

AirSpace Season 2, Episode 13

Out of the Frying Pan

Nick:

Welcome to AirSpace, the podcast from the Smithsonian National Air and Space Museum. I'm Nick.

Emily:

I'm Emily.

Matt:

And I'm Matt.

Nick:

Today, we are going to talk about a movie, Mission Mangal.

Emily:

We are talking about a Bollywood space movie.

Matt:

That's right, and it is an incredible show.

Nick:

Yeah, we're kind of bursting at the seams to talk about it. It's about a mission to Mars by the ISRO, which is the ...

Emily:

Indian Space Research Organization?

Yeah, and I think we're all really, really excited to talk about this movie.

Well, and it all started with a field trip over the weekend.

Nick:

We all saw it together and then we stood outside the theater for a few minutes, not discussing it so that we wouldn't ruin this conversation.

Matt:

Trying really hard not to.

Nick:

Yeah, this might be my favorite space movie now.

Matt:

You took the words out of my mouth.

Emily:

Wow, that's big.

Matt:

This, I think probably is the most energetic and lively movie you could possibly make about a robotic mission to Mars.

Nick:

I was sitting there and in the first 10 minutes, I thought to myself, I'm going to like this more than Armageddon.

Emily:

So, but the movie in a nutshell.

Nick:

It's an Indian film, mostly in Hindi and it's about the Mars Orbiter Mission or MOM, which was a real mission that ...

Emily:

Is a real mission.

Nick:

Is a real mission that's still flying.

Matt:

Mm-hmm (affirmative).

Nick:

You're right, that's ISRO sent to Mars a few years ago. When did it launch?

Matt:

It launched in November 2013.

Nick:

Yeah, and from a historic standpoint, this is the first time that any nation has reached Mars on its very first attempt.

Emily:

And this movie has only been out for a few weeks, right? This is not a movie like Armageddon that we like dredged back up because we're so excited about it. We had to talk about it on the podcast. This is a movie that's a new release. It's in the theaters right now.

Matt:

Right. It's in US theaters now I think it was released a little bit earlier in India and it's just now made its way to the US.

Nick:

Came out on August 15th, which is, I believe Indian Independence Day. The poster said this Independence Day, the sky is not the limit.

Emily:

I didn't even see that.

Nick:

Yeah, I'm going to buy that poster for my office.

Matt:

Nice.

Emily:

Wait, can you buy in triplicate?

Nick:

Yeah.

Emily:

Okay.

Matt:

So the movie starts in 2010 with the failed launch of the GSLV Fat Boy rocket.

Nick:

Which is the name of that. That's the official name of that rocket.

Matt:

Right. And in the movie, they set it up that they call it Fat Boy, because it's such a heavy lifter. It could lift, they say two elephants, the weight of two elephants. So, you know, this was going to be their big, heavy payload lifting rocket.

Nick:

As you would theoretically, traditionally need to go to Mars.

Matt:

To go to Mars or even just to send humans into low earth orbit.

Nick:

So, the director of the failed launch, there's a mistake in one of the sensors. And he says, "This was my responsibility. It was my decision to go." and the person that made the error that got him demoted comes back and says, "I feel terrible." And he's still trying to figure out how to make the Mars mission work and she's the one that has the breakthrough.

Matt:

She's the one with the big game-changing idea.

Nick:

Exactly, that they can reach Mars for not a whole lot of money with the existing equipment that they have.

Emily:

Which means using a smaller rocket which is a really central thread in the film and sort of spawns all of this scientific ingenuity and engineering.

Matt:

And you know, I don't know if this was true or not, but I thought if it is sort of creative license, what they did too, to show how she came up with that idea, right? She's cooking Poori in her home and that's the sort of fried puffy bread that you, you get at Indian restaurants and that, you know, is cooked in Indian homes, I suppose, all over India. And you know, they're, they're starting to run out of fuel at home for the stove. And so she tells her daughter, "No, just turn off the flame and the oil will stay hot. And then when the oil gets cool, you turn the flame back on and you save fuel." And that's where she realizes what if we don't have to fire the rocket all the time to get all of the speed that we need to get out of the Earth's gravitational influence.

Nick:

Kind of burn the rocket, the orbit stays hot. Then burn the rocket, the orbit gets a little hotter.

Matt:

Yeah, so getting into more and more, I don't know, what would you call them eccentric orbits?

Emily:

Much more eccentric orbits and gaining velocity.

Matt:

Yeah, each time gaining more velocity until finally you're ready for that last burn.

Emily:

Which gets you out of earth's orbit and gets you on your trajectory to Mars.

Matt:

Yeah.

Nick:

So they've got that big breakthrough. They lobby for the mission in very dramatic and wonderful scenes. There are a couple of really wonderful, like what would this mean to the nation? What would this say to the world? How would this look if we were this audacious and this bold, there were a lot of really wonderful scenes. There ...

Matt:

Yeah, it's got a reminiscence of our own space race with the Soviet. It's like if we could beat China to Mars is essentially what they're saying. If we can be the first Asian country to reach Mars, and if we can be the first country in the world to reach Mars on the first try.

