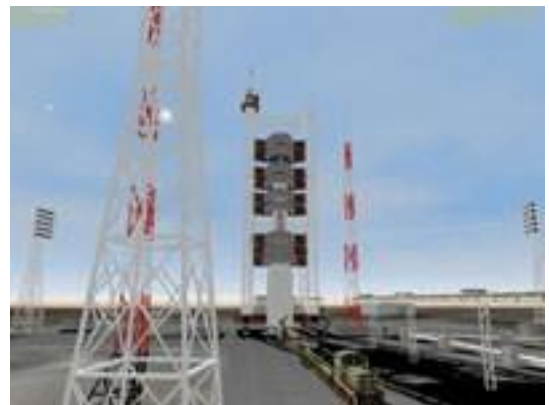
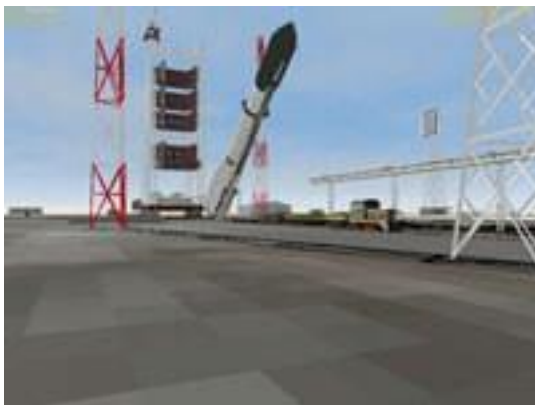
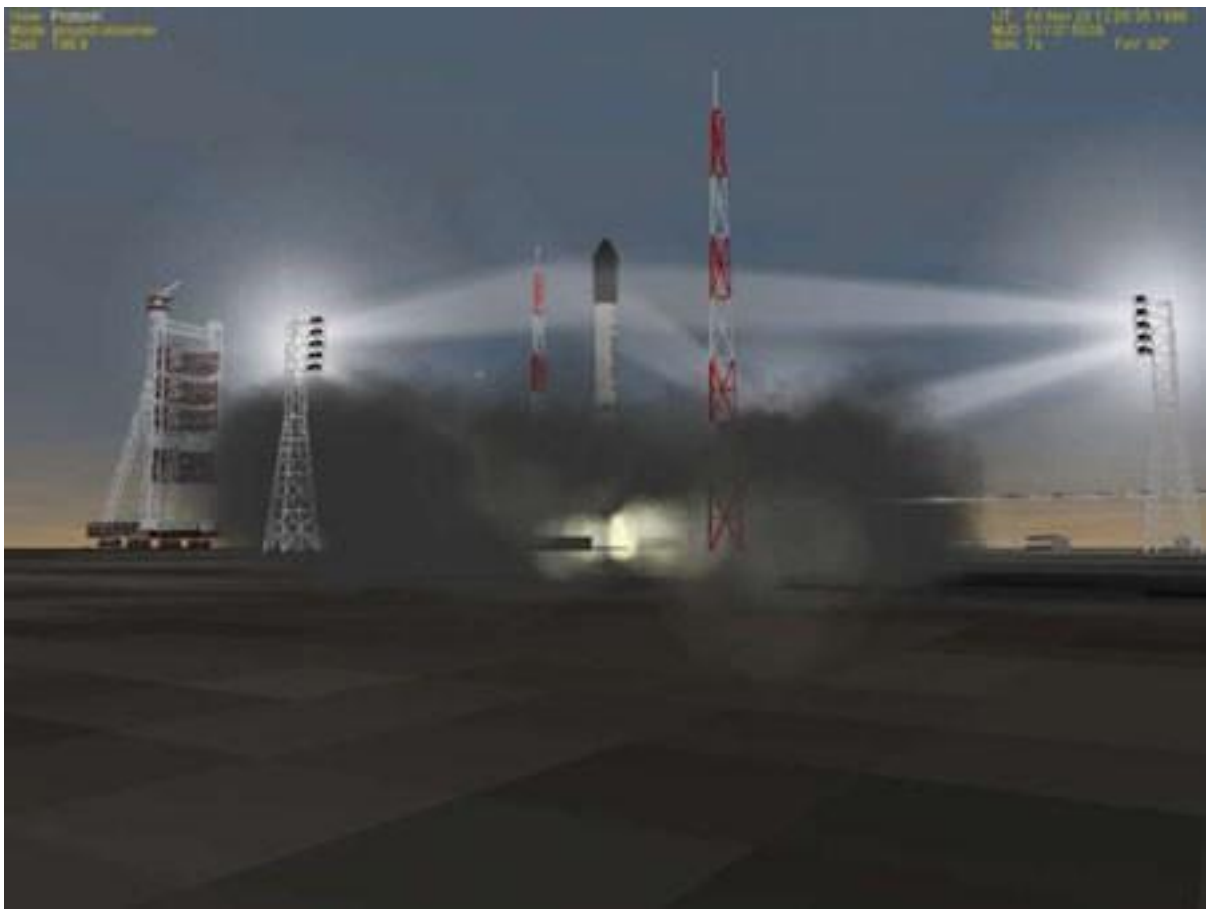


# PROTON UR500 BAIKONUR PAD 24

Pack by Papyref  
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Modified  
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## HISTORICAL

The concept of Proton start with a study for ballistic rocket begun in 1961. The goal was to create a universal family of rockets called project UR (Universal Rocket)

The first Proton K takes off on July 16, 1965. It is a high rocket on three stages of 38m weighing approximately 740 tons without load and developing a thrust of 9,5 MN (970 tons)  
It could put into orbit a little more than 8 tons in low orbit.  
Various later evolutions of this model (lengthening of the second stages, increase in the engine output...) one allowed to put into orbit 22 tons in low orbit.

