

Ecosystem for Space Applications Space Forum 2017

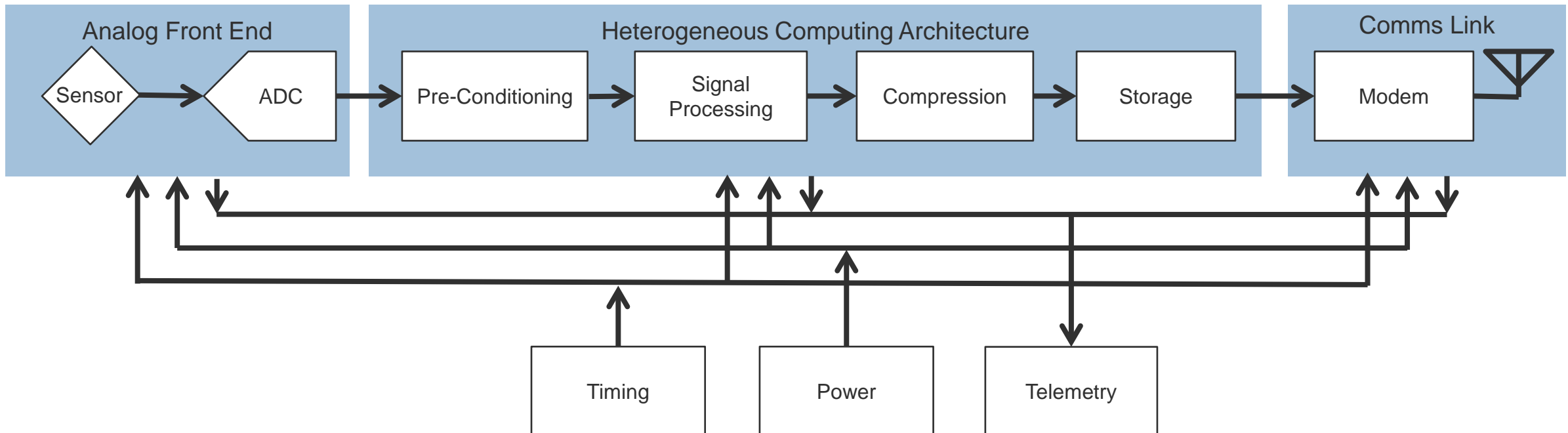
Hichem Belhadj, VP, Field Applications and System Engineering
Ken O'Neill, Director of Marketing, Space and Aviation

Outline

- Our Vision for Space
- Expanding Ecosystem to Enable the Space Community
- Microsemi and Partners' IPs
- Applications Specific Ecosystems
- New Space Reference Platform
- Your Feedback
- Summary

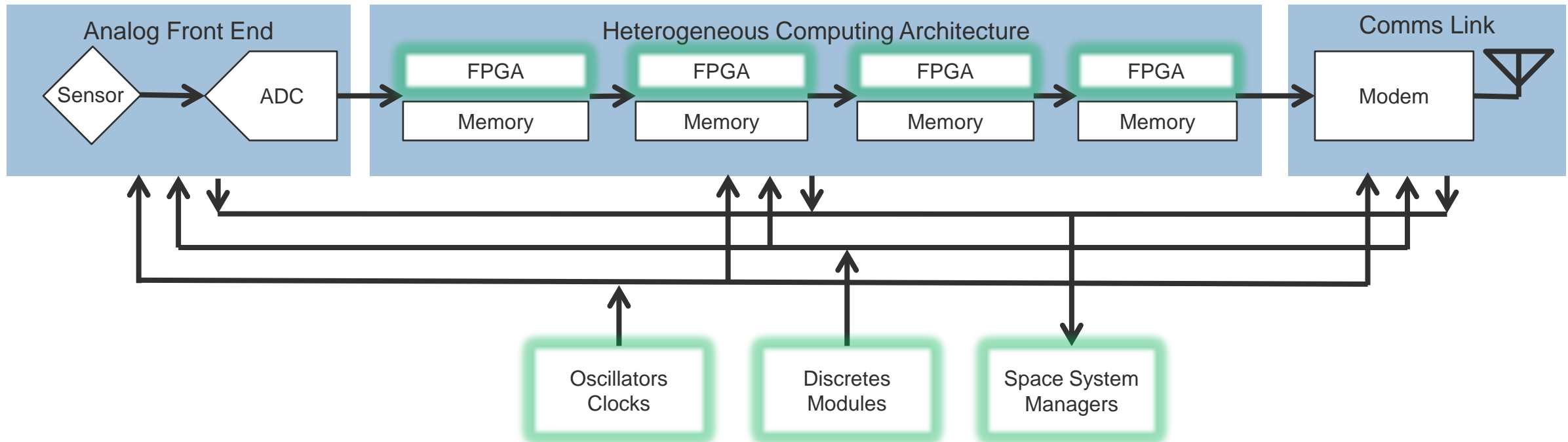
Our Vision For Space

- Help solve customers' main problem: *Getting more computing throughput in space*
 - Signal processing—need faster performance, pre-conditioning, algorithmic flexibility
 - Telemetry—gather telemetry from increasingly complex payloads and reduce SWAP-C
 - Power—support evolving needs of high performance ICs, support higher bus voltages
 - Timing—precision timing for GPS-denied environment



