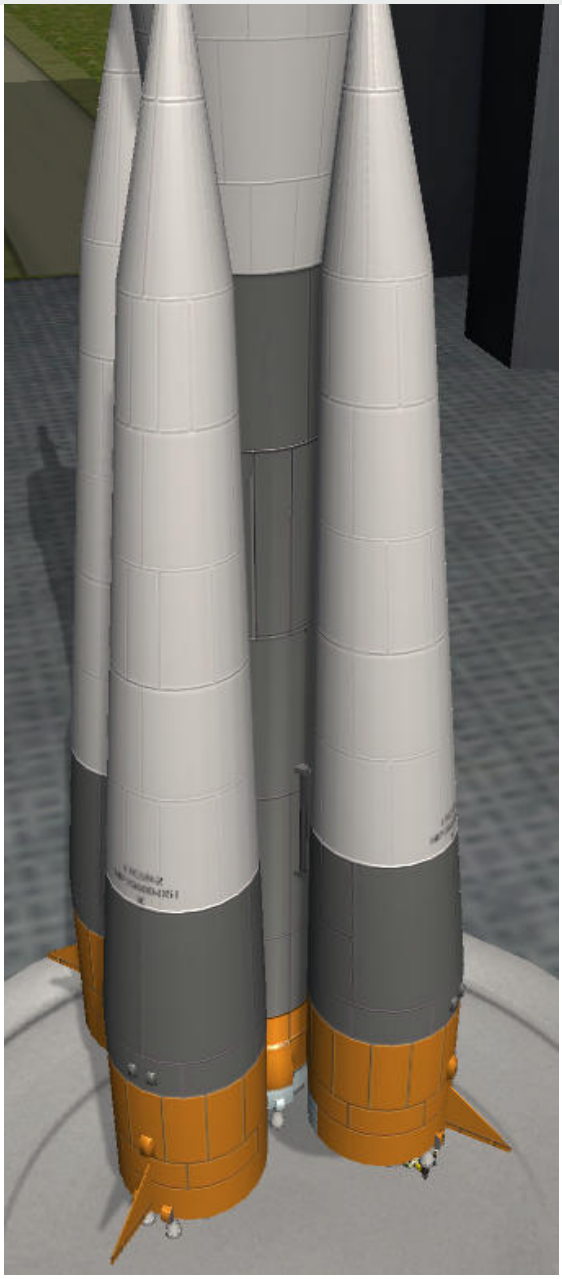
SOYUZ-U LAUNCH VEHICLE



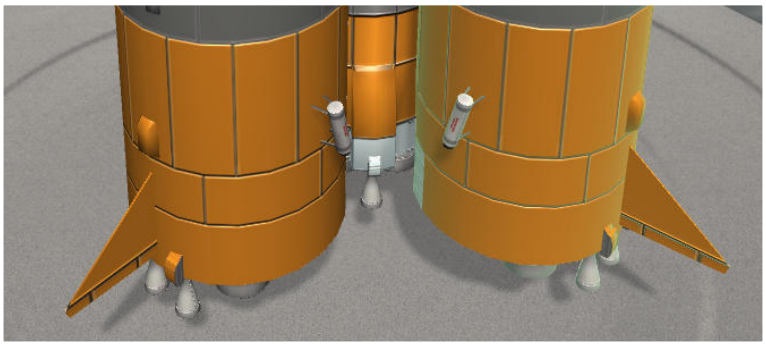
SPECIAL ASPECTS FOR ASSEMBLY

SOYUZ-U FIRST STAGE LATERAL BOOSTERS

Turn on 4-Symmetry Mode and place four stock radial decouplers (such as Hydraulic Detachment Manifold). Then place four First Stage Lateral Boosters.