Nick:

Exactly.

Emily:

What's special about the MOM mission is that there were so many women leading the sort of sub teams, right? So you have a mission team and you've got the team that's in charge of communications between the earth and whatever satellite, and the team that's in charge of the rocket and the propulsion, and you've got the team that's in charge of building the spacecraft and what materials that's going to be all built out of and how it's going to look and how it's designed.

Nick:

And at the end, they do make a point of saying like 17,000 people worked on this mission.

Matt:

Yeah.

Emily:

Right, and so in the same way, we talk about Apollo. We're talking about three people who went to the moon for that first Apollo 11 mission, even though there was Apollo before and Apollo after, but that was what 400,000 people that stood behind the Apollo mission and helped make it happen. So in the same way, the Mars Orbiter Mission significantly smaller in scope and scale, but ...

Nick:

Not smaller in energy and charisma and charm, man, I cannot, I cannot get over how much I liked this movie. In this movie, these people reminded me of my friends. They reminded me of all of the people I know that work at NASA.

Matt:

And the people who you know, wherever you are, who have great passion for what they do and have great ambitions.

Nick:

Right.

Matt:

You know, and there were seriously moments in this movie that brought tears to my eyes. There was one scene with all these flashbacks of how people first got learned that they loved science and that they were going to go into science. That, that part really got to me. This movie really had a very strong, emotional connection with the audience. At least if I'm any indication of that.

Emily:

Well, I think for me it was a totally different connection. I have never had the experience of getting to watch a film that not only is entertaining and not only is doing a wonderful job of storytelling. This was the first time I saw a movie where you didn't have that quintessential NASA man guys in short sleeve white button, down shirts with skinny black ties in horn-rimmed glasses solving the problem because they are the people who are solving them. It had scene after scene, that was being dominated by a woman of color. And for me as a woman in a STEM field, that was an incredibly powerful two hours of my life. That was a reality that I still don't know and it was really cool to see it on a big screen like that.

Matt:

And that was, that was absolutely an incredible aspect of this film. And the other thing that I think makes it very different from a film like First Man or any other Apollo story, is that when you talk about Apollo, you're talking about a program that had an unprecedented level of government support of financial support, if you need a piece of technology, the sky is the limit and in so far as how much that thing can actually cost. In this case, we're talking about a mission that was working with a very restricted budget that got cut in half partway through the project, went from eight billion to four billion. And they had to find very innovative solutions to keep this mission going, even on that sort of tightened budget.

Emily:

It wasn't the space race. It wasn't the U S against Russia. But this was still an enormous first.

Matt:

Historically, getting to Mars has been incredibly difficult, so difficult. There were so many failures in the early years of, of Mars exploration that a JPL engineer actually, when speaking to journalists, invented an imaginary character of the galactic ghoul that stood in the way sort of swatting away spacecraft, as they were trying to reach Mars.

Emily:

Sort of like the sea monsters at the edge of the ocean?

Matt:

Yeah, exactly.

Emily:

Or early explorers?

Matt:

And you know, so on the US side in 1971, the US attempted to send two spacecraft Mariner 8 and 9 to Mars. Mariner 8 didn't even make it out of earth's orbit, Mariner 9 did. So, it was our second attempt at orbiting Mars that actually was a success.

Emily:

So the fact that ISRO sets their goals with, in some ways kind of a slap dash team of scientists with a very limited budget, very limited payload, very limited fuel carrying capability on a smaller rocket than intended and they do it on the first go.

Matt:

Yeah, and in a way that really required all of the timing to go close to perfectly.

Emily:

And so they launched in 2013, which means with an 11-month cruise, they arrived in 2014. And so, not only did they accomplish this mission on the first try, they're still orbiting Mars, taking data, sending it home and this is a testament to their great achievement. Mission is still going.

Nick:

Really wonderful movie.

Emily:

Go see it.

Nick:

Go see the movie.

Matt:

Absolutely.

Emily:

It's also good in a theater. It's a good movie to watch on a really big screen.

Matt:

Mm-hmm (affirmative).

Nick:

It is. It's got really great energy, it's got so many great scenes. Favorite line from the movie, "A dream is not what you see in your sleep. It's what you see when you can't sleep."

Matt:

I quoted that yesterday.

Nick:

It's such a good line.

Emily:

That's it for this episode of AirSpace. Airspace is produced by Katie Moyer, Jocelyn Frank, and Michelle Harven. Mixed by Tarek Fouda.

Nick:

Special thanks to Jason Orfanon, Genevieve Sponsler and John Barth.

Matt:

We'll be back in two weeks with an episode about the special rules that govern planetary protection.

Emily:

And water bears.

Matt:

And space treaties.

Nick:

Space treaties.

Matt:

Trying to keep the planets pristine for future scientific exploration.

Emily:

Don't forget to check us out on Instagram at AirSpace Podcast, to see photos of the three of us at the movies and some cool images of Mars that the Mars Orbiter Mission from the Indian Space Research Organization captured.

Matt:

Mission Mangala.

Nick:

Mission Mangala. Yeah, it's an extraordinarily upbeat.

Matt:

Yeah. It's great.