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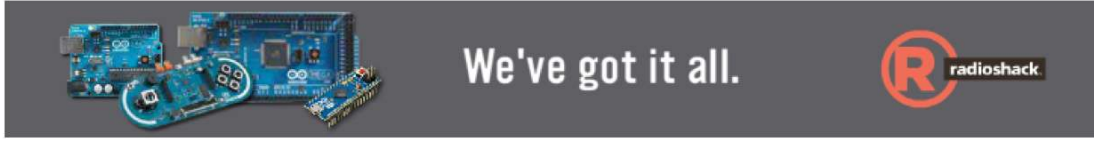
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My Space Balloon: Project Stratohab Success!! High School Student's Budget

by [robotkid249 \(/member/robotkid249/\)](#)



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Aug 23, 2012

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Bio: I'm 17. I enjoy making cool stuff, and promoting the "maker" community. Vote for my space balloon in the hurricane laser contest and hands on learning!!

More by robotkid249



[\(/id/Electricity-Generating-Kite\)](#)



[\(/id/Wireless-Power-Transmission-Over-Short-Distances-U\)](#)

"We're making space more available, approachable and real to the average American." - James Muncy, President of Polispace

As an avid maker and hobbyist, I support the open source initiative like the Arduino micro controller platform. When I decided to start this project 6 months ago, I dreamed of reaching space on a high school student's budget. Along the way, I also dreamed of publishing my research and development on near space, so we can make space more democratic and available to the everyday DIY-er.

Through my research, I never found a COMPLETE guide that would get me into space. Hence why the project took 6 months. This guide will be a FULL guide so you don't have to spend the same 6 months trying to figure out which systems work the best. For a reasonable budget, this instructable will get you into space.

On August 19, 2012, we launch a near space balloon on a high school student's budget from

Brookfield, CT, equipped with tracking equipment and a Canon camera programmed to take pictures every 15 seconds. We captured the entire journey on film.

<http://stratohab.blogspot.com> (<http://stratohab.blogspot.com>)

All the photos:

(<https://plus.google.com/photos/110326863516727335506/albums/5780029367725007809?authkey=CJq77Zb82ZPtsAE>)

(<https://plus.google.com/photos/110326863516727335506/albums/5780029367725007809?authkey=CJq77Zb82ZPtsAE>)

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Space (/tag/type-id/category-technology/keyword ord-space/)

Stratohab Space Balloon Launch!! Photos of Space! 08/19/2012 (<http://vimeo.com/47907178>) from Kyle Ryan (<http://vimeo.com/user6942601>) on Vimeo (<http://vimeo.com>).



Stop - Don't go solar

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Mobil Super Official Site

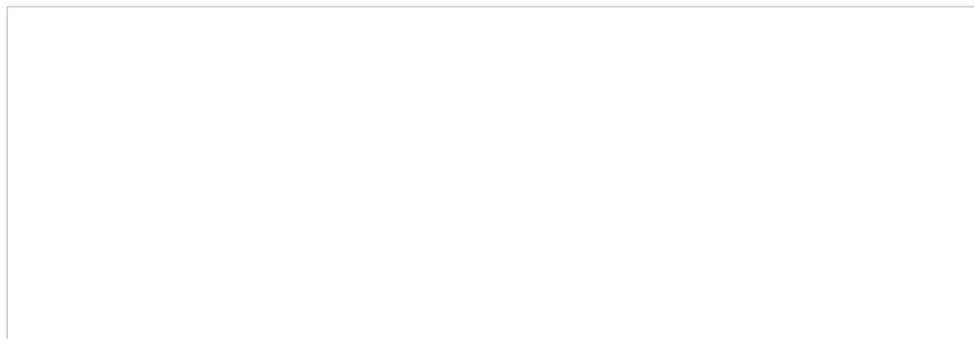
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Step 1: Safety - Calling the FAA



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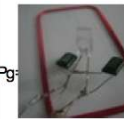
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How to Listen to RADAR Signals From Space. (/id/How-to-Listen-to-RADAR-Signals-From-Space/) by philip42 (/member/philip42/)



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DIY Hot Air Balloons (/id/DIY-Hot-Air-Balloons/) by TheScienceMan (/member/TheScienceMan/)

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Federal Aviation Administration

(/files/deriv/FBK/RWHM/H5R9F69Z/FBKRWMMH5R9F69Z.LARGE.jpg)

The primary person cannot just launch things into space whenever they please. You must abide by the rules that govern your state or country. On that note, **I AM NOT RESPONSIBLE FOR ANYTHING THAT GOES WRONG IN YOU ENDEAVORS.**

In order to get approval, you must talk things over with the FAA if you're in the united states since they govern the skies. I called the U.S. NOTAM office. 1-877-487-6867. Be prepared to play some phone tag. Be diligent. **You can't launch without this clearance.**

They'll ask you a bunch of questions about launch time, location, and payload weight. A full list can be found in the FAA guide.

[http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?](http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&rgn=div5&view=text&node=14:2.0.1.3.15&idno=14#14:2.0.1.3.15.4)

[c=ecfr&rgn=div5&view=text&node=14:2.0.1.3.15&idno=14#14:2.0.1.3.15.4](http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&rgn=div5&view=text&node=14:2.0.1.3.15&idno=14#14:2.0.1.3.15.4)

([http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?](http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&rgn=div5&view=text&node=14:2.0.1.3.15&idno=14#14:2.0.1.3.15.4)

[c=ecfr&rgn=div5&view=text&node=14:2.0.1.3.15&idno=14#14:2.0.1.3.15.4](http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&rgn=div5&view=text&node=14:2.0.1.3.15&idno=14#14:2.0.1.3.15.4))

(a) Prelaunch notice: Except as provided in paragraph (b) of this section, no person may operate an unmanned free balloon unless, within 6 to 24 hours before beginning the operation, he gives the following information to the FAA ATC facility that is nearest to the place of intended operation:

- (1) The balloon identification.
- (2) The estimated date and time of launching, amended as necessary to remain within plus or minus 30 minutes.
- (3) The location of the launching site.
- (4) The cruising altitude.
- (5) The forecast trajectory and estimated time to cruising altitude or 60,000 feet standard pressure altitude, whichever is lower.
- (6) The length and diameter of the balloon, length of the suspension device, weight of the payload, and length of the trailing antenna.
- (7) The duration of flight.
- (8) The forecast time and location of impact with the surface of the earth.

(b) For solar or cosmic disturbance investigations involving a critical time element, the information in paragraph (a) of this section shall be given within 30 minutes to 24 hours before beginning the operation.

(c) Cancellation notice: If the operation is canceled, the person who intended to conduct the operation shall immediately notify the nearest FAA ATC facility.

(d) Launch notice: Each person operating an unmanned free balloon shall notify the nearest FAA or military ATC facility of the launch time immediately after the balloon is launched.

§ 101.39 Balloon position reports.


top

(a) Each person operating an unmanned free balloon shall:


- (1) Unless ATC requires otherwise, monitor the course of the balloon and record its position at least every two hours; and

- (2) Forward any balloon position reports requested by ATC.
- (b) One hour before beginning descent, each person operating an unmanned free balloon shall forward to the nearest FAA ATC facility the following information regarding the balloon:
 - (1) The current geographical position.
 - (2) The altitude.
 - (3) The forecast time of penetration of 60,000 feet standard pressure altitude (if applicable).
 - (4) The forecast trajectory for the balance of the flight.
 - (5) The forecast time and location of impact with the surface of the earth.
- (c) If a balloon position report is not recorded for any two-hour period of flight, the person operating an unmanned free balloon shall immediately notify the nearest FAA ATC facility. The notice shall include the last recorded position and any revision of the forecast trajectory. The nearest FAA ATC facility shall be notified immediately when tracking of the balloon is re-established.
- (d) Each person operating an unmanned free balloon shall notify the nearest FAA ATC facility when the operation is ended.


Next » (/id/My-Space-Balloon-Project-Stratohab-Success-High/step2/Apparatus-Overview/)




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 **eaglepandey (/member/eaglepandey/)** says:
 cool one Aug 25, 2013. 4:35 AM [Reply \(CSPQNLKHKPX92PW\)](#)

[\(/member/eaglepandey/\)](#)

 **eaglepandey (/member/eaglepandey/)** says:
 cool one Aug 25, 2013. 4:35 AM [Reply \(C14Y5U2HKPX92PU\)](#)

[\(/member/eaglepandey/\)](#)

 **electronizwizzard (/member/electronizwizzard/)** says:
 Totally awesome as well as an awesome presentation, what a great job you guys did. I am proud of all of you that took part in this project. I am a ham radio operator and its so cool to see young people taking part in this type of venture, I will vote for your submission, great job. Jul 14, 2013. 7:32 PM [Reply \(CHFLY5UHJ369OGL\)](#)

[\(/member/electronizwizzard/\)](#)

nearspaceman (/member/nearspaceman/) says:
 um..... your making Space more democratic by making it more American ????

Mar 1, 2013. 2:40 PM [Reply \(C4W7SKDHDOWA8BL\)](#)[\(member/nearspaceman/\)](#)**t.rohner** ([/member/t.rohner/](#)) says: Aug 26, 2012. 11:56 PM [Reply \(CY76R4FH6738WYF\)](#)

Very nice instructable.

9 I wasn't aware that getting a HAM license is so easy today in the U.S.
 (member/t.rohner/) I made mine 30 years ago, in Switzerland ;-)

**t.stowe** ([/member/t.stowe/](#)) in reply to t.rohner Jan 30, 2013. 10:58 AM [Reply \(C47070GHCJNW9UF\)](#)

It's gotten easier since then.
 (member/t.stowe/)

**TechDech** ([/member/TechDech/](#)) says: Aug 29, 2012. 9:19 PM [Reply \(C47ZBPJH6DWWIW5\)](#)

I really like your project, but isn't it a bit risky for a normal person trying this?

[\(member/TechDech/\)](#)**techno guy** ([/member/techno+guy/](#)) says: Aug 29, 2012. 6:32 PM [Reply \(CUEYKXWH6739P6U\)](#)

I dont like the way you have to do all this regulatory government stuff just to send a balloon to space. But never the less, nice 'ible.

10
 (member/techno+guy/)

**nerys** ([/member/nerys/](#)) says: Aug 26, 2012. 7:41 AM [Reply \(C75HWROH672X0E3\)](#)

Got some questions.

(member/nerys/) did the Cellular track all the way to 65k ? at what altitude did you lose the signal from that?
 what altitude did you reacquire if you lost it ?

**robotkid249** ([/member/robotkid249/](#)) (author) in reply to nerys Aug 26, 2012. 10:03 AM [Reply \(CNE53LDH6734OQU\)](#)

6 Yea, thanks. The cellular pocketfinder only worked up to about 5,000 feet.
 (member/robotkid249/) However, the HAM radio tracked it through the entire flight up to 65,000 and gave us speed and position reports which was pretty awesome. We only got a signal from the PocketFinder when it was almost near the ground. About the last 10 minutes of flight.

**nerys** ([/member/nerys/](#)) in reply to robotkid249 Aug 26, 2012. 12:18 PM [Reply \(CO11NMWH6738Q7Z\)](#)

ahhh pity. \$149 sounded great !!
 (member/nerys/)

I was thinking of going with a SPOT device. \$99 a year and you can get them online for under \$100. but at \$200 I might as well go the extra \$100 and get the micro trak.

I plan to push for over 130k (theoretical max is 180k for helium) I might go with hydrogen and

push for 150k. its cheaper and you need less of it and it can push higher faster. (it really is not dangerous your 5gallon gas tank is more dangerous) as long as you respect it.

Hydrogen (pure) just does not burn or explode as much as people think it does. now mix it with air and WATCH OUT :-)

eventually I want to send up a "GLIDER" to drop.

and after that I want to push for 200k with a rockoon under the balloon (launch a rocket when the balloon is ready to pop)



robotkid249 (/member/robotkid249/) (author) in reply to nerys

Aug 27, 2012. 10:02 AM

[Reply \(C2Q7USMH6734RW9\)](#)

6
(/member/robotkid249/) We looked at the SPOT, but their prices were way too high in comparison to the microtrak which would provide a much more accurate signal. The SPOT costs \$99 for the unit with a \$100 service charge and another \$50 service charge if you want tracking. Add it up and you get \$250 for a device that doesn't even work too well...

Good luck.



nerys (/member/nerys/) in reply to robotkid249

Aug 27, 2012. 10:17 AM

[Reply \(CEHGTY7H6734RWF\)](#)

(/member/nerys/) Hmm I was informed the every 2 minutes "notifications" of where your at it INCLUDED in the \$99 a year no extra charge. \$50 if you want LIVE tracking.

is that incorrect?

you can get USED spots for around and even under \$100

you DO need to 3 axis gimble mount them. they only work of "points" up at the sky :-) if its upside down it will not work.

but again when I was looking at this a micro trak was a LOT more money. \$300 is really not bad.

makermike (/member/makermike/) says:



Very complete Instructable! I've been interested in launching a high altitude balloon for a while now and have perused various sites on the web for hints and inspiration, so I appreciate the work that went into this Instructable.

4

One question though—I thought that FAA approval wasn't required if the payload was below a certain weight. Still a good idea to contact them though.

Still hoping to get things together and hoping for the price of Helium to come back down to Earth!



moebuspcgold (/member/moebuspcgold/) says:

Aug 26, 2012. 8:05 AM

[Reply \(C29ZGTGH672SZVR\)](#)

The world is running out of Helium for ever, most of the wastage goes in health care like yours. Without Helium, MRI (Magnetic Resonant Machines) machines in hospitals will not be able to function as they need liquid Helium in a closed circuit cooling supply.

Pure Hydrogen is used for met balloons and could safely be used providing the balloon is inflated and launched remotely in a open area. Just google 'Remote Weather Balloon Launcher'.



oldboffin (/member/oldboffin/) in reply to moebuspcgold

Aug 26, 2012. 9:02 PM

[Reply \(CGZ5O2QH68GSW8W\)](#)

I didnt realise that ! I knew that the Hindenberg had to use hydrogen because the US wouldnt sell helium to Germany (at that time) Until recently we had the biggest franchise of steak houses here in South Africa giving away helium baloons to kids ! I can't say I have seen them lately though..

1



bstott (/member/bstott/) in reply to moebuspcgold

Aug 26, 2012. 7:06 PM

[Reply \(C593DN9H6734R8R\)](#)

Uh, really? You mean that a party space balloon is going to collapse the birthday, event and helium balloon industry along with destroying our ability for better health? Even the continued distillation from the vast quantities of newly discovered natural gas along with the resultant producing outcome from uranium radiation will not keep up with this youngman's and others scientific explorations? And leave the planet void of vital helium? Wow! Whooda think?

I'll keep worrying about the ground and continue recycling..... :)

Good Instructable!!!

moebuspcgold (/member/moebuspcgold/) in reply to bstott



The amount of Helium that is found alongside Uranium ore is independent on geological factors and the amount is very minimal.

Helium derived from natural gas or oil is only as abundant as the supplies of the natural gas or oil, which as you may know is running out as well. (newly discovered natural gas fields??? Where???)

The price of Helium has quadrupled since 2004 due to demand exceeding supply. If people want to play with balloons and talk funny then expect to pay alot more for it.



bstott (/member/bstott/) in reply to moebuspccgold

Aug 27, 2012. 9:13 AM

Reply (CD0XDV0H672M015)

Prices risi.g because of false rumor and they can. We should and do not take to panic but, sense.

New finds? One is, if you listen to rumor it could be one of the biggest is Marcellous (spelling?) Shale in NY, OH, PA, WV. There is reports of another bigger (?) in the mid-west, more in Canada and the government is focusing, as well as business on exploration within the states, finally. One cause, use, excuse for rumor and false commodity inflation, or real is to motivate private industry to produce. Greed is a mighty motivator. But, if a shortage CT is in use and more technology everday to replace current old stuff. Anyway, I applaud the youngman and I do conserve and try to be aware too. So, I thank you for more news an insight.



syates3 (/member/syates3/) says:

Aug 26, 2012. 8:01 PM

Reply (C72QQK7H685B7IL)

Slightly off topic but it would have been amusing if that box was crafted to look like a Love Cube, just encase anyone saw it from up there lol.

(/member/syates3/)



oldboffin (/member/oldboffin/) says:

Aug 26, 2012. 4:21 PM

Reply (CZVDEGMH68GSWD)

"We're making space more American. We're making space more democratic. We're making space more available, approachable and real to the average American."

(/member/oldboffin/)

If space is American, does this mean that I have to ask permission from the FAA to launch a baloon here in South Africa ?

England thought once that it could rule the world, and there was a Boston Tea Party :-)



robotkid249 (/member/robotkid249/) (author) in reply to oldboffin

Aug 26, 2012. 10:12 AM

Reply (C95C874H6734ORY)

:) It was just a reference to making space more accessible. I'm not sure what the rules are in south africa. Good luck

(/member/robotkid249/)



oldboffin (/member/oldboffin/) in reply to robotkid249

Aug 26, 2012. 8:02 PM

Reply (CZYZQE0CH68GSW6P)

just kidding, it did sound bit pretentious !

(/member/oldboffin/)

**airplanes717 (/member/airplanes717/)** says:

What was the total cost of the entire project?? Thanks!
(/member/airplanes717/)

Aug 26, 2012. 1:39 PM

[Reply \(CSIMGQHH6738QTW\)](#)**grammers (/member/grammers/)** says:

Wow good job! I watched your video before reading the instructable and thought things like, "good thing an airplane didn't hit that" and, "oh no! terminal velocity is going to hurt on the way back down". Then, I realized that you contacted the FAA, made a parachute, tracked the balloon. WOW!!!
(/member/grammers/)

Aug 25, 2012. 10:42 AM

[Reply \(CZZNX85H673CS7Y\)](#)**nerys (/member/nerys/)** in reply to grammers

Very cool man! a few notes. you don't need FAA permission unless you go over 4 pounds. you only need to notify them not ask permission.
(/member/nerys/)

Aug 26, 2012. 7:31 AM

[Reply \(CG6CSOGH672X0DU\)](#)

the timelapse is great !!!
nice to see some higher quality pictures on one of these. VERY nice.

**robotkid249 (/member/robotkid249/)** (author) in reply to nerys

You should have to morals to at least file a NOTAM (notice of airmen) to prevent collision.
(/member/robotkid249/)

Aug 26, 2012. 10:04 AM

[Reply \(CM2NFBQH6734OQW\)](#)**nerys (/member/nerys/)** in reply to robotkid249

You misunderstand or I was not clear.
(/member/nerys/)

Aug 26, 2012. 12:14 PM

[Reply \(C6UYWG3H6738Q7K\)](#)

A NOTAM is not permission. its simply what it says. A Notice TO airmen. nothing more. I give notice all the time for our Rocket Launches and of course they have the OPPOSITE of the intended effect ie they DRAW airmen to the area who are curious and they get annoyed when we don't fly not realizing WE ARE NOT ALLOWED to launch a rocket while they occupy our airspace envelope so all launching ceases till they leave :-)
hehe

you ARE required to inform the FAA and that process "WILL" result in a NOTAM.

but that is not permission. that is simply notification. an understandable requirements when in an advanced society where the airspace is heavily used. ie they can not tell you "NO" without cause.

you are simply "informing" them so they can be aware of it and so the NOTAM can be filed for pilot safety.

but its important to understand the difference between NOTIFICATION a reasonable societal requirement and "PERMISSION" ie NO you may not do this unless "we" say ok.

the difference is pretty critical in the long run.



blongmier (/member/blongmier/) says: Aug 26, 2012. 10:26 AM [Reply \(CX79RMJH672X0MI\)](#)

robotkid249,
Sweet job on the launch and nice instructions! I hope this helps more students get their projects to the near-space environment.

regards,
Ben
www.ProjectAether.org



spizzak (/member/spizzak/) says: Aug 26, 2012. 8:28 AM [Reply \(C7T2OKVH672SZWH\)](#)

Why can the rope not have a break force of greater than 50 lbs?

6

(/member/spizzak/)



robotkid249 (/member/robotkid249/) (author) in reply to spizzak
Aug 26, 2012. 10:09 AM [Reply \(CE4OKOOH6734ORO\)](#)

FAA rules in case your payload goes into a plane, it can get chewed up easily, I guess.

6

(/member/robotkid249/)



PRO wilgubeast (/member/wilgubeast/) says: Aug 23, 2012. 2:43 PM [Reply \(CBFAZZPH673C6YE\)](#)

Did you enter this into the Hands-On Learning Contest? If not, could you?

31

(/member/wilgubeast/)



robotkid249 (/member/robotkid249/) (author) in reply to wilgubeast
Aug 24, 2012. 12:36 PM [Reply \(CJXT02MH6734L22\)](#)

I did and it should show up in the contest page. it's awaiting moderator approval. Thanks for the encouragement!

6

(/member/robotkid249/)



angelabchua (/member/angelabchua/) says: Aug 24, 2012. 11:51 AM [Reply \(CVB5U47H672WSTB\)](#)

wow wow wow. awesome video, awesome photos, and documentation!

27

(/member/angelabchua/)



kebmooore (/member/kebmooore/) says: Aug 24, 2012. 8:39 AM [Reply \(CKHO06KH6738C78\)](#)

The work that went into your project and into publishing this guide are impressive. Well done!

1

(/member/kebmooore/) Do you plan additional flights now that you have all of the prerequisites covered and most of the equipment? Will you be sending additional experiments into near-space?



PRO karalalala (/member/karalalala/) says:

This is so, cool.

Aug 23, 2012. 5:52 PM

[Reply \(C2RLPVAH6730DWD\)](#)

14

(/member/karalalala/)



PRO kelseymh (/member/kelseymh/) says: Aug 23, 2012. 4:18 PM

[Reply \(CRAL7Y9H6730DRJ\)](#)

Yowza. Congratulations! Is the horizon picture taken from your balloon? If so, you really should say so. And please put up more pictures -- several of your steps have the "no image" hand, because just videos don't count.

10

(/member/kelseymh/)



robotkid249 (/member/robotkid249/) (author) in reply to kelseymh

Yep, I updated the first Step. Thanks!

Aug 23, 2012. 5:29 PM

[Reply \(CRYDXSUH6734KDF\)](#)

6

(/member/robotkid249/)

On August 19, 2012, we launch a near space balloon on a high school student's budget from Brookfield, CT, equipped with tracking equipment and a Canon camera programmed to take pictures every 15 seconds. We captured the entire journey on film. "



PRO ilpug (/member/ilpug/) says:

Aug 23, 2012. 4:52 PM

[Reply \(CAQZSBJH672SUQT\)](#)

Ooh, me likey!

39

(/member/ilpug/)




PRO Kiteman (/member/Kiteman/) says: Aug 23, 2012. 2:11 PM

[Reply \(CRVD8WEH67388VV\)](#)

Oh, my word.

177

(/member/Kiteman/) I am left speechless...



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