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Name: Oscar Monj

Date of Birth: December 20, 1959

Place of Birth: La Paz, Bolivia

**Question:** What brought you to Logan, Utah?

Well I had family here, so I went to school somewhere near family. That’s when I came to Utah.

**Question:** As a child did you have any experiences with space or any desire like that?

Well I lived in the States and I remember growing up with all the Mercury cereal boxes and you know, always I saw the landing on the Moon on TV and stuff like that. So yeah, it was always there. Because I grew up in the sixties.

**Question:** So what years were you on the GAS team?

I started in 1984. I was a walk on and I came in after talking to Rex Megill. He asked me, hey do you have an idea for an experiment? because I’m a biological person and they did have that many. But he said just make sure you aren’t looking for gold. I said no, no it will work. So that’s how I started.

**Question:** What does it mean to be a walk on?

I guess I’m not like, you know, I’m not sure. I was, I guess they needed students to offer opportunities as opposed to others that got scholarships or were recruited or you know.

**Question:** What was your major then?

My major was chemistry.

**Question:** What projects did you work on for the Get Away Special?

Well I worked on a payload on G254 and I had one space pack and it was project Pachamama. Pachamama is “Mother Earth”, it’s a Bolivian word. Basically it was to do photosynthesis experiment in a GAS can. Now the restrictions of the GAS can were you had to be powered off for months, you had to come on and be alive and so it’s much tougher to do a biological payload in a GAS can because of all the restrictions. So after a lot of research I found that a lichen can lay dormant for months and then you rewet it and they do their stuff and then they can be dried again. So that’s why I chose it. So basically I chose to look at to how measure photochemical properties of a lichen during microgravity. That was my experiment.

**Question:** Do you remember any of your results?

Well I remember the whole process of building it. When I started it I was more into the science. Ok we’re going to do photosynthesis, blah, blah, blah. The what I’m going to measure and how I’m going to measure, what the treatments were, what the expected results are. You
know, typical science experiment, you know, from high school whatever idea. Then you had to put it in the GAS can. So that meant well how are you going to collect your data? Well what is a space pack? How are you going to power it? What’s going to turn it on? All of a sudden it became a big project in the sense there was no boards, there was no data acquisition, there was no mechanical, there was no sensors. Let me give you an example. I wanted to measure chlorophyll of this thing to determine if it was wet or had a certain chlorophyll content. So that spawned a whole chlorophyll meter investigation. I wrote a paper on it, on a chlorophyll meter. I made one with a clothespin and then I calibrated it against a Minolta spag meter. I think it was a spag 50I which is built by Minolta and mine cost in components $50.00. It does as good as the Minolta $1500 meter. So that was published and that’s just one sliver of what came about. I had to learn electrical engineering, how to make circuits, how to make Peltier coolers so I can control the temperature. So I had to learn how to do PID control, actuators, how to program a watering system, pumps, meters. It quickly became pretty complicated, but it was a lot of fun. Now as far as the result, I used a Campbell Scientific Data Logger. So you know again, going out into industry using a Campbell Scientific Data Logger that would control everything. Programming it was a lot easier than the QSI and all these other controllers that other people were using because I didn’t know assembly line and I just wasn’t going to learn it. So that was the last thing that came on board was the control system. But because it did and the features that we wanted to do was so many we had a failure in the program. But we collected data, but it got hooked up on a bad loop. We were able to water the lichen, we looked at how far the water had gotten and we had watered the lichen for many days and we were able to turn on the lights and everything, but we didn’t get any data back from the sensors. That’s too bad.

Well you know the what is, I mentioned in my brief little speech, the what is what we do and we get consumed by that because that is the hard part. But I think what, what was maybe the experiment worked to some degree or not, but the how we did it that’s the important value of the GAS experience.

Then going back I didn’t take many pictures. I think I have a copy of the program, I have a few pieces of hardware, whatever. I found my lessons learned. I wrote a lessons learned post-experiment and was reading it the other day and that’s pretty much how I run my lab now. I’ve been working on space stuff for, since ’94 until now and that lessons learned is how I operate within the lab.

**Question:** You’ve mentioned a lot of skills that you’ve gained with the GAS experience. How would you say those skills helped you, beside your current lab no. But are there any other ways your skills helped you too?