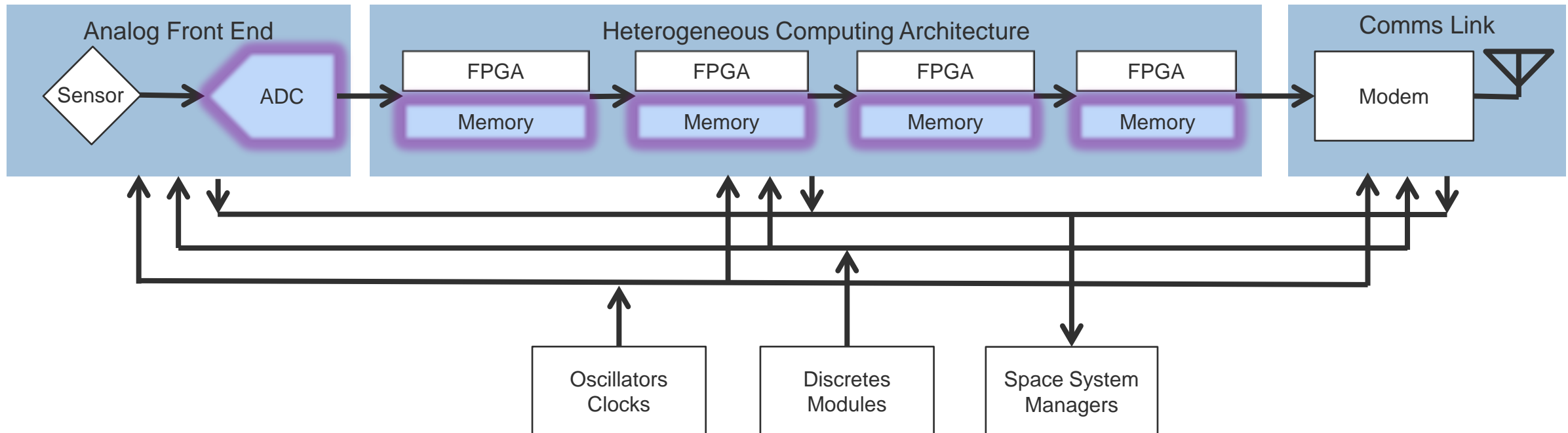
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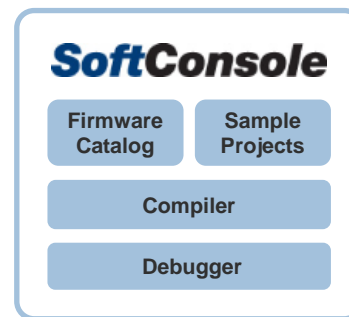
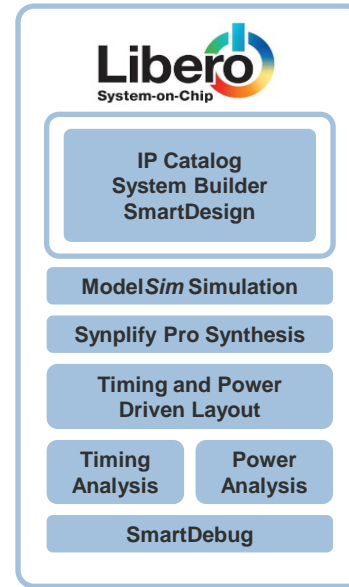
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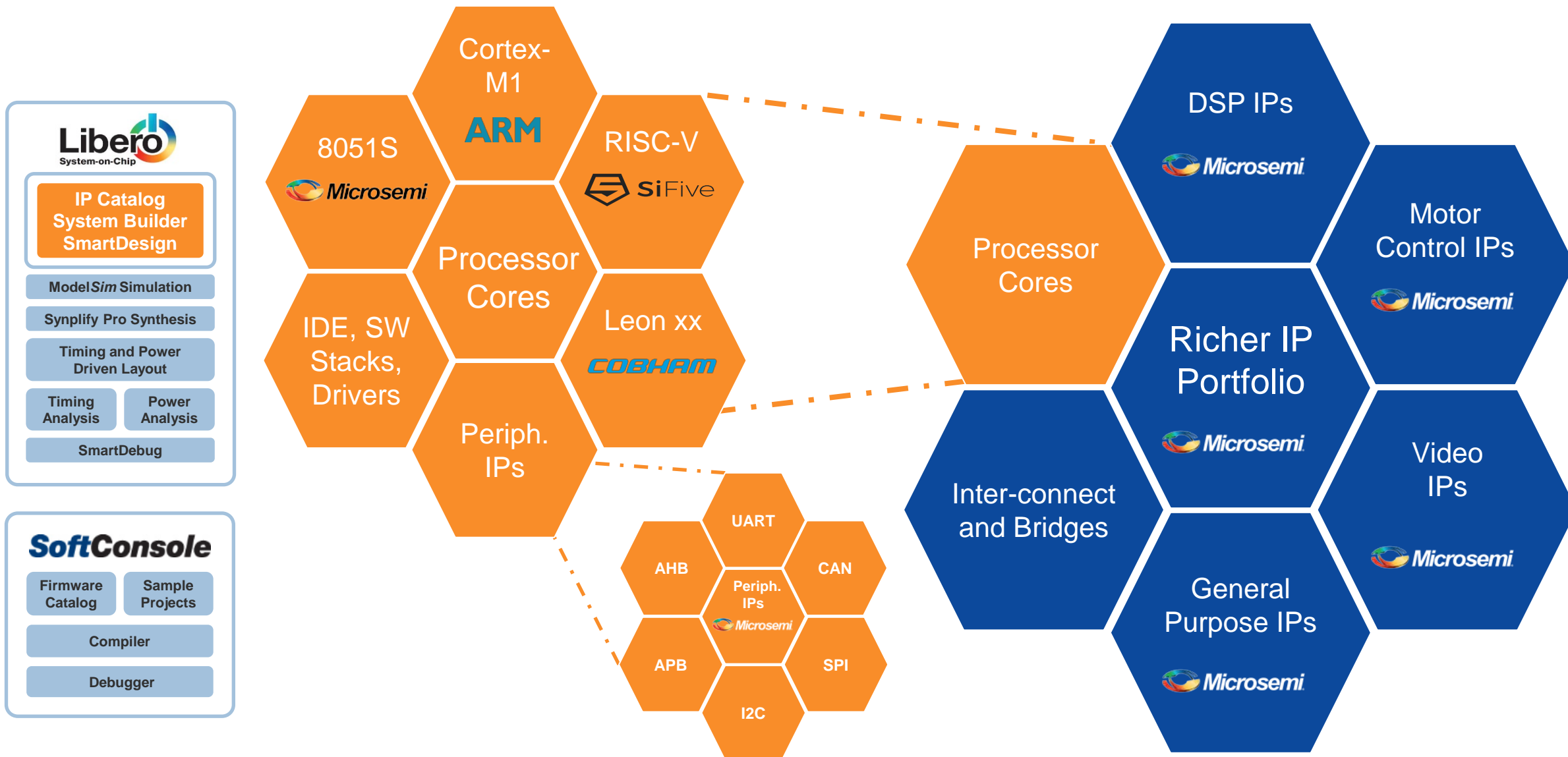


