

Everything FPGA.

IP Cores

Development
and Design
Services

SoC and
FPGA Modules



ENCLUSTRA
FPGA SOLUTIONS



About Enclustra



The company was founded in 2004 by Martin Heimlicher, with the aim of providing comprehensive FPGA solutions, from design through to production.

We currently have more than 60 people in our team, of 16 different nationalities, and we're growing.



Demand for our design services, FPGA modules and base boards is growing – our current customer base stands at over 1600 customers in over 70 countries, and continues to expand.

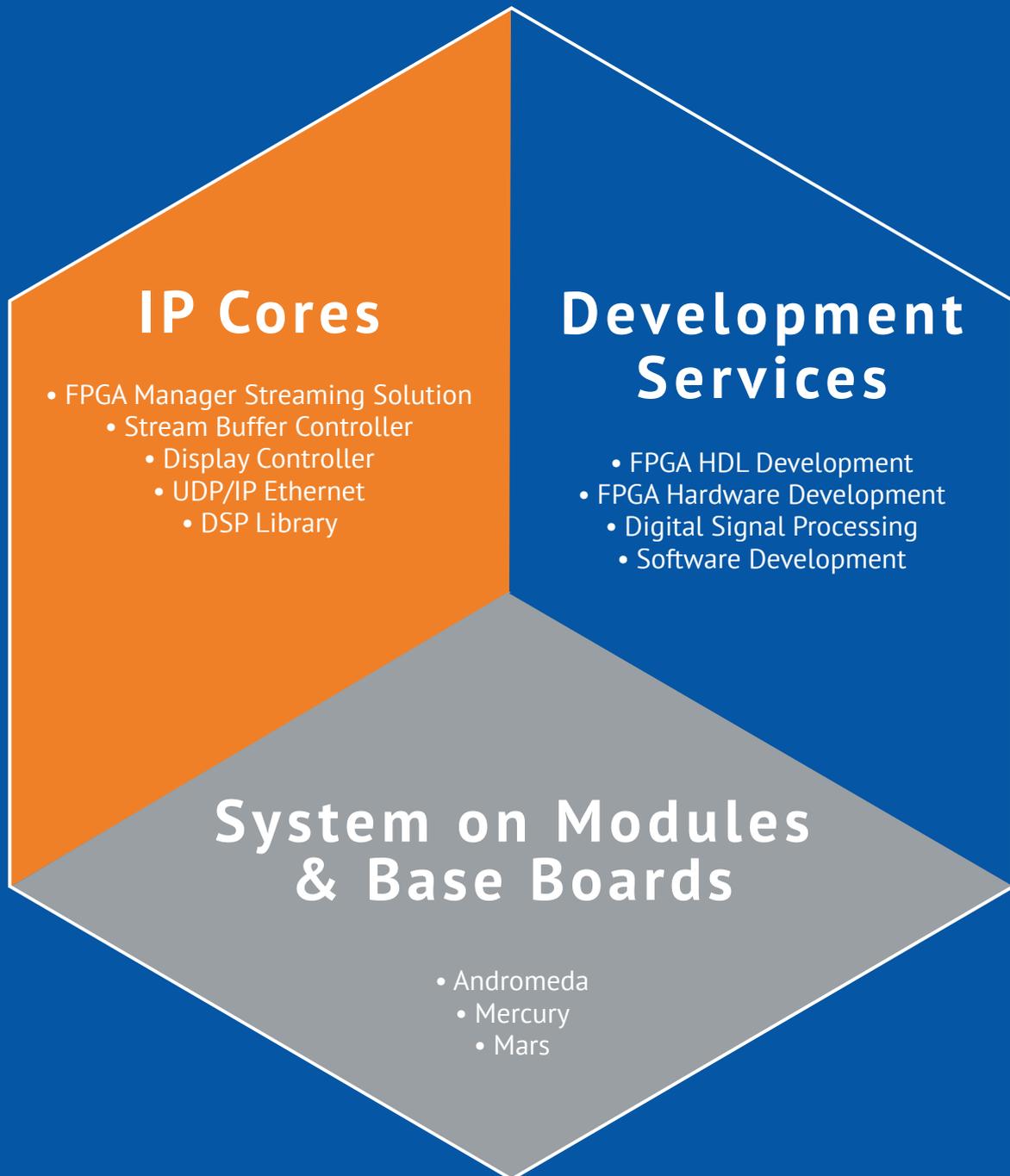
Our headquarters are located in the thriving Binz quarter in Zürich, Switzerland – an ideal location in one of the world's leading cities for technology and innovation.



