FSA Forum

Mixing the Signals to Stay in Tune

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Chairman, President and CEO

Company background

- Started in Portugal in 1997 as a 5-people ADC design group, Chipidea has grown into a global organization with 200+ people and a very broad **analog technology foundation**.

- We have served small- and medium-size fabless operations, as well as many of the world's biggest semiconductor companies, both IDMs and fabless, and have enabled scores of new digital-centric products to come to the market in a timely and cost-effective manner.

- We have witnessed the amazing resurgence of digital consumer electronics and the proliferation of "people's centred" applications.

- We have witnessed and "suffered" the waves of process technology evolution, all "eyes on the digital world" with little "respect and concern" for the analog world.

- We have become the leading provider of embedded analog CMOS IP and are now addressing emerging market requirements to deliver also analog CMOS systems with unprecedented levels of analog system integration, performance and flexibility.

What is there in and around the Space of Convergence?

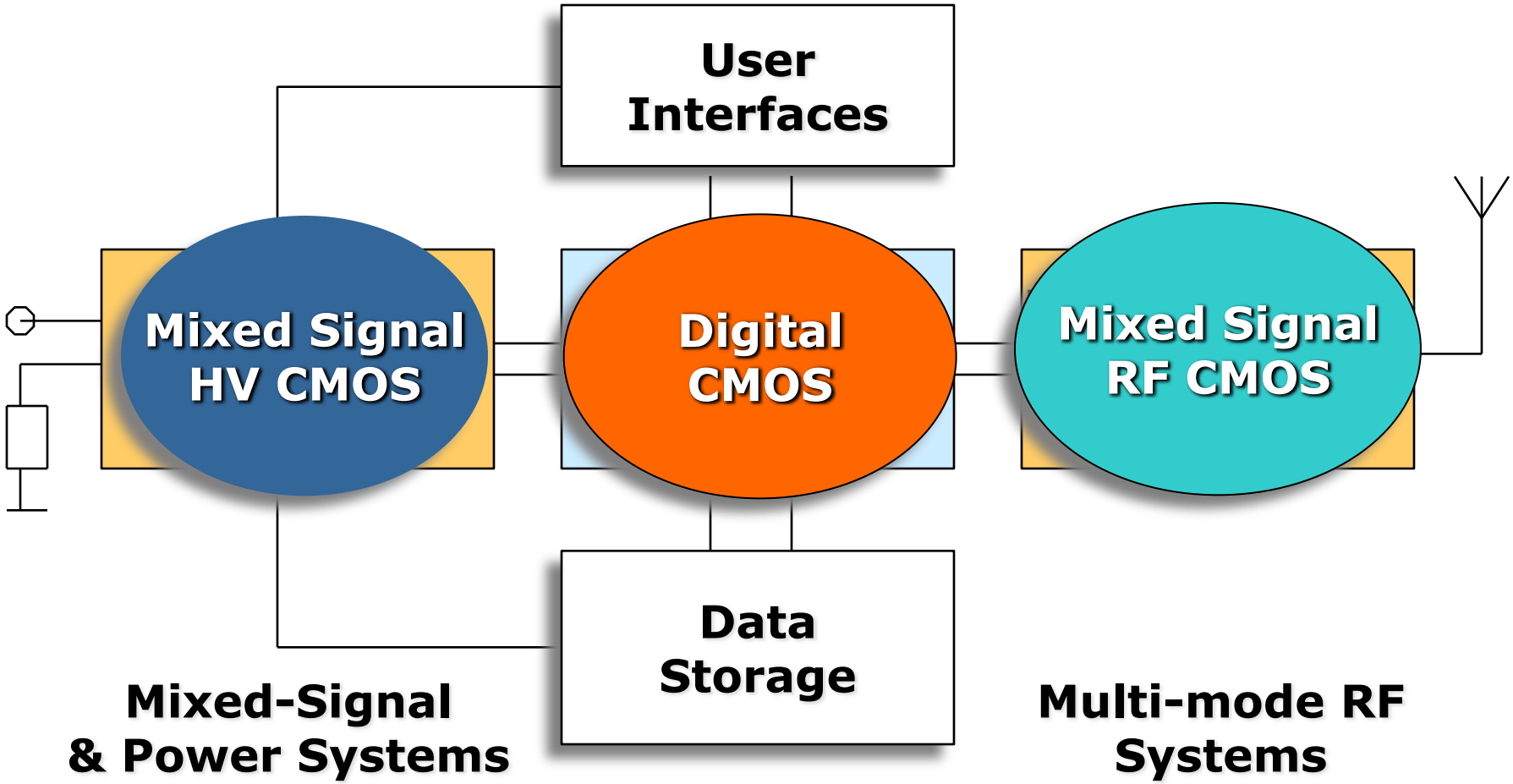
- Fast growing diversity of **Applications** that Connect, Network, Inform, Entertain, See, Sense and Control through **Communications**.
- Cost conscious consumers that want all the above in the palms of their hands at increasingly **Lower Costs** and possibly in disposable form.
- Increasingly complex, costly **Process and Packaging Technology** enabling multiple forms of **Systems Integration**.
- Multi-layered segmentation and specialization that make **Global Networks and Workflows**, **Organizational Responsibilities** and **Partnerships** a necessity to succeed.

