AIRCRAFT

TACTICAL RINSE SYSTEM CASE STORY

RIVEER'S TACTICAL RINSE SYSTEM INTEGRATES GRUNDFOS PRODUCTS

INTRODUCTION

With 2.1 billion people living without access to safe water throughout the world and changes in consumer behavior and consumption patterns expecting to increase the demand for water and energy by approximately 40% and 50% respectively by 2030, it becomes more and more critical for organizations that have a global reach to partner with companies, organizations and governmental entities that take the sustainable use and reclamation of water seriously while improving technologies for a better tomorrow. Grundfos is a company that not only takes these matters to heart, they also assist companies in fully automating systems to ensure precision monitoring increasing system efficiency and the reclamation of water. Riveer is a company Grundfos has a longstanding relationship with and manufactures solutions and products for. Grundfos solutions integrated into Tactical Rinse System (TRS) builds have led to some of the most environmentally innovative and advanced systems on the market benefiting governmental entities and the aviation industry.

THE SITUATION

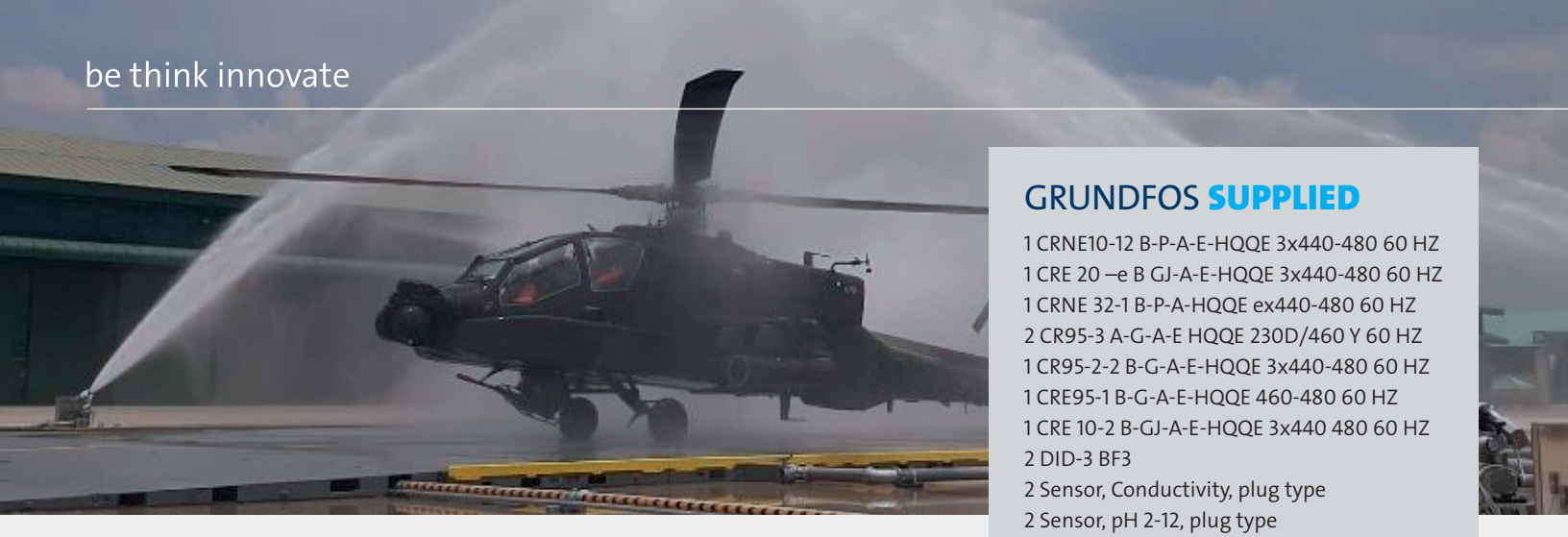
Riveer, a global niche manufacturer of wash rack, clear water rinse systems, and wash water recovery systems, located in South Haven, Michigan receives ongoing contracts to build customized Tactical Rinse Systems (TRS) for clients throughout various locations around the world to ensure the proper rinsing of aircrafts preventing corrosion. They needed environmentally friendly and reliable products and solutions to advance their system and worked directly with Grundfos to source and manufacture these products. Each system build is different and customized to the needs of the client.

THE SOLUTION

The latest TRS system Riveer has designed automates the clear water rinse process using Grundfos pumps, Grundfos digital instrumentation dosing (DID) sensors, DID controllers and variable frequency drives (VFD's). Innovative usages of VFD drives maximize system functions allowing for better water recovery. A Grundfos VFD drive that is typically used for running Grundfos pumps is incorporated to run a large regenerative blower motor which produces vacuum allowing them to recover water directly off the racks. Having the VFD drive on the blower allows them to ramp up the blower slowly and fine tune their recovery flow rate.

"The really cool thing about having a VFD is because in our first systems we did not have these on blowers. The blowers would effectively run one speed and we would recover water at whatever rate we would, but having the VFD on it allows us to ramp up the blower slowly...It's like a jet engine turning on...not only can we ramp up the blower nice and smoothly, but then we can decide we only need to run the blower at 60% to keep up...We can fine tune our recovery flow rate which then feeds to another pump with a VFD which is then filtering water through a large media filter. And then it goes back into a tank." – Graham Blackwood, Mechanical Engineer - Riveer

Two CR 95 pumps are used in parallel to deliver the finished product (filtered/treated water) to specific zones for aircraft rinse procedures. Proper water pressure and placement are essential to the effectiveness of this system and the CR95 pumps allow precise control.



GRUNDFOS **SUPPLIED**

1 CRNE10-12 B-P-A-E-HQQE 3x440-480 60 HZ
1 CRE 20 –e B GJ-A-E-HQQE 3x440-480 60 HZ
1 CRNE 32-1 B-P-A-HQQE ex440-480 60 HZ
2 CR95-3 A-G-A-E HQQE 230D/460 Y 60 HZ
1 CR95-2-2 B-G-A-E-HQQE 3x440-480 60 HZ
1 CRE95-1 B-G-A-E-HQQE 460-480 60 HZ
1 CRE 10-2 B-GJ-A-E-HQQE 3x440 480 60 HZ
2 DID-3 BF3
2 Sensor, Conductivity, plug type
2 Sensor, pH 2-12, plug type
2 CUE 3x380 0500V IP55 45kW DC
1 CUE 3x380-500V IP55 18,5kW DC
2 Cord, power, NEMA 5-15P male plug, 18/3

Even though the systems are not totally maintenance free and typically have individuals check on them quarterly, much like you would have someone check or service your car changing out the filters, they are designed to be autonomous and easy to install.

Water is sprayed on the aircraft and then the run-off is collected and properly filtrated and treated for water reuse. The water is collected through what is called a rack under the helicopter. When asked what makes the system innovative Graham shared that it is portable. In theory you can move the system, two shipping containers and rack used to collect the water and deploy it wherever needed throughout the world.

According to Graham, the system is activated from the cockpit. The pilot will pull up and park their aircraft in a pre-designated place on the pad that collects the rinse water that is being sprayed, tune their radio to a certain frequency, follow the procedure to activate the system and receive confirmation. The pressure and disbursement of the rinse water is entirely dependent on the type of the aircraft and Grundfos products provide the necessary technology to monitor and control pressures and flow. Recipes are configured for robots to shoot water towards the aircraft based on the aircraft airframes. The pressure must be just right for each airframe to ensure damage does not occur leading to costly repairs and downtime. To visualize the system Graham says to think of a CNC machine. The robots are moving differently and spraying differently dependent on the airframe of the aircraft. One day they could be spraying for a Black Hawk, the next for an Apache and another day for a Chinook.

"When we are rinsing Chinooks, it's a whole other ballgame because you have two big rotors going...it takes time for the water to actually reach the Chinook. It basically has to carve a tunnel out." - Graham Blackwood, Mechanical Engineer, Riveer

Special technologies are also available on many of these aircraft which are highly sensitive in nature to pressures making it extremely important to control and monitor points within the system. Because these systems are installed sometimes in harsh climates, temperature, wind speed and other environmental factors are considered. Sensors are added to the top of containers to accommodate and adjust to environmental needs or shut down the system when necessary.

When asked why he selected Grundfos products to meet specifications for the build, Graham shared that relationships and product reliability were the deciding factors. He simply stated, "We use Grundfos pumps for everything and Tracy is a great salesman. I've worked with him for five years...we spent tons of man hours before, working with competitor pump issues, and it's a completely different game now. We shouldn't be worrying about the pumps instead more about the whole system together." - Graham Blackwood, Mechanical Engineer, Riveer

"We got a break because they were using a competitor's pump that couldn't meet the new EISA standards for their motors. This was the first break we got with them where they gave us a shot, and from there we started speaking to Graham and the other engineers." - Tracy Whitaker, Lead Sales Engineer, Grundfos

According to Graham, the TRS system was originally designed for helicopters. Riveer is currently working with the United States Air Force on a TRS that will be sized to properly rinse both C-130 aircraft, as well as helicopters, for several rescue wing locations. These aircraft are routinely flown at low levels over salt water and are a perfect candidate for this type of system. Riveer has also designed a number of in-ground traditional aircraft rinse systems commonly known as a "BirdBath". Recent BirdBath systems can be found in locations throughout the world in places like the United States, South Korea, Indonesia, New Zealand and Australia.

THE OUTCOME

UP TO **80% WATER RECOVERY**
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