Dropping cooling Guardians

A historic breakthrough in the combat against wildfires was recently achieved when California-based Caylym Technologies International successfully deployed the Precision Container Aircraft Delivery System (PCADS) at the former Castle Air Force Base in Atwater, California. Ann-Marie Knegt reports.

This rapid response aerial firefighting system encompassed the release of 32 individual Guardian PCAD units from the rear of a C-130 aircraft, a four-engine turboprop military transport aircraft built by Lockheed.

The Guardian units were deployed from 500ft above ground level, and 25 of those delivered over 6,000 gallons of water mixed with Chemguard's First Class Foam – which the company kindly donated for the purpose of the exercise – on a GPS identified location. In addition, another seven units were released with Thermogel, which was mixed into 1,700 gallons of water. A Guardian unit consists of a filled bladder in a biodegradable sleeve, which can be filled with water, foam, gel and fire retardant, and can hold in excess of 200 gallons of material, and a standardised high pressure hydrant can fill the Guardian bladder in as little as three minutes. Chemguard's Matt Boyle explained that Caylym was looking for a wildfire foam that had a minimal environmental footprint. "FirstClass was the obvious choice, because it has the lowest environmental toxicity profile among all the major Class A foams currently available. It was the first fully qualified and approved Class-A foam by the USDA Forest Service under Specification 5100-370A, as well as being UL Classified as a wetting agent in accordance with ANSI/NFPA 18. FirstClass is also readily available on the USDA Forest Services National Long-Term Fire Retardant Requirement Contract.

Caylym Technologies' PCADS system in action – 32 individual units were dropped over California. The majority contained Chemguard's First Class foam.

"We are constantly looking for creative and innovative ways to use our foam products. Exploring opportunities like the "Guardian" system allows us to gain insight into new firefighting technologies. This insight opens the door to new product development, as well as the possibility to improve on our current line of foam concentrates."

Caylym's Steve Chung, who functioned as the Incident Commander, told *F&R* that the exercise was carried out with extreme precision according to NATO CIMIC standards. Over 60 people were involved in the execution, and they were all highly trained professionals, ranging from direct and general support, medical – Red Cross, academical, military, ICS volunteers, and subject matter experts to local, county state and federal Government.

"We had a great time in the process to deployment, and we kept to our planned timelines of our C-130 drop. Research and experimental avionics were built in the forward areas of the aircraft, to monitor the system. The original avionics on C-130 aircraft consist of analog instrumentation, which increased aircrew workload. Our aircraft operator is working with an avionics integrator to provide commercial owners of C-130 aircraft with a digital cockpit and new flight management system which improves flight performance and reduces crew workload," said Chung.

The main objective of the exercise, set by Caylym's CEO Rick Goddard, was the Validation of Guardian's capability for C-130 deployment. During the evaluation it was concluded that the main objective as well as all sub-goals had been met. Sub-goals included: deployment of the units to Castle Airfield, the loading operations, air operations, flight performance and target delivery.

The multi-agency part of the exercise was also deemed extremely successful and the integrated part of the command structure had been set up to demonstrate that the field and mission application could be used as a standard response strategy. "Any cargo ramp equipped aircraft can deploy the system, but in this case the C-130 was chosen because of its wide availability and good capacity. The aircraft doesn't need to be modified to accommodate our system," continued Chung, "This greatly increases the availability of already stretched resources during major wildfires."

How PCADS works

The Guardian units are loaded on to the aircraft, which then flies to the predetermined GPS location, where they are released by a strap system, which can be preset for the boxes to open with a certain time delay. This then creates a rain effect in which the agent is delivered to the fire, which then causes a cooling effect, rather than a deluge. According to Chung this is very important, as it gives the Incident Commander deployment options – rain effect vs deluge – based on fire behaviour, situational awareness, and protecting critical infrastructures.

PCADS can also be used to create a breakline area, to stop wild fires from progressing, and in this case it not only cools the environment down, but it also attaches itself to the fuel sources and stops the fire from progressing further.