In addition to our main office, we have a subsidiary in China and sales and support offices in Germany, France, USA, Canada and the UK.

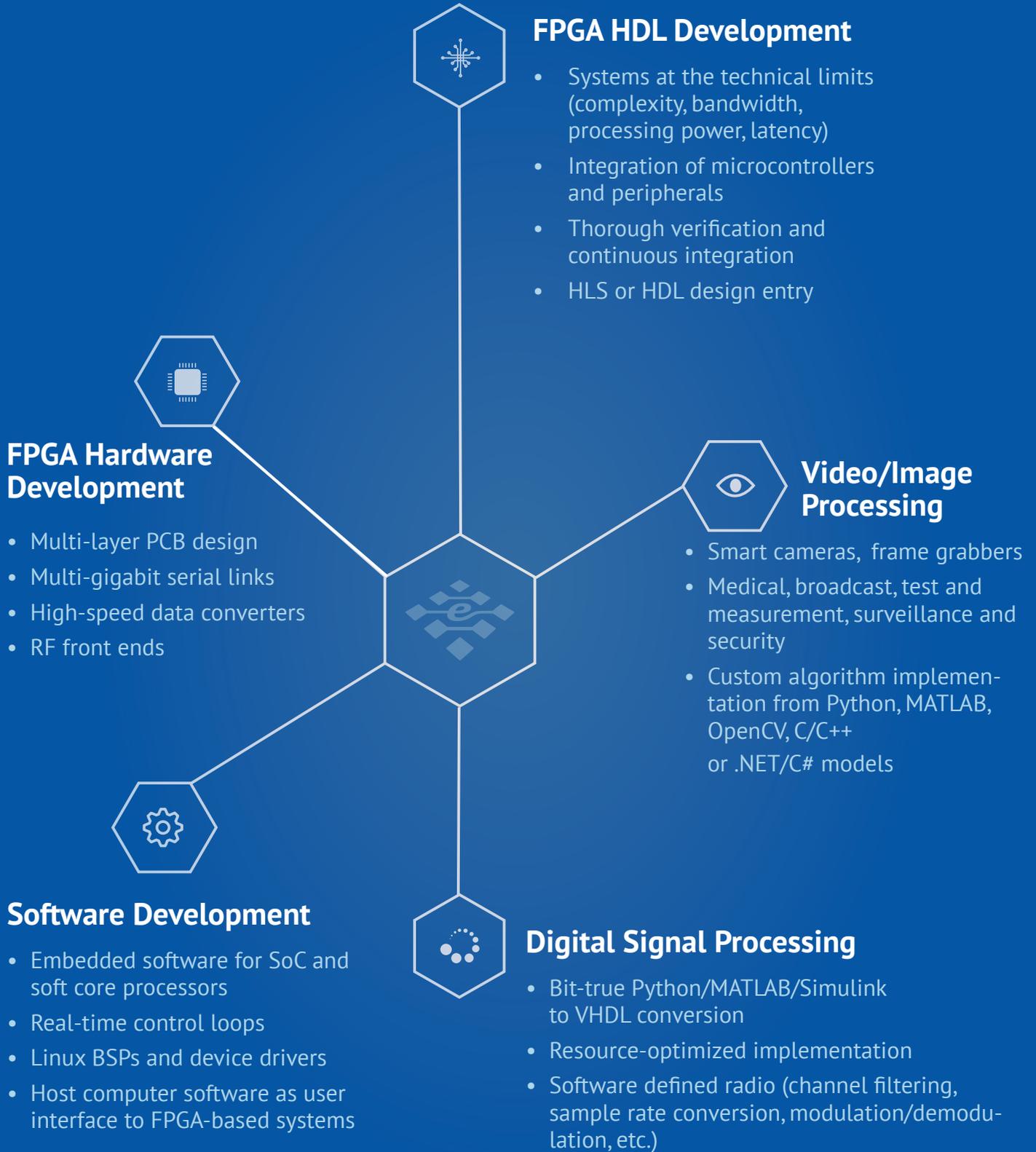


What We Offer



We deploy leading edge technologies, and we're design service partners of Intel®, Xilinx® and Microchip® – this close collaboration allows us to be forward-looking in our design process, and remain on the cutting edge of the most advanced FPGA technology.

