



## **Ali Guarneros Luna** **Aerospace, System and Quality Engineer**

Ali Guarneros Luna currently works at NASA Ames Research Center Programs and Projects Management Division (PX). Prior to her work in the PX, Ali worked in the Office of System Safety & Mission Assurance (SS&MA) and the Office of Engineering Directorate as a technical authority for small satellite development and payloads bound for the International Space Station (ISS). In the Synchronized Position Hold, Engage, Reorient, Experimental Satellites (SPHERES) National Lab, she worked as the system and safety engineer. In the Edison Program, Ali served as the system engineering, mission and ground operations, and launch vehicle service expert for multiple CubeSat projects including the Technological and Educational Nanosatellite (TechEdSat). Ali functioned as the Deputy Project Manager, ISS expert, and launch vehicle interface for the Small Spacecraft Technology (SST) program's Nodes project. In the Sub-Orbital Aerodynamic Re-entry EXperiments (SOAREX) Series of suborbital experiments, Ali has performed in multiple engineering roles to include design, building and testing engineer. Ali is currently the deputy project manager and co-investigator for the SOAREX 10 and Safety Mission and Assurance for TechEdSat 5 and 6.

Ali was born in Mexico City and now lives in San Jose, California. She received her Bachelor of Science and Master of Science degrees in Aerospace Engineering from San Jose State University (SJSU) in 2010 and 2013, respectively.

Upon completion of her undergraduate degree, Ali obtained an internship at NASA Ames with the Office of the Chief Technologist. During her time as an intern, she led and helped develop education and outreach programs for SJSU. The first program was called System of Networked Autonomous Positioning Satellites (SNAPS) followed by the TechEdSat Series. As a professional engineer, Ali has led various projects affiliated with the International Space Station (ISS).

During her internship at NASA Ames, Ali supported the SNAPS project, which is an evolution of the SPHERES program, which aims to demonstrate the practical applications of a network of autonomous probes. SNAPS was a test bed for guidance, navigation, and control (GNC) capabilities to enable probes to navigate without human interference or the need for external control. The technology will exist as a platform for future missions, such as an interferometer array for space observation or autonomous assembly of larger vehicles using modular parts. Through this program, the aerospace engineering senior class at SJSU has the opportunity to build a platform that may be used for technology demonstrations.

As a professional engineer, Ali was mission manager for TechEdSat-1. In this capacity, Ali had managerial and oversight on all technical and programmatic aspects of the NASA Ames - San Jose State University project. In particular, Ali provided technical contributions to both speed the development and avoid ISS define hazard that could stop the mission, through innovative design, lab testing, and qualification methods for the TechEdSat flight hardware. She also developed and engineered the Auxiliary Lateral Inhibit (ALI) Switch for safety deployment from the ISS. Ali has co-authored technical papers for the TechEdSat structure and payload including the project plan and Safety Data Package, among others.

Her efforts enabled the project to successfully meet both ISS program and Ames Engineering Requirements. Developed, built, tested and certified for flight to the ISS in

only 9 months, TechEdSat-1 was the first American CubeSat deployed from the ISS as well as being one of the first CubeSats deployed from the Station overall. TechEdSat-1 completed a life cycle with over 1000 beacon packets and 208 days of service. The TechEdSat-1 deorbited May 5<sup>th</sup>, 2013.

As a result of TechEdSat-1's enormous success, an opportunity was presented to develop, build, test and certify TechEdSat-3P which ultimately launched to the ISS in 2013. For this mission, Ali served as a mentor to the other students and engineers as well as performed the role of safety engineer. For TechEdSat-4, launched in 2015, Ali was a radio frequency, safety and system engineer. TES-4 developed further the Exo-Brake passive deorbiting system by adding drag-modulation for accurate de-orbit and eventual re-entry control. It is also demonstrated a satellite-to-satellite communications system that allows for more frequent communication sessions with the satellite, leading to a higher rate of accuracy for satellite altitude and positioning predictions which are important for the operation of the Exo-Brake. TechEdSat-4 was also deployed from the ISS with re-entry occurring in only 4 weeks. For TechEdSat-5 Ali was the lead Safety Engineer. She ensured that all the safety requirements were identified, controlled and verified for ISS requirements. Ali also work on TES-6, TES-7, TES-8 and TES-10 as the quality and system engineer.