A fourth stage called block DM made its appearance in 1974 to make it possible to initially place a load in parking orbit and then to place it on a transfer orbit making it possible to reach the generally geosynchronous final orbit.

Proton DM give possibility to place 19 tons in low orbit and 5 tons in geosynchronous orbit  
In this version with a long cap the height of the rocket is about 60 m and the weight without load 760 tons.

In 1995 new fourth stage called Bloc Briz was put at least to improve the performances. It makes it possible to put into orbit 21 tons in low orbit and 6,2 tons on geosynchronous orbit.

The complete family counts at least 10 types of assemblies of launchers and 10 types of fairings adapted to the various loads.

The pad 24 is a part of complex SK 81 on the site of Baikonur. It was renovated at the end of the years 1990 to allow the launch of Proton rockets with Briz stage since 2003.

The complete launcher is charged on a railway vehicle which leads it to the launching pad and it is placed on a retractable arm.

The arm equipped with powerful jacks makes it possible to straight the rocket in approximately 4 hours posing it on supports which return in the table of launching at the time of takeoff.

Then the tower of service is advanced to carry out the last preparations. It is what I tried to simulate in my animations.

The position of the launch table is 46.0709390 °N 62.9847630 °E

## INSTALLATION

**Unzip Pad24\_ProtonUR500\_V1.zip file in your Orbiter folder ( Only For Orbiter 2010 -P1)**

The necessities addons for fonctionnement are included in the pack for easy use

**Zarya-J, Zvezda-J by Jekka and Sat Spot5 by Mustard you can load eventually on the site site <http://orbithangar.com>**

**Multistage2015 by Fred18 you can download eventually on the site <http://orbithangar.com>**

**Spacecraft 4 by Vinka you can download eventually on the site <http://orbiter.dansteph.com>**

**Don't forget to install and activate OrbiterSound 4.0 by DanSteph you can download on the site <http://orbiter.dansteph.com>**

**If you use D3D9 client, create links in Video → Advanced → Create Symbolics Links otherwise you have CTD**

Thanks to the authors and to Laserpithium for the count in Russian

## SCENARIOS

**Six scenarios are provided with an autopilot which can be started with the key P**

At the end of the placing in orbit it is wise to press again on the key P to disarm the autopilot. It is preferable to avoid especially accelerating time during the phase of lighting of the first and the second stage.

It is possible to release the fairing manually by using **the key F**

The payload can be released by using **the key J**

Autopilot is launch using the **key P**

- ***A scenario with ProtonK (3 stages) simulates launching Zarya at the time of the mission which allowed its placement on orbit like first element of station ISS***

Launching of Proton 8K82K/11886 (in other words Proton 3 stages) 20/11/1998 6h40 GMT to put Zarya into orbit.

Objective:

To put Zarya on an orbit inclined at  $74^{\circ}79'$  with a perigee = 176 km and an apogee = 343 km  
Correction then to carry out an orbit 383x396 km and one awaits the shuttle which brings Unity.

Use of the autopilot who gives roughly 188x344 km and  $73^{\circ}94'$ . It will remain to make the final corrections!

- ***A scenario with Proton KD-NPL (No Payload) and the same autopilot makes possible to see the difference for orbit without the load***
- ***A scenario with Proton block DM (4 stages) simulates the launching of the Astra satellite (one uses Spot5 failing this)***

Objective:

To put Spot5 on an orbit inclined at  $0^{\circ}10'$  with into final an altitude at the perigee = 35778 km and the apogee = 35793 km

One uses the autopilot who will create an orbit of apogee close to 35800 km and it will not any more remain but to go until the apogee to burn in prograde mode and to go up the perigee with the good value.

When you are in correct orbit, appreciably observe on the MFD Map the regular passage of the satellite per same hour at the equator

- ***A scenario with Proton block Briz (4 stages) simulates the launching of Zvezda on a high orbit.***

The purpose of it is only to try the capacity of carrying of the rocket. By lighting the Briz stage again with the perigee one can create a very elliptic orbit with an apogee with 10M km.

In fact as Proton block DM this rocket is intended especially for the launching of the geosynchronous satellites.