Place Sepratrons



SOYUZ-U LES

Place on top, LES connect to the Docking Mechanism

Go to "Action Groups" and set actions

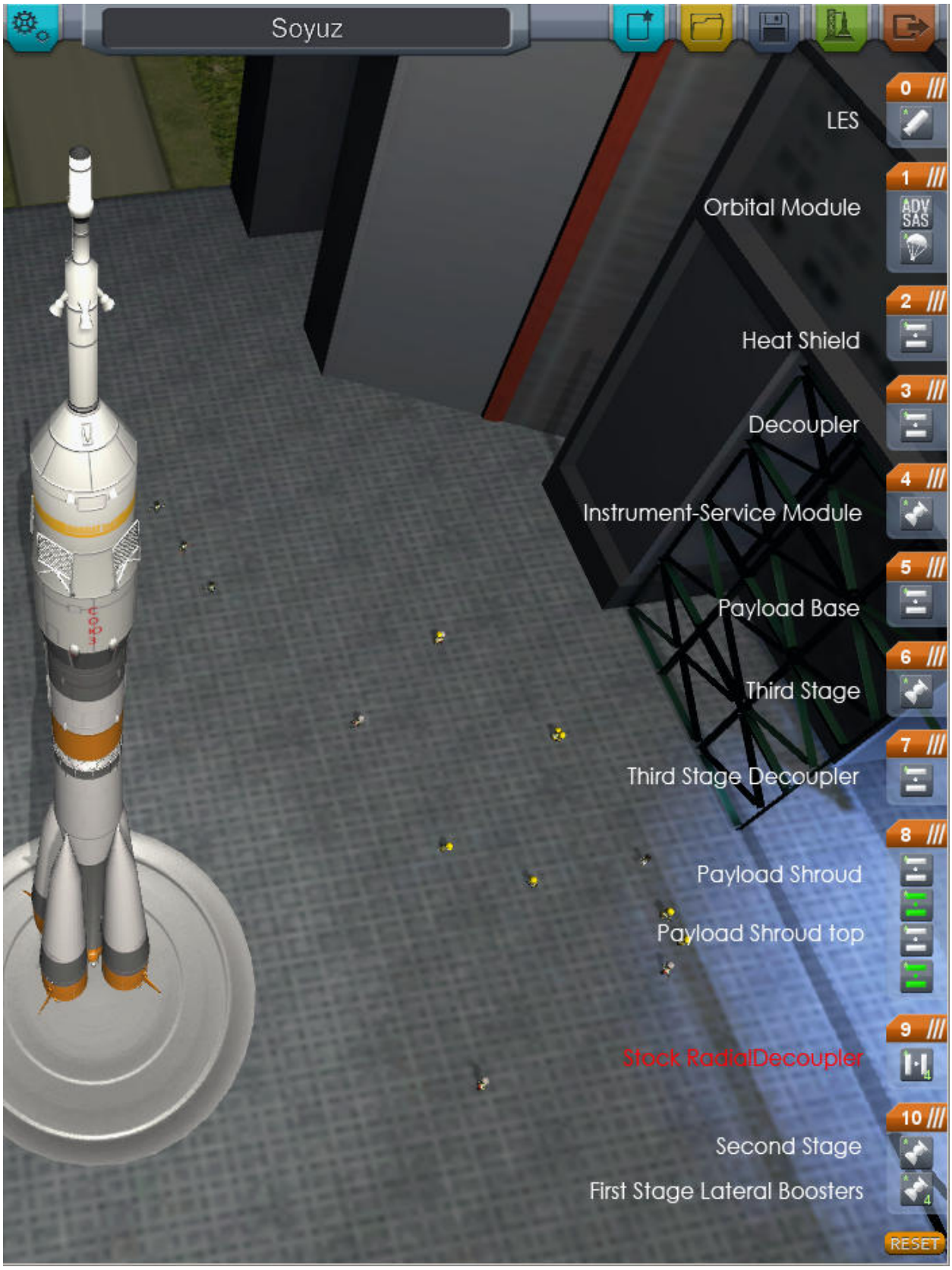
[Custom 0]	For Soyuz-U Payload Shroud (all) -- **Decouple**
[Custom 9]	For Soyuz Payload Base **– Decouple** For LES -- **Activate Engine**
[Custom 8]	For Soyuz Orbital Module **– Decouple** For Soyuz Instrument-Service Module -- **Decouple**
[Custom 7]	For Soyuz Main Parachute -- **Deploy**

