

Interview With Steve Squyres  
written by Alex Moore on February 11, 2003

In August 2000 and again in February 2003, Red Colony.com founder Alex Moore wrote an email to Steve Squyres, Principal Investigator of the Mars Exploration Rover Missions, Professor of Astronomy at Cornell University, and Chairman of NASA's Space Science Advisory Committee. He kindly wrote back with answers to several important questions, and it is interesting to see how he answered over a three-year period.

**August 2000:**

**My first question is, what made NASA decide to send not just one, but two rovers to explore Mars?**

Primary reason is that by sending two rovers to two very different sites, you can effectively double the science at much less than twice the cost. An added side benefit, obviously, is protection against certain types of mission risks, via redundancy. The same thing was done on Mariners 8 and 9, Viking, and Voyager. It paid off with significantly improved science on Viking and Voyager, and paid off bigtime when Mariner 8 went in the drink after the launch vehicle failed but Mariner 9 still worked.

**Where will these rovers actually land?**

It hasn't been decided, and won't be decided for a couple of years. There are some known constraints... we'll need to land within ten or fifteen degrees of the equator in order to get adequate solar power, and we'll need to land below some critical elevation in order to get adequate deceleration out of the parachute. Beyond that, though, it's wide open. The idea is to find places where the orbital data suggest that water was once present, and to use the payload to read the geological record at each site and learn what conditions were really like and how habitable they were. We want to wait as long as possible to select the actual sites, since that allows the maximum time for the science community to work with the MGS data and find the best possible sites.

**Finally, what precautions are you taking to make sure that the same mistakes that took place in previous missions [Climate Orbiter and Polar Lander] will not occur once again?**

Plenty. The most obvious one is that this mission is adequately funded, with healthy cost reserves to help us deal with the problems that will occur. We've also got a much more rigorous review process planned than has been the case for some recent missions. Perhaps most importantly, we've got a lot of really major heritage... the Pathfinder entry/descent/landing system being the most significant example. We'll be the first mission ever launched to Mars with a landing system that has been demonstrated previously to work.

**Thank you, and good luck to you in all your endeavors.**

Thanks... the good wishes and interest are greatly appreciated.

Cheers, SS

**February 2003:**

**My name is Alex Moore and I am a high school student in Pittsburgh, Pennsylvania.**

That's funny... I happen to be in Pittsburgh at the moment. I live in upstate New York and work in LA, so I change planes here a couple of times a week. :)

**At this stage in development, what technical issues still need to be overcome before launch?**

None. We put our last technical issues behind us some months ago. At this point, it's just a matter of trying to hold to a very tight schedule, to get two very complicated spacecraft to the launch pad on time.

**Of which of the landing site choices are you in favor, and what will be the deciding factor in your selection?**

Well, the two sites that my team favors are Meridiani Planum and Gusev Crater. These were the highest-rated science sites identified by a large community of Mars scientists over about a two-year period of work.

Which sites will actually be selected, though, also depends very much on landing safety. The final selection will be made by NASA Headquarters in April, and will take both science and safety into account.

**What important discoveries are you hoping will come out of these missions, and what are you personally hoping to find?**

Too difficult a question to answer well during a brief plane-change in Pittsburgh!

The purpose of MER is to find out whether or not Mars ever had an environment at its surface that could have supported life.

Mars is cold and barren today. There is evidence in orbital pictures that water once flowed across the martian surface, but what that evidence really tells us about the past habitability of Mars is largely unknown. The rovers are essentially robot field geologists, equipped to read the geologic record preserved in the rocks at the landing sites, and to tell us whether or not those sites were once the kinds of places that would have been friendly to life.

Note that what we're after is the question of whether or not Mars was once capable of supporting life. That is very different from the much more difficult question of whether or not Mars actually did support life. Answering that one is, I think, likely to require both a sample return and a good deal of luck. Also, we're not "looking for water". Mars Odyssey has already done a good job of telling us where near-surface H<sub>2</sub>O exists on Mars, mostly in the form of ice. With MER, we're going to places where it seems likely that liquid water existed in the past, and reading the record there to assess their past habitability.

As for what I personally hope to find... I just hope that we find out the truth about these sites. I've spent the past seven years trying to build the very best robot field geologists that it's possible to build. Now I want to turn them loose and see what they can tell us. It'd be asking too much to ask Mars to conform to our expectations... to give us this property or that characteristic. So I'm not hoping to find any one particular thing. But what I really want is a clear answer to what I consider to be a compelling question: were these landing sites ever a place where life could have survived?

Cheers, SS

**I wish you and your team luck in this mission, because I feel that it represents more than just taking soil samples and reading atmospheric conditions. This is a giant leap for humanity toward putting a man on Mars. I feel that with this mission the public will begin to understand that Mars can be another home for mankind. More and more will take interest in the red planet, and maybe some student like me will grow up to walk on Mars. We hope, and some of us know, that the human race will one day expand from this little blue dot. Is it not for this reason that we gaze at the stars? We will spread the consciousness of this universe into the cosmos, seeing and learning everything. Everything.**

I feel that this mission will forever be remembered as the one that turned a sleeping world onto Mars. The work that you and your team are doing is history in the making. It is an honor to speak with one of the most

important members of this team.

Remember, we do it not because it is easy but because it is hard.

Bon voyage,  
Alex