

*"That's one small step for man, one giant leap for mankind"- Neil Armstrong*

## **The Journey with Eva**

### **Prologue**

When man first stepped on the moon, the world rejoiced. Human kind had finally broken the 'final frontier'. Here in this day and age where technology practically is used in almost every walk of life, we have come to understand that the world has become a very curious place. The road to innovation and creation is an ever evolving one where new inventions often come from the most unlikely places.

Believe it or not, all of *"this"* stemmed from the spark of one simple idea. Big things start small after all.

I myself don't have engineering major; rather I majored in International Relations (though I would have to admit, it was my dream to be an astronaut); but as we all know life often takes turns we can't control.

I would have to admit though, this is not a story of "rising from the ashes" or how a random discovery led to the changing of the world; rather it's the story about real life, building bridges, and how a simple challenge held by NASA brought people from literally four corners of the globe together to create something wonderfully innovative for a common cause. We all had dreams to work with NASA, and regardless of what happens here, I know for a fact that we all are going to strive to continue to work towards our life long goals and dreams.

Forming Team Eva here on HeroX was probably the first among many steps that we each as individuals would have to take in order to get to where we want to be. And as the astronaut Neil Armstrong said, *"That's one small step for man, one giant leap for mankind."*

Though joining the Space Poop Challenge on HeroX was a small step, it was a giant leap in the right direction.

*“Shoot for the Moon. Even if you miss, you’ll land amongst the stars.” - Brian Littrel*

## Chapter 1

The real journey all started when a bouncing three year old dreamed of becoming an astronaut, and as she grew older her innocent dream soon became a lifelong passion. Her main goal was to somehow wind up in NASA and earn her wings as a pilot. You see both her parents worked in the Airlines, and she had spent much of her childhood literally in the air. And as we all know, it only takes a spark of interest to evolve into something much deeper and more profound. I mean, we all had to start somewhere right? Take a look at the astronauts living up there in space- the mere idea of sending someone *“up there”* in a rocket ship sounded impossible and crazy at one point in history; but look at all of us now. We’ve reached the point where we as a people are trying to find ways to prolong our ability to live *“out there”*.

Once she entered middle and high school, she directed her line of study towards that one dream. Everything seemed to be going so smoothly until one unforeseen event changed the course of her life forever. With the passing of her father in October 9, 2008 all the dreams, hopes, and sense of security seemed to vanish as well. Now, her mother along with herself and four younger siblings had to fend for their own, in a foreign country where they literally didn’t have anyone else to support them.

The life of an expat could most certainly be a lonely one-especially if you didn’t have friends or family. As fate would have it, her mother had recently started working again to help support the family, as the stress of flying had already begun to take a toll on her father; his health was waning. And like most fathers, he didn’t speak of his ailments so as to not worry the rest of his family who depended on him.

His death was sudden.

The situation now had changed.

She would have to set aside chasing her own dreams, to chase after a different goal-a goal to help her mother bring the family back to their feet. With the understanding that everyone had a sad story to tell, dwelling on the sad and frustrating things soon became but a dusty book on a shelf. As time went along, dreams of earning her wings and a place in NASA soon faded as well to focus on the *“here and now”* -the more pressing priorities. (She was the eldest sibling you see.) Her interest in space didn’t change however, and she still read a lot about the sciences on her free time. Little did she suspect that an opportunity would arise in the last place she had expected.

“Marie, look there is a challenge on HeroX.”

When long time friend Sung had spoken about a certain “Space Poop Challenge”; she was intrigued. After checking out the link, her dreams of working with NASA were revitalized. She also knew that her chances of winning were slim as she didn’t manage to study at a university for aerospace, and she understood she lacked a lot of knowledge in that particular

field. The girl now at the age of 26 decided to just go for it. With a comical goofy grin on her face, and a determination set into her eyes and heart, she signed up and later told Sung, “Haha! I joined the challenge!”