Ali was the deputy project manager, liaison and lead for ISS requirements for the Network and Operation Demonstration Satellites (Nodes) mission. The Nodes mission consists of two 1.5- unit (1.5U- 10X10X15 cm) nanosatellites derived from the hardware and software developed for the Edison Demonstration of Smallsat Networks (EDSN) mission (a swarm of eight spacecraft). Each Node utilizes the Android operating system with EDSN- specific software programmed to perform command and data handling tasks that allow the satellites to 1) relay ground commands through one satellite to the second satellite, 2) collect and relay science data on the radiation environment in the ISS orbit from each satellite to the ground station, and 3) autonomously determine which of the two satellites is best suited to control the space network and relay data to the ground ("Captain") and notify the ground system and second satellite ("Lieutenant") of the result. The science instruments on each satellite will collect data on the radiation environment at an altitude of 400 kilometers (km) above Earth after being deployed from the ISS. This mission was deployed from the ISS in May 16<sup>th</sup>, 2016.

Developing new technology, Ali worked with the SOAREX Series team. SOAREX serves as a test bed for a variety of re-entry and supporting technologies for use in autonomous sample return and other applications. Within the SOAREX team, Ali has multiple engineering roles from designing, building and serving as a testing engineer. She is also the deputy project manager and co-investigator for SOAREX 9 and SOAREX 10 missions. Ali supported the Orion Thermal Protection System (TPS) as a S&MA lead for the sensor on the Heat Shield (HS). She oversees the quality and safety of the design, build and testing of the sensor that will be installed in the HS for the next flight in 2018.

Ali works currently for the Small Satellite Technology Program at NASA Head Quarters (HQ). She is leading and Managing the Tipping points technology which are technologies that NASA wants to mature for commercial use.

As an aerospace engineer, Ali recognizes the significance of relatable role models. She is an advocate and actively promotes Science, Technology, Engineering and Math (STEM) education. She is registered with the NASA Ames Speakers Bureau and is an active participant of this program, speaking to local classrooms and community events about her

role with NASA. Ali also supports yearly programs including, Girls Scouts Go Tech, SJSU Society of Latino Engineers and Scientists (SOLES) Science Extravaganza, Society of Women Engineers (SWE) Get Set, SWE “WOW that is Engineering”, and the Society of Hispanic Professional Engineers (SHPE ) “Noche de Ciencia (Science Night)” by providing hands-on activities, tours of NASA’s federal research labs, and motivational sessions for underserved and underrepresented STEM K-12 and college groups.

Ali’s past community involvement includes being a member of the Plug-n-Play Mission Operations (PPMO) Workshop organizational committee at NASA Ames and helped organize the workshop, which was held at SJSU. Additionally, Ali was on the student committee for the 10th International Planetary Probe Workshop (IPPW-10), which was held at SJSU during the Summer of 2013.

Most notable is Ali’s international reach and impact. In 2012, Ali had contact with the Mexican university, Universidad Autonoma de Baja California, UABC. She hosted a 6-week workshop at SJSU for the UABC students to build and launch an amateur rocket. The success of this project was greatly broadcasted in Mexico. As a result, the Agencia Espacial Mexican, AEM, became interested in organizing a similar program with the involvement of more universities.

#### **LinkedIn**

[https://www.linkedin.com/profile/view?id=45330950&trk=nav\\_responsive\\_tab\\_profile](https://www.linkedin.com/profile/view?id=45330950&trk=nav_responsive_tab_profile)

#### **HENAAC 2013 Luminary Honorees**

<http://www.greatmindsinstem.org/professionals/luminaries-2013>

#### **Radio Amateur Encourages Engineering as a Career**

<http://amsat-uk.org/2012/03/11/radio-amateur-encourages-engineering-as-a-career/>

#### **KJ6TVO “Pursuing My Childhood Dream”**

<http://amsat-uk.org/2012/07/20/kj6tvo-pursuing-my-childhood-dream/>

In recognition of Ali Guarneros Luna’s achievements and extensive community involvement, the Hispanic Engineering National Achievement Awards Conference (HENAAC) named Ali as one of the 2013 Luminary Honorees.

<http://www.greatmindsinstem.org/professionals/luminaries-2013>

Ali received technical merit with the International Space Station (ISS) Space Award in 2014 for her contributions to SPHERES, Modular Rapidly Manufactured Small Satellite (MRMSS), Nodes and TechEdSat Series Projects:

- SPHERES: For dedication and exceptional performance in the development and operations of free flying robotic satellites inside the ISS testing autonomous satellite maneuvers.
- MRMSS: For dedication and exceptional performance in research and development of modular design and manufacturing processes for spacecraft systems.
- Nodes: For dedication and exceptional performance in two nanosatellites that will be deployed from ISS to demonstrate networking and advanced multi-spacecraft operations.
- TechEdSat Series: For exceptional performance and dedication in the development, test, launch, ISS deployment, and operation of the TechEdSat Nanosatellite

spaceflight mission, launching the first NASA CubeSat from the ISS.

- TechEdSat-3p: For exceptional performance and dedication in the development, test, launch, ISS deployment, and operation of the TechEdSat-3p Nanosatellite “Exo-Brake” spaceflight mission, launching the first 3u NASA CubeSat from the ISS.

In October 2015, Ali was awarded the NASA Honor Award - Equal Employment Opportunity Medal. This prestigious NASA medal is awarded for outstanding achievement and material contribution to the principles and goals of NASA's Equal Employment Opportunity, Diversity, and Inclusion Programs, either within the Government or within community organizations or groups.

In February of 2018, Ali was awarded the 2017 Space Technology Award for the Project Nodes.

Ali's international recognition includes the Ohtli Award or Reconocimiento Ohtli, which will be presented to her May 3, 2018. The Mexican Government bestows this honor to individuals who have given assistance to Mexican citizens or promoted their culture.

<https://mexampac.org/2018/05/10/ime-otorga-10-reconocimientos-ohtli-en-eua/>

In October 2018, Ali was recognized by the Women of Color (WOC) as the 2018 WOC Outstanding Technical Contribution to the Government Award.

<https://www.facebook.com/watch/?v=414512136035175>

In September 2019, Ali was recognized by the Hispanic Engineer National Achievement Awards Corporation (HENAAC)- Great Minds in STEM Conference as Most Promising Scientist or Engineer with a Master's.

<http://www.greatmindsinstem.org/professionals/award-winners-2019>

In September 2020, Ali was award as the Contracting officer Representative of the year for NASA in recognition of her work as Manager for the Tipping Points program.

Ali's significant technical contribution to NASA and international space research along with her extensive community involvement promoting STEM to mass underrepresented STEM populations are highlighted in many media sources, including:

- SJSU Alumna Spotlight: <http://www.sjsu.edu/ae/alumni/guarneros-luna/index.html>
- NASA Ames Podcast: <https://www.nasa.gov/ames/nisv-podcast-Ali-Guarneros-Luna>
- MSN Noticias: <http://www.msn.com/es-xl/noticias/otras/nunca-pens%C3%A9-que-llegar%C3%ADa-a-la-nasa-ali-guarneros-luna-la-ingeniera-aeroespacial-mexicana-que-desarrolla-proyectos-para-viajar-a-marte/ar-AAAtJCt>
- Xataka México: <https://www.xataka.com.mx/ciencia/ali-guarneros-luna-la-ingeniera-mexicana-que-tendra-la-mision-de-llevar-la-realidad-virtual-al-espacio>
- BBC Mundo: <http://www.bbc.com/mundo/noticias-41547843>
- 2019 WiSE Conference <https://news.txstate.edu/campus-community/2019/2019-wise-conference.html>