What is there in and around the Space of Convergence?

- Ubiquitous **Analog Technology** remains one of the key enablers of the industry, for it provides the essential physical connectivity for communications, human and sensor interfacing, and energy supply and management:
  - ◇ Technology that is as diverse as the applications it serves.
  - ◇ Technology that is neither standardized nor easily commoditized.
  - ◇ Technology that has resisted automation trends and is still fundamentally based on talented, experienced engineering.
  - ◇ Technology that despite all its art is not fundamentally different from a process that can be monitored, controlled and improved to be delivered predictably and reliably.
  - ◇ Technology that, despite its huge diversity, will inevitably consolidate as others have done.

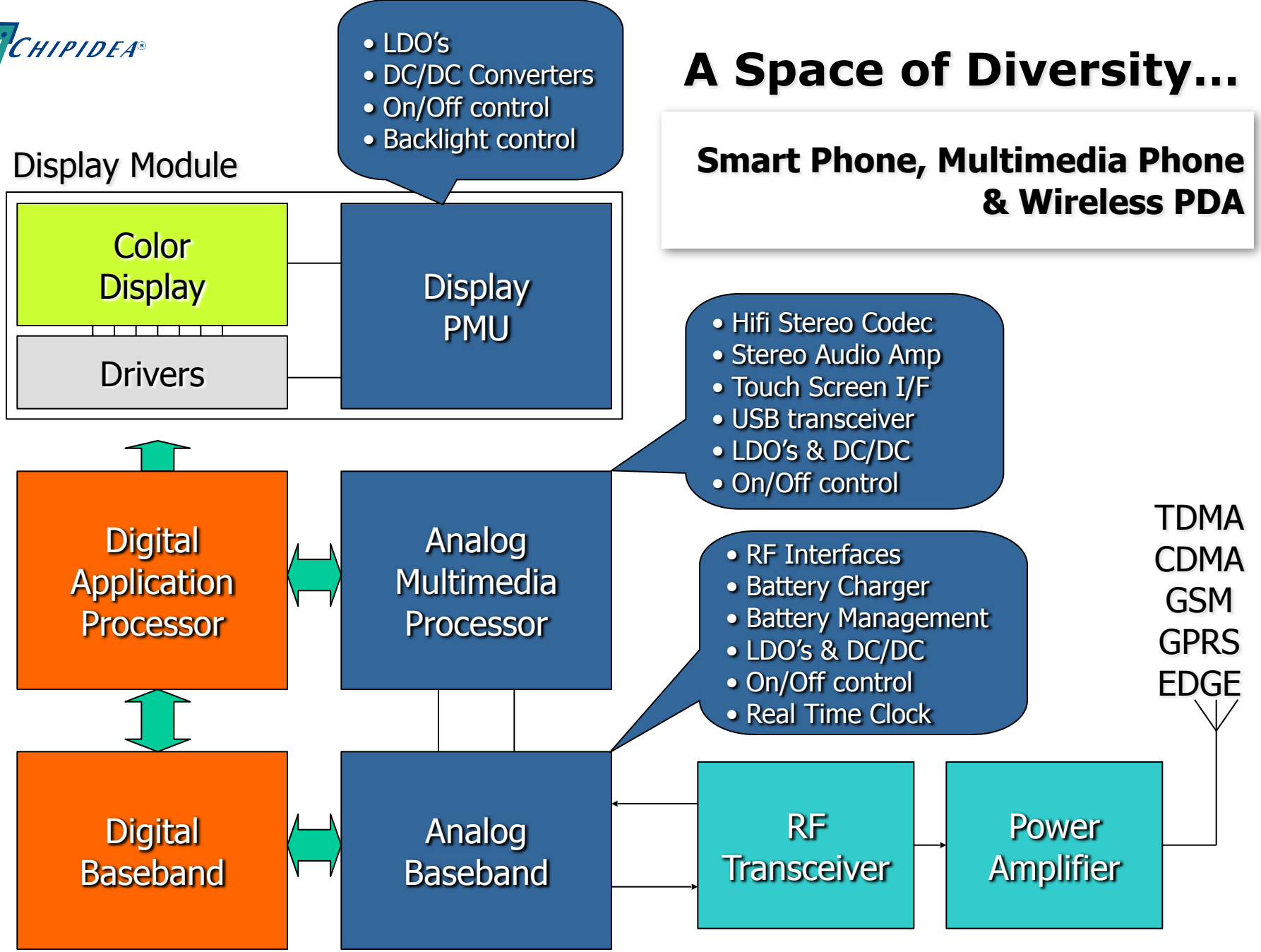
What do they have in common?

"Mixing signals to stay in tune"