Expanding Ecosystem to Enable the Space Community

- Growing Silicon offerings
- Methodical approach to build a comprehensive ecosystem
- Internal development
 - IPs, tools, HW reference platforms
- Strategic partnerships
 - Silicon—interoperability testing
 - IPs
 - Software development kits (SDKs)
 - Reference platforms



Microsemi and Partners' IPs



Libero
System-on-Chip

IP Catalog
System Builder
SmartDesign

ModelSim Simulation

Synplify Pro Synthesis

Timing and Power Driven Layout

Timing Analysis Power Analysis

SmartDebug

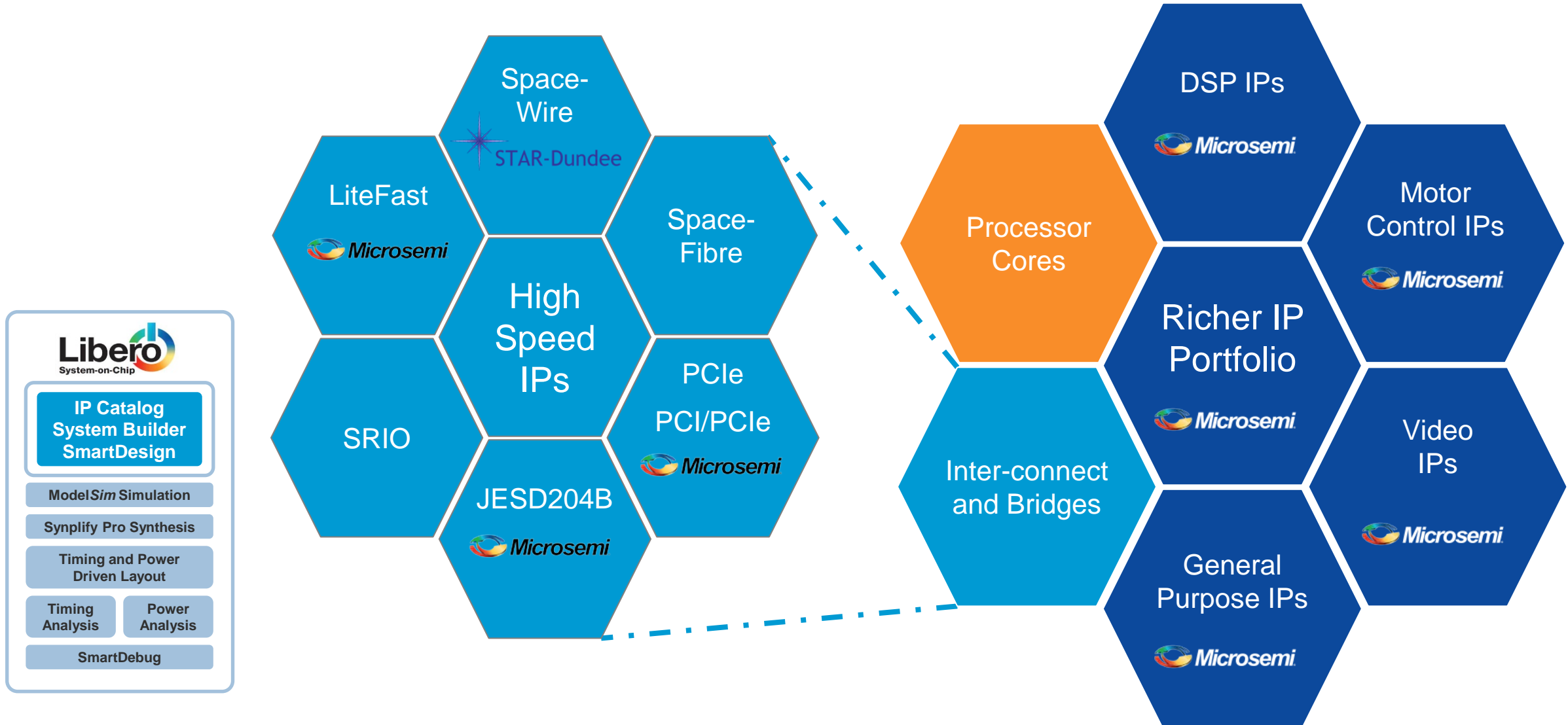
SoftConsole

Firmware Catalog Sample Projects

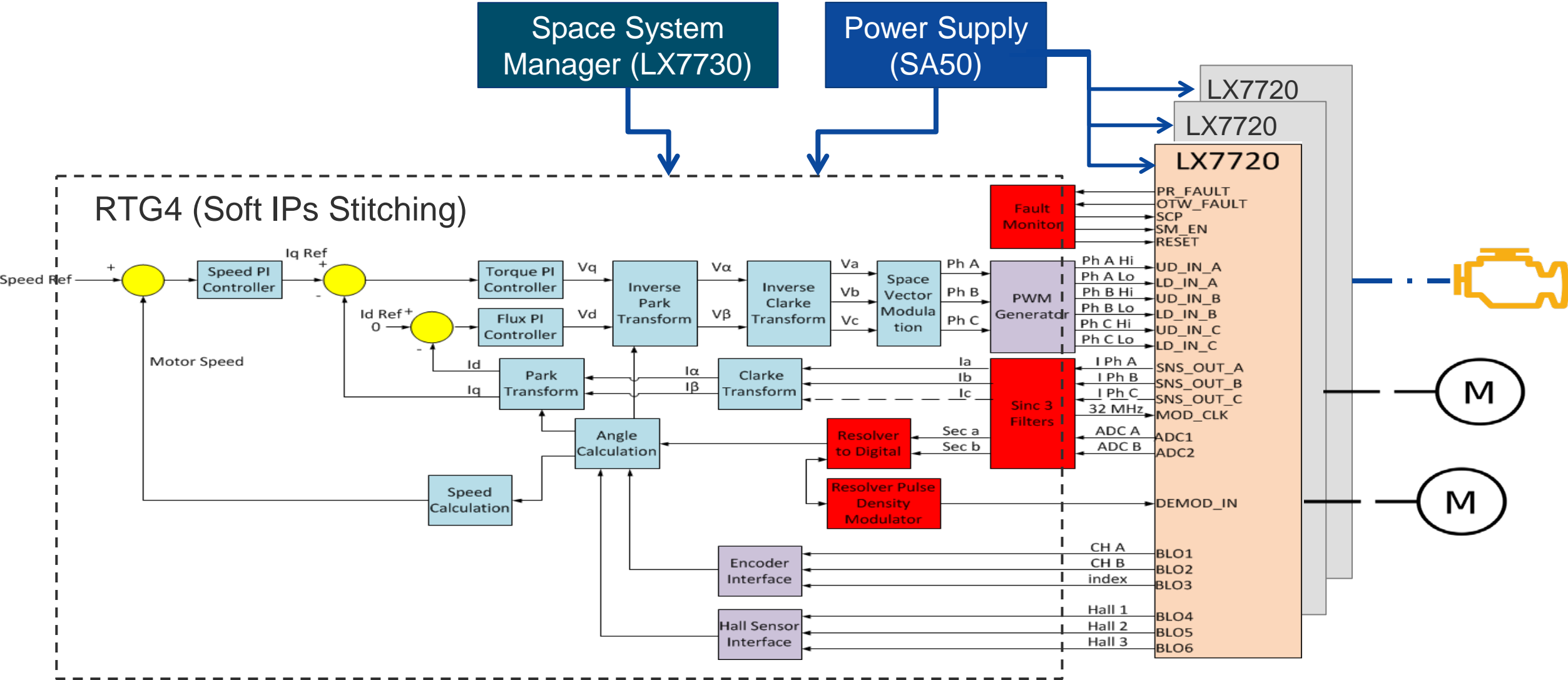
Compiler

Debugger

Microsemi and Partners' IPs (continued)



