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The Needle's Eye

Riding A Moonbeam Into A Year Of Hope

CHAITANYA KALBAG

The privately-funded Team Indus plans to beat 15 rivals from 12 other countries to roll a robotic lunar rover over the moon's surface before the end of 2017

Just over two weeks ago the world's nations agreed they have averted cataclysmic global warming. Close on the heels of Chennai's submersion, we have news that the North Pole is going to be warmer than Southern California, a severe winter storm is battering the north-eastern United States, and northern England has been hit by severe flooding and freezing temperatures. The worst flooding in half a century has also hit large parts of South America. Australia is baking in a record heat wave. Most of the past week, Gurgaon, where I live, was colder than New York or London. On September 24, India's Mars spacecraft completed one year in elliptical orbit. If you had looked up from the surface of the Red Planet, you would have seen Earth buffeted by its own heavy weather, its skies heaving and plunging with optimism and despondency, its atmosphere roiled by terrorism, wars, political turmoil, population pressure and climate change. It seemed fitting, therefore, to end such a cacophonous year by letting hope and imagination soar into the stratosphere.

Back in July 1909, Louis Bleriot won a 1,000-pound prize to become the first man to fly from Calais to Dover across the English Channel. Eighteen years later Charles Lindbergh won the $25,000 Orteig prize for flying across the Atlantic. In between, in December 1911 the Norwegian Roald Amundsen beat the Englishman Robert Scott to the South Pole in a brutal race against time and savage cold which ultimately claimed the lives of Scott and his four companions. Competition, and reward, have fuelled some of mankind's greatest explorations.

In 1962, President John F. Kennedy pledged in his famous speech at Rice University that America would go to the moon within the decade. "The exploration of space will go ahead, whether we join in it or not, and it is one of the great adventures of all time, and no nation which expects to be the leader of other nations can expect to stay behind in the race for space," Kennedy said, adding memorably: "There is no strife, no prejudice, no national conflict in outer space as yet."

More than just a Cold War race into space, the Apollo missions incubated a chain of achievement in rocket technology, U.S. aerospace domination, and helped nurture the world's biggest military-industrial complex. But space isn't a rich boys' club any longer. India is now a recognised and respected space power with proven rocket technology. Its PSLV (Polar Satellite Launch Vehicle), developed by the Indian Space Research Organisation (ISRO) has been one of the world's lowest-cost rocket systems. It has launched about 40 satellites from 19 countries, as well as India's own moon orbiter, Chandrayaan-1 and the Mars Orbiter.

What we have not done so far is land on the moon. The privately-funded Team Indus, based in Bangalore, plans to do just that – and beat 15 rivals from 12 other countries to roll a robotic lunar rover over the moon's surface before the end of 2017. At stake is the $20 million Google Lunar X Grand Prize, but there is more.

Rahul Narayan, the 42-year-old Fleet Commander and Star Trek fan and one-time serial entrepreneur, told me that like the Apollo missions, HHK#1 (short for Hum Honge Kamyaab's first mission) will be a similar rallying point for India. Kennedy quoted George Mallory saying he wanted to climb Everest because it was there. Well, Everest has been summitted a total of 6,979 times. If Narayan and his team succeed, India will be only the fourth nation to land on the moon.

That is just the race, and the prize. The significance of the 75-member Team Indus goes far beyond the objective of rolling out from the spacecraft a 12-kg, four-wheeled lunar rover powered by a 45-watt solar panel, mounted with six cameras that will traverse at least 500 metres on the moon's surface in the Mare Imbrium (Sea of Showers) crater and transmit high-definition video and pictures back to earth stations. Team Indus has already won a $1 million Milestone Prize last January for its landing system, ranging from altitude control to propulsion that will enable its rover to achieve a soft landing.

PROVEN TECHNOLOGY

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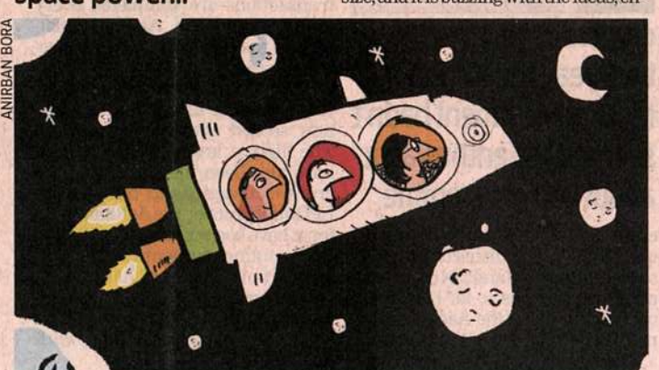

ANIRBAN BORA

The significance is that five years ago, Team Indus was the last to throw its hat in the ring for the Lunar X prize, which was announced in 2007. None of the original team members had any space expertise, but they were all propelled by a sense of adventure and innovation. They began by launching a talent hunt and enlisting expert advisers, industry partners, suppliers and investors. The team has steadily grown in size, and it is buzzing with the ideas, energy and enthusiasm of dozens of young engineers as well as about a dozen retired ISRO scientists. Among the many private-sector collaborators Narayan has roped in are L&T, Sasken, and Tata Communications.

Narayan likens the catalytic potential of Team Indus to India's 1983 cricket World Cup victory, which made an industry of the sport and brought in big money. But building a spacecraft for a moonshot is infinitely more complex than a cricket match. Team Indus members are beavering away at segments like mission, structures, mechanisms, thermal, propulsion, prototypes as well as power generation post-landing. HHK#1 is not the world's first spacecraft, but it will have its own unique DNA.

Within the next year, Team Indus will have to sign a verified launch contract with ISRO to stay in the competition (it plans to ride the PSLV). Then, it will have to test, and re-test, a moonshot that will involve two earth orbits and about a dozen moon orbits, before the spacecraft begins its final descent from an altitude of about 12.6 km to the lunar surface. At that point the craft will be moving at a speed of 1.8 km a second. There is no room for error – a two-second signal delay between Moon and Earth means that if something goes wrong the lander will already have moved a considerable distance before a fresh command reaches it. Once deployed, the rover will have to avoid rilles, large mountains or craters and aim for areas of minimum shadow that are not rock-strewn.

These are all hurdles, and they can be crossed. At a broader level, Team Indus is creating the belief that you can start in India, stay in India, be financed in India, and be launched from India.

"Our ideas are back-of-the-envelope ideas. We all think the world should change, we all think somebody else should change it. But how many of us get up and say Hey, let me get out of my comfort zone and see what I can do about it. It's about rolling up your sleeves and saying how can I make that change?" Narayan told me.

Dr K. Kasturirangan, the former ISRO chairman, has become a mentor to Team Indus. He told me the moonshot could spawn future missions and take India's space industry to a level beyond the government's own programme. Last Sunday in his monthly radio talk Prime Minister Narendra Modi promised to roll out a Start-up India plan across the nation on January 16, saying he would rope in IITs, IIMs and central universities to foster innovation in every nook and cranny.

Kasturirangan called Team Indus the ultimate start-up. "The most important thing for me is the spirit behind it. It is important to demonstrate that youngsters in this country have the spirit of risk-taking and adventurism, and this certainly demonstrates a way for how India can shape itself in the 21st century," he said. As they say, aim for the moon – even if you miss you will land among the stars.

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