As a scientist in the space industry, or in the government, or NASA area you are always interacting with many groups especially if you are going to do payloads. We flew, you can see my patch here, we flew the PESTO experiment. I was hired to go down and become a research scientist for the PESTO flight experiment by the PI, which is Gary Stutte, at the Kennedy Space Center. I came in, I did my masters and PhD with Bruce Bugbee here at the University in plant science. But when I came down I was a scientist, but I already had this expertise in how to communicate with engineers. So there’s engineers, there’s safety people, there’s all the documentation, there’s mechanical engineers, there’s electrical engineers, there’s integration engineers and engineers are very bossy people. They don’t mean to do it, but they always think ah this is just some science, my mechanical system, if they don’t have my structure nothing is
going to work which is true. You have to keep reminding them why you are doing this. This is an experiment with a purpose. The engineers don’t come up with the purpose. They are just enabling the purpose. The purpose is the science. So I’ve learned how to do that, but that’s nothing new. The important thing, what you’re asking me is what I learned that really helped me was how to talk to the engineers. I can talk engineer jargon because I used to talk engineer jargon with Casey and others. They’re like but you didn’t think about this or that and I didn’t even know that they were talking about, but now I do and so I’m able to communicate with people using their language. So then I’m better able to collaborate make, get the job done.

Question: What was your biggest frustration on the GAS team?

Frustration? Well I never really got frustrated. Because you didn’t have time you were on a short, I think that’s Gil Moore screaming in the background, anyway we never really had time to worry about frustration. There were deadlines to meet, I can’t in a period after the Shuttle, but then all of a sudden we had to get the payload done and we had to do a balloon flight. I got to do a balloon flight. So it was scramble, scramble, scramble to finish all the systems and put them together. So what I think is actually you become immune to frustration. You know you have to put that aside and it served me in many, I’ve done several parabolic flight campaigns where I guess during transport something broke and wasn’t working and you are about to take off. The plane is about to take off and you’re doing your checks and something doesn’t check right. Instead of frustration or whatever, you put that all aside, your GAS training kicks in. You get your soldering gun, you get your test meter, you go through this, you go ah ha it’s right here. People are going come on, come on and you’re like chill. You get your soldering gun, you fix it, it works, and you move on. The experiment runs. So that’s my answer to that one.

Question: You mentioned something about a balloon flight. What was that exactly?

All I knew we had an opportunity to deploy our payload space pack and test the integrity in a balloon flight. Which is one of these atmospheric balloons. What they have is a gondola with a bunch of honeycomb material for when they land. So this thing is going to smash everything. It’s a pretty brutal test of mechanical integrity. So what we did we ran the data logger with a few on off things and made sure it ran the batteries, had the whole mechanical system set up and we put it in our space pack. Then we went all the way to New Mexico, Holloman Air Force Base near White Sands missile base, and that was a whole experience all on its own. We went down there we were integrating into the balloon payload there were all these tours, facilities, the usual things, but the main thing was to get your payload in a balloon and then watch the deployment of this balloon. A huge balloon, very thin, 30 mil material, they fill it up with helium, took hours, they released it, it was gone and they you are recording data all along and then it comes down and you get your data back. So that was kind of like a verification test of all your equipment. That really helped prepare for the real thing that was coming later and we flew on STS 64, on the G254 GAS can.

Question: Did everyone get to fly their experiment on a balloon flight like this?

There was other people, like I mentioned, from BYU. It’s hard to remember exactly because you’re totally focused on trying to get your space pack ready. We had the space packs that were ready or the people who didn’t want to shatter, potentially shatter, theirs, because these things sometimes don’t come down on the right axis and you could destroy stuff. It was like on a
volunteer basis if you wanted to do this kind of thing, as I recall it. But it was invaluable in the sense that you got to have another opportunity to be manifest on a balloon payload.

Question: So with this balloon flight you said you had to travel somewhere? Was this a road trip then?

I believe so. Yeah. When we went on the G254 trip I went with my family so I flew. I flew there and met them over there. So I got to miss that part. I also had friends at the Kennedy Space Center so it really I kind of got to see both sides. I got to see what the GAS team got to see once we met up there, but I also got to see what the NASA side. So it was really a unique experiment.

Question: Do you want to describe the trip a little bit?

You mean the launch?

Question: Well, what you got to see, the tours, the launch itself?

