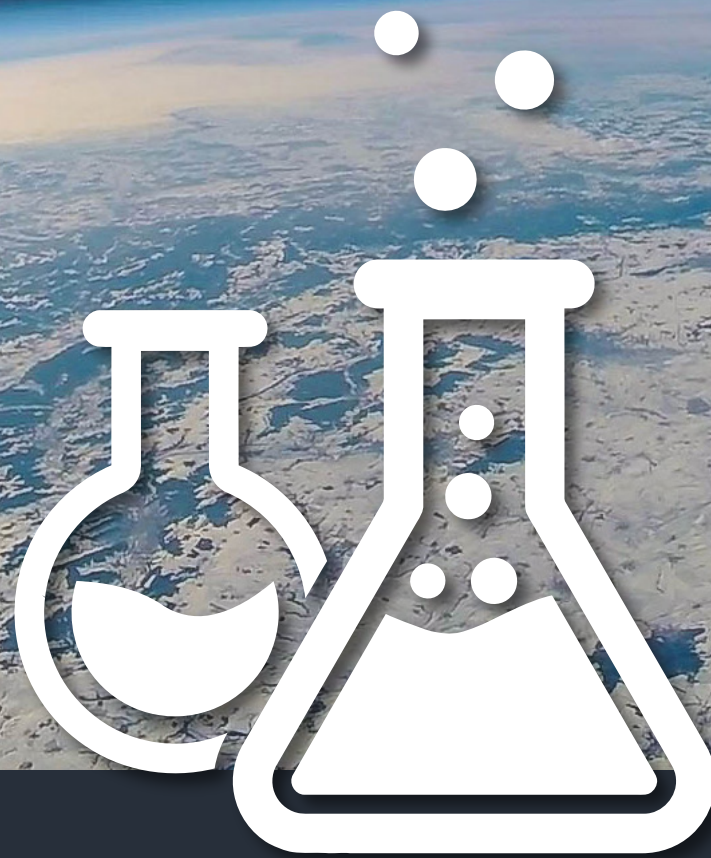


STRATO



FLIGHTS



STRATOlab****

Experiment mount

**Kit for own experiments
in the stratosphere**



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1 General information

This experiment kit STRATOlabor enables you to carry out experiments in the stratosphere, just like real NASA scientists! With the help of STRATOlabor, you can examine the effects of the extreme conditions in the stratosphere on different substances and record the whole process by using the Space Cam Apeman which is built into the Polystyrene probe. Additional measurement data (provided by the Datalogger STRATO4) such as temperature, air pressure, humidity, altitude, and speed deliver further information for the evaluation of the experiments afterwards.

1.1 Scope of delivery

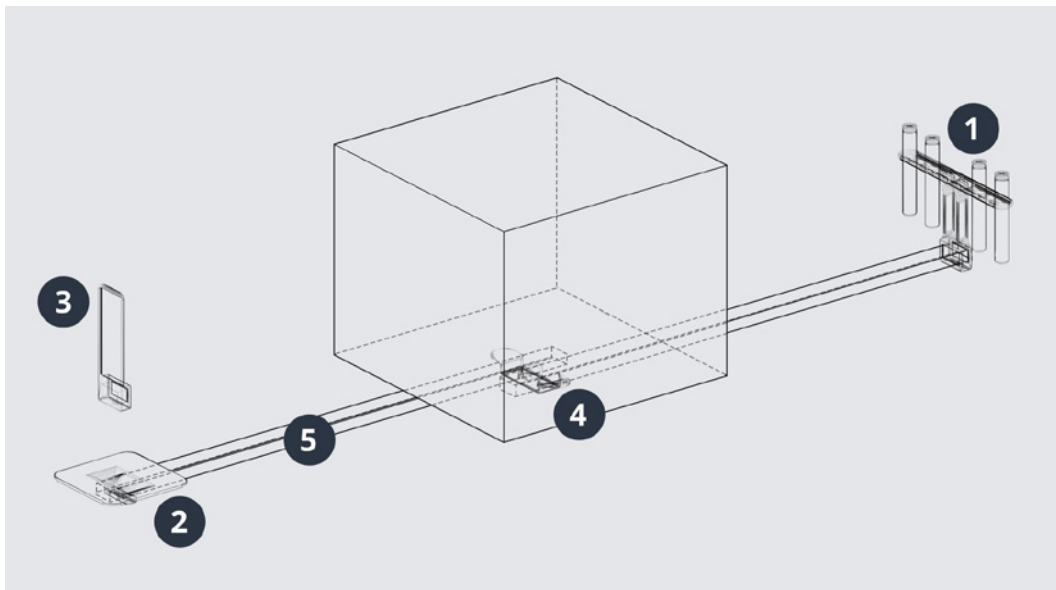
STRATOlabor contains these following components:

- Test tube holder (1)
- Object plate (2)
- Object wall (3)
- 2 x mounting clamps (4)
- 2 x 45cm pieces of balsa wood (5)
- 4 x test tubes with lids
- 8 x screws
- 4 x cable ties



Optionally, you may also need a stratospheric probe if you have not ordered the Weather Balloon Kit beforehand. The stratospheric probe is part of the Weather Balloon Kit and is also available, separately, in our shop.

Please note that the balsa wood sticks shown here have been painted black with spray paint. The delivered and available sticks are wood coloured. If you want to, you can also spray-paint them black.



1.2 Required tools

You will need these tools for the installation of the STRATOLab experiment mount:

- Phillips screwdriver
- Cutter
- Optional: electric screwdriver
- Optional: matt black spray paint

2 Installation of the experiment mount

2.1 Installation of the base frame

To attach the experiments to the experiment holder, the mounting clamps first must be fastened. The STRATOlabor experiment mount comes with mounting clamps which enable two experiments at the same time. Thus, the Space Cam Apeman can record



one experiment on each side of the stratospheric probe.

Furthermore, two experimental setups are used, so that both slots of the mounting clamps are occupied. Of course, you can also just use one slot of the mounting clamps and record one experiment.



Expert tip: If possible, you should “equip” both balsa wood sticks with experiments, regardless of which mounts you install at the end of the balsa wood sticks. Attaching experiments to both sides will prevent your probe from rotating too much. This would also impair your video recordings as a result.

First, you need the Polystyrene probe, the two mounting clamps and the balsa wood sticks. In order to use the brackets supplied on the balsa wood stick, the balsa wood stick must first be fastened below the probe. To do this, align the balsa wood stick in the appropriate directions where the experiments will later be located. Make sure

that the brackets are roughly in the centre of the probe (below the Polystyrene probe).

Take the two mounting clamps and press the balsa wood stick into the respective slots of the mounting clamps. For safety reasons, it is important that each balsa wood stick is held by both mounting clamps.



Expert tip: There should be at least 20cm of space between the camera lens and the object. Otherwise, the background (and therefore, the view of the stratosphere) will get blurred. After the installation it is essential to check whether the objects and the background can be seen clearly!



If you have determined the correct length of the balsa wood stick for your experiment, use the corresponding brackets to try them out. Use the supplied screws to fasten the balsa wood sticks in the mounting clamps. The screws prevent the balsa wood sticks from slipping. Each balsa wood stick must be secured with two screws. If you are going to use two balsa wood sticks, you will need four screws.



Now you can align your fixed base frame. Your goal: the objects should be placed and seen as centrally as possible. Therefore, you should fasten the holder (below the Polystyrene probe) also as centrally as possible. You don't have to worry about the misalignment of the two balsa wood sticks, you can adjust the camera shaft/slot again and align your camera on each side so that the objects are perfectly centred for the camera focus.

To finally fasten the base frame, take a screwdriver and carefully poke through the holes of the mounting clamps through the bottom of the Polystyrene probe and thus, creating a hole. Hold your base frame tightly. You must repeat this process three more times. The base frame should not slip!



There are now four holes in the Polystyrene probe. If you are satisfied with the position of the base frame, you will now need two cable ties. The cable ties are needed to fasten the base frame.

To do this, first pull a cable tie (from the underside of the Polystyrene probe) through the hole you have previously drilled with the screwdriver. Pull the cable tie (inside the probe) through the adjacent hole.

Now you can carefully tighten the cable tie so that the bracket is tight and secure. Please note that our Polystyrene probe consists of compressed Styrofoam, therefore





it cannot withstand much pressure. Please be careful with the cable ties and do not damage the Polystyrene probe. The supplied pieces of balsa wood sticks should be used on the other side of the cable ties to “balance” the pressure.