Our Core Competencies



Main Application Areas

We carry out customer projects in a wide array of application fields – below are some of the areas we're particularly experienced in.

 **Digital Signal Processing**

 **Wired Networks and Switching (Ethernet)**

 **Industrial Communication (CAN)**

 **Wireless Communication (Software Defined Radio)**

 **Embedded Interfaces (PCIe, USB, AXI, etc.)**

 **Drive and Motion Control**

 **Computer Vision and Smart Cameras**

 **Test and Measurement / Data Acquisition**

 **Waveform Synthesis**

FPGA Design Services



Vision

Perspective Through Stereo

Introduction

What was once only possible in crime series is now a reality: 3D scans of forensic evidence found at crime scenes, recording minute details to be later analyzed from all angles. Enclustra developed the main elements of the 3D-Forensics scanner.

Customer Challenge

Procure an FPGA-based electronic system that is small enough to fit into the hand-held case, performant enough to meet the functional requirements and power-efficient enough to ensure a reasonable battery runtime.

The Solution

A system based on the Enclustra Mars AX3 module projects interference patterns through a miniaturized beamer attached via HDMI and simultaneously captures stereo images via two cameras connected to the Mars EB1 base board over Camera Link. The FPGA firmware running on the Mars AX3 then streams the data to a host PC via Enclustra's FPGA Manager Ethernet IP solution.

The Result

A compact, cost-effective FPGA-platform as the heart of the 3D-Forensics scanner solution.

Keywords

Xilinx® Artix™-7, Camera Link, Gigabit Ethernet, Xilinx MicroBlaze™, VHDL, C, C#, FPGA Hardware, FPGA Firmware, Embedded Software, Host Computer Software, Mars AX3, Mars EB1, FPGA Manager™ Ethernet



Space

FPGA to Satellite: Please Respond

Introduction

A reliable data connection between a satellite and the ground station is essential to the success of any satellite mission – to this end, one of our customers from space industry asked us to develop a data transmission testing system.

Customer Challenge

The testing system (special checkout equipment, SCOE) is used to verify the communication between individual satellite components as well as the communication between the satellite and the ground station. It needs to be able to transfer, record, store and check huge amounts of data, simulate the most extreme scenarios and provoke potential errors that can occur during the communication. The customer had difficulties finding such a specific solution off-the-shelf, so they opted for a contract development with Enclustra.

The Solution

In this project, our engineering team designed-in the Mercury KX1 module, mounted on a custom PCIe®-capable base board utilizing Enclustra's FPGA Manager™ PCI Express IP solution. The

complete FPGA firmware that handles the employed protocols in real-time, as well as the host computer software, providing a GUI for setting up, running and analyzing the communication tests, were developed by our engineering team.

The Result

«Enclustra provided us with a turnkey development of a special checkout equipment (SCOE) for intra-satellite communication testing in the context of the SARah satellite mission. Their full-stack expertise, from PCB over FPGA firmware to application software development, made them a one-stop-shop for our needs. We will happily consider them again for our future projects.» Rafael Plonka, Team Lead, OHB System AG.

Keywords

Xilinx® Kintex®-7, WizardLink, VHDL, C#, C++, FPGA System Design, FPGA Hardware, FPGA Firmware, Host Computer Software, Mercury KX1, FPGA Manager PCIe®, SCOE, Satellite

FPGA Design Services



Aviation

Zynq UltraScale+ Drone Controller

Introduction

The official term is unmanned aerial vehicle (UAV), apparently, which is a bit of a mouthful, so we prefer to say drone. Drone tech evolved tremendously over the past decades. Nowadays, they can be used in construction, agriculture, photography, entertainment, and many other areas. In any case, we developed a flight and video controller for a UAV (drone) for a customer.