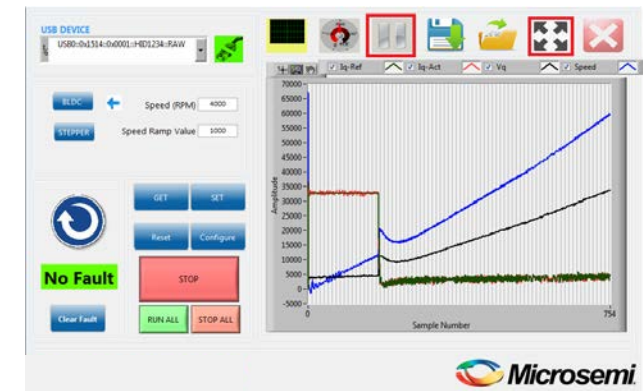
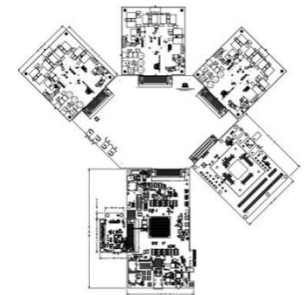
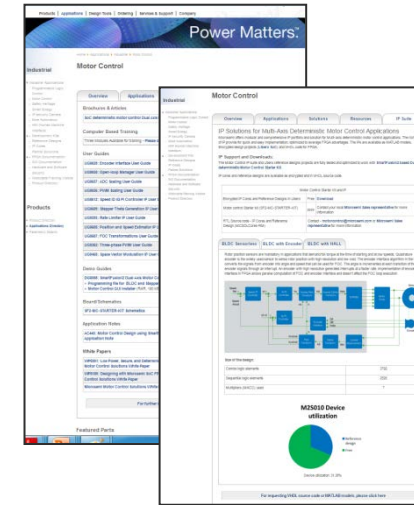
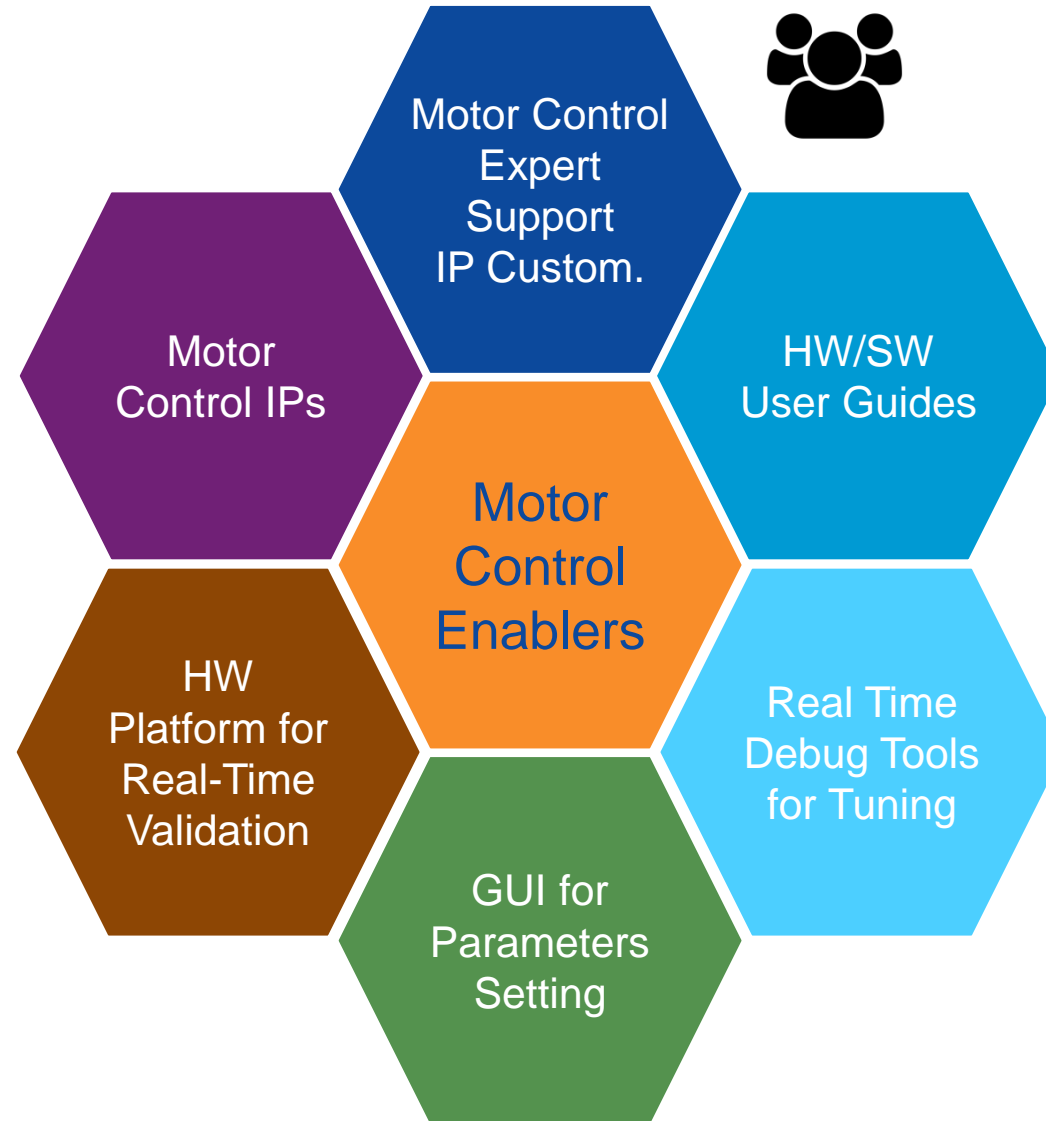
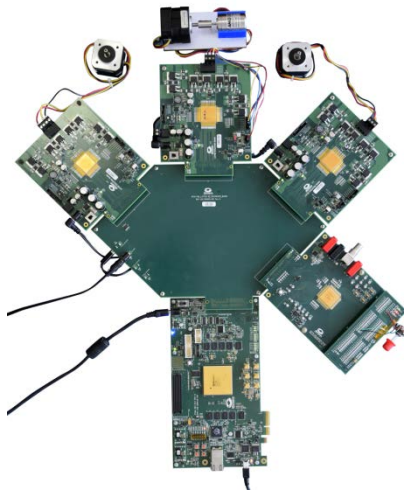
Deterministic Multi-Axis Motor Control Solutions



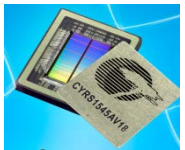
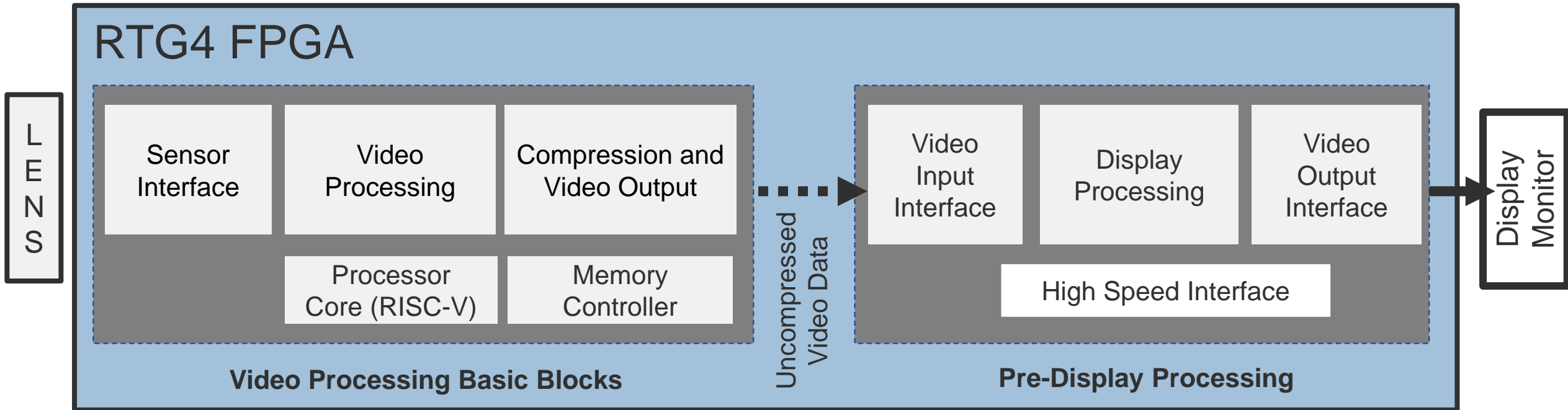
Motor Control—Enablers to Accelerate Development and Validation

