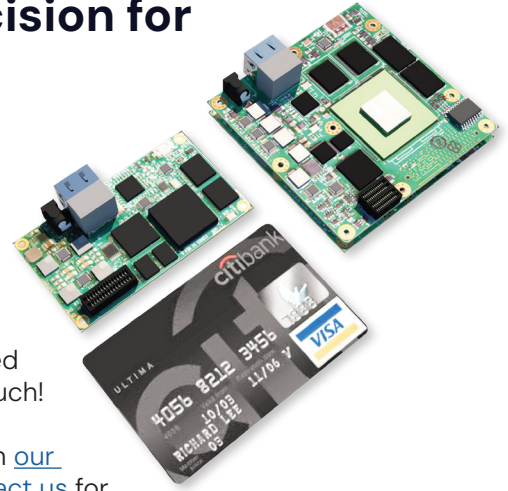**XIPHOS**

Factors Affecting the Make–vs.–Buy Decision for Space Processors

We make Commercial Commercial–Off–The–Shelf (COTS) processors with proven space heritage; so while we are just a little biased on the topic of make vs. buy, there are numerous factors to consider nonetheless. This is a complex topic, and it is worth examining why customers have bought more than 2,000 units from us over more than 20 years. In general they thought it was better for their programs.

Xiphos products carve out a unique place for themselves somewhere between standard and custom, such that customers get the benefit of standard products while getting something easily tailored to their unique needs. Our (somewhat) biased opinions are shown in the tables below, but we're happy to have a spirited discussion on this or many other space–processor–related topics. Get in touch!

Find out more on our website, or contact us for more details.

Category		Approach		
		In–House	**Unit–Level Solution**	**Xiphos**
Time to Launch	Schedule	Depends where you are starting from, but inevitably longer than you are expecting once designed, tested and qualified.	Off the Shelf.	**Multiple options** for your situation: 1. Off the shelf Xiphos Q–Cards and one of our many standard daughterboards. 2. Customer only develops a daughterboard without having to develop a processor. 3. Xiphos develops customized daughterboard solution tailored to customer mission.
Capabilities Matching	Integration with Existing Systems	Perfect alignment with the program needs ensuring compatibility and optimizing performance.	Unknown, but based around predetermined form–factors and interfaces.	**Standard–plus custom** flexibility, along with tiny form–factor allows adaptation to program needs. Control precisely which interfaces are needed for your program, but no more.
	Innovation	Adopt the latest available innovations at the start of the (probably long) design process.	Often one or more generations behind.	**Latest technology** absorbed into flight–proven platform for the best of both, available off the shelf.
	SWaP	Up to you.	Often standard form–factors such as 3U VPX – large, more power hungry and heavier or solutions targeted at CubeSats which can artificially limit processing capabilities.	**As–small–as–it–gets** – can be as small as credit card–sized, drawing as low as 2W, and weighing as little as 24g.
	Development Tool Ecosystem	Up to you.	Usually good toolchain support.	Robust toolchain.
	Customization	You get to tailor to exactly the needs of your program.	You're stuck with whatever comes standard.	**You choose**. From fully off-the-shelf, to custom housing only, to custom daughterboard developed by you or Xiphos. Dozens of Xiphos customers have successfully implemented their own daughterboard designs for our processors. Xiphos offers design review services to ensure the daughterboard to Q–Card interfaces are correctly implemented.

Category	Approach		
	In-House	**Unit Level Solution**	**Xiphos**
Budget Constraints — Cost	If you are designing for a constellation of thousands and have the time, designing your own could be lower cost eventually. However, significant upfront investment is required including design, manufacturing, test and qualification. Limited economies of scale.	Cost benefits of amortizing development over many customers and programs.	We've been designing for **new space since 2002** and offer the best value in the industry.
Qualification	Up to you.	Usually a strong selling point of traditional off-the-shelf SBCs.	Xiphos qualification includes a **comprehensive environmental and radiation test** campaign.
Risk Reduction — Deployment Risk	Custom development projects carry inherent technical risks increasing costs and development time.	Flight-proven.	**Flight-proven**.
Heritage	None.	Variable.	We're on our **8th generation**, with learnings over more than **20 years and over 210 boards in orbit**.
Intellectual Property	You have complete control over your IP.	Unknown.	You have full access to all the necessary compute, FPGA, and I/O resources and development toolchain you need to build your IP on top of our hardware and software platforms.
Reliability	No track record.	Not all COTS solutions are created equal.	More than 210 missions launched, >2,000 boards delivered over 20+ years with **no on-orbit board failures**. **Fault tolerant designs** evolved over many generations. Robustness features include supervisor FPGA, redundant boot, maintenance access, local radiation latch-up protection, radiation fault detection and notification infrastructure. All delivered in a fully space-qualified package.
Expertise	You will need to allocate a variety of skill sets from your main program including hardware, software, and logic engineers, PCB layout experts, mechanical designers, etc.	Dedicated teams who do this for a living.	Dedicated teams who do this for a living.
Supply chain	Custom SBCs require careful management of the supply chain to source high reliability components suitable for space applications. Ensuring a steady supply of such components can be challenging and introduce risks from obsolescence and lead times.	Dedicated teams who do this for a living.	Dedicated teams who do this for a living.

ABOUT XIPHOS

Founded in 1996, we launched our first processor into orbit in 2002, and have been supporting what has become known as 'new space' ever since. We help when schedules are short, SWaP requirements are extreme, and flexibility is a must.

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