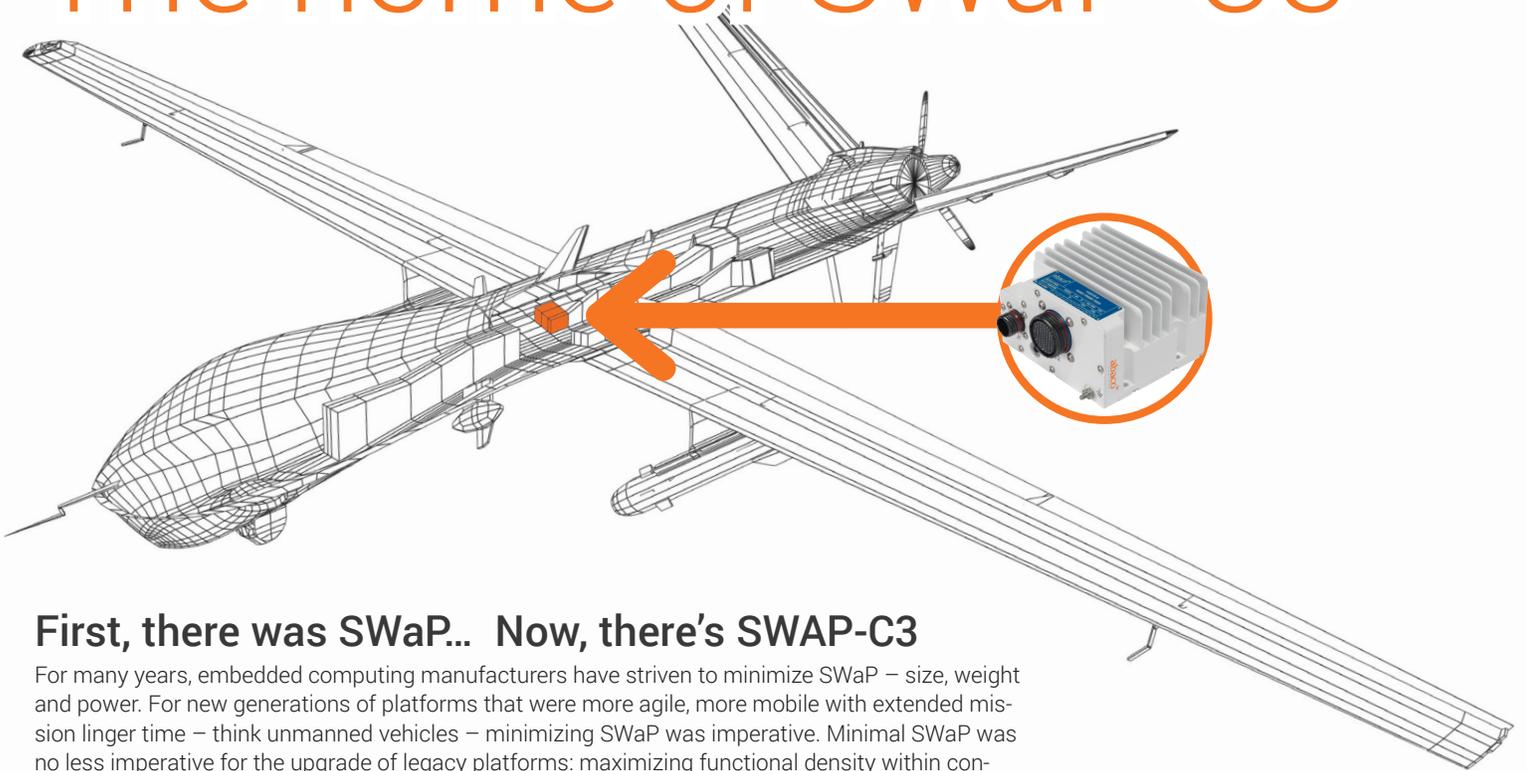


# The home of SWaP-C3



## First, there was SWaP... Now, there's SWaP-C3

For many years, embedded computing manufacturers have striven to minimize SWaP – size, weight and power. For new generations of platforms that were more agile, more mobile with extended mission linger time – think unmanned vehicles – minimizing SWaP was imperative. Minimal SWaP was no less imperative for the upgrade of legacy platforms: maximizing functional density within constrained spaces.

Today, minimal SWaP is largely a given. But the DoD wants more. The Department is now evaluating proposals based on SWaP-C3: SWaP plus cost, cooling and compliance.