- ***A scenario with Proton K-NPL (without load) ready to launch on the table and another Proton K in standby on the train for the placement when the pad is released***
- ***A scenario with Proton KD equipped with Spot5 and Carina to give an example of file for two loads (see further for explanation)***

The joined scenarios show the standard structure to adopt

**If his own scenario is created, it is necessary to make there appear the three elements ProtonTower, ProtonLights and ProtonTrain. If not they will not appear on the launching pad. It is also necessary to position Proton with coordinates POS 62.9847654 46.0709434**

## ANIMATIONS

**They are carried out by taking the control of the element in the open table with F3  
If you use Windows 7 you must deactivate the number function on the numeric keyboard**

- **For the tower (ProtonTower)** the initial position in the center, is placed on the rocket.

Opening of the footbridges > key G  
Closing of the footbridges > keys Ctrl+G

Stop in progress > key G  
Stop in progress > key G

Distance of the tower > key K  
Bringing together of the tower > Ctrl+K keys

Stop in progress > key K  
Stop in progress > key K

The height adjustment of the 9 footbridges of the tower can for adaptation to the rocket. They are numbered from 1 to 9 on the basis of the top and their position can be modified by using keys 1 to 9 of the digital keyboard following the footbridge to be ordered.

Descent > Shift+ key 1 to 9

Stop in progress > the same

Rise > Ctrl+Shift+ keys Ctrl+1 to 9

Stop in progress > the same

Pay attention because nothing prevents from overlapping the footbridges, also it is necessary well to look at which is the possible amplitude and the direction of the displacement which can be carried out.

- **For lighting (ProtonLights)**

Progressive ordering of the lamps by using keys 0 and. (not) of the numeric keypad as for the ordering of a Hover engine.

- **For the train (ProtonTrain)** the initial position is in the center of the launching pad to the foot of the rocket

### Caution !

**The train is ordered like a handling arm and you must launch the SoundConfig.exe file in the file Orbiter and to strip "Display has T+time counter At launch during 300s" which creates a disturbance of posting when one is on the ground**

After the selection of ProtonTrain by using F3 the commands are:

- **Shift + SpaceBar** to take the train command (idem to leave)
- **Shift + 4 or 6 (numeric keypad)** to cycle in the two directions out of the three possible orders

To move € To raise € Machoires allowing to advance or move back the train, raise or lower the support, open or close the jaws.

A text is displayed to give the name of the actual command and a number give the value in position or rotation compared to the initial point

- **Shift + 2 or 8 (numeric keypad)** makes it possible to carry out the movement adapted in the selected order
- **Shift + 0 (zero)** makes it possible to release the rocket of the support once vertical or to hang up again if you want to gain it

You can have a displacement or a rotation continuous by realising the Shift key before the numerical key. Then the stop is done by remaking the order.

For probability, one should raise the support only when the train is in extreme position with the foot of the rocket and open fixings as a preliminary

## LES CHARGES

If you wish to modify the payload, it is enough to modify the Payload paragraph in the file ini of the rocket (in config / Vessels / ProtonUR500). to put that which you wish.

For example in the ProtonK.ini file one finds:

```
[PAYLOAD_1]
MeshName="Zarya-J"
name="Zarya-J"
Module="spacecraft\spacecraft3"
off=(0,0,38)
Diameter=3.00
Height=12.00
Mass=18500
```

It is enough to replace the values MeshName, Name and Module by those which correspond to the satellite that you wish to launch.

You can regulate his position under the cap by modifying the last value in the offset (here 38). While increasing it is placed higher, and while decreasing lower

If you modify the mass it may be that the file of guidance of the autopilot does not function correctly any more. I advise you to keep that there even if it is not the truth, if not you risk surprises!

If the dimensions allow it you can to put a second load by creating one [ PAYLOAD \_ 2 ]

For example like Zarya 12m measures and weighs more than 18 tons you can without problem embark for example two satellites of 5m length weighing each one up to 9 tons (It is preferable to keep a total weight for the loads equal to 18500 kg even if it is not the truth.

The overall diameter of the satellites should not exceed 4m.

The scenario Proton KD with Spot5 and Carina show this.

It is enough to create a file cfg and a file ini in the ProtonUR500 file in Vessels folder to create a new rocket by copying an existing file ini and adding a payload

In my example I took two files Proton KD2.cfg (not modification) and a file KD2.ini proton with an added load. Here the end of the file ini

```
[PAYLOAD_1]
MeshName="Carina"
name="Carina"
module="Carina"
off=(0,0,46)
Diameter=2.00
```

Height=5.40  
Mass=3030

[PAYLOAD\_2]  
MeshName="Spot5"  
name="Spot5"  
Module="spacecraft\spacecraft3"  
off=(0,0,42.5)  
Diameter=2.00  
Height=5.40  
Mass=3030

In Payload\_1 you find Carina which must be released in first since it is in front of Spot5.(see offset)

Read the explanatory note of Multistage to know some more

If you want to change the launch heading, it is enough to modify the third value in the Roll line of the guidance file to replace it by the desired course (here one launches to 63° on the basis of an initial course of 90°

23=roll(2,90, 63 0,87,1)

## LIMITATIONS

This addon is limited to a use with the Orbiter software  
Its commercial use is strictly prohibited

I hope that you will take as much pleasure with this addon than I had of it to do it

**Papyref**  
**September 2016**