

## Timothy Compston finds out why aerostats are making their mark in the on-going battle to secure borders and critical infrastructure from a wide array of threats and to thwart drugs smugglers on land and sea

**A**lthough drones are very much in the news at the moment, aerostats are one family of aerial systems which have much to commend them. Certainly the ability to deliver a persistent overview of areas, for days or even weeks at a time, from thousands of feet above the surrounding landscape makes such lighter-than-air systems stand out from the crowd as surveillance platforms.

The resurgence of aerostat systems, at a tactical and strategic level, in recent years can partially be put down to the way that they have been rolled out to great effect by the US military in both Iraq and Afghanistan. Now, many of these battle-proven units are being trialled and deployed by other government agencies for non-military applications. Lockheed Martin's vice president of C4ISR, Dr Robert Smith, points out that, as the US returns its complement of aerostats from

theatre, re-using them for other military and civilian applications is an excellent way of leveraging existing capital assets for civilian roles. "With the capability to provide panoramic day/night surveillance in extremely challenging weather, aerostats have shown themselves to be very successful in supporting border protection efforts," he said, adding that Lockheed Martin is actively involved in discussions with a number of domestic and international customers regarding future aerostat deployments.

Dr Smith stressed that aerostats support a 24/7 surveillance capability that simply isn't possible with manned and unmanned aircraft which face "surveillance time limitations" dictated by fuel consumption and payload. Touching on how aerostat technology has changed

©Lockheed Martin

# BALLOONING S

in recent years, he reported that the biggest advances centre on sensors and payloads. "Our LM 74K aerostat system, for example, is modular and can support up to five different payloads plus multiple communication assets," he said. On the distinction between tactical and strategic aerostat systems, Dr Smith says it basically comes down to size. "The larger class aerostats fly higher and carry significantly heavier, more capable, sensors," he said.

Craig Laws, senior product manager at Raven Aerostar, another aerostat manufacturer with a strong track record here, agreed aerostats can deliver exceptional operational capability. "For any kind of sensor you would put on a tower, [but] you would like to have higher, an aerostat is a good option," he said. The same holds true for sensors you might like to deploy on an aircraft or UAV but want to keep airborne for as long as possible, he added: "With aerostats you don't really have to fuel them; you just need to make sure that you have lifting gas [usually helium]."

When assessing which aerostat meets a particular customer's mission requirements, Laws advised that it usually depends on what the end user actually wants to monitor. "Do they need a camera?" he asked. "Do they need radar? Do they need both? Do they want to put a communications relay on-board as well? Once we can build that payload package it allows us to size the aerostat, as payload weight is the most critical factor." Advances in sensor technology are also helping to keep a lid on payload weight, so there is the option to downsize the aerostat, stay aloft longer, or fly higher. "You can get almost the same performance out of a ten-inch [camera] gimbal as a 15-inch gimbal a few years ago," said Laws. Another factor is the altitude at which the user wishes to fly the aerostat, with smaller systems typically flying up to 3,000 feet above the ground, and larger systems reaching 6,000 feet.

Typical systems range from smaller, "tactical" platforms through mid-sized "responsive" options up to "enduring" models. For smaller tactical systems, Laws explained, the benefit is mobility. "They are great because they are small," he said. "You don't need to carry great quantities of helium with you. You can put them in the back of a truck, take them where you want and inflate them without a large logistics train. Probably two to three people are sufficient."

Law added that, on balance, it is the mid-range "responsive" systems which are the most versatile. "They are a great match for current technology," he argued. "Our 25,000 cubic feet balloon is a workhorse with a payload normally around 300lb; for practical purposes you can put a small radar and a 15-inch camera on that. This is the model we sent to Afghanistan back in 2010/2011." A mid-range aerostat can normally have an aerial endurance of around 14 days, with larger, enduring models able to stay up for around 30 days.

One individual with his finger on the pulse of larger, strategic, aerostats is Rob Brown, programme manager at US Customs and Border Protection (CBP). Brown is responsible for the long-serving tethered aerostat radar system, (TARS). TARS units stretch over the southern US border at 10,000 feet, from Yuma, Arizona, to Lajas, Puerto Rico. "The aerostats are aerodynamic balloons and fly like kites in the wind," said Brown, adding that eight special TARS units were recently transferred from the Department of Defence to the Department of Homeland Security, under whose umbrella CBP falls.

The beauty of TARS, according to Brown, is the opportunity to use a powerful 200-mile range radar to pick-up light aircraft which are frequently employed in drugs smuggling and other nefarious activities. "The fleet of TARS have been in operation for over a quarter of a century along the south-west border, South Florida and even parts of the Caribbean," he said. "With TARS we are looking and sorting through hundreds of aircraft a day and trying to help our law enforcement officers identify what might be suspicious. They are then able to launch further action against any suspicious activity, that might be an investigation or an actual interdiction of the aircraft."

The origins of the CBP aerostat programme can be traced all the way back to when the US Customs Service started using tethered aerostats to counter the rising number of low-flying aircraft operated by drugs smugglers. It was estimated by customs authorities that, by the early 1980s, as many as 8,500 illegal flights per year were transporting narcotics directly from the Caribbean, Central America and South America into the US. The drug smugglers' modus operandi was to employ aircraft which could fly at low altitudes and use the terrain to avoid detection by ground-based radar. Placing radar in aerostats has proved to be a game-changer here, as previously elusive aircraft are now detectable. Today, the number of unidentified

# SURVEILLANCE

# BALLOONING SURVEILLANCE

©US Customs & Border Protection



**Border watch: the drones used in the TARS project can carry up to a ton of surveillance equipment**

aircraft flying across the border has dwindled, reports CBP, to around ten per year – a far cry from the thousands before.

Brown contrasted the sheer scale of the TARS fleet with the more compact tactical aerostat solutions that have been transferred from the Department of Defence following their tasking by ground forces in Afghanistan. “They [TARS] are at least two times higher and five times bigger,” he said. “They carry a ton of equipment as opposed to the smaller systems that lift a couple of hundred pounds.” But, he argued, CBP’s past experience with TARS has helped with the roll-out of these tactical systems. “There is certainly some relationship between the strategic TARS and the tactical aerostats around the common support infrastructure that we are able to capitalise on. The contractors we deal with are pretty much the same, so there is synergy in our programme management activities.” Despite this, Brown acknowledges that the strategic (TARS) and tactical aerostats are focused on two distinct missions. “You have one where the technology is orientated very much to a short-range ground target, versus the other [TARS] where the focus is on long range aircraft target detection,” he said.

Tobin Ruff, deputy director for operations, observation and analysis at CBP, offered further insight into the trials being conducted with smaller aerostats for border protection. “We are responsible for putting the tactical aerostats in various areas of operation over Southern Texas, specifically the Rio Grande valley,” he said. “We did an initial 22-day test in the late summer of 2012, and about a year later deployed the first array close to the border, with 500 to 1,000 feet versions of the aerostats. Most of our situational systems are line-of-sight dependent where elevation provides you with a much better range. Using aerostats you get a bird’s eye perspective to see groups crossing within

certain areas.”

The CBP’s tactical aerostats fall into three types, with the initial set-up featuring two Rapid Aerostat Initial Deployment (RAID) models. “These are the smaller 17 and 22-metre systems and are closer to the border,” said Ruff. Subsequently two Persistent Ground Surveillance System (PGSS) models were added. More recently CBP started flying even larger systems – the Persistent Threat Detection System. Altogether there are now five aerostat sites in total.

Ruff explained that each aerostat has a dedicated control station close to where it is tethered. “As we are evaluating the efficiency of these systems [aerostats], we haven’t integrated multiple systems into one display yet,” he said. Questioned on the ability to move the aerostats to new hotspots, he responded that the smaller tactical systems are all re-deployable using 18-wheeler trucks. An important attribute of these tactical systems, he added, is the ability to reconfigure them to face up to a changing threat situation on the ground.

So what has been the impact of these tactical aerostats? To date, Ruff estimates that an impressive 40 tons of narcotics have been removed from circulation. “The detection and apprehension numbers compared to historical levels have in some cases doubled and even trebled,” he said. “Those are the sort of numbers that makes us encouraged that these systems are having an impact.”

The clear message is that aerostats have demonstrated their worth when it comes to detecting suspicious activity in and around borders and pushing back against drugs smuggling on the land, in the air, and at sea. For agencies that may have dismissed aerostats out of hand in the past, or perhaps never even considered them, perhaps now is good time for a reassessment of what tactical and strategic aerostats can actually offer.

**Timothy Compston is a freelance journalist and PR professional who specialises in security issues. He studied International Relations and Strategic Studies at Lancaster University, is PR director of Compston PR and a previous chairman of both the National PR Committee and CCTV PR Committee of the British Security Industry Association (BSIA).**