
INTERNATIONAL
SPACE APPS
CHALLENGE
2015 MISSION REPORT

The 4th annual International Space Apps Challenge in April 2015 brought 13,700 individuals from 62 countries together in 133 locations across the world

ABOUT THE SPACE APPS CHALLENGE

NASA's International Space Apps Challenge encourages innovation, creativity and collaborative problem-solving by gathering coders, makers, citizen scientists, technologists, artists, engineers, storytellers, students, and entrepreneurs together for a 48 hour problem-solving marathon.

Open data sharing is written in NASA's DNA: the Space Act of 1958 challenges the agency to "provide for the widest practicable and appropriate dissemination of information". The purpose behind the open data efforts at NASA and the federal government is to spur innovation. The Space Apps Challenge is our Innovation Incubator where we take NASA's data and wrap it in the context of mission challenges. Space Apps makes the agency's open data and open-source assets available to the public, giving people new ways to engage with high-value datasets derived from NASA's missions, with the aim of producing relevant open-source solutions to global needs.

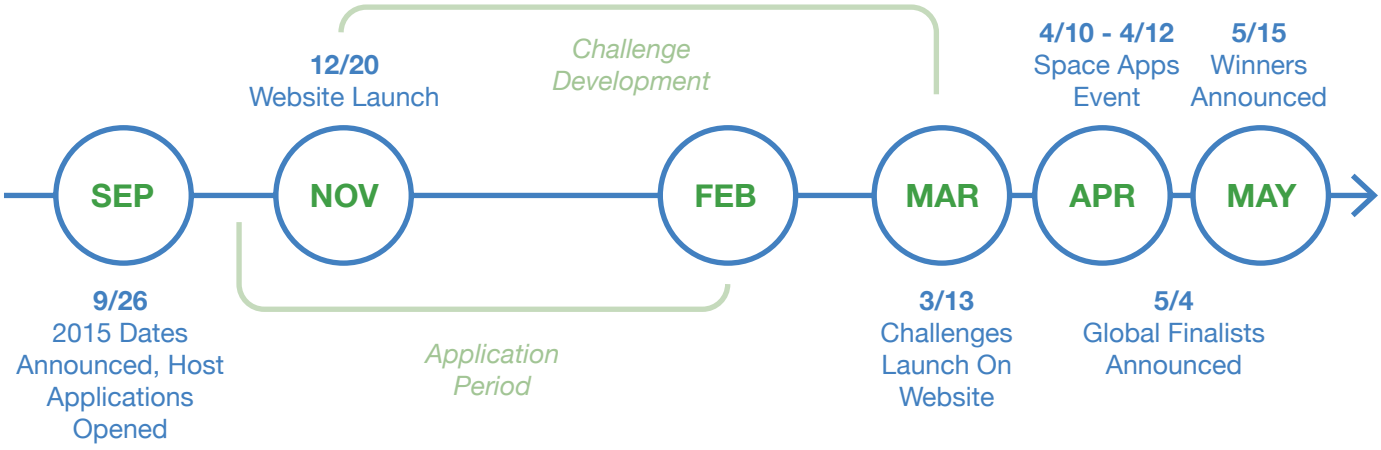
The Space Apps Global Team, comprised of people from NASA, Valador and SecondMuse, is managed by NASA's Open Innovation Team within the Office of the Chief Information Officer.

THE EVOLVING SPACE APPS MODEL

Space Apps relies on collaboration and distributed authority across hundreds of volunteer organizers worldwide. Acting in the role of convener, NASA provides the seeds for Space Apps success, outlining the vision each year; setting the challenges; and providing guidelines and best practices for hosting a local Space Apps event.

Grassroots Organization

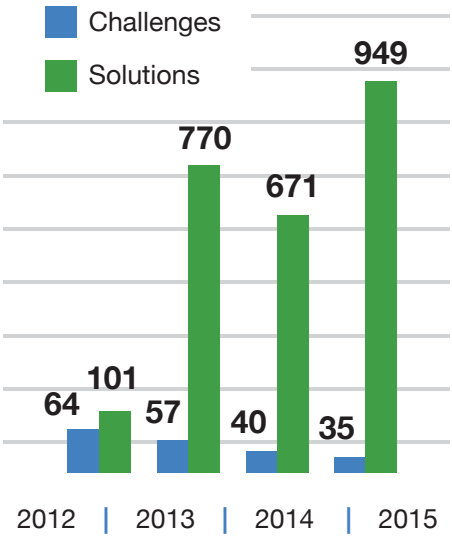
Local volunteer organizers do the heavy lifting to plant Space Apps in their own cities. Each local organizer submits an application to NASA. Once approved, the organizer builds a local team; secures the venue, technology resources, and local collaborators; and manages logistics and event promotions. NASA's Space Apps Global Team provides significant support to local organizers.



Challenge Creation

NASA develops challenges that showcase interesting datasets and tools. The Space Apps Global Team works closely with each challenge owner to build their ideas into fully-developed challenge statements. The global team ensures that each challenge has mission relevance, compelling issues to solve, usable datasets and resources, and subject matter experts available to answer questions leading up to, and during, the Space Apps event.

Other agencies and organizations also offer challenges. The European Space Agency is a consistent and enthusiastic partner each year, offering challenges that are always popular with participants.



Local Host Coordination

Three months prior to the Space Apps event, the Global Team begins active coordination with the local hosts, including weekly suggestions, reminders, resources and contacts to help organizers create their local events. The Global Team convenes calls with the organizers to communicate new information, share common issues, and answer questions.