Customer Challenge

The customer required a hybrid FPGA/CPU hardware that is able to fulfill the performance and functional requirements while taking up as little room and weight in the vehicle as possible and, at the same time, is so power-efficient that a passive cooling solution would be sufficient. In addition, the hardware needs to be fit to reliably operate in harsh conditions (vibration and temperature).

The Solution

Our engineering team employed a Xilinx Zynq UltraScale+ MPSoC, whose CPUs implement the position control as well as tracking of the flight trajectory. The sensors and actors are attached

through the FPGA logic; the number and type of these interfaces vary greatly with the application of controlled vehicle, so all of these interfaces are dynamically configurable. The controller supports redundancy by having two parallel flight controller units supervising each other. Should the currently active flight controller fail, the reserve unit takes over all tasks autonomously. Aside flight control functions, the controller prepares and compresses a Full-HD video signal (HD-SDI) from a camera for transmission over radio.

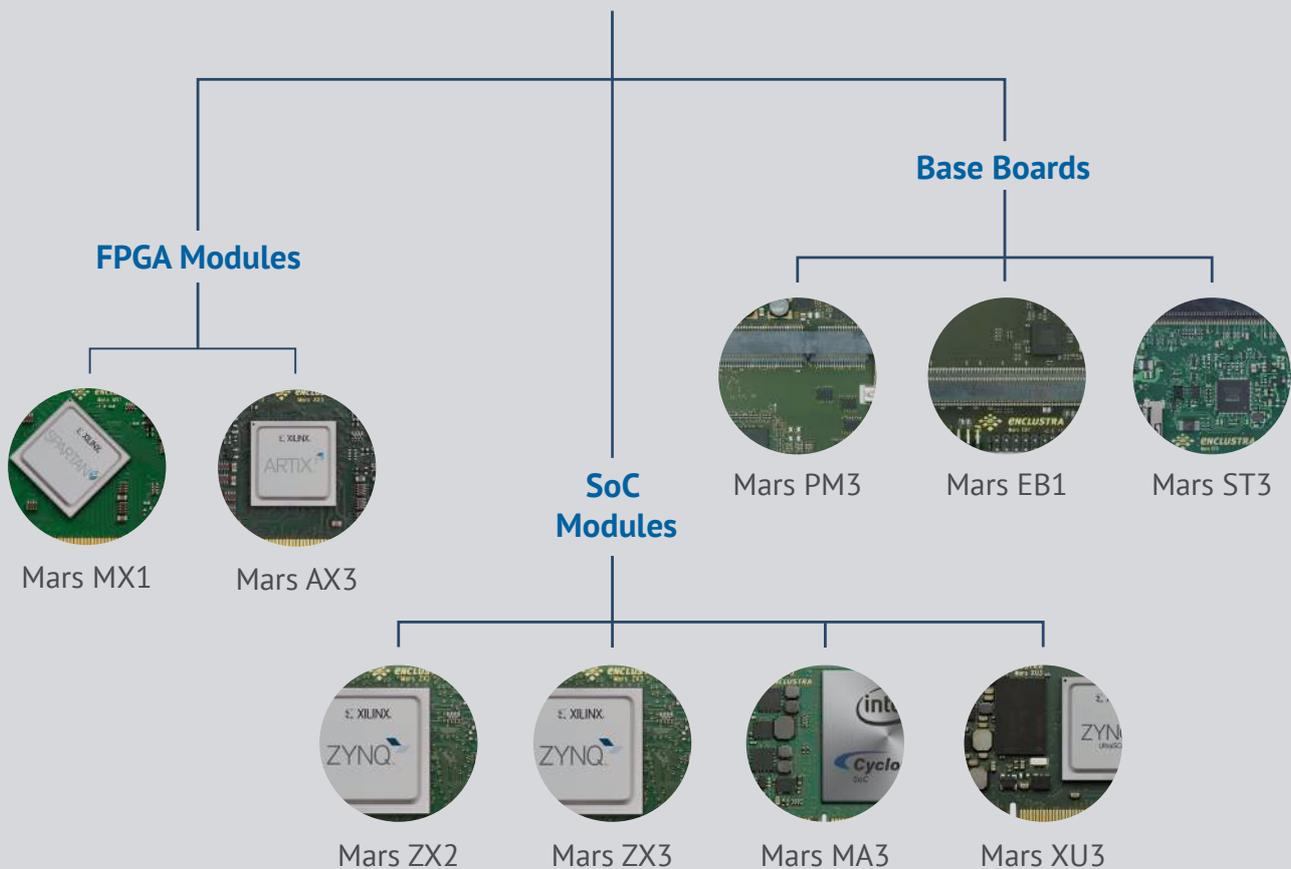
The Result

A compact, powerful and very flexible flight and video controller. It is not only rugged but also very reliable thanks to the built-in redundancy.

Keywords

Xilinx® Zynq® UltraScale+®, Mentor Graphics PADS®, HD-SDI, VHDL, C, C++, FPGA System Design, FPGA Hardware, FPGA Firmware, Embedded Software

The Mars Module Family



The Mars family of FPGA modules, system-on-chip (SoC) modules and base boards is optimized for digital signal processing and high-speed communications.

The modules offer powerful, low-cost FPGAs, high-capacity, high-bandwidth memory, and versatile user I/Os with on-board standard interfaces – using the compact, industry-standard SO-DIMM form factor (67.6 x 30 mm). With an expected availability of at least 10 years, our modules represent reliability in addition to performance.

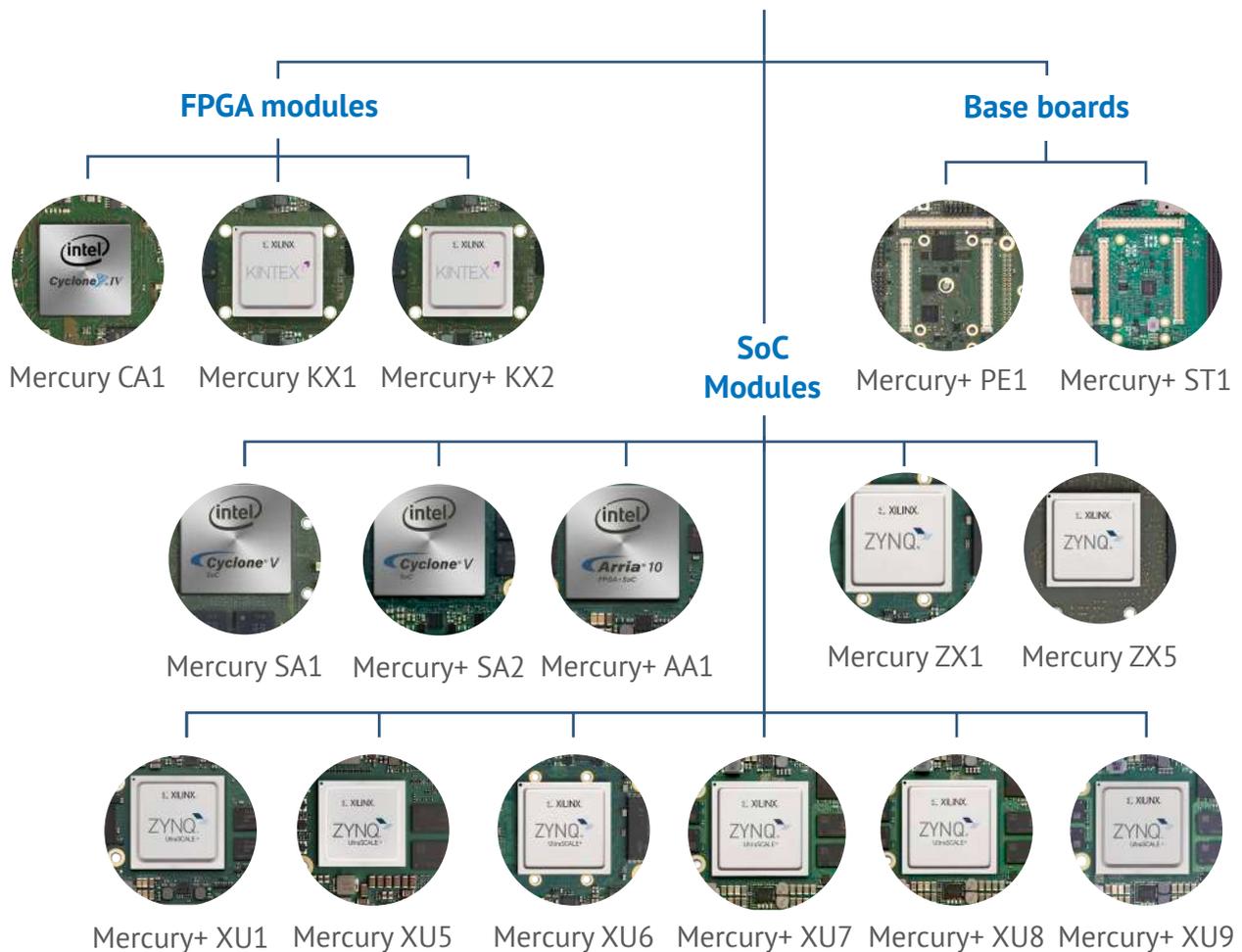
For each module, a variety of standard configurations is available, offering different combinations of FPGA logic density, temperature grade and package, as well as different DDR memory, flash memory, and interfacing options.