Expert tip: Our Polystyrene probe consists of compressed Styrofoam, so the cable tie inside the Polystyrene probe do not need to be “balanced out”. If you use Styrofoam plates from the hardware store or heavier experiments, you should attach the supplied small pieces of balsa wood below the cable ties inside the probe so that the cable ties do not “eat” through the soft Styrofoam when you tighten the cable ties.



Notice! Make sure that the base frame and the rest of the experiments are fixed in such a way that nothing can come loose! Do not put any people or property at risk!

Repeat the process with the second cable tie and check that your base frame is positioned according to your needs. Remove the ends of the cable ties that are too long with a cutter.

2.2 Installation of the test tube holders

If you want to examine liquids during your research flight, the STRATOlabor experiment mount contains a holder for four test tubes for this purpose.

To install the test tube holder of the already fixed base frame, you need four test tubes, the test tube holder, a screw, and a screwdriver.



Expert tip: The red lids of the test tubes are especially important during the shaky launch. The liquids should not be spilled and should remain/stay in the test tubes. However, attention must be paid to the decreasing ambient atmospheric pressure during the ascent. Thus, if you use the red lids, be aware that there is a risk that the lids will come off like small „projectiles“ due to the increasing pressure. If this is not desired, a small hole should be drilled carefully into the lid so that the pressure can be equalized.

After drilling small holes in every lid (for pressure equalization), insert the test tubes into the holder from above. The holder is tapered; therefore, the test tubes cannot slide through and drop. Optional: you can also fasten the test tubes with a small dot



of glue from a hot glue gun. Now, put the equipped test tube holder on the balsa wood extension. Make sure that there are at least 20cm of space between the camera lens which is installed into the Polystyrene probe and the test tube holder. During your flight, the test tube holders and its surroundings should be always visible and seen clearly.

Use a screwdriver and fasten the object wall with the supplied screw. Carefully screw down.

2.3 Installation of the object plate



If you want to observe small objects during your flight, the STRATOlabs contains an object plate for this purpose.



In order to install the object plate on the already fixed base frame, you need a screw, a screwdriver and, of course, the object plate.

Put the object plate on the balsa wood stick. Make sure that there are at least 20cm of space between the camera lens of the Space Cam Apeman which is installed into the Polystyrene probe and the object plate. During your flight, the test tubes and its surroundings should be always visible.

Use a screwdriver and fasten the object plate with the supplied screw. Carefully screw down.



Expert tip: Use a hot glue gun or superglue to attach the objects to the object plate. However, before you fasten it to the object plate, check how your chosen objects respond to hot glue or superglue.

Notice! Do not put people and property at risk! Objects must be tightly and securely attached to the probe and, if necessary, secure it by using cords! Safety has first priority!



2.4 Installation of the object plate

If you want to observe small objects during your flight, the STRATOlabor contains an object plate for this purpose.

In order to install the object plate on the already fixed base frame, you need a screw, a screwdriver and, of course, the object plate.

Put the object plate on the balsa wood stick. Make sure that there are at least 20cm of space between the camera lens of the Space Cam Apeman which is installed into the Polystyrene probe and the object plate. During your flight, the test tubes and its surroundings should be always visible.

Use a screwdriver and fasten the object plate with the supplied screw. Carefully screw down.

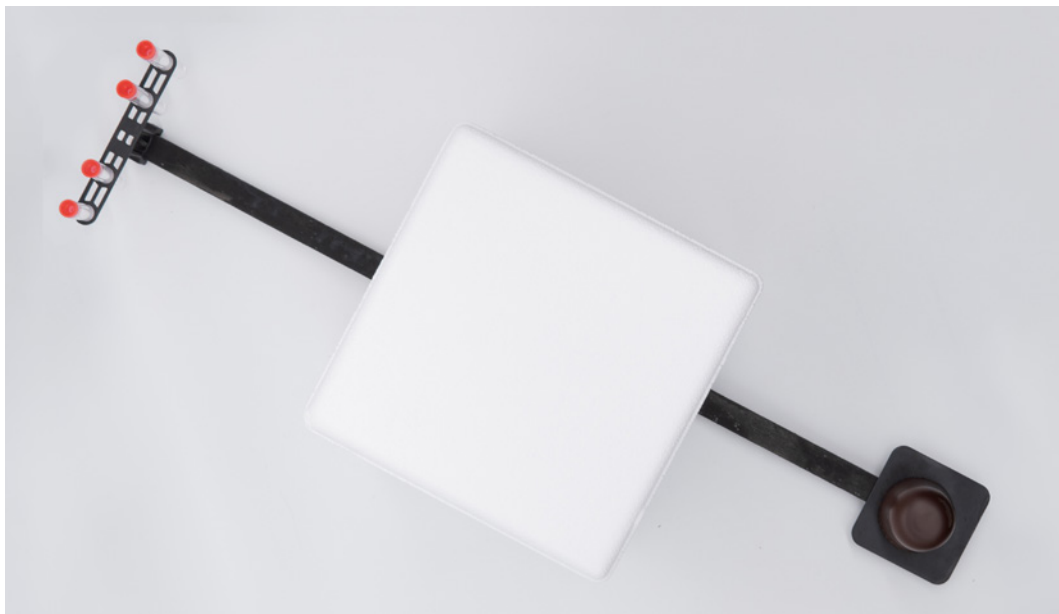




Expert tip: Use a hot glue gun or superglue to attach the objects to the object plate. However, before you fasten it to the object plate, check how your chosen objects respond to hot glue or superglue.



Notice! Do not put people and property at risk! Objects must be tightly and securely attached to the probe and, if necessary, secure it by using cords! Safety has first priority!



3 Safety instructions

Please make sure that you understand the following safety instructions regarding the product. Remember and think about these safety instructions while preparing and carrying out the flight!

3.1 Signal words

These signal words are used in some instructions:

- **WARNING:** This indicates a hazard with a medium level of risk. If you do not pay enough attention, it could lead to serious injuries.
- **Notice!** It indicates possible material damage.
- **Expert tip:** They derived from our personal experiences (10 years and over 1,000 stratospheric flights)! Stratoflights does not guarantee or assume any liability for the expert tips mentioned here.

3.2 Proper use

Read these safety instructions for the STRATOlabor experiment mount carefully before use. The STRATOlabor experiment mount was made exclusively for experiments in the stratosphere. All objects and holders must be properly attached to the probe to avoid damages and possible injuries.

Notice! The manufacturer and dealer assume no liability for damage caused by improper or incorrect use.

3.3 Danger for children and people who are vulnerable















The STRATOlabor should not be used by people (including children) with limited physical, sensory, or mental abilities. Only exception: if you have a responsible adult around who gives you instructions on how to use the device. Make sure that nobody is toying with your equipment (e.g. accessories, etc.). The STRATOlabor is not a toy! Children could swallow these small items and suffocate. Therefore, explain possible hazards and show them how to use the STRATOlabor correctly.

3.4 Packaging disposal

Dispose of all packaging material and the packaging separately. Recycle paper, cardboard and packaging and collect foils for the recycling collection.











4 Checklist: are you ready?

You will need the following components for a successful stratosphere mission:









<input type="checkbox"/>		Ascent permit	You need an ascent permit in your country to launch a Weather Balloon. Use our Weather Balloon Registration for this.	
<input type="checkbox"/>		Batterypack	In temperatures as low as -65°C, the camera's internal battery will not last for the entire flight time. You will need a batterypack so that your entire stratospheric flight can be filmed.	
<input type="checkbox"/>		Parachute 800	In order for your load capacity to float smoothly and safely back to earth, you need a parachute. The parachute 800 is designed for payloads up to 800g.	
		Parachute 2500	Obviously, you need a bigger parachute to carry a bigger payload. This parachute 2500 is perfect for payloads heavier than 800g.	
<input type="checkbox"/>		Helium pressure reducer	In order to fill the pre-calculated amount of helium/balloon gas into your Weather Balloon from the gas cylinder, you need a Pressure Reducer for helium. You can fill the pre-calculated amount precisely using it.	
<input type="checkbox"/>		Starting location	Starting locations like meadows, parks or your own property which are not in the vicinity of flagpoles or skyscrapers.	
<input type="checkbox"/>		GPS Tracker STRATOfinder	The STRATOfinder transmits the location of your stratospheric probe with an accuracy of 5 meters. With the help of the Stratoflights app, you can include the STRATOfinder in the app and see the current position data.	

<input type="checkbox"/>		Gloves	To avoid „damaging“ the sensitive envelope of the weather balloon, all team members working on the weather balloon should wear gloves and take off rings, earrings, etc. Please avoid contact with the ground!	
<input type="checkbox"/>		Helium/ Balloon Gas	Gas creates the lift. This is available from gas dealers in your region or larger DIY stores / Hardware stores. You can use our helium calculator in the tutorial/ Stratoflights app for the calculation of the correct amount you need.	
<input type="checkbox"/>		Aviation owner liability insurance	You need an aviation liability insurance for the ascent permit. You can find more information about this in the tutorial.	
<input type="checkbox"/>		SIM card for GPS Tracker STRATOfinder	You need a commercially available prepaid SIM card. The GPS tracker can send its position via SMS. Use the best-developed mobile network in your country for this. In Germany (DE) it is Telekom: D1.	
<input type="checkbox"/>		Space Cam „Apeman“	A solid camera for extreme conditions. Many cameras and action cameras from well-known manufacturers have problems with the weather and temperature in the stratosphere. The Space Cam is fail-safe and takes great pictures.	
<input type="checkbox"/>		Special cord	Most countries in the EU require a maximum tensile strength of 230N in accordance with the SERA VO, which forms the legal basis for Weather Balloon launches. This Special Cord meets all these criteria.	
<input type="checkbox"/>		Polystyrene probe	Your equipment must be protected from the extreme factors in order to avoid failures. The Styrofoam offers enough space and protects everything from extreme temperatures of down to -65 ° C.	
<input type="checkbox"/>		Tesa duct tape	To seal your probe and your Weather Balloon, you need fail-safe adhesive tape. TESA fabric tape is perfect for this mission.	

The following equipment can be a useful addition to your mission:

<input type="checkbox"/>		Backup-GPS Tracker	A second STRATOfinder or SPOT Trace can be useful to have as a backup GPS tracker, just to be safe.	
<input type="checkbox"/>		Datalogger STRATOfinder	The STRATOfinder is ready to show you the flight altitude, to obtain information about flight routes and speed, and much more.	
<input type="checkbox"/>		Datalogger STRATO4	In addition to values like GPS position, altitude, and speed, the STRATO4 also records temperature, air pressure, humidity and much more in order to fully analyse the whole flight.	
<input type="checkbox"/>		SPOT Trace	If a live position is desired or a landing at sea is not unlikely, the GPS tracker SPOT Trace is the perfect choice for a successful stratospheric flight.	
<input type="checkbox"/>		Weather Balloon Guide	Every mission into the stratosphere will succeed if you just follow all the steps explained and pictured in this guide. That is a promise!	

For best results you should have the following tools at hand:

<input type="checkbox"/>		Cutter knife/ scissors	It is useful tool for preparing your probe and carefully opening the package of the Weather Balloon.	
<input type="checkbox"/>		Screwdriver for the Pressure Reducer	The gas bottle for the helium/balloon gas is screwed with a cap. The Pressure Reducer must also be attached.	
<input type="checkbox"/>		Side cutter	It is useful to have a side cutter if you need to get rid of cable binders which are too long.	
<input type="checkbox"/>		Stratoflights app	Your loyal companion in your pocket: Checklists, all tools and additional information handy!	

5 About Stratoflights

We hope that this guide and our other free services such as the Stratoflights app, tutorials and videos on our homepage have been helpful. We hope that you will experience an extraordinary adventure and that you will take sensational shots of our planet.

We are always open and happy to receive suggestions and constructive feedback as well as reviews of our products in our online shop.

We would like to use this opportunity to point out that this project is perfect for students/pupils since all STEM disciplines are involved. The students are not only introduced to the STEM disciplines and can put their acquired knowledge into practice, but they also experience a learning adventure through a stratospheric flight.

Thank you again for your confidence! We would be very happy if you recommend this project to your friends and colleagues.

Your Team Stratoflights

Follow us on Instagram, Facebook and YouTube and tag us on your project!





www.stratoflights.com