



Waiting for the call

Skeldar has been extensively modified since programme launch, including a new engine. (Photo: Saab)

■ Airspace access problems continue to prevent small unmanned helicopter designs from realising their considerable full potential, finds **Claire Apthorp**.

While the large fixed-wing UAV sector goes from strength to strength, the small VTOL UAV market is still finding its feet. A number of manufacturers are focussed on this area, but while military and civil users are slow to take up the technology, the potential benefits of deploying these systems, including eye-in-the-sky surveillance and intelligence-gathering in land and naval environments, are still to be fully utilised.

'From a producer's standpoint, there is a level of frustration in the time it has taken to address and resolve certain issues so we can serve those who have expressed so strong a desire for the technology our industry offers,' a spokesperson for **Schiebel** told *Unmanned Vehicles*. 'But as wider acceptance and funding allocation amongst new user communities continue, we are confident that a more extensive use of airspace is forthcoming, and we will continue our efforts to expedite the process.'

Schiebel's Camcopter S-100 UAV has received European Aviation Safety Agency airworthiness certification, which has been a

significant factor in the growing success of this system. One of the most mature rotary UAVs in production, development of the **S-100** took place over five years, with previous models having been available for 16 years. The aircraft grew out of an early-1990s requirement for airborne systems able to detect mines, while also acting as a stabilised camera platform for aerial photography and motion picture filming.

The **S-100** comprises a compact helicopter vehicle with ten hours' endurance, high speed and precise manoeuvring capability in a configuration that can be fitted with a variety of payloads weighing up to 50kg, and a GCS. The system is designed to minimise the need for operator training, requires no launch or recovery equipment, and can be programmed to fly an autonomous mission profile via a simple point-and-click graphical user interface, with zero operator intervention. However, it can be reprogrammed at any time during flight to perform an interactive mission or react to task changes, giving total performance flexibility.

■ EYE IN THE SKY

In terms of payload options, the **S-100** is modular, giving users the ability to reconfigure for a wide variety of missions. Imagery is transmitted to the GCS in real time. As standard, the **S-100** flies with state-of-the-art EO/IR sensors, but alternatively integrated spotlights, loudspeakers, rope/net-dropping containers, or even synthetic aperture radar (SAR) are available.

In January, the system carried out its first flight with the L-3 Wescam MX-10 EO/IR payload, installed at a test range near **Schiebel's** production facility in Wiener Neustadt, Austria. The trial focussed on the advanced capabilities of the MX-10 and enabled detailed observation of the surrounding area. The MX-10 was controlled via data link, with real-time live imagery transmitted successfully back to the GCS. The addition of such stabilised HD sensors makes more demanding roles possible and further increases the utility of the **S-100**.

Approximately 130 units at a sales value of over €100 million (\$136 million) have been sold worldwide. Most recently, the **S-100**



to arms

The Camcopter S-100 is easily ground-transportable. (Photo: Schiebel)

supported the provision of security at the fifth meeting of the G-20 heads of government in Seoul on 11-12 November 2010.

'Today the need for maximum security, in both military and civilian domains, demands a system which combats the many diverse challenges and dangers in the delivery of immediate information for total protection,' the spokesperson explained.

'We offer a system with capabilities that can make a difference. The VTOL UAS is an ideal solution which provides powerful surveillance delivering constant real-time information 24/7. It needs no prepared area, supporting launch or recovery equipment, and operates day and night, under adverse weather conditions, with a beyond line-of-sight capability out to 200km, both on land and at sea.'

The S-100 is in use in Malaysia and the UAE and has also completed trials for France's DGA defence procurement agency and the Spanish military. The type recently conducted a demonstration for the US Army Special Operations Command in cooperation with Boeing, involving integration with UGVs for psychological operations in theatre. During the demonstration, the S-100 was equipped with an American Technology loudspeaker capable of addressing crowds at a distance of up to 2km, a leaflet-drop capability and an IAI

POP 300 EO/IR camera payload. John Deere's R-Gator UGV was also equipped with a loudspeaker augmented with a Trident data link, demonstrating the potential for teaming unmanned platforms.

'The psychological operation mission at a mock-up city training facility at Fort Bragg [North Carolina] simulated in-theatre conditions, and was aimed at minimising civilian unrest and preventing civilian casualties while apprehending a suspected terrorist cell,' the Schiebel spokesperson told UV. 'The S-100 was utilised to survey the area and provide real-time aerial intelligence, as well to address the public and drop information leaflets.'

KEEPING AFLOAT

Key to the success of aircraft such as Camcopter is that small VTOL systems are uniquely capable of penetrating areas which may be too dangerous for piloted aircraft or a dismounted patrol. One of the most promising applications for rotary-wing platforms, in particular, is the maritime environment, a market that Saab is focussing on with its Skeldar V200M system.

'We see a huge potential in the maritime domain, especially for smaller ships, offshore patrol vessels and naval vessels, and as a

complement to manned naval helicopters,' Stefan Löfström, director of UAS marketing for Saab, told UV. 'The paramilitary domain is also hugely potentially exciting, for applications such as maritime border surveillance, [as is] commercial industry, for use on operations such as offshore gas line inspection.'

The V200M can hover in the air for hours, providing real-time information to its GCS and remote video terminals. The potential for the system to expand the situational awareness of vessels is significant, due to an ability to collect images at long range, allowing it to approach areas of interest while remaining difficult to detect, even by surveillance radar. This enables the home vessel to avoid threats, making the V200M a powerful asset, suitable for high-risk missions with high-value targets.

The naval system can be installed on vessels with a fixed landing platform that can be situated on deck or on top of its 6m transport container, reducing the logistical footprint, where space is at a premium. The GCS is designed to be integrated into a ship's existing operator consoles and combat management system by adding minimal flight safety critical hardware.

DOMINANT EYE

Saab sees the land-based Skeldar V200, which recently completed trials for an international customer, as a next-generation VTOL UAV, which Löfström calls a complete system solution. 'We are a true systems solution provider, able to customise our product to meet specific customer requirements,' he said. 'We can integrate a customer's data links or specific payloads if required, and we can also integrate the UAV into a customer's legacy command and control system, which makes us unique in the market. We have also integrated UAVs from Swiss UAV into our control station, so we are able to offer customers a total air vehicle family – a highly attractive concept for customers who want to operate a mixed fleet of air vehicles from the same GCS.'

The V200 is billed as the land forces commander's 'dominant eye,' acting as the primary day/night reconnaissance, ➤

surveillance and target acquisition system for dismounted troops. The requirements of lower-level tactical units have been a big driver in the development of the system – rapid set-up, tear-down and handover between the GCS and remote payload terminals give the system the flexibility to keep pace with troop movements and provide information on the move, particularly in urban areas and difficult terrain where situational awareness is otherwise difficult to obtain.

AUTOMATION CONTROL

Another company working closely with Swiss UAV is Guided Systems Technologies (GTS) in the US, an automation control group which offers adaptive solutions for VTOL systems.

'We've been tasked with adapting all kinds of VTOL systems,' Eric Corban, chief technical officer for the company, told *UV*. 'Over time we found that customers would rather buy a completely integrated turnkey UAV solution, so we partner with a number of UAV airframe manufacturers to produce that, and now offer a family of vehicles in different sizes.'

The smallest offering from the group is the SiCX 12 UAV, a lightweight VTOL aircraft able to carry payloads of up to 5.4kg, while the largest is the SiCX 250 that can carry an external payload of 113kg and fly for up to

'The VTOL UAV market will develop very quickly when it starts to take off.'

two hours. The Swiss UAV joint product is known as the SiCX 45T, which constitutes an ideal ISR platform, able to carry payloads of up to 20kg, and by integrating its systems onto existing airframes, GTS is able to focus on its technology specialisation and deliver integration solutions faster.

Mission flexibility is also a central aspect for GTS systems. The SiCX 250 is an ultra-lightweight manned helicopter that can be converted to an unmanned system with an installation kit by removing the seat and controls and replacing them with a pre-fabricated aluminium structure that carries the systems required to fly the aircraft in unpowered mode. The system can be quickly converted back, giving operators the flexibility to use the same aircraft for both manned and unmanned missions.

'The key driver we're seeing is for users who operate manned helicopters for missions that

have high risk to the pilot,' Corban said. 'We see interest from customers involved in things like geographical survey work, where manned helicopters are flown at very low speed very close to the ground on long-duration operations. In this situation the pilot is likely to get fatigued and it's far safer to operate an unmanned vehicle in this instance.'

'Another very interesting application is for ship-based survey work in the Arctic. This is traditionally carried out by a manned helicopter acting as a "spotter", providing navigation to an ice-breaker and survey ship. In harsh weather conditions such as these, the risk to the pilot is increased dramatically, making this a logical potential application for our systems.'

LOOKING AHEAD

While there is an increasing requirement from potential customers to field small rotary UAVs, the market for these vehicles remains fairly niche. Until current airspace regulations and the regulatory authorities' ability to integrate UAS into 'manned' airspace are cleared as a hurdle, the practical application of these high-value systems is somewhat restricted. VTOL UAVs remain a significant part of the future of aeronautics within both the military and civil domain, and work is being carried out around sense-and-avoid technology in order to further increase these platforms' compatibility with piloted vehicles in commercial airspace.

'Looking towards the future, it's hard to see how the technology will progress,' Löfström said. 'The technology domain and the VTOL UAV market will for sure develop very quickly when it starts to take off, but it's still quite an immature market. We carried out an assessment of the UAV market and determined that there was a huge number of fixed-wing UAV suppliers and saw big market potential for the VTOL market – but the problem for all of us is that no one wants to be the first to really commit to deploying these products, but when we do see a customer start to really use it operationally, the market will take off very fast.' **uv**



Camcopter has been the most successful VTOL UAV brought to market so far. (Photo: Schiebel)