We can also produce custom modules when a customer requires a more specialised configuration.

All modules are compatible with the Mars base boards, which allow you to get a complete system up and running within minutes.

SoC & FPGA Modules

The Mercury Module Family

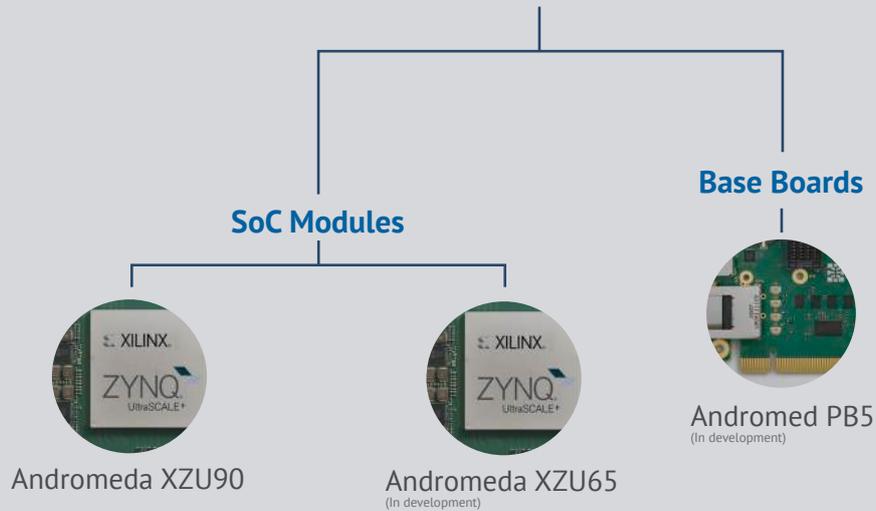


The FPGA and SoC modules in the Mercury family are optimized for digital signal processing, rapid prototyping and high-bandwidth I/O. The modules feature powerful FPGAs/SoCs from both Xilinx® and Intel® platforms are supported – as well as large memory with high bandwidth, LVDS I/Os, and Gigabit Ethernet and USB 2.0/3.0 high-speed interfaces. Up to 3 Hirose 168-pin connectors allow for a large number of I/Os and maximum flexibility.

The Mercury+ PE1 PCIe® card and the Mercury+ ST1 base board are as well-suited to prototype development as it is to being an end-format for serial production. As user I/Os there is large selection of different interfaces available, like Ethernet, USB, MIPI, HDMI, DisplayPort, FMC HPC & LPC, microSD, mPCIe, mSATA, FMC, Anios, Pmod™.

SoC & FPGA Modules

The **Andromeda** Module Family



The Andromeda family of System-on-Modules (SOM) / System-on-Chip (SoC) modules is optimized for high-end applications. It supports up to 6 Samtec ADM6-60 high-speed connectors with up to 686 user I/Os. Thanks to its built-in large Xilinx Zynq Ultrascale+ MPSoC devices with integrated ARM CPUs, the Andromeda SOMs are the optimal solution for the most rugged and demanding applications.