He originally didn't think he would have much time to work on the project as he was in the middle of final exams, but as she returned with interesting ideas to solve the “waste” problem; his own mental dials started churning. After a while, Marie soon convinced him to join as well and they both founded their team, Eva.

They both honestly didn't have much time to work on the project, as they both joined during the last leg of the challenge, but they were determined.

Want to know the funny part? They were already working in-between two completely time zones! Sung was situated in California, and she was situated in a tiny country called Kuwait located in the Middle East. That was more than a ten hour time gap! That's not counting the fact that they both had work and classes to attend to-among other pressing responsibilities.

Quite a feat right?

After doing a lot of research, they both finally came up with a plausible innovation that involved creating an internal system that collected, and filtered solid and liquid bio-waste. The purified water would then be returned into the system to be reused. The inspiration came from the very familiar human circulatory system, where the liver represented the filter, the tubing inside the space suit would represent the blood vessels in the human body, and the piston pump used to regulate it all could be represented by the human heart.

To surpass the micro-gravity they both devised a vacuum that would draw the waste into the main pipeline with a hydrophobic glaze, leading into the purifier with 0.1 micron hollow fibers installed which would make the recycled water clean enough to drink. Solid waste would then be carried into a container outside the suit for storage. The astronauts themselves would be fitted with customized underwear that would be made with porous materials to allow for “breathing”. It would be able to both inflate and deflate to accommodate their comfort when in the process of excretion, cleaning and collection of waste. Micro tubes would be situated at an angle to allow for small water jets to shoot into the ‘sensitive areas’ to help clean any residue; this water would also be collected. The collection process would involve a pipeline connected to the special underwear and the vacuum would be created via piston pumps that would be worn like a backpack outside the suit. The waste containers would also be located outside the suit as well to protect the astronaut from any sort of leakage should an ‘accident’ happen.

Sounds a little confusing right?

Wait, it gets even better!

Over the next week or so, two more members joined their team. One was an engineering student nicknamed Neil while the other was a programmer named Pedro.

Fun fact: Neil lived in India, while Pedro lived in Portugal.

Talk about the United Nations! Ha!

This little twist in fate, not only had its share of new ideas, but also had many challenges to overcome.

How would Team Eva accommodate it all?

*“It only seems impossible until it’s done” - Nelson Mandela*

## Chapter 2

Believe it or not, the whole collaboration process left the International Team with literally only 3 days to compile all the details and ideas into one final report.

Using Kuwait’s time as a guide, Marie had organized the meeting times of the four different time zones. Her usual meeting time with Sung was after her working hours at 7:00pm which would thus make Sung’s time around 8:00am. With this in mind it was much easier to work out meeting times with Pedro and Neil who were closer to her time zone. The team spent many a sleepless night dedicating their time and resources into researching the many details required to make their idea into a reality.

Disaster struck when Marie fell ill with a spell of flu and a severe migraine that made her bedridden for an entire week. During this time she suffered from photophobia and was unable to use any forms of technology that had a glaring screen for research- and for obvious reasons she also was unable to read for even a small glare from a nightlight was enough to make her feel nauseous. (Not to mention when you’re sick you’re supposed to be resting to recover properly.) Within this time she was worried, and concerned about what was to become of her team Eva and the project that they worked so hard for. They already had a limited time to submit, and now they were one person short. She decided she would have to just trust all of them to do their best until she returned. When she was able, she rejoined the plight again, even if she was still in recovery mode. After all, win or lose, she was not one to let her teammates down no matter what happened; Marie would always strive to do her very best. She soon came to learn that her teammates added a few more details to their original creation, and merged Neil and Pedro’s ideas into the original scheme.

