Why are Scientists Interested?

DLN: I think sometimes the general public becomes jaded about spending money on space exploration when there's a limited amount of resources. So why should we spend money to do that?

KG: *Yes, comets are great to look at, but why are scientists so interested? Those particles that come from outside the solar system, since they're out in deep space and out isolated from all the dust and debris we have in our solar system, when it comes in if we're able to get some of those particles and give them to some scientists for analysis then we can perhaps learn about what was happening to the mechanics behind how our solar system was created.*

DLN: So there's just a lot of fascinating science, and we've kind of seen graphics or talked about all the different kinds of jobs that are involved. I think when people think of space exploration, the two jobs- you're either in the control room or you're an astronaut. There seems to be a lot of different career paths for people. So how did you get involved? What was your career path?

KG: *I studied computer science and electrical engineering. I graduated from CU Denver, downtown. You're right, at Lockheed Martin, that's certainly true- it takes all kinds. To have a program that is this complex takes so many different- even different kinds of engineers. Aside from astronauts and scientists, it takes every kind of engineer. We have structural engineers, mechanical engineers, electrical engineers, all the computer sciences involved; programming computers for the spacecraft, or computers used for data analysis. All of the data that we have- there's a huge amount of data. Web design is important to be able to manage all the data. Then you think about building a spacecraft, just the thousands of parts. It takes any interest in business, or all the contracts involved- all these jobs are so important to getting a spacecraft like this to fly successfully.*

DLN: So you personally, was space kind of your direction from early on?

KG: *Well, not really. General engineering, and generally interested in computer programming*.

DLN: From high school? From elementary school?

KG: *From high school. I was raised by engineers, so I kind of had that inspiration.*

DLN: I think you need that as a button, "Raised by engineers."

KG: *Well then, my kids would need that, too.*

A good place to learn about these missions- I've talked about the command sequences we send and the testing. That's where I began working is involved in putting together commands and testing. That's a great way to learn about all the details of the spacecraft.

DLN: So we have some gifted high school students or college students- how would they get involved in something like this?

KG: *Part of the Stardust mission is to support public education. In fact, every NASA mission is dedicated to supporting public education about that mission and the science on that mission. There's a Stardust website, and this website has some great projects on it. There are educational activities that are for all ages. This next year we're going to be very busy getting ready for our flyby, and I think it would be great if kids were learning along with this. There are projects for all ages, and here's one of the projects. This is*

on the website. It's for the younger students, and this is called Comet on a Stick. You can see there is a variety of materials here that represent the gas, the nucleus is in there somewhere- that's hard to find. Then the tail. Actually, it has more than one tail. This is a great activity, and as you're putting together what you would imagine a comet to be, now you're faced with the same question the scientists had, "What does a comet look like? I think I know what it looks like." You put it together, and you can compare your vision with others as well as look at some of the teacher resources for this project show us how scientists have had different ideas change over the years as we learn more and more about comets.

DLN: So this one is building an actual model of the Stardust spacecraft?

KG: Right. *This is a paper model. It's maybe a few times smaller than this, but it's a really well detailed model that's fun. You can just print it out on nice cardstock and set some time aside. It takes awhile, but you can create a nice model of the spacecraft- an accurate model. There's another activity for older students that's actually putting together a comet nucleus out of dry ice. That experiment, you can see the vaporization that I'm talking about, creating a cloud with the particles coming off it and you can actually see the creation of a tail as well by heating that. That's a great project. In fact, that is a class project that's a scientifically accurate model of a comet nucleus.*

DLN: We like to encourage teachers to use scientific models in the classroom, but one of the things that sometimes is left out is a discussion of what are the advantages of this model, and what are the disadvantages of this model- what it doesn't show. Because models are designed to model certain aspects, and they don't model other aspects of the same piece. The dry ice one sounds really cool.

Thanks for coming in. Let me put your name up there. Thanks for Kevin Gilliland from Lockheed Martin. Watch those credits because we're going to run the websites on there and we have a lot of people to thank. Good luck on your mission, and we hope to see you again coming into the studio to talk about some other spacecraft or space-related activities.

KG: *Thanks for having me.*