SoC & FPGA Modules

IP Cores

Our FPGA-optimised IP cores and solutions enable quick, easy addition of desired functionality to any FPGA design, with minimal resource usage and minimal design cost.



UDP/IP Ethernet

Communicate with other subsystems via Ethernet, using the UDP protocol, at full 1 Gbit/sec wire speed – without CPU.



Display Controller 2D

A embedded display controller with optional 2D accelerator. It supports DVI, LVDS or LVCMOS and resolutions up to 1080p60 (1920 × 1080) pixels.



Universal Drive Controller

Control up to 8 DC, BLDC, 2- and 3-phase stepper motors – without a separate drive controller chip.



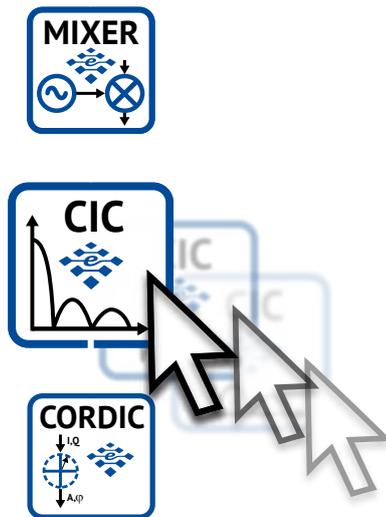
Stream Buffer Controller

Efficiently transfers up to 16 data streams to and from external SDRAM memory.

IP Solutions

IP Solutions

Our IP solutions crank as much as functionality into as little FPGA resources as possible. They help to maximize the functionality and utilization of your FPGA device.



Universal DSP Library

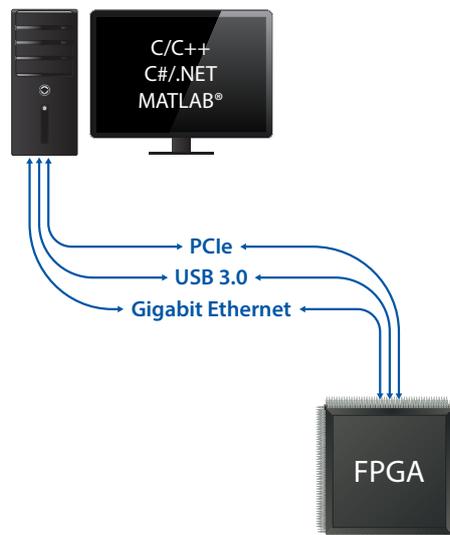
Create DSP systems with a few clicks.

The shortcut to your signalprocessing system. With the Universal DSP Library even complex DSP systems can be realized only in minutes. It provides efficient FPGA implementations of the most common digital signal processing components, such as FIR and CIC filters, mixers, CORDIC and function approximations. It also provides the necessary glue logic needed to connect DSP systems together.

FPGA Manager

Streaming, made simple.

One tool for all FPGA communications. Transparently stream up to 16 data streams between FPGA and host, without needing to know the underlying protocols. PCIe, USB 2.0, USB 3.0, and Gigabit Ethernet links, with Xilinx® or Intel® FPGAs – all with one single API. Also supported are FPGA-in-the-loop applications, and memory-mapped access.



IP Solutions



enCLUSTRA
FPGA SOLUTIONS



Germany
Hartmut Müller
Sales Director Germany
+49 152 599 430 29

**France, Belgium &
Quebec**
Aimad Rhatay
Sales Director
+33 6 51 28 18 75

Enclustra GmbH
Raeffelstrasse 28
8045 Zurich
Switzerland

+41 43 343 39 43
info@enclustra.com
www.enclustra.com

United Kingdom
EnTegra Solutions Limited
Lewis Williams
+44 (0)1590 671700
sales@entegra.co.uk

USA & Canada
Tristan Martin
Sales Representative
+1 807 907 8169

Asia
许广源 | Kiddy Xu
销售经理, 大中华区
Sales Manager, Shenzhen
+86 176 0300 1909