The comical irony of it all, it turned out that both Neil and Pedro had come up with a similar idea. Where Sung and Marie had decided to return the water back into the system to be reused for hygiene purposes, Neil suggested that this “recycled water” could be used as a coolant inside the space suit. Additionally the special undergarment designed by Sung that would inflate and deflate in the process of waste excretion with the use of micro jets to wash away the remaining dirt, (similar to the system found in Japanese toilet bowls), was also similar to the garment Pedro had come up with where the micro-jets would be used as a way to clean the sensitive areas. It was apparent that they weren’t the only ones considering the same approach, which made the project all the more competitive. They knew they were not full-fledged engineers or scientists who had special specializations in the field, but through their passion of discovery, problem solving, and the hope to make the world a better place through innovation and invention, they found themselves competing in the Space Poop Challenge called for by NASA.

With the understanding that each member of Eva had their own lives to live, responsibilities to fulfil, and exams to complete, the team literally had only about three full days to compile and submit the project. The work was divided, and well-coordinated; each member had access to a google drive that all could access and edit. Each trusting the other to do their very best to answer the questions that other members posted, or respond to thoughts and concerns that were shared. The team had contacted HeroX on several occasions for clarification as well.

Their project dubbed the Universal BioWaste Control (UBWC) was slowly but surely materializing into something more solid.

As with all multimember schemes, it was not without disagreements. One a few occasions time was lost to a repeated discussion based off of another idea separate from the UBWC that the group had originally agreed upon. That set back added more stress, and agitation- with that naturally moral dropped too. The team pulled through however, and the resulting submission was put together with haste. All the details and concerns were combined into a fifteen page write-up which honestly did not do the project justice. The team specified in the report that the project still lacked a lot of details that could've been covered had they had more time to work on it. To support their venture, a mock trial of the system was created and filmed by Sung. Each member contributed a piece to the report as well, as could be seen with the video, and the many different colored fonts on the actual document itself, and diagrams.

The impossible feat that literally spanned the four corners of the globe, topped with four different time zones, and four different ways of thought all came together to build a bridge for a common goal. To attempt to give their astronauts a better way to keep themselves healthy and clean in times of emergency where the possibility of being stranded in a suit for six days was more than just a scary thought- it was a reality that had to be addressed.

The report, diagrams and video for the Universal BioWaste Control system was finally completed within the last leg of the Space Poop Challenge, and submitted.

There was a time Marie thought it would be impossible to have their submission done on time, but hey, they did it.

*“To be beautiful means to be yourself. You don’t need to be accepted by others. You need to accept yourself”- Tich Nhat Hanh*

## Epilogue

In this wild and wacky universe, we have come to learn that through hard work, cooperation and determination, anything can be made possible. I mean seriously, trying to find an appropriate meeting time between four regions was practically a feat in itself-but we did manage it.

And if something this small can be achieved by four individuals who barely knew each other, how much more if we all put our heads together as a global village?

I’m sorry to say, that there is no ending to this story, haha! You see, the Space Poop Challenge is still going through the judging stage, and results will be announced on February 17<sup>th</sup> 2017.

Talk about a literal cliff hanger.

Regardless of what happens in this or any challenge, one thing remains the same. We as a people will forever grow, learn, evolve, innovate and create. Through this entire experience, I think it’s safe to say that we learned to accept each other, ourselves and limitations.

I believe we can all agree that putting together a project in three days in our different global locations was amazing in itself.

The beauty in imperfection is that it is imperfect. It gives us the room to grow, and bloom. It really put things into perspective for me, and I find it hilarious that we take so many little things for granted.

And regardless how many challenges we may partake, no matter how many times we win or lose, I believe the true prize of it all is the very fact we made a decision, chose to stick with it, and saw it through until the very end without fear or judgment.

There are many ways to actually “win” all it takes is the right perspective- and even if it may not have happened the way you may have wished, you did walk out of whatever situation you were in with something valuable.

Be it prize money for a contest, wisdom from a book, or a new friend that used to be an old enemy, the only time we actually lose is when we decide to give up and not try at all.

At least in this way, we are all winners in the end.