OTHER ACTION GROUPS

Go to Action Groups and set actions

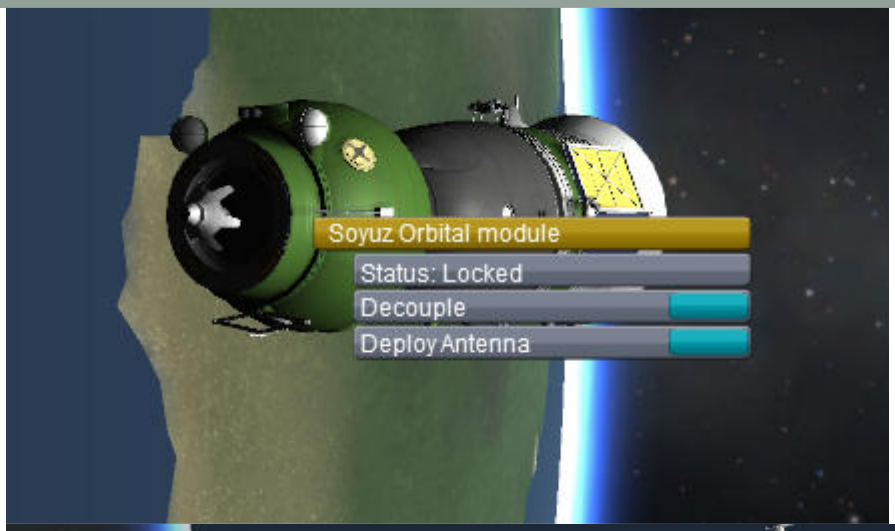
[Custom 1]	For Soyuz Docking Mechanism **– Decouple** For LES -- **Activate Engine**
[Custom 2]	For Soyuz-U First Stage Lateral Boosters **– Shutdown Engine** For Radial Decoupler **– Decouple** For Sepratrons -- **Activate Engine**
[Custom 3]	For Soyuz-U Payload Shroud (both) -- **Decouple**
[Custom 4]	Soyuz-U Third Stage **– Activate Engine** Soyuz-U Third Stage Decoupler -- **Decouple**

Last check.


Soyuz
0
LES
1
Orbital Module
ADV SAS
2
Heat Shield
3
Decoupler
4
Instrument-Service Module
5
Payload Base
6
Third Stage
7
Third Stage Decoupler
8
Payload Shroud
Payload Shroud top
9
Stock RadialDecoupler
10
Second Stage
First Stage Lateral Boosters
RESET

MENU ITEMS

Right-click on the Soyuz Orbital Module. Press **Deploy Antenna**.



Right-click on the Soyuz ISM. Press **Deploy Antenna.**

The antenna is not functional.
Just for beauty.

SPECIAL ASPECTS FOR OPERATION

ASAS

ASAS can be turned off after docking with the station to reduce the vibrating conveyor. Right click in the Soyuz Orbital Module and find the appropriate item from the menu.

SOLAR PANELS

When you get into orbit, expand the solar panels. Do not forget about electricity, it can be useful.

TRANSFER TO ORBITAL MODULE

Select an astronaut, EVA press. Fly to Orbital Module hatch, press [F]. If you want to return to the Descent Module, proceed in reverse order.

IVA

In IVA mode, are clickable portholes and a periscope. Periscope screen at the bottom of the dashboard.

DOCKING

Right-click on the Docking Mechanism. Press **Activate Docking Camera**.

LES (LAUNCH ESCAPE SYSTEM)

The LES is designed for bringing the crew modules away from the failed Launch Vehicle and providing conditions for guarantied operation of the landing aids while at the launch site and in the orbit injection phase.
If you have properly assembled LES and properly configured Action Groups, the procedure is as follows:
If during the launch of the threatened use LES. Press key [0] and then key [9]. When the engines stopped working, press key [8] and when the Descent module will start to decline, press key [7].

REENTRY

Run the deorbit burn.

Right-click on the Soyuz Decoupler. Press **Jettison**, then **Decouple**.

Right-click on the Soyuz Orbital Module. Press **Decouple**.

Right-click on the Soyuz Descent Module. Press **Jettison**.

Right-click on the Soyuz Main Parachute. Press **Deploy Chute**.

Right-click on the Soyuz Heatshield. Press **Decouple**.