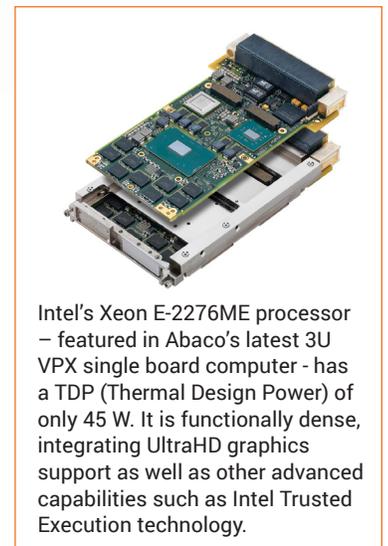
## SWaP-C3: SWaP

### Size, Weight

When we design a product, our first question is: "What functionality are our customers telling us they need?" Our second? "How can we deliver that functionality in the smallest, lightest form?" Designing for minimal size and weight involves intelligent board design; minimizing component count while maximizing onboard functional density – the use of FPGAs, for example; and using lightweight materials wherever possible.

### Power

Major component manufacturers such as Intel offer a range of processors specifically designed for deployment in confined spaces in which power consumption must be minimal, and in which heat must be minimized as adequate cooling can be challenging to achieve. Abaco routinely leverages these technologies to help our customers achieve their goals.



Intel's Xeon E-2276ME processor – featured in Abaco's latest 3U VPX single board computer - has a TDP (Thermal Design Power) of only 45 W. It is functionally dense, integrating UltraHD graphics support as well as other advanced capabilities such as Intel Trusted Execution technology.

## SWaP-C3: Cost

Experienced buyers know that no company can deliver leading edge performance, ultimate reliability and in-depth, long term support - and also offer the lowest purchase price. Low purchase prices invariably mean compromises have been made, corners cut.

Today, those same experienced buyers evaluate solutions based on lifetime cost of ownership. That's an area in which Abaco has led the industry for over 30 years. We have a long term commitment to easily upgradable product families that provide the opportunity to insert new levels of form-, fit- and function compatible performance and capability at minimal cost and with minimal disruption.

That commitment to minimizing lifetime cost of ownership extends to our Product Lifecycle Management (PLM) program, which offers customers a range of opportunities to mitigate the impact of obsolescence in multi-year programs.



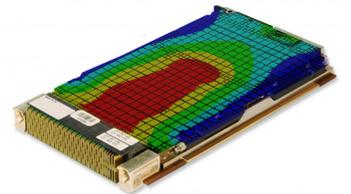
Abaco introduced the PPC1A 6U VME computer in 1995. Over the course of 20 years, we have provided simple, cost-effective technology opportunities for those customers. In 2016, we introduced the PPC11A – compatible with the PPC1A, but offering 50x the performance.

## SWaP-C3: Cooling

High performance embedded computing systems generate significant heat – the enemy of reliable performance. Traditional cooling techniques – such as fins, fans and heatsinks – add unacceptable size and weight. What's needed is a dual-pronged approach: design for minimal heat – and innovative cooling architectures.

Abaco designs for minimal heat in several ways. Board layout is critical, as is extensive thermal modeling. The key to success is to use powerful components – especially processors – originally destined for mobile applications in which minimal heat dissipation is a prerequisite, such as laptops.

It's in cooling that Abaco truly excels. Projects developed in cooperation with DARPA have seen us develop a range of innovative cooling technologies – including Heat Pipes, Nano Thermal Interface, Thermal Ground Plane and Dual Cool Jets.



Thanks to Abaco's innovative cooling technologies, the SBC347D 3U VPX single board computer operates at its full core speed even at temperatures as high as 75°C. Not only does this maximize available performance in a range of environments, but it also delivers predictable/real time determinism.

## SWaP-C3: Compliance

Aligning with, and being compatible with, industry standards has been at the heart of Abaco's business for over three decades. One of the first companies to develop truly rugged VME single board computers for military applications, Abaco was also instrumental in creating the OpenVPX standard that is at the heart of many of today's programs.

Today, that commitment extends to a much broader set of standards. We were, for example, contributors to the development of the Army's VICTORY standard – our RES3000 is VICTORY Switch-compliant. We joined the FACE Consortium in 2013: the FORCE2C mission computer is FACE-conformant. Abaco's recently-announced Health Toolkit is built on the Data Distribution System (DDS) open standard middleware layer used in FACE and SOSA. Our dedication to meeting the needs of our customers and their computing standards continues with our commitment to supporting CMOSS – as witnessed by the recent launch of the SBC3511 3U VPX single board computer.



The SBC3511 3U VPX single board computer, with its 2.8GHz Xeon E-2276ME 6-core/12-thread (Coffee Lake Refresh) processor, is in alignment with the SOSA technical standard and supports the CMOSS standard.

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