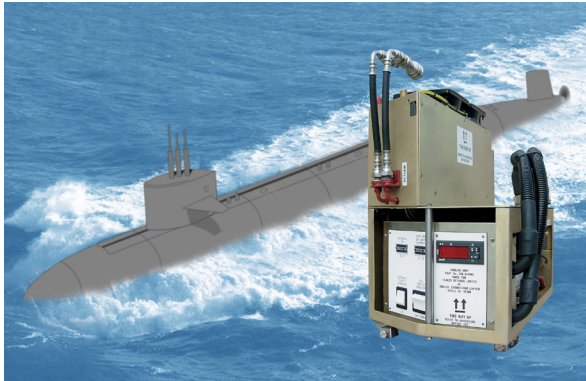


Tricool Thermal designs compact cooling system for submarines

Experts in temperature control, Tricool Thermal is well used to designing solutions for a variety of applications. One of its more unusual projects has been a cooling system developed in partnership with Thales UK for the communications masts on the Royal Navy's submarines.



Tricool Thermal's compact cooling systems for submarine

Although in principle, a straightforward requirement the project threw up a number of considerations, which combined with the MOD's stringent performance criteria, posed an interesting challenge for Tricool Thermal. Communications facilities on submarines are complex. Some are housed in a retractable cassette-like structure that does not penetrate the hull others are sited in masts that retract into the fin of the submarine. Either way space constraints are a key issue no more so than in the communications mast. This holds a vast amount of equipment, including satellite communications and extensive cabling. At the top sits a large resin dome that houses the antennae.

Specifications

As with most hi-tech equipment, its usage generates large amounts of heat that needs to be removed to prevent equipment overheating and malfunctioning.

Simple enough but Tricool Thermal had to take into account a number of other factors. When in high temperature climates, the heat build can increase dramatically, also solar radiation affects how much heat an antennae can cope with.

With such a huge swing in temperatures to consider, Tricool Thermal's solution had to factor in the

worst-case scenario. Any solution also had to take into account that the system would be in a sealed environment filled with nitrogen to prevent any moisture ingress. "Thales provided engineering support to help Tricool Thermal achieve the desired solution," says Keith Holroyd, Materials & Purchasing Manager at Tricool Thermal. "It was very much a partnering relationship combining our skills and expertise with Thales UK's skills to meet the MOD's exacting requirements."

Challenges

Timescales were critical, as was the quality of the product. With no room for error, the system had to be 'right first time' and constructed robustly enough to be in commission for some 20 years.

Working within stringent parameters and using 3-D modelling a prototype was developed within eight week. The design engineers worked on the basis that temperatures would never exceed +55°C and that noise, restricted power consumption, flow rates and temperature of fluids dictated the product.

In parallel, the mast's dome was rigorously tested to make sure there were no temperature hotspots.

Keith cites noise as a particular challenge. "Submarines can be deployed in very sensitive areas where it is essential they remain at depth undetected. We went to great lengths to ensure that compressors were adequately insulated."

Maintenance was also a significant factor. Although basic repairs can be carried out in-situ, submariners are not temperature control experts.

Success

Once the prototype had been approved, the units went into full production and were manufactured and supplied within a nine-month period.

Visit our website www.tricool.com for more information, or contact us on **0800 977 5709** or at info@icstemp.com.