The Next Great Frontier

NOON SALIH: Close your eyes. No, seriously. Close your eyes. This'll be fun.

ARCHIVE

Omran Sharaf saying in Arabic: بسم الله...بدأ العد التنازلي...١٠...٩...٢...١...إطلاق.

NOON SALIH: Lift off. You are speeding away from Earth using your solid-fuel engines, getting closer and closer to the Earth's atmosphere. As you make your exit, you let go of your fairing - your outer shell that helps reduce air resistance - and initiate your second stage launchers. You're about to embark on a seven-month journey, traveling at a speed of more than 11 kilometers per second - 39,600 kilometers per hour - towards a red planet nearly 493 million kilometers away. You send a signal back to Earth - a pale blue dot behind you - letting everyone know that you've made it, that you're okay. You...are going to Mars.

OMRAN SHARAF: So it was quite stressful, but at the same time I was proud the moment the launch took place and it was - we identified the launch as a successful launch.

NOON SALIH: This is Omran Sharaf, Project Director of the Emirates Mars Mission - the first Arab uncrewed space exploration mission to successfully arrive at Mars. What you just listened to was the launch of this mission's protagonist - Misbar Al

Amal, the Hope Probe, on July 20th, 2020. Complete with the first ever countdown to liftoff in the Arabic language done by Omran himself.

OMRAN SHARAF: The moment we received that first signal, I think an hour and 15 or an hour and 10 minutes after launch. That was a very, very good moment because that's when we were like, okay, the spacecraft is working. The solar panels are deployed. Uh, the power systems are good. The communication is good. The spacecraft is stable, the propulsion is on. So, so it's basically the, the fruits of the past six years. You see it as it gets born in front of you or gets alive in space.

NOON SALIH: The Hope Probeentered Mars' orbit on February 9th, 2021, just under 8 months before Expo 2020 Dubai opened its doors. Now, you might be wondering, what does this mission, let alone space, have to do with the Expo?

OMRAN SHARAF: When it comes to Emirates Mars mission, the reason why we were able to deliver in half of the usual time that's required with a limited budget is because we worked with others. We collaborated. We didn't have multiple identities. We had one identity as the Emirates Mars mission team, regardless of our backgrounds. When it comes to Expo, again, a very important event to bring people from different cultures, different backgrounds all together. It's about bridging the gap. It's about emphasizing our identity as citizens of earth, rather than citizens of separate nations.

NOON SALIH: In fact, space has been a part of World Expos as early as 1867, and in today's episode, we take a look at this rich history that culminates in Expo 2020 Dubai. How is the world's largest stage shooting for the stars, for infinity and beyond, for the next great frontier?

I'm Noon Salih, and this is Inside Expo, an official podcast of Expo 2020 Dubai, where history is being made.

[INTRO STING]

NOON SALIH: To tell us more about the history of space at World Expos, we talked to the World Expo encyclopedia himself, Charles Pappas, who also happens to... like space.

CHARLES PAPPAS: I'm in love with it. My room is plastered with space posters, especially especially of the solar system. I was in love with the planet Saturn. I mean, why couldn't other planets be cool like Saturn and have rings?

NOON SALIH: It might be hard to think that people were thinking about space as far back as 1867, but true to their mission, Expos have always been forward-looking and ahead of their time.

CHARLES PAPPAS: The French exposition that year in Paris. And there was a man named Thomas Barlow who had perfected an orrery, which was a mechanical reproduction of parts of the solar system. And this orrery, this mechanical model was this elegant glass and filigreed iron and wood model of the sun, Mercury, Venus, Earth, and the moon. And it could show you on any given day for the entire 19th century, what the relative position of those objects would be.

Next thing up is 1876 exposition in Philadelphia, but once again, the French are involved. There was a man named Etienne Trouvelot. He made his way to the United States. Now he started doing these gorgeous kind of watercolor-like illustrations of the moon, of Jupiter, of Saturn, of comets, of the constellations. They became so popular, he displayed them at the 1876 Expo.

So fast forward, 1893 Expo in Chicago. Now we've got the Yerkes telescope being put on display - world's largest refracting telescope. It's about 64 feet or about 19 meters long, has a 40 inch lens, which is about 102 centimeters. So right after the fair, this was put in the state of Wisconsin Yerkes Observatory where really it's considered to be the birthplace of astrophysics - thanks to this telescope that was on display at the expo in which had been heavily publicized so that there was a kind of a national knowledge about it.

NOON SALIH: Expos helped translate this national knowledge into national interest over the next 50 or so years, leading us to what is now commonly known as the space race between the US and Soviet Russia in the 1950s and 60s. The Russians kicked off this race by launching Sputnik 1, the first artificial Earth satellite, in 1957. Then, they launched a human by the name of Yuri Gagarin.

CHARLES PAPPAS: First man, in space in April, 1961. In May, you had Alan Shepard, the first American into space take off.

Kennedy stood before Congress on May 25th, 1961, and declared that the US would launch a man to the moon and return him safely before the decade was out.

So again, the race was real, but how we're going to use it and employ it, that's going to play out. And one of the places it really plays out first in the popular imagination in popular culture is the Century 21 Exposition.

NOON SALIH: The Seattle World Expo of 1962, dubbed the "Century 21 Expo," wanted to send the message to the public that space was fun, that space was cool, that space was almost inevitable. And we, as humans, were going there. This space obsession can perhaps be captured by two of the Expo's primary attractions. First up, the Space Needle.

CHARLES PAPPAS: So you have this, this wonderful space age structure, which by the way, a man named Ed Carlson doodled out on a scratch pad one day over lunch, and it's roughly 605 feet tall, about 184 meters, and is deliberately designed based on the shapes of rocketships and UFOs. The official colors were astronaut white, re-entry red, orbital olive, and galaxy gold. So you go up this huge fast elevator, which is designed deliberately to look like space capsules with the viewing port. Then you go into the top, which is a revolving restaurant and the waitresses are clad in gold outfits, which kind of reflect later what you would see in Star Trek, Lost in Space and other space related popular culture of the era.

NOON SALIH: Next up, the Spacearium.

CHARLES PAPPAS: So Boeing has its own display, the Spacearium, which is a 75 foot - about what, 23 meter surround screen that would show you a trip into space.

NOON SALIH: The Space Needle and the Spacearium took Expo's visitors to space, but other attractions like the monorail and General Motors' Firebird 3 - basically a rocket on wheels - gave them a hint at what life in the space age would look like.

Now, if this all reminds you of an episode of "The Jetsons," you might be onto something. The animated sitcom premiered at the tail end of Century 21, and it's no surprise that the Expo's commercials looked very much like an episode of the beloved space age series. We wanted to catch Charles' live reaction to one of those commercials that ran in 1962 to promote the Century 21 Expo.

CHARLES PAPPAS: Now this looks like a Jetsons cartoon, mid-century illustrations look. What does it have? It has a, it has a lightness. Fun. This is not the heavy handedness of industrial space. This is the fun of what space will be. This is what

we actually thought the world might be like very, very soon. That was the optimism of it. If it's one thing you can, if it's one thing you can say about this expo, it was optimistic.

NOON SALIH: That optimism continued till the end of the decade. The US Pavilion at the Montreal Expo of 1967 had an exhibit called "Destination Moon," where you could visit models of space capsules, see films and photos of launches, and read audio transcripts of astronaut conversations. The Russian Pavilion had models of the Sputnik satellite and a viewing room where you could experience a journey to Mars.

Two years later, we achieved what was once thought to be impossible.

ARCHIVE

NIEL ARMSTRONG: Archival add tape of Niel Armstrong saying "One small step for man, one giant leap for mankind."

NOON SALIH: Neil Armstrong became the first man on the moon.

Now, space was still a subject of interest in the few years following the moon landing - including a wildly popular display of actual rocks from the moon at the Osaka Expo of 1970. But the world gradually started trading in its obsession with space for...concern over what was happening on Earth, from wars to environmental crises. Expos followed suit in that time period and, over the next 50 years, turned into a space for preparation, almost. Preparation for the worst.

But Expo 2020 Dubai looks to change that.

CHARLES PAPPAS: What's kind of cool is that Expo 2020 has now brought back an interest in space in many ways. And really, I think a lot of it is due to the fact that the UAE launched and successfully orbited the Hope satellite around Mars.

MUSIC

OMRAN SHARAF: Going to Mars is not the main goal here. It's a tool for a much bigger objective.

NOON SALIH: Here's Omran again to tell us about the vision that accompanied the Emirates Mars Mission.

OMRAN SHARAF: It's about inspiring Emirati youth and encouraging them to go into STEM. It's about creating a disruptive change in multiple sectors in the UAE that are critical to the future of our economy. It's about creating an ecosystem that is based on an advanced science technology sector that supports a competitive, creative, and an innovative knowledge based economy. And it's about also building capacity in the UAE to address certain national challenges when it comes to water resources and food resources, environmental challenges, and things like this.

NOON SALIH: In 2013, Omran embarked on the journey of sending the Hope Probeto Mars - 7 years before its launch in 2020. But they only had a few chances to get it right.

OMRAN SHARAF: Because you launch, whenever Mars is closest to earth and Mars comes close to earth once every two years. And basically it was at that time, 2014, then 2016, 2018 and 2020.

NOON SALIH: For reference, missions like this one usually require 10 to 12 years to execute. The Emirates Mars Mission was executed in almost 6.

OMRAN SHARAF: The reason why we were able to deliver the mission with such a limited timeframe and budget is because we worked with our knowledge transfer partners at the University of Colorado at Boulder, Arizona State University also, and the University of California, Berkeley. So 450 people work on this mission. 200 Emiratis, 150 from our knowledge transfer partners. And about 100 subcontractors from around the world,

NOON SALIH: And when the probe was successfully inserted into Mars' orbit in February 2021...

OMRAN SHARAF: I was like, is this a dream? Is this, is this actually happening? Uh, the feeling of relief, being relieved at the same time, you know, proud and exhausted. We can hear people from outside, like clapping and happy and an... that was a very, very, very important moment for all team members, I believe.

NOON SALIH: In a similar way to the Emirates Mars Mission, this year's Expo looks to promote collaboration and multilateral cooperation between its 192 participating nations.

MUSIC

OMRAN SHARAF: This region, centuries ago used to be an example of coexistence, people from different backgrounds lived together. Built this region. Scientists from different backgrounds, different religions came up with a huge, important scientific findings that are today core to many of the things that we use in our lives. Having things like Expo, like Emirates Mars Mission and an example of a nation like the UAE, which was able to reach Mars in less than 50 years, which was able to host Expo - a huge, important cultural scientific event, in less than 50 years, it tells you

something. And we hope that we were able to share this experience with other nations in the region and help everyone move forward.

NOON SALIH: The Expo also looks to restore our faith in space. Remember the Boeing Spacearium from the 1962 Century 21 Exposition?

CHARLES PAPPAS: The UAE has the Al Wasl Dome - the largest projection surface in the world, and they're going to be showing space related films on it, like the Boeing Spacearium in Seattle in 1962, except the Spacearium was something like around, let's say 23 meters long. I believe the dome is something like 130 by 67 meters. It is massive. So it's a super-size version of what happened in many ways in Seattle in 1962.

NOON SALIH: The national pavilions are also showcasing their space innovation.

CHARLES PAPPAS: The US pavilion. Now they have a replica of the Space X Booster, which is something like 43 meters tall if I recall correctly. And so it's a replica of the Falcon 9 Booster that they're going to launch and just space. It's cool. And they'll also have a replica of one of the Mars rovers in the US pavilion too - probably Perseverance.

The Italians are getting into it because they'll be showing a robotic arm that a company called Leonardo made for the Rosalind Franklin Rover, which will be on the joint European Space Agency - Russian Roscosmos agency mission coming up.

NOON SALIH:: In mid-October, Expo's Programme for People and Planet held its Space Week focusing on the safe and productive exploration of space with key speakers such as Omran himself. But all of this barely scratches the surface of the

UAE's future plans in space. These include a mission to Venus and seven asteroids in the asteroid belt, as well as the first colony on Mars by the year 2117.

CHARLES PAPPAS: I so want to see that because I know to imagine being finally on, not just a moon, but another planet Yeah. Yeah, that's good. That's what I want to see.

NOON SALIH: So...why space now? Can space give us ideas for how to deal with our world's most pressing issues?

OMRAN SHARAF: If I have a farm that I live from, whatever this farm is generating, whether it's food or the water, that water well, it has, or the income I make from this farm. And there's an adjacent, adjacent farm that basically all of a sudden dies as a farm. The plants go dead, the water goes dry.

Uh, something went wrong there, right? So we are in the same neighborhood. I need to know what happened there because whatever happened there, what will affect me or affect my life. So the same thing when it comes to outer space exploration. We have an example of a dead planet. Mars. The planet that scientists believe that more than 4 billion years ago used to be similar to us.

Something went wrong there and turned it into a dead planet and started losing its atmosphere. And it became a toxic planet. So understanding what happened to Mars and what's happening around Mars a little bit that will help us better understand what's happening around us and what's happening on earth also.

So this is why space exploration is very important. We need to know what's going on. Because it's going to affect our work lives, if not today, but in the future.

CHARLES PAPPAS: And I believe that's partly what Expo 2020 can show us and hopefully be like the other great expos, a tipping point for those ideas, because if it's a tipping point for those ideas, it gains mass acceptance.

It gains the backing of the people. And that's, what's vital to a world expo, not just to look cool, but hit that tipping point so that we accept this as something we need to do, not just want to do.

NOON SALIH: Inside Expo takes you behind the scenes at Expo 2020 Dubai, sharing our stories and others across the 170-year history of this global event. Learn more by visiting VirtualExpoDubai.com.

Interested in learning more about space exploration in the context of Expo 2020 Dubai? Listen to the first episode of "People and Planet," the official podcast of Expo 2020 Dubai's Programme for People and Planet, featuring Dr. Maggie Aderin Pocock.

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