FREQUENTLY ASKED QUESTION	
Why so little fuel?	This is a copy of the Soyuz LV . Its mission is to deliver three astronauts into orbit. And that's all. However, you can increase the amount of fuel. To do this, you need to correct configuration files.
What are these antennas?	For authenticity and beauty. But it cannot be ruled out in the future appears feasible to some useful functions.
Docking mechanism are compatible with the stock?	Yes.
Not working Docking Camera.	And you have installed the plugin **Lazor System**? Correctly installed?
When I use the RCS, the ship is twisted.	Place the RCS symmetrically around the center of mass.

CREDITS

3D modeling and texturing - BobCat

Programming – CrashnBurn

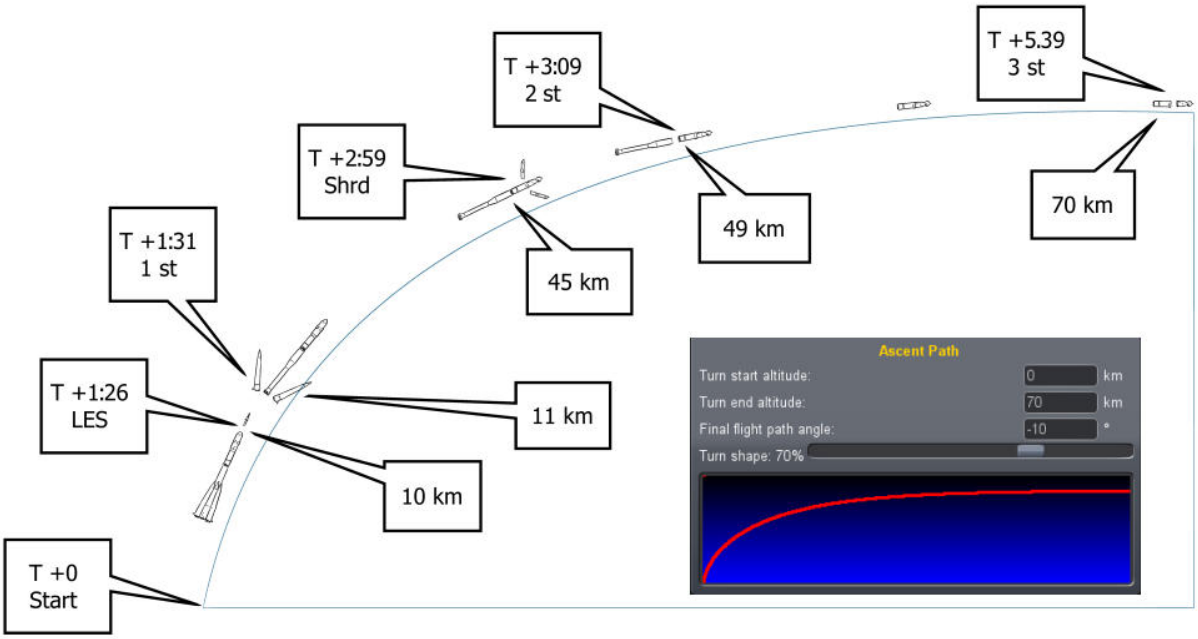
Documentation, Testing and Tuning – CCCP

Testing -- BlazingAngel665

Used information from websites:
http://www.tsenki.com
http://www.spaceref.com
http://www.aerospaceguide.net
http://www.daviddarling.info

APPENDIX 1

Ascent profile and timing



Thus, a typical ascent into orbit is:
- Set throttle at 85-90 percent.
- At 10 000 – Decouple LES (press Key [1])
- At a height of 11 000 – Decouple first stage (press Key [2]) and set throttle at 100 percent.
- At an altitude of 45 000 – Decouple shrouds (press Key [3])
- At an altitude of 49,000 – Decouple second stage (press Key [4]). At this point apocentre raised to 70 kilometers. Move to apocenter and circularized orbit.

APPENDIX 2

Once the orbit is circularized, You have left 300 liters of fuel in the third stage. Good idea - to drop the third stage into the ocean. Not debris in orbit! If you're concerned about space, cleanliness, stock up on such things in advance: