



Technical Frequently Asked Questions (FAQ)

UPDATED Friday, October 26, 2012

Overview

The objective of the **Space Florida International Space Station Research Competition**, hereafter to be called the ‘Competition’, is for **Space Florida** and **NanoRacks LLC** to partner and provide a competition in which up to eight (8) winning individuals or organizations will be provided an opportunity to fly their scientific payloads to the International Space Station (ISS) and have their research conducted on board the U.S. Lab on the ISS.

The Competition is designed to bring forth innovations, research opportunities and access for customers to the ISS. Space Florida (SF) and NanoRacks (NR) share the view that “breakthroughs” in basic research on materials, biological, environmental monitoring as well as understanding complex drugs, have visible and immediate application for human health-benefiting and commercial research. This research will be beneficial to broader applications in future launch systems, frequent access to Earth orbit and help ignite commercial capabilities for dedicated launches and research opportunities. SF and NR view these areas as emerging markets for government, commercial, and academic customers.

Frequently Asked Questions (FAQ)

Here’s a collection of questions we have received from potential customers. If you can’t find the answers you’re looking for – check out the [NanoRacks Forum](#).

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- [Is the cube included as part of the kit?](#)
 - [Are the experiments limited to 1 U only?](#)
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 - [What is the thermal load in the Nanolab?](#)
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 - [What is the quality of the microgravity and how much does it vary?](#)
 - [Will we have access to a vacuum? What are the capabilities of the vacuum?](#)
 - [Will we have access to batteries?](#)
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Q–What is NanoRacks?

A–NanoRacks LLC has permanently installed on the U.S. National Laboratory aboard the International Space Station two research platforms. Each of the platforms holds up to 16 NanoRacks payloads in the CubeSat form factor. We call the payloads NanoLabs, others call them CubeLabs(TM). Each payload is 4 inches by 4 inches by 4 inches.

Q–What is the advantage of using the NanoRacks Platform?

A–Use of a standard form factor lowers the cost and speeds up the development of the research project. There is no reason to have unique research hardware, what should be unique is the research itself. What’s more, the design of our Platforms allows for an easy “plug and play” interface, in which every project on the Platform plugs into the space station power and communications system.

Q–What is a typical mission?

A–A payload is flown and installed on the space station for up to 30 days. Power and daily data downloads are through the existing station communication system. It is the ultimate plug and play.

Q–Why is there a need for a platform like this?

A–The NanoRacks Platform standardizes what has been until now custom designed hardware: the research platform and payload hardware. By providing a set standard the barrier to entry for space station research is lowered. In addition, recent advances in miniaturization means that real science can take place in far smaller containers—hence the value of the NanoLab.

Q–How often can you fly to the space station?

A–We are able to book on any cargo ship to the space station. That means Japanese, American, Russian or French. You don't have to worry about the details of the uphill ride. We take care of that.

Q–How long does it take to manifest and fly the payload?

A–We have had customers from high schools to researchers fly within a year.

Q–Is there any peer group review of the proposed payloads?

A–**No!** At NanoRacks we believe strongly that one path for space research should be any project that a customer believes in strongly enough to pay the costs (and it must of course pass the NASA safety review). We believe that breakthroughs in research, any research, sometimes involves hunches, accidents, trial and error, and that the peer review is of course an accepted system for selection, but so too the commercial path.

Q–What sort of research can take place?

A–All sorts of testing of materials and hardware in the space environment. Environmental and radiation testing, pharmaceutical and medical research. A project can be more than 1U or one CubeSat in size. It

can be 4U or 8U or even 4U long with 2U perpendicular, to allow for example for a video camera to observe what is happening in the 4U section. A lot can be done in a small space. For more information, see our web site which has a report entitled “How to Build a Great NanoRacks Payload.” (see next question for url)

Q–What materials are accepted and what other sorts of advice can you give us?

A–For starters, take a look the [Resources section](#) where we have several documents that should give you some good pointers:

Q–Do I have to be present to meet with NASA officials?

A–No. Our team handles the interface with NASA from start to finish. You work with us.

Q–Do we have to use your Platforms for payloads and do we have to use the CubeSat form factor? Are there other choices?

A–A CubeSat form factor payload can be passive, meaning it does not require power. But for return of data, it may have to be plugged into our Platform. And we do offer here research opportunities not using the CubeSat form factor. We are flying on STS-134 for example, a 2U hardware that allows researchers to take individual “wells” for materials research at a lower cost. This is a program we expect to continue in the post-shuttle era and we can discuss this with you.

Q–What sort of outside support exists for NanoRacks payloads?

A–We are excited that a vendor community is now emerging. Some examples: Entropy Engineering has been awarded a 2010 SBIR by NASA to develop a standardized bus (circuit board) at low cost, which will make building NanoRacks payloads far easier. Our friends at Valley Christian are preparing a curriculum for student payloads. Our educational partner NCESSSE has a national STEM program underway for high school students. And our partners are setting up a STEMLab program. Our hope is that, like the software and computer communities, people will come forward with imaginative ideas for use of the NanoRacks Platforms and help make space research as low-cost and hassle-free as possible.

Q–What innovations are coming from NanoRacks?

A–We are now working on more sophisticated (powerful) research Platforms, better delivery of the data, dedicated on-orbit research hardware for use by our customers (such as a microscope). We can discuss this in detail with you and check out the other sections of our site.

And above all, we are open to ideas to figure out together out to utilize the unique environment of space for all sorts of reasons.

UPDATED Questions for Friday, October 26, 2012

Q–Is the cube included as part of the kit?

A–Yes

Q–Are the experiments limited to 1 U only?

A–NanoRacks will provide a 1.5U at no additional cost. Space Florida reserves the right to award to teams that are utilizing more than 1.5 U, however there has to be a compelling scientific reason that your experiment can not be performed in a 1 U or 1.5U Nanolab. So in other words, the more space you take up, the better your payload has to be.

Q–Is there an option to have video taken of the experiment?

A–Yes, although video is considered an add-on. Other add-on's include return of material from the space station via a Soyuz, a mission longer than 30 days, greater power, unusual staffing time for the mission control, and use of other NanoRacks hardware including microscopes, Plate Reader, and centrifuge. These add-on's are available, but once again, there has to be a compelling reason to include them as they are an additional cost to Space Florida.

Q–What is the thermal load in the Nanolab?

A–2W heat rejection per cube

Q–What is the max g force on reentry?

A–About 5 g's

Q–How do you get the downlink?

A–Stella

Q–Will gyros work?

A–Yes

Q–How much does the temperature vary in the location of the Nanolabs?

A–only +/- 2F from 78F

Q–What is the quality of the microgravity and how much does it vary?

A–From 10⁻³ to 10⁻⁶ g. The poorer ug is when the crew is exercising (daily in the morning and evenings).

Q–Will we have access to a vacuum? What are the capabilities of the vacuum?

A–Not without special accomodation. The vacuum is on the order of 10⁻⁶ torr.

Q–Will we have access to batteries?

A–Yes but there are two tricks. First, flight qualified primary alkaline (D, C, AA, AAA) batteries are available on-orbit. Second, NanoRacks has flight qualified Li-polymer batteries available for \$1000 per cell.

For more information, check out the [NanoRacks Forum](#) or [contact our team](#).