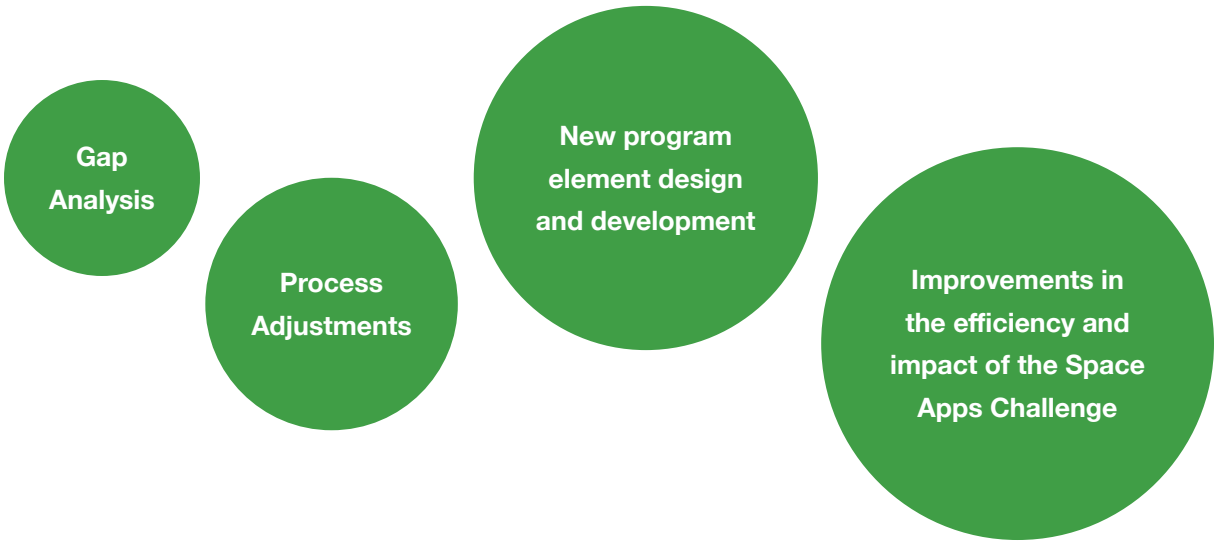
Space Apps Preparation

To prepare for the Space Apps weekend, many local organizers host pre-events in the days and weeks leading up to Space Apps. Veteran Space Apps organizers use pre-events to introduce participants to the logistics of the event, help them brainstorm challenges together, and begin the process of forming teams in advance of the hackathon itself – which allows participants to get to work immediately when Space Apps commences. This trend is one example of community-driven innovation with the Space Apps model, where experienced leads take the initiative to test out new approaches that will improve participants' experience. The Space Apps Global Team gathers feedback from organizers to incorporate into the suggested guidelines for the subsequent year.

> *"Do you know what it means for students who are from a small town...to all of a sudden mingle with people who are alike and actually be allowed to think big and believe that he can have an impact on other peoples' lives? This spark we saw in every single participant this weekend. Literally, thank you so much for making the guys believe in themselves and see that they are part of something much bigger."* - *Helene Bilaud, Quito organizer*

Continuous Improvement

Each year the NASA organizing team dedicates time and attention to distilling lessons from the process and targeting improvements and areas of growth and innovation for the coming year. Space Apps volunteer organizers and participants actively engage with NASA's Space Apps Global Team in a continuous feedback loop of observations and recommendations on how to best engage with their local communities, which then informs:



SPOTLIGHT: SPACE APPS NEW DELHI

“It was a roller coaster ride, no doubt about it,” says first-time Space Apps host Abhijeet Gahlot. “It was completely new territory for me.” In the process of building Arya Space, a company that engineers small launch vehicles for small satellites, Gahlot wanted to engage in more space technology events. He decided to become an organiser when he saw Delhi had no event. “I started Space Apps because I know the potential of the space industry and of space tech to have an impact. I wanted to spread the awareness of space tech and how people from different backgrounds can come together to form a great project. They don’t have to be rocket scientists.”

Starting out with the intention of hosting around 20 people for his first event, New Delhi ended up as one of the largest events globally, with 250 participants. One of the biggest surprises was the high level of attendance from hardware hackers. “70% of the participants were hardware developers,” Gahlot reported. “There are no hardware hackathons in Delhi so the hardware people never get to use their skills.” The hardware element drew teams from cities up to 1000 kilometers away. Many high school students also attended; the youngest participant was 13 years old. Gahlot worked closely with Astronomy Club at the Indian Institute of Technology, where the event was hosted. While rewarding, the process of hosting Space Apps for the first time was challenging. Gahlot’s advice: “Build your organizing team early, and aim for a really big number in terms of outreach.”

Now that he’s pulled off a successful event, Gahlot plans to go even bigger next year, leveraging the networks and sponsor relationships he has already developed. “I want to coordinate something at the national level for India, and have many local cities participating and working together. If people could come up with these results in only two days, imagine what we could do in India if more young people dedicated their careers to space technology.”

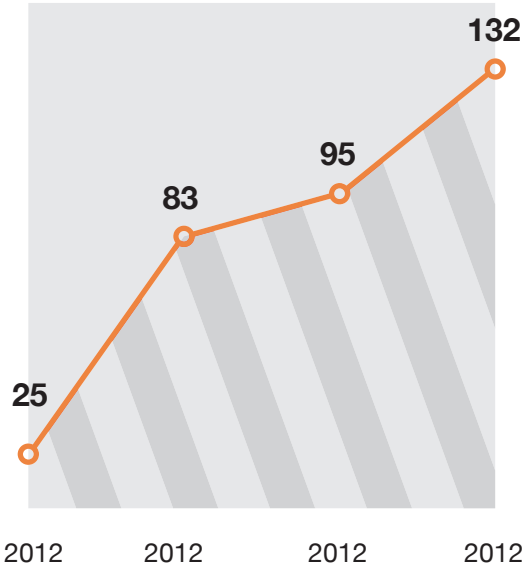
SPACE APPS 2015

The 4th annual International Space Apps Challenge in April 2015 brought 13,700 individuals from 62 countries together in 133 locations across the world, from Abidjan to Zaragoza. Participant teams, often meeting for the first time, solved 35 challenges using NASA's open data and tools, creating nearly 1000 projects in the four mission categories:

In 2015, organizers who hosted Space Apps events in prior years stepped up to mentor first-time organizers, and took the initiative to reach out to new cities within their region to establish first-time events. We see this spontaneous self-replication of the Space Apps model as a measure of success – innovation is not only taking root at the local level but the roots are stretching and seeking new ground.

"Seeing people from multiple teams collaborate and help each other out when one team got stuck on a problem was an incredible experience." - Jonathan Rach, Space Apps Orlando participant

Space Apps Locations



The significant year-on-year increase in Space Apps locations is an encouraging sign that the program is a positive experience for participants and local communities.

In Space Apps 2015, NASA's Women in Data focus increased opportunities for women and girls to develop skills. NASA endeavored to create a safe space for women and girls to engage with NASA open data. Simply naming the need was the first step, encouraging young women around the world to host Space Apps events, where they may ordinarily have felt disinclined due to cultural traditions.

Two other outcomes of the Women in Data focus include the new NASA Datanauts program which debuted in May of 2015 as a prototype for additional citizen-centered data engagement to supplement Space Apps; and the Data Fellows concept which will bring in promising female data scientists to work at NASA on short-term fellowships.

Collaboration And Growth

In 2015 more local cities banded together to collaborate within geographic regions. In Nigeria, three local events across the country coordinated their efforts. In Central and Eastern Europe a central organizing team mentored ten local sites across the region. These regional collaborations demonstrate a model of sustainable and

systematic regional growth of Space Apps communities: experienced organizers can build and strengthen existing Space Apps communities more successfully, and debut organizers in new locations can request support and guidance from their regional innovation hub.

"For the first time, my 11-year-old daughter and my husband attended as well. This was my daughter's first time at a hackathon event and she really loved it and felt included as if she had a real contribution to make." - Louise Dennis, Space Apps Exeter

Coordinated efforts also benefit local collaborators and sponsors by extending the impact of their contributions, whether through funding, subject matter expertise or resources for project follow up. The 2015 event also gave rise to interest from a variety of organizations in broader, global partnerships with Space Apps – an area for further exploration in 2016.

"I thought NASA was only concerned in exploring space. But Space Apps made me believe that NASA is also concerned in encouraging creativity of people." - Bijaya Dongol, Space Apps Kathmandu

Four years into the growth of Space Apps globally, we are now also able to see the capacity and potential of some of the mature Space Apps communities. In New York City, enthusiasm has extended to the creation of a Space Apps science and tech festival, an upcoming high school hackathon, and periodic meetups throughout the year. This increase in capacity is a testament to the strong relationships these communities build internally, as well as with NASA and the Space Apps brand – giving them a launchpad to dream big and propel new efforts to explore new territory with each successive year. We're learning about what communities want and need, in terms of data, tools, and support, so that innovation takes root at the local level.

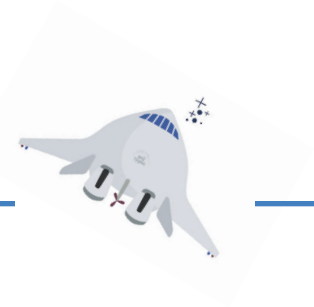
Judging And Winners

Space Apps teams produce concepts and prototypes that they present to their peers and a panel of judges at the close of the second day. Judging panels are selected independently by each location, and often include local VIPs and government officials, experts in scientific fields, successful entrepreneurs and venture capitalists, and local celebrities.

In 2015, five astronauts representing NASA and ESA participated onsite at local Space Apps events (with a sixth, ESA Astronaut Samantha Cristoforetti, sending a message of support to Space Apps participants from the International Space Station). In addition, NASA staff attended and supported the events.

Winning Space Apps projects rely on good storytelling. Without a story describing what the project solves and why it matters, a great project can get lost in the pack. With that in mind, the Space Apps Global Team stressed the need for improving the quality of team presentations so that judges at both the local and global levels could better understand the impact of the solutions developed. The point: winning teams embrace designers, artists, and communicators to complement coders, technologists, and scientists. To support the team presentation process, the Space Apps Global Team created and shared "240 Seconds of Glory," an easy, visual guide to successfully presenting a project and answering the questions that will be on the minds of the judges.

240 SECONDS OF GLORY

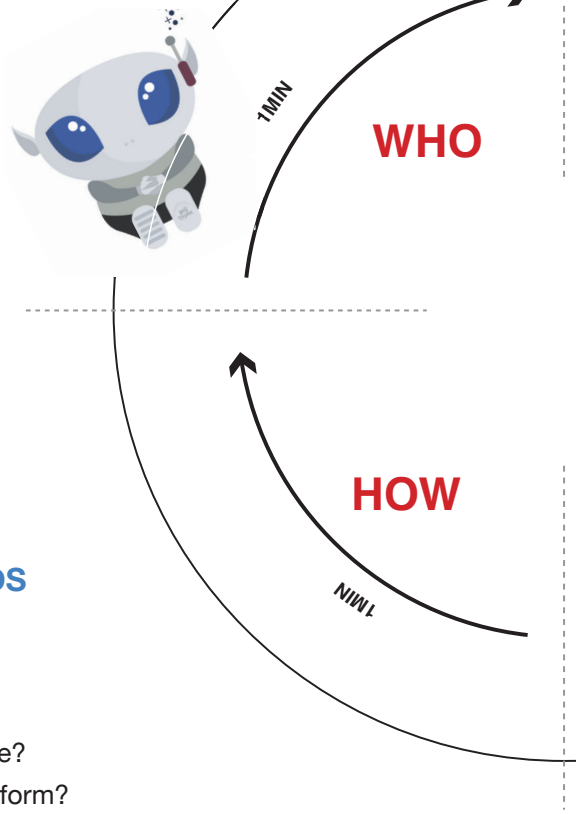


1 ATTENTION & AUTHENTICITY

START HERE

Spend the first 45 seconds grabbing the attention of your audience

- Who are you?
- What makes your team special?
- Win them over with a story
- Show them your passion
- The first 15 seconds are crucial to get them leaning forward



4 IMPACT & YOUR NEEDS

Look towards the future

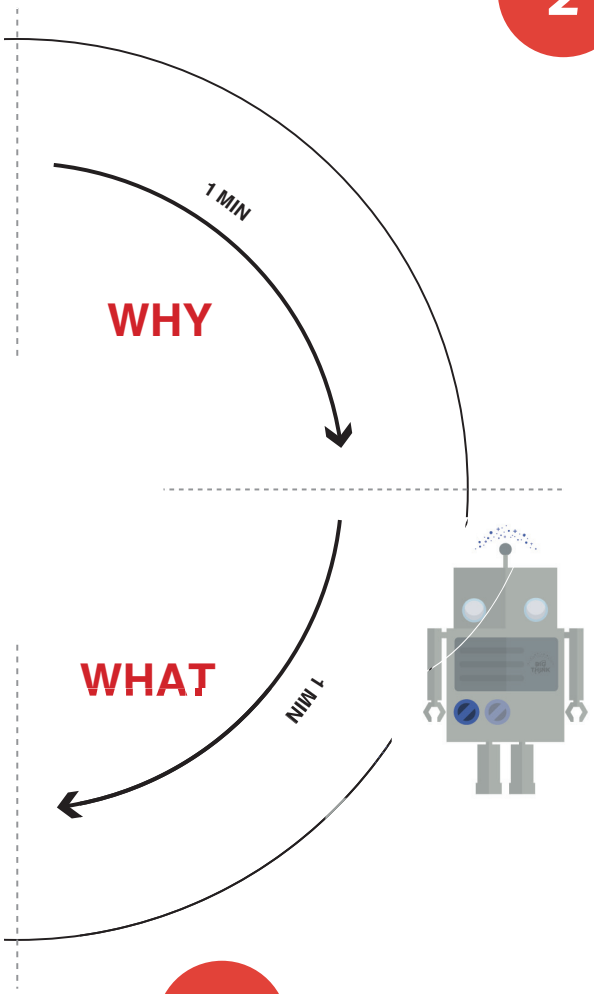
- What will this idea change?
- What is your burning platform? (What do you need to take your innovation to the next step?)
- Tantalize your audience with what it could be one day

SHOW A DEMO OR PROTOTYPE

A MODEL FOR THE PERFECT PITCH AT SPACE APPS*

•A great pitch can be the difference between greatness and obscurity. This rough guide is designed to ensure your good work gets the attention it deserves.

DESCRIBE THE OPPORTUNITY OR THE PROBLEM YOU ARE SOLVING



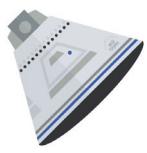
2 CREATE EMPATHY FOR THE PROBLEM...

Help your audience understand the problem you are solving

- Why is it important?
- Humanize it... Who does it affect?
- Why is it an opportunity? (Again, try and find a short story or killer data point.)
- If you can't do this in 60 seconds you're taking too long!

3 YOUR BIG IDEA: EXPLAIN YOUR INNOVATION

Detail your core concept



- How does it work?
- Provide evidence and images
- Discuss applications
- Reveal a prototype, demo or short video to bring it to life

The Global Team coached local organizers on the use of the guide and offered tips and structure to share with their participants that could increase the effectiveness of their presentations. The result was a marked increase in the quality of presentations to local judging panels, and many more dynamic video presentations among the globally nominated projects.

At the conclusion of Space Apps, each local team can nominate two local projects for global awards and one People's Choice award. For the global nominees, each is required to tell their story in a 30 second video. The teams have one week to put the video on their Space Apps project page for the global judging team at NASA.

"Prior to the challenge, I didn't give NASA (and space for that matter) much thought. however, after listening to the wonderful stories and experiences from the women of NASA and interacting with NASA staff, my interest in NASA programs is heightened. I look to teach my young son more about NASA and space from this experience because it is more tangible to me now." - Courtney Wiggins, Space Apps NYC participant

For the People's Choice award process, NASA's Open Innovation Team narrowed over 100 People's Choice global nominees to 15 finalists. Over 156,000 votes were cast over a 10-day period to select the winner.

Simultaneously, the NASA reviewers, consisting of the Open Innovation Team and Challenge owners, assessed over 250 Global Nominees provided by the Space Apps local events and narrowed the field to 25 Global Finalists in the 5 judging categories:

- **Best Use of Hardware,**
- **Best Use of Data,**
- **Best Mission Concept,**
- **Most Inspirational, and**
- **Galactic Impact.**

A panel of senior NASA executives judged the top 25 to determine the global winning projects. As the global prize, all winning teams are invited to participate in a NASA launch event.

"I loved the global nature of the event and NASA's support of fresh, innovative thinking." - Sam Yang, Space Apps Managua participant

SPOTLIGHT: SPACE APPS CAIRO

“At first I thought of registering a team,” said Cairo lead organizer Menna Hamza, of first learning about Space Apps. Upon checking out pages of other cities from 2014 and emailing other organizers, however, Hamza became so interested in the competition, she decided to host it herself. Hamza faced some challenges from among her colleagues, with more senior individuals wishing to take over leadership of the event and the relationship with NASA: “I almost didn’t have the event, I felt really demoralized, but I received so much encouragement from other leads and the global team that I persevered.”

Hamza was able to connect with the head of the Institute of Electrical and Electronics Engineers (IEEE) Cairo, who was an enthusiastic supporter. The IEEE community lent Hamza its support, and their combined efforts catapulted Space Apps Cairo to the largest global event in 2015 with over 700 people registering to participate. Significantly, a majority of the organizing team members and volunteers at Space Apps Cairo were women. “About half our event participants were also women,” Hamza said. “There were even eight girls who traveled four hours all the way from Alexandria to Cairo to be part of it.”

One of Hamza’s favorite moments of the Space Apps Cairo event shines a spotlight on the spirit of collaboration that Space Apps is all about. “Five people planned to work as a team on the Zero Bee Gee challenge,” Hamza said. “They invited anybody else who was working on that challenge to join their brainstorm session to discuss together so they all improved their understanding of the challenge before they started competing and solving it. I was so happy to see people help one another that way. I saw that even though everyone wanted to win and travel to NASA, they were working together – a huge collaboration.”

As for next year, Hamza and the Cairo organizing team are already working on their plans. The 2015 event was more successful than any of them could have imagined. “Of course we are going to be doing this again next year,” Hamza states confidently. “We are also planning to build the Space Apps community in Egypt. We have extra money from sponsors, so we’re planning to make some community building events across Egypt to prepare for Space Apps 2016.”

SPACE APPS 2015: AWARDS

BEST USE OF DATA

Winning team: **NYSpaceTag**
Location: **Space Apps NYC**
Challenge: **Data Treasure Hunting**

A tagging system that extracts natural keywords from titles and descriptions. It allows users to explore concepts, see related concepts, and drill down directly into the data.

Two Space Apps veterans and data scientists, Jon and Matt, came to Space Apps wanting to build together in response to the Data Treasure Hunting challenge. At the event, they were introduced to another data expert, Tim, and Irena, a visiting Space Apps organizer from Macedonia who had attended the Space Apps Data Bootcamp the day before and was eager to plug into a team.

Irena brought expertise in how to tell the story and communicate the project's impact. The team exceeded the challenge requirement to tag 70 datasets, by tagging and articulating relationships for over 16,000 datasets during Space Apps weekend. NYSpaceTag is currently working with NASA's Open Data team to apply the team's algorithm to data.nasa.gov. Once the solution is in place, NASA plans to offer it to other federal agencies.

BEST USE OF HARDWARE

Winning team: **Valkyrie**
Location: **Space Apps Sofia**
Challenge: **SpaceGloVe: Spacecraft Gesture and Voice Commanding**

An innovative approach to gesture and voice recognition using a sophisticated "smart" glove and mobile device which can be used in the home or in space to control devices such as a robot arm and robots using WiFi, BLE, or V-API.

After finishing as a finalist in 2013, Martin and his team of university friends returned to Space Apps Sofia in 2015. The team, passionate about futuristic technologies (such as bringing home automation to their dorm), was immediately drawn to the SpaceGloVe challenge. Building on some of their experience with wearables and home automation, the Valkyrie team created a project to bring wearable technology to space. Over the Space Apps weekend, the team worked with limited access to parts due to store closures for a Bulgarian holiday. They burned through five batteries in the process. Just ten minutes prior to the deadline for presentations, their prototype glove worked. Moving forward, the Valkyrie team wants to develop a universal API for the technology, and plans to improve the design to increase the comfort factor for future users.

BEST MISSION CONCEPT

Winning team: **Arachnobeea**
Location: **Space Apps Limassol**
Challenge: **ZERO GEE Bee – Your Friendly Neighborhood Drone**

A drone with the ability to work even in airless (or any other gas) environments and move around a facility in an efficient and adaptable way.

The Arachnobeea team is comprised of colleagues and friends from two countries, Cyprus and Serbia, who came together for the Space Apps weekend with a shared love of space, and the desire to solve the ZERO GEE Bee space drone challenge. Experienced with building drones, the team wanted to create something greater than a traditional quadcopter.

Over the course of Space Apps weekend, the team designed a mechanical arm with four limbs that could be adaptable to gasless environments, move autonomously, and carry out tasks. With further research, the team wants to push the limits of their ideas and adopt electroadhesion technology to the limbs of the arm. They plan to build their project into a working prototype.

GALACTIC IMPACT

Winning team: **CROPP**
Location: **Space Apps Rome**
Challenge: **Crop Alert – Learning From the Growers**

CROPP (Cultures Risks Observation and Prevention Platform) is an easy and user-friendly application designed to help farmers monitor their land.

The CROPP team, a group of university friends, participated in Space Apps for the first time, specifically to take part in the Crop Alert challenge. Complete with a group of satellite engineers and a hardware expert, the team's greatest challenge centered around integrating the sensors with the software.

Working collaboratively, with guidance from mentors at the Rome event, the team completed a prototype that collected short term measurements from the local area, coupled with macroscopic images for a broader farming area.The team seeks to improve the hardware, electronics, and connectivity to work out bugs and improve resolution from satellites in order to offer their innovation as a publicly available app.

MOST INSPIRATIONAL

Winning team: **Tracking and Sensing**
Location: **Space Apps Kathmandu**
Challenge: **Sensor Yourself**

A mobile robot platform that is capable of extracting data from nearby objects using on-board sensors present in an Android smartphone.

The Tracking and Sensing robotics team was formed by three engineering buddies. Despite the sharp rise in developers in Nepal in recent years, robotics is a fledgling field, so tackling the Sensor Yourself challenge was daunting. Taking advantage of the Space Apps collaborative spirit of innovation, the team sought advice from more advanced programmers at the event to help them merge the hardware and software aspects of the challenge to create a winning solution.

Since Space Apps, the team shifted their focus and efforts into integrating smartphones into society as a way to address challenges in Nepal. To do this, the team is looking for a local physical space to convene a community of Android and robotics hackers.

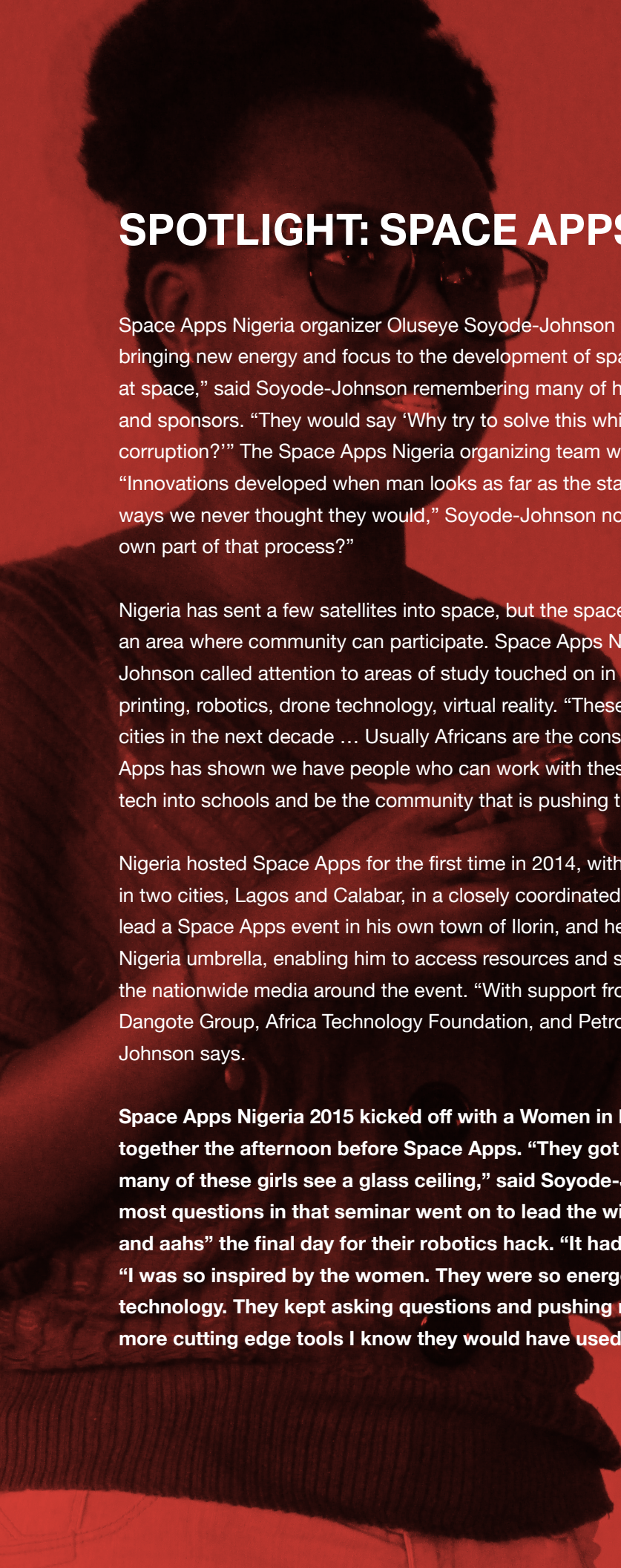
PEOPLE'S CHOICE AWARD

Winning team: **NatEv Explorer**
Location: **Space Apps Pristina**
Challenge: **Volcanoes, Icebergs, and Cats from Space**

An interactive web-based globe with the most interesting/hazardous natural events shown at the user's location. Users have the ability to view additional data, get inspired to explore other events, and submit them to the web application.

The NatEv team was formed when four university friends met a group of three friends from another university at Kosovo's first ever Space Apps event. The team members selected the Volcanoes, Icebergs, and Cats from Space challenge to create a project to help people affected by global natural disasters.

The team started with the basic idea of mapping some major geological events on an application, then continued to add new, unique features. Accustomed to working for several months on a university project, the team stepped up to the challenge of creating a working prototype in just two days. Their hard work paid off, as evidenced by the high volume of votes for their project in the People's Choice competition. The NASA subject matter experts are quite intrigued with their project as well. The team is continuing development on NatEv Explorer for public release in the future.



SPOTLIGHT: SPACE APPS NIGERIA

Space Apps Nigeria organizer Oluseye Soyode-Johnson believes Space Apps has been instrumental in bringing new energy and focus to the development of space technology in Nigeria. “Africa is not looking at space,” said Soyode-Johnson remembering many of his early efforts to pitch Space Apps to partners and sponsors. “They would say ‘Why try to solve this while Africa has so many issues with water, traffic, corruption?’” The Space Apps Nigeria organizing team wants to build a new vision for space within Nigeria. “Innovations developed when man looks as far as the stars end up invariably affecting us on the ground in ways we never thought they would,” Soyode-Johnson noted. “What happens when Africa starts owning their own part of that process?”

Nigeria has sent a few satellites into space, but the space sector is viewed as largely commercial rather than an area where community can participate. Space Apps Nigeria is actively seeking to change that. Soyode-Johnson called attention to areas of study touched on in the 2015 Space Apps challenge statements: 3D printing, robotics, drone technology, virtual reality. “These things will fundamentally change how we live in cities in the next decade … Usually Africans are the consumers, not the producers and innovators. Space Apps has shown we have people who can work with these technologies here in Nigeria. We can bring this tech into schools and be the community that is pushing this agenda into the public sector.”

Nigeria hosted Space Apps for the first time in 2014, with Soyode-Johnson and his colleagues leading events in two cities, Lagos and Calabar, in a closely coordinated effort. In 2015, a former participant applied to lead a Space Apps event in his own town of Ilorin, and he was immediately brought under the Space Apps Nigeria umbrella, enabling him to access resources and sponsors from the other cities and benefit from the nationwide media around the event. “With support from our forward-thinking African partners like The Dangote Group, Africa Technology Foundation, and Petrodata, next year we plan to do five states!” Soyode-Johnson says.

Space Apps Nigeria 2015 kicked off with a Women in Data seminar where women and girls came together the afternoon before Space Apps. “They got to listen to top women in tech in a society where many of these girls see a glass ceiling,” said Soyode-Johnson. Two of the young women who asked the most questions in that seminar went on to lead the winning Space Apps team, receiving many “oohs and aahs” the final day for their robotics hack. “It had a real impact on me,” Soyode-Johnson recalled, “I was so inspired by the women. They were so energetic, so passionate, so giddy and excited by the technology. They kept asking questions and pushing more tools. If we had provided them with even more cutting edge tools I know they would have used them to the maximum.”

BEYOND SPACE APPS

The Space Apps incubator sparks new thinking on how to encourage even greater levels of innovation. An exciting range of events, programs and resources has emerged from the International Space Apps Challenge.

Space Apps Data Bootcamp 2015

After the 2014 International Space Apps Challenge, NASA saw the need to engage more women, creating a Women in Data study. After conducting more than two-dozen interviews and additional research on women in data, making, and startup communities, NASA focused on ways to empower, equip and honor women who are making a difference in the field of data science.

The study insights led to the development of the inaugural Space Apps Data Bootcamp the day before the kickoff of the 2015 Space Apps mainstage event in New York City.

"I loved the Data Bootcamp a lot. I really like listening to speakers--their experiences, their work, and their goals to create tech events and opportunities for women of all ages, backgrounds, color and religion. Seeing other women in the room made me feel more comfortable about attending the hackathon weekend and making it more about education and team building than competing and winning." - Tiffany Linzan, Bootcamp participant

The goals of the Bootcamp were to provide opportunities for individuals interested in participating in hackathons to get their feet wet using data, skills, and resources that would help them to engage productively as project team members at a hackathon; as well as to gain a better understanding of how the existing skills and perspectives they bring to the table can be an asset to their project teams.

In keeping with the Women in Data focus of Space Apps 2015, the program featured exceptional women who impact their communities through creative and unique data engagement tools, techniques, and engagements. Putting a spotlight on women (and even offering childcare for parents with young children) ensured the Data Bootcamp was a welcoming space for women and girls interested in exploring Space Apps for the first time. To ensure Bootcamp remained open to the broader community, NASA livestreamed the program, enabling participants from around the world to tune in and follow the presentations and workshops, and even ask questions.

Plenary sessions in the morning included women hackers, scientists, entrepreneurs, and astronauts who shared insights on data manipulation, creative problem solving, and storytelling through data, as well as what to expect at a hackathon. Speakers included NASA Astronaut

"We always thought that spacial agencies were something out of this world. I think that the open innovation, collaboration, networking, and the way you are helping us empower youth is outstanding. We have done the event 3 times and because of this event the perception of science and technology in many universities and the government agenda in Guatemala is changing. Very smart and generous approach to help science and technology worldwide. NASA for many youngsters is the best technology agency they know and they are thrilled to participate."
- Maria Zaghi, Space Apps Guatemala Organizer

Cady Coleman, who spoke about her work with space robotics; IBM General Manager and author Sandy Carter, who shared career hacks for women entering technology fields; and 13-year-old Olivia Ross from Black Girls Code, who discussed her first (winning) hackathon experience. The afternoon sessions were hands-on breakout groups where participants got to work closely with mentors on sample projects including using NASA's new open data APIs, building wearable technology, using datasets in game building, and discussing ways to engage in a hackathon for the first time.

The Bootcamp closed with the Women in Data Panel and kickoff reception for Space Apps 2015 in New York. The panel was introduced by New York City's Chief Technology Officer, Minerva Tantoco, and speakers included Cady Coleman, Ellen Stofan and NASA's Open Innovation Program Manager, Beth Beck. The panelists answered questions from the floor, and from around the world, about NASA's work, upcoming missions, and how citizen scientists can be a part of NASA's efforts.

"I've made friends with a few attendees that are shaping up to be long lasting relationships... and being a new mom, I really appreciated the babysitting." - Courtney Wiggins, Bootcamp participant

Highlighting the accomplishments of NASA female executives and leaders in the startup tech community demonstrated our active encouragement of women from all backgrounds and skill levels to engage in problem solving with NASA data. Bootcampers expressed appreciation for the inspirational stories shared by the speakers on the barriers, challenges, and opportunities for women in the tech workplace.

> *"I got to do the event with my daughter. Exposing her to that type of environment, it was illuminating for her as it was for me too." - Cesar Abueg, Space Apps Orlando participant*

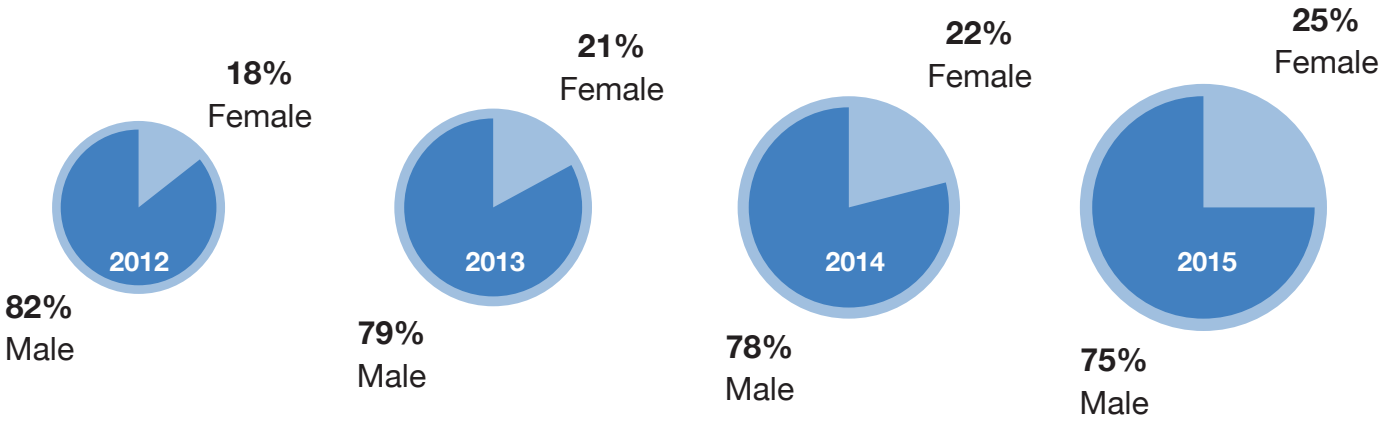
119 participants registered to attend the Bootcamp, and 84% of the attendees on the day of the event were women. Young women were particularly well-represented, with 18% of participants under 18 years of age and 67% under 35. In addition to the NYC event, Cairo and Lagos hosted Bootcamps, while Rome and El Salvador gathered together to participate virtually via the livestream.

"The time that these women spent was amazing and I appreciated the intimacy of the conversation. And I loved the challenges for the hackathon. There was such a nice range of projects - many different areas, and different levels of challenge so that EVERYONE could feel successful." - Jennifer Lau, Bootcamp participant

The positive response to the Data Bootcamp from participants and viewers of the livestream suggests that it would be worthwhile replicating the Data Bootcamp model in more locations, leading to further community-based innovation similar to the Space Apps model itself. In fact, NASA is looking at applying the model internally to grow and nurture female employees with data science skills. Further, NASA is considering the creation of a Data Academy that offers online classes to supplement Bootcamp.

One of NASA's goals for the Data Bootcamp pre-event to Space Apps was to give women an opportunity to get comfortable with data and code, begin teaming, and kick start their efforts for the Space Apps hackathon activities the following day. The Space Apps Global Team and NASA executives who attended Space Apps NYC were pleased to see Bootcampers first in line to get in the following morning for the hackathon; front and center at the opening festivities; and actively forming, recruiting, and leading project teams. Bootcampers, many of whom are young women, participated confidently and actively during the weekend through collaborative teaming, building impactful solutions, and presenting their results to the Space Apps judges. One all-female Bootcamper team took top honors with the Space Apps NYC judges. Bravo!

Bootcamp clearly impacted on the ratio of men and women participating in Space Apps NYC. While globally 25% of all Space Apps participants were women, in New York City, women made up 49% of participants, and many of that number were Bootcamp attendees.



Space Apps Project Accelerator Toolkit

"Doing such events opens minds of people [about] how actually NASA is caring about human life both on earth and Space."
- Shakeel Shafiq, Islamabad Organizer

In 2015, NASA released the Space Apps Project Accelerator Toolkit to the Space Apps community. The toolkit offers a resource to local Space Apps organizers to build their own community-sourced incubator to accelerate the most promising projects into sustainable innovations that benefit humanity. Many Space Apps teams with promising solutions need guidance and support to move beyond the hackathon environment, from prototype to early-stage start-up and beyond. The Toolkit is designed to help innovation take root in communities around the planet, planted from the seeds of NASA's open data.

Since its inception in 2012, Space Apps has thrived on a community-based model, which has fostered local innovation with global reach. The toolkit applies this same framework to incubation and acceleration, and offers options for local organizing teams to leverage unique local resources to build a successful acceleration process.

"I understand NASA priorities better and how they relate with the whole world in general as compared to the thought I had that NASA only serves the interests of the United States of America. The learning [was] unparalleled and the exposure also. Congratulations to NASA for the program." - Brian Amuh, Space Apps Nairobi Organizer

Space Apps organizing teams in Nairobi, Guatemala, and Dakar are undertaking efforts to accelerate projects created during Space Apps 2015. Because the Space Apps Project Accelerator Toolkit is a new tool, NASA and the Global Space Apps Team will assess the process as the local organizers share experiences and resources. Like Space Apps itself, the Project Accelerator Toolkit is community-owned and continuously evolving. The Global Team continues to work with local teams to offer support; and to capture and integrate learning in an effort to further develop the accelerator process so project teams around the world can reach their full potential.

SPECIAL THANKS

Deborah Diaz, NASA Office of the Chief Information Officer, Chief Technology Officer for IT, without whom Space Apps would not exist

NASA Challenge Category Owners

Lawrence Friedl, Director of Applied Sciences, Science Mission Directorate

Dr. John Allen (Human Exploration and Operations Mission Directorate)

Dr. David Miller (NASA's Chief Technologist)

Women in Data Panel Members

Dr. Ellen Stofan, NASA Chief Scientist

Cady Coleman, Astronaut

Minerva Tantoco, Chief Technology Office of New York City

NASA Global Judges

Cady Coleman, Astronaut

Deborah Diaz, NASA Office of the Chief Information Officer, Chief Technology Officer for IT

Dawn Schaible, Deputy Chief Engineer

Gale Allen, Deputy Chief Scientist

Greg Williams, Deputy Associate Administrator for Policy and Plans, Human Exploration and Operations Mission Directorate

Lawrence Friedl, Director of Applied Sciences, Science Mission Directorate

Office of the Chief Technologist team

Space Apps Global Team

NASA

Beth Beck

Jason Duley

Danielle Gervalis

John Sprague

Jeanne Holm

Eldora Valentine

Nick Skytland

Valador

Ali Llewellyn

SecondMuse

Elizabeth Sabet

Blake Garcia

Katey Metzroth

Michael Brennan

Special Contributors

Donna Connell, Valdor

European Space Agency (for challenges and data!)

Gladys Henderson and Jason Kessler, NASA Office of the Chief Technologist,

James Parr, Imaginals

Syd Mead, Artist

Design and Infographic

Jonathan Kurten, Phuse

Photography

IST Media Club

Space Apps Lima

Space Apps Cairo

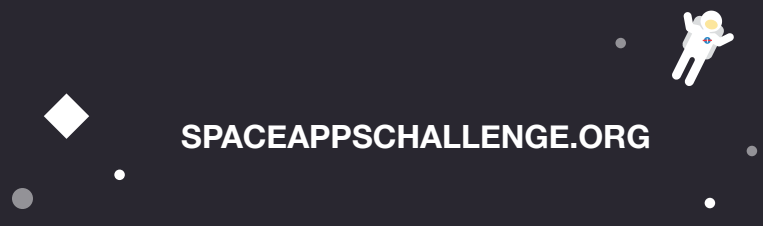
Shiku Nyambura

Amanda Ghanooni

Clare Hyde

And most importantly…

A big round of applause for all Space Apps local organizers and participants. You ARE Space Apps!


SPACEAPPSCHALLENGE.ORG