During the G254, STS 64 I believe. We got to meet, before we went, we got to meet the astronaut who was going to push the button to activate the GAS can. So that was important. Everything on payloads is done on a sequence. So they get there, they take off their suits, the shuttle, the station, wherever their keeping, blah, blah blah. Then eventually somewhere on there they push the button and activate the GAS can and then that activates all the payloads and they run and then they shut the power later on and you’re done. So I think the astronaut’s name was Linenger, but he was, I guess it must have been his first flight or something. Later on in ’96 and ’98 he was on the Russian Mir station, I got to work with him. I got a chance to meet him before then during the Mir missions and then later on in meetings at the Kennedy Space Center about plants in space. They brought him in and I got to talk to him. That happened because I got to meet him from an astronaut during that time before we even left Logan, we met him, he came over and you know picture opts. Then it was the whole preparation for flight. That was intense. Day and night forget about eating, forget about sleeping and then you start making mistakes from sleep deprivation parts but you got to meet the deadline. Put it together, tear it apart, put it together, tear it up because you forgot to put a screw or something, that whole process. Then it’s like you’re done, it’s closed, and basically you hand it over to Ragu and Casey and they would bolt it down. They had their own procedures. They had to put all the hot wire harnesses and once that was done you’re off. It’s too late, you’re done. The payload is out of your hands and then you can start looking. I didn’t go on the road trip. I met them over there and we got to go see the VAB (Vehicle Assembly Building). We got to go up to the 17th floor of the VAB and we are all taped up and we got to see the space shuttle close up and everything. Now you can’t even do that with all the safety things. We got to be on, during the launch, we got to go see the VAB site, we got to go where the clock was, now it’s the press side box. It took forever to launch STS 64 there clouds and the weather patterns, they have to have 10 miles down range, no I think it is 20 miles down range and 10 to the sides. If there was any clouds within that they wasn’t going to launch. So we got to see the whole process, because there was an Air Force meteorology station receiving satellite images and they are sending out helicopters to go check the lightening levels and all that. We got to see that whole process. You get an understanding of how complicated this whole launching stuff into space is. Then of course the whole launch excitement and you know launching. I mean I’ve seen many launches, but something of yours is in there. It’s a very emotional moment and it’s because of the ownership you develop. Years
later you still keep that so it gives you kind of a flagger (?). You’ve done something, it gives you motivation, you’re more, you’re a confident person. You’ve heard it many times, how when I got to industry I was way ahead of everybody else and it’s because of that. You’ve lived stuff that just gives you the confidence. I don’t know why, this is before you even knew if your experiment worked. Ok you have done all this, you’re really confident and you don’t even know if it worked or not. It doesn’t matter if it did or not, again it’s because it’s the how you have to, you know.

**Question: Is there anything you would like to add to this?**

I don’t know what the other GAS students, I know many went to industry, many went to this, I continued in science and I’m working at the Kennedy Space Center since ’98. It’s that multi-disciplinary training that I’ve had that’s allowed me to stay working, being like a GAS student the whole time. Design payloads, write proposals, and working on safety. The whole thing is that integrative process, whatever it is. By knowing the jargon and talking to either electrical, mechanical, machinists. It’s a really good background to have being a GAS student, but without it I don’t think my career would have taken this path.

Then the other thing is every year I get students through NASA outreach. I get two students on the average per year since I’ve been there and I’ve treated them just like a GAS student. I say this is the background, this is what you need to accomplish, this is the equipment and you come up with a plan. If you have questions, you come and get me, but it’s your problem. A lot of people are not ready for that, but I think it is the best way to start. It could be six weeks, it could be three weeks, it could be eight weeks, or six months, you know you tailor it to their experience. What I try to do is teach them the how. How you do things, how you balance your time between doing too much of one thing that you think is going to pay off, but not to neglect the other areas that are important. Like you don’t want to, that’s the hardest thing to learn I guess. Once you learn that, that’s how technology development and science can be accomplished. It’s all about a mission, whether flight or research. It’s all about getting the job done and that’s what the GAS program is about.

**Questions: Just to make sure we got this, what years were you on the team?**

Well I started in ’84 and then like Kent Miller was saying, the GAS program was going to go down or not, but during that time I was still working on getting the experiment, science and components on paper to work, preparing. Then came the ok we’re going and we’re going to do balloon flights and this and that. So that became the building phase and getting ready. So until ’94 that’s when it flew. During that time I completed a BS in chemistry and then I worked for two years at the Eco-physiology Lab on campus. Then I went and got a masters in plant physiology and then a PhD. I was here all that time anyway.

**Question: Is there anything else?**

Yeah, while I’m still available use me as a resource. I’ve already kind of interacted with you guys. You know I’ll give you my opinion. I’ve worked on many aspects of going to space. The GAS team should work on making those connections, I mean, of course financial and all that stuff, but there’s also the expertise. There’s a lot of knowledge accumulated in the members of the GAS team, so if you need me as a resource on anything I’m there.

*Thank you.*