



Game of drones

UAVs made by young Indian entrepreneurs are flying high and being used for everything from guarding borders to making movies, says **Aarti Dua**

When a fire broke out in Calcutta's Chatterjee International Centre recently, the city's police force moved quickly to avoid a repeat of the Stephen Court tragedy. Additional commissioner of police Debasish Roy pulled out an unusual weapon from his arsenal. He rushed a team to the site and, within minutes, they launched Netra, a small unmanned aerial vehicle (UAV) or drone in the sky. Soon, Netra was cruising around the building's top floors, training its camera through the windows to provide real-time visuals to ensure that no one was trapped inside.

"Unlike in the Stephen Court fire, where we couldn't reach a part of the building, this time, Netra gave us a bird's eye view of spaces we couldn't access. We've had a good experience with the UAV since we got it," says Roy.

The Netra is nothing less than a home-grown unmanned flying machine. And it's the baby of Ankit Mehta and his band of IIT-ians from Mumbai, who co-founded IdeaForge Technology in 2007 and who are among the leading young drone-makers in India today. Some 70 Idea-

Ankit Mehta (right) and Vipul Joshi's Netra is among the most well-known small UAVs in India today; (Above) an aerial shot of Calcutta's Science City complex from the Netra, and (facing page top) providing disaster relief in Uttarakhand



GAJANAN DUDHALKAR



forge UAVs — their prototype even featured in *3 Idiots* — are flying the skies. There's the Netra quadcopter (it's like a helicopter with four rotors) and the NAF fixed wing UAV.

Says Ankit: "When we started, nobody knew about UAVs. Now, the market has grown. People have realised that UAVs can unlock the potential to gather intelligence and manage situations."

Move across to Delhi, where Aakash Sinha is showcasing his Garun quadcopter and Hansa fixed wing UAV. The robotics scientist moved back from the US — he worked with robotics major iRobot Corporation there — to set up Omnipresent Robot Tech in 2010 to make robots for the ground, air, water and space.

He's made a bomb disposal robot and what's called the river-cleaning Ro-Boat. And, he's not only offering the Garun and Hansa for defence operations but he has also used them at Jabong's warehouses in Manesar and also to monitor crop health on a wheat farm in Haryana. "The UAV sector in India has evolved dramatically. The potential is huge," he says.

Ever since the US used its big Predator drones in Iraq and Afghanistan, and ever since Amazon has talked about using smaller UAVs to deliver goods, there's been a surge of interest in — and hype around — UAVs. Hollywood films like *Skyfall* have used drones. And experts like Chris Anderson, former *Wired* magazine editor-turned-drone-maker, expect small UAVs to become like the personal computers of the drone world.

Naturally, the excitement has rubbed off in India, and a host of young entrepreneurs have emerged, who're giving wing to their imagination and developing small UAVs. From stunts like a pizza delivery in Mumbai to rescue operations in Uttarakhand, from aerial wedding videos to election coverage by news channels, UAVs have hogged the headlines.

There's the increased availability of toy UAVs costing a few thousands and the growing band of hobbyists assembling UAV kits. And there are the young entrepreneurs building professional

UAVs costing from Rs 20 lakh to a few crores. They're taking on



JAGADESH N.V.

Asteria Aerospace's Nihar Vartak (above) and Neel Mehta are in the final stages of testing their Cygnus fixed wing UAV

the big private defence equipment firms and they're looking at a range of defence and commercial applications.

According to John Livingstone, former UAV pilot in the Indian navy and president, Consortium of Unmanned Vehicle Systems India, the country had barely five UAV firms in 2007. That's grown to nearly 50 today, including some 20 indigenous drone-makers. "The UAV craze has caught on," he says.

Take a look at Aniket Tatipamula, Shinil Shekhar and Neeraj Waghchaure, who set up Airpix, a UAV aerial photography firm, in Mumbai last year. The VJTI engineers, who build their own UAVs, were among the first to approach the real estate sector, among the biggest commercial applications today. Says Aniket: "Photography was an obvious choice because the core thing that any UAV does is collect images and data."

Airpix zoomed onto the fact that buyers look for the view from high-rise flats in Mumbai. So, for an under-construction tower overlooking the Mahalaxmi Race Course, Airpix got its quadcopter to hover and click views from the exact altitude of the proposed flat. That was a hit, and now, its clients include builders across India.

Or, meet Nihar Vartak and Neel Mehta, co-founders of Asteria Aerospace in Bangalore. The aerospace engineers from Purdue University —

they graduated in 2005 — always wanted to start their own venture. So, after first working in the US — Nihar was with Boeing and Accenture while Neel worked with aerospace equipment major Rockwell Collins — they returned to

found Asteria in 2011. Now, they're running the final tests on their Cygnus fixed wing UAV, which can fly up to 15km.

"We wanted to set up a full lifecycle design company that can create a complete product," says Nihar. They chose UAVs because they'd worked on them at Purdue and as they wanted a product they could bring to market quickly — they've funded Asteria on their own.

In Chennai, meanwhile, Prof. K. Senthil Kumar, director, Centre for Aerospace Research, Madras Institute of Technology, can't get over the unusual call, to help solve a murder case, he got from the Chennai Police in February.

Senthil Kumar began working on UAVs as a student in 2002. In 2012, he beat 153 countries to win the Drone Olympics held by the US Defence Advanced Research Projects Agency (it's like our Defence Research & Development Organisation). In the final fly-off in Georgia, his octa-rotor had to reach a target 5km away, crossing 150ft-tall pine

Aakash Sinha has used his Garun drone to deliver packages between Jabong's warehouses and to even monitor crop health on a farm in Haryana; (Bottom) Airpix's (left to right) Neeraj Waghchaure, Aniket Tatipamula and Shinil Shekhar have won over builders with their aerial pictures of views from upcoming flats like this one overlooking Mumbai's race course



trees. "All the teams had sophisticated models and they laughed at our UAV. But we were the only team to complete the mission," he says.

Since then, Senthil Kumar has used his Daksha UAV to help the Chennai Police track illegal granite quarries and monitor crowds. This February, Daksha zoomed in on a bushy area to search for clues of a techie's murder.

It's the commercial use of UAVs that is generating excitement. Senthil Kumar is talking to Chennai hospitals to use Daksha in organ transplantation operations. And all the drone-makers are exploring their use in industrial security, monitoring oil and gas pipelines, and in agriculture.

Yet, given the security threats UAVs could pose, the Directorate General of Civil Aviation has just banned any private body from using UAVs in the civilian airspace till it issues regulations. (The US, which had banned their commercial use, has just begun giving selective permissions.)

For Indian drone-makers, their first focus has been on security and surveillance. Take IdeaForge, founded by Ankit

along with Rahul Singh, Ashish Bhat, Vipul Joshi and Amardeep Singh. In 2008, they took part with IIT Mumbai in an Indo-US Micro Aerial Vehicles contest, where they came first with MIT.

"Everybody took notice of our technology," says Ankit. IdeaForge then built a small UAV with "the smallest and lightest auto-pilot in the world" in 2009. Impressed by it, the DRDO came in as collaborator. "We knew that a surveillance eye for the immediate 2km was required. So we made the most efficient product, which could be easily used by a constabulary level officer," says Vipul.

Since 2010, Netra has been inducted by the CRPF and BSF, and used on the border, in counter-insurgency operations and even to make movies. "Netra is the most popular name among UAVs in India today," says Amardeep, who used it in Uttarakhand last year.

Disaster relief is the other big UAV application. The National Disaster Relief Force (NDRF), which has two Netras, used it in the Srinagar floods recently. "It's been very helpful in emergencies," says Alok Avasthy, Pune commandant, NDRF.

JAGANN NEGI

sector presents," he says. Now, the early response to Cygnus is "very encouraging", he adds.

Meanwhile, Omnipresent's Aakash has sold some 25 UAVs to bodies like the Meghalaya Police and industrial security firm SIS India. Aakash, who did his BTech at Delhi College of Engineering, got interested in robotics when he joined Carnegie Mellon University in 2001 and met renowned robotics scientist Raj Reddy.

After his MS in 2003, he joined Lockheed-Martin's Perceptek, where he worked on unmanned cars, before joining iRobot Corp in 2006. In 2009, he set up iRobot's India operations only to start Omnipresent in 2010.

Now, his Garun and Hansa UAVs have been short-listed for some armed forces tenders. He's also excited about their use in agriculture. On a Haryana farm, Garun's infra-red cameras moni-

tored a wheat crop for six months, resulting in huge savings on fertilisers and water and higher output. Aakash wants to scale this across the farm sector. "It will be huge for India," he says.

Meanwhile, the demand for aerial UAV photography is already huge as Airpix has shown. Says Shinil: "Now, we're looking at other uses like land mapping." Adds Neeraj: "The true potential of the technology will be realised when it reaches the common man."

The drone-makers are aware of the challenges — and hype ahead. Amazon-type deliveries, for instance, may not be feasible in congested urban areas. But they're all excited about the future, given both the growing demand from the army as well as the commercial opportunity. Says Aakash: "Once the regulations are sorted, UAVs will take off in a big way." ◆

Experts predict that small UAVs will boom and be like the PCs of the drone world



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