SEE THE ENEMY: 822X SQUADRON

Celebrating its first anniversary as an operational unit in October, Navy’s 822X Squadron continues the important role of testing and operating Unmanned Aircraft Systems (UAS) capabilities in order to inform future plans. By Nigel Pittaway.

Commissioned in October 2018 from the former Naval Unmanned Aircraft Systems Unit (NUASU), the squadron’s motto is ‘See the Enemy’ which is very appropriate, given the organisation’s Intelligence, Surveillance and Reconnaissance (ISR) test and evaluation role.

822X Sqn presently operates both fixed-wing and rotary-wing (Vertical Take Off and Landing) unmanned systems from land and sea bases and ships, in order to inform Navy’s forthcoming SEA129 Phase 5 Maritime Tactical Unmanned Aerial Systems (MTUAS) program.

822X GENESIS

Navy formed the Navy UAS Development Unit, consisting of just five personnel, at HMAS Albatross (Nowra) in 2013 and, with the introduction of the Insitu Pacific Limited (IPL) ScanEagle fixed-wing UAS, the unit was renamed Navy UAS Unit (NUASU) in 2015, by which time the number of personnel had almost trebled.

The unit acquired a rotary-wing VTOL UAS capability with the acquisition of the Schiebel Camcopter S-100 in 2017 and was ultimately commissioned as 822X Squadron on 25 October 2018, becoming the Fleet Air Arm’s fifth operational squadron.

Based at Nowra, local operations are conducted from the nearby airfield at Jervis Bay and the Beecroft Weapons Range. Recent activities have included participation in the Autonomous Warrior 2018 exercise, held in the area in November last year and Exercise Talisman Sabre 2019, held in Shoalwater Bay in July this year.

The role of 822X Sqn is to define future Naval UAS capability and the ‘X’ in its name indicates the developmental nature of the unit. The squadron is set to become the operator of Navy’s MTUAS being delivered under SEA129 Phase 5 once the capability reaches Initial Operational Capability (IOC) in the mid-2020s.

“822X Squadron has two roles: to conduct operational evaluation activities to inform the MTUAS project and, secondly, to prepare ourselves and the Fleet Air Arm and indeed the fleet for the introduction of the MTUAS capability,” explains the squadron’s Commanding Officer, Commander Mick Rainey.
“We’re a seagoing squadron and to fulfil our role we have to test existing theories and concepts, while working within the existing aviation regulatory system framework, in order to help develop new rules and regulations which are applicable to unmanned aircraft systems.”

The ScanEagle and S-100 have different capabilities and a different footprint when embarked at sea, as befits their differing configurations. The fixed-wing ScanEagle has a longer endurance for example but, because it requires a launch and recovery system, it has a larger footprint in the host vessel.

“We receive direction from the capability development area within Navy Headquarters and we have a long list of things to trial and test,” CMDR Rainey adds. “We provide all that information back to Navy Headquarters so that Navy will be an informed customer when it comes to SEA129 Phase 5.”

SCANEAGLE

The squadron has operated the ScanEagle system since 2015 and has tested it at sea on several occasions, including a deployment to the Middle East Region aboard HMAS Newcastle, one of the Navy’s Adelaide class frigates in 2017.

The remotely piloted aircraft itself has a wingspan of 3.11 metres and weighs only 22kg but has an endurance of between 12 and 14 hours. It is capable of carrying a 6.5kg payload which, in Navy service, has included an Insitu E0900 Electro-Optic Infra-Red (EO/IR) sensor and Sentient Vision Systems’ Visual Detection and Ranging (ViDAR) software, to provide a wide-area passive ISR capability.

“The ScanEagle is one of the most widely used tactical UAS in the world and it has flown over a million flight hours world-wide,” CMDR Rainey says. “We’ve operated a number of different payloads on ScanEagle, with EO-IR sensors being the primary ones, but we’ve used ViDAR and the Maritime Automatic Identification System (AIS) and we also use Identification Friend Foe (IFF).”

At the present time, the unit operates two ScanEagle systems, each of which comprises of a Ground Control System (GCS) and three to four remotely piloted aircraft.

CAMCOPTER S-100

The S-100 has a rotor span of 3.4m and a maximum take-off weight (MTOW) of 200kg and can carry payloads up to 50kg, with a maximum endurance of over six hours. Payloads trialled by 822X Sqn to date include a Wescam MX-10 EO/IR turret and the AIS system.

“The capability was acquired (and is being operated) under Navy Minor Project 1942, with Schiebel delivering the first platform during the course of 2017. At the present time, Navy operates one complete system (two remotely piloted aircraft and a GCS) but also has additional components.

The original S-100 petrol engine used aviation gasoline but Navy’s requirement is for an alternative heavy fuel engine, which will use the kerosene-based JP-5 fuel, offering a higher flash point. Navy is the launch customer for the heavy fuel concept but the initial delivered engine configuration resulted in a quite high overall empty weight (of the S-100) and therefore reduced endurance to an unsatisfactory level (Schiebel).

The project was originally divided into two phases, to acquire a suitable capability for the minor and major fleet units but they have now been brought together under Phase 5 to consider a single capability.

At the Maritime Environment Working Group in July, Defence advised it is reconsidering its approach for SEA129-5 due to a number of factors including the current maritime strategic environment. Currently in the Risk Mitigation and Requirement Setting Phase of the Capability Life Cycle, SEA129-5 may undertake additional risk mitigation activities. More than one MTUAS type may be required to meet Navy’s needs. Defence intends providing either a progress update or further advice later in 2019.

SEA129 PHASE 5

Project SEA129 Phase 5 will acquire a MTUAS which will operate from the decks of a range of Navy ships, from the Arafura class Offshore Patrol Vessels (OPVs) to major surface units such as the Hunter class frigates now under construction.

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“We are platform agnostic. It’s all about the effects we achieve and, if anything, we are more focused on the payloads to achieve the effect we’re looking for,” CMDR Rainey explains. “I don’t think there is a school of thought for a particular platform, all options are open. Fixed-wing and rotary-wing platforms each have their strengths and weaknesses and we don’t have a preference for anything at this stage.

“We’re open to all ideas and we operate an indicative VTOL option and an indicative fixed-wing option, so that we can learn and understand more – and be an informed customer when we approach the market for SEA129-5.”

One certainty, however is that there will be a human in the loop of whichever system is selected for SEA129-5. CMDR Rainey says Navy’s consideration of autonomous aircraft systems (human on the loop), while being closely monitored, is still some way into the future.

“We’re a long way from these systems being autonomous and until we can sufficiently trust the autonomy, we’re going to have humans in the loop,” he explains. “It takes on average around 10 people to get one UAS airborne at the present time, however in the future we want to be in a space where for one operator, we’ll have 10 UAS airborne.”

AN INDUSTRY PERSPECTIVE

Schiebel was announced the winner of NMP1942 and began delivering the initial Camcopter S-100 training activities in early 2017. Today, the company has trained around 12 Navy personnel (operators and maintainers) in Vienna and this training is ongoing.

In September 2018 the Austrian company formed Schiebel Pacific Limited, based at the Albatross Aviation Technology Park adjacent to the Naval Air Station, to establish a permanent program, logistics and sales presence in the region. At the time, the company also announced that it had partnered with Air Affairs Australia to support its bid for SEA129/5 and future programs.

“We’re investing in Australia not just because of one minor project (NMP1942); we created Schiebel Pacific and we have come to stay,” explains Schiebel Pacific Director (Fabian Knecht sagt). “We also plan to establish a training capability in Australia because, for all our future plans, it’s a must for us to be able to conduct training in the country.”

Schiebel Pacific currently has a footprint of four people at Nowra, including a Field Service Representative (a qualified S-100 operator) who is, for all intents and purposes, embedded within 822X Sqn. The company is also in discussions with local industry representatives to grow its Australian supply chain.

“We have a goal to become the regional hub for the Pacific region, including parts of Asia. It’s our identified goal to establish training facilities here in coming years and the first program we will compete for is L4129. Depending on our success, we’ll decide how far we grow, but we understand that the Australian Government requires a solid investment in local industry and Australian Industry Content (AIC),” Knecht says.

“We enjoy working with the Navy – they are a very demanding but also a very reasonable customer. We are engaged all over the world, but it’s nice to work with a technically educated customer who knows now to fix problems. We really see a ‘can do’ attitude in Navy.”