IP Catalogue

- [ADC Scaling](#)
- [BLDC Estimator](#)
- [Encoder interface](#)
- [FOC TRANSFORMS](#)
- [OLMNG](#)
- [PWM SCALING](#)
- [PWM3PH](#)
- [RATE LIMITER](#)
- [SEQ CONTROLLER](#)
- [SPEED ID IQ PI](#)
- [STEPPER THETA](#)
- [SVM](#)
- [HALL INTERFACE](#)
- [PI CONTROLLER](#)



Video—Signal Chain and Readily Available Soft IPs



SDRAM

Flash

Power (SA50)

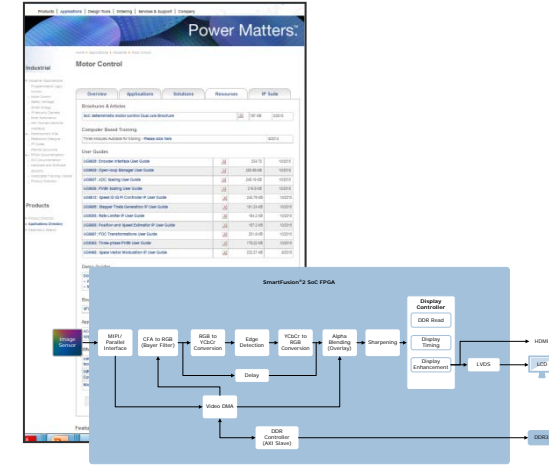
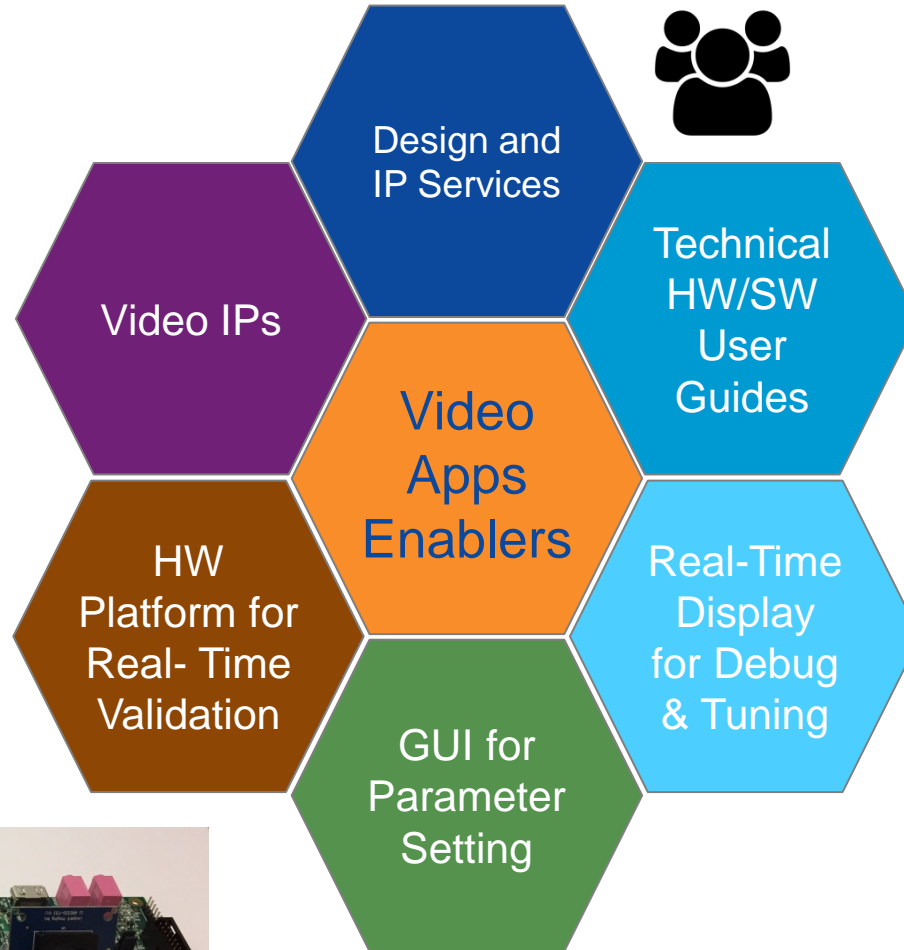
PoLs

Space System Manager (LX7730)

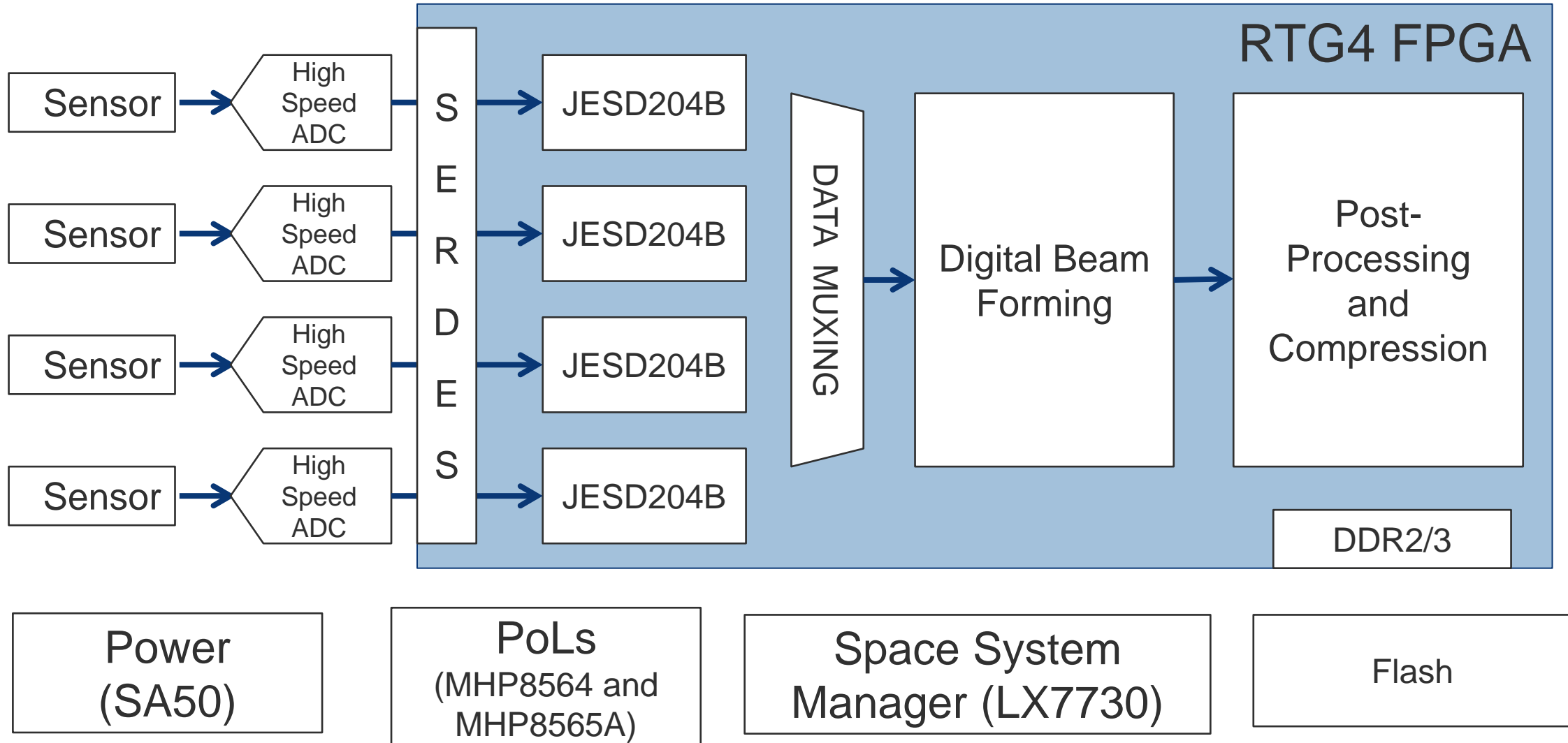
Video—Enablers to Accelerate Development and Validation

IP Catalog

- [ARINC 818-2](#)
- [Camera HDMI Video Input Interface](#)
- [Camera Interface](#)
- [Chroma down Resampler](#)
- [Chroma Resampler](#)
- [Chroma Up Resampler](#)
- [Color Space Converter](#)
- [Image Rotation](#)
- [LCD HDMI Video Output Interface](#)
- [LCD Interface](#)
- [Video Decoder Interface](#)
- [Video DeInterlacer](#)
- [Video Encoder Interface](#)
- [Video Scaler](#)

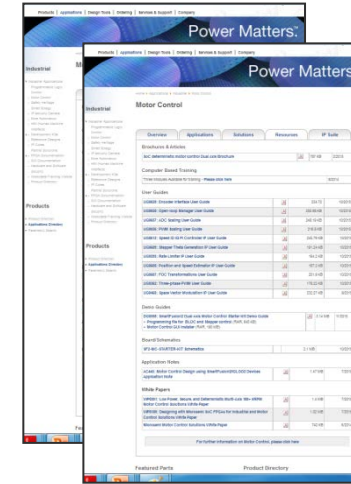
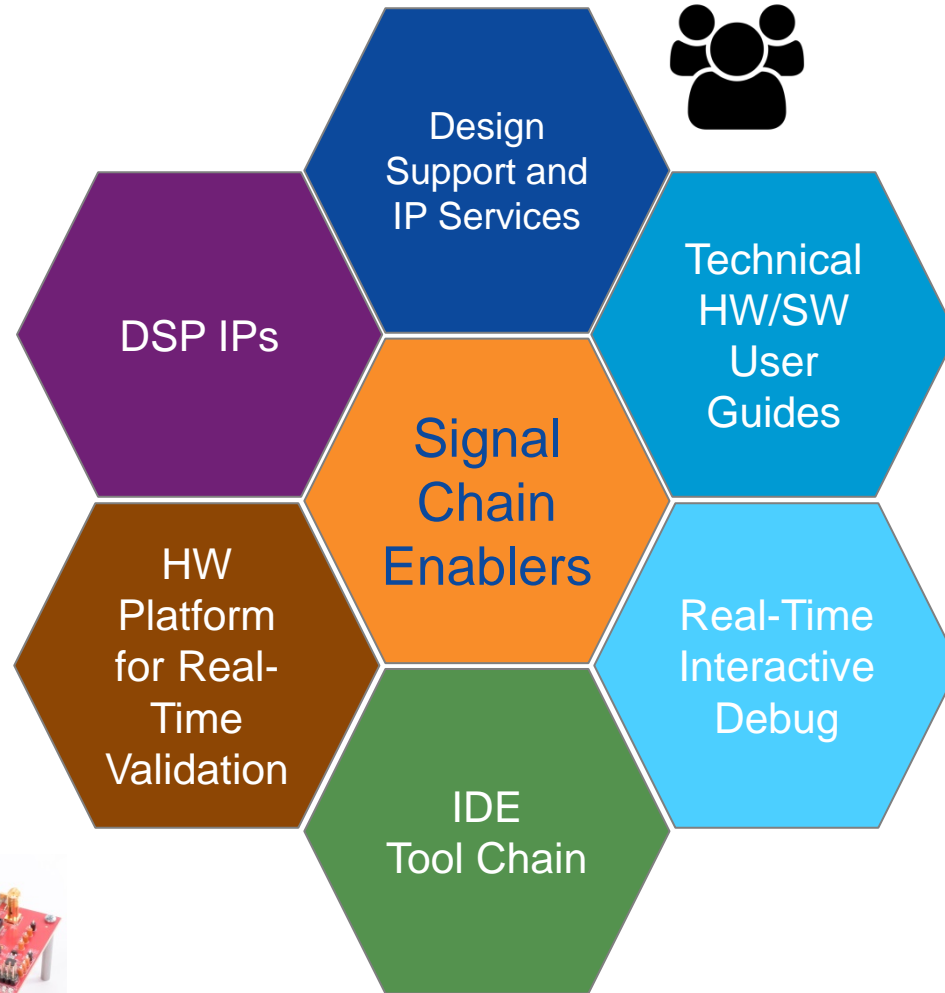
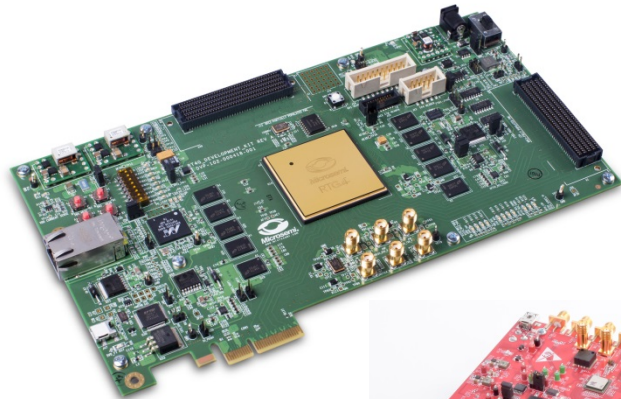



Signal Chain—Acquisition and Processing



Signal Chain—Enablers to Accelerate Development and Validation

IP Catalogue
CoreRSDec
CoreFIR
CoreFFT
CIC
CoreCORDIC
CoreDDS
CoreEDAC
CoreRSEnc
Athena BFFT
Athena BFFT-M





IP Catalog
System Builder
SmartDesign

ModelSim Simulation

Synplify Pro
Synthesis

Timing and Power
Driven Layout

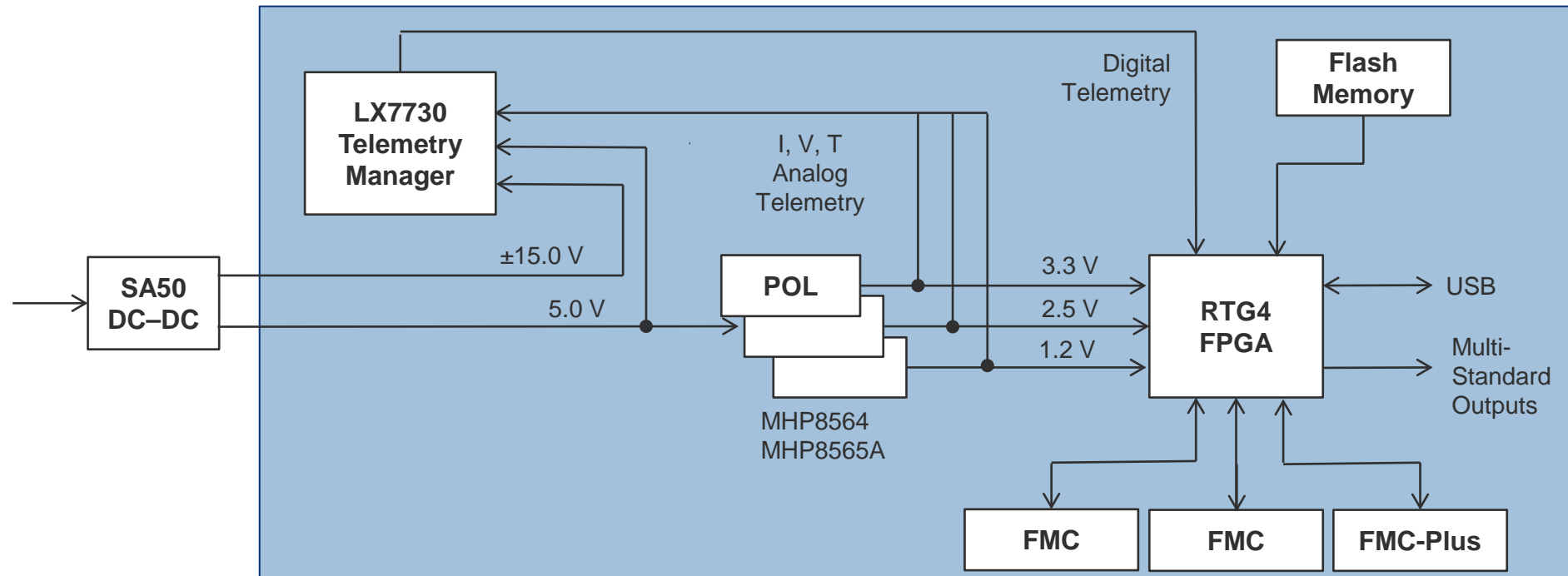
Timing
Analysis

Power
Analysis

SmartDebug

In Development—New Space Reference Platform

- RTG4 development kit with the following upgrades and enhancements:
 - Microsemi LDO regulators
 - Capable of sourcing power from Microsemi SA50 DC-DC converter
 - Microsemi LX7730 telemetry manager mounted directly on board
 - FMC-Plus connector for direct connect of latest TI DAC/ADC daughter kits
 - Total 3 FMC/FMC-Plus connectors to allow more products to be connected
 - Flash memory for storage of soft processor executable code



Your Feedback

- Reference platform content and interconnect?
- Enablers not provided today?
- Problems that no vendor is solving for you?

Summary

- The Microsemi Vision for Space
- Overview of the space ecosystem
 - Comprehensive—all enablers
 - Built in collaboration with strategic partners
- Application-specific ecosystems
 - Motor control
 - Video and image
 - Signal chain
- New reference platform to further enable the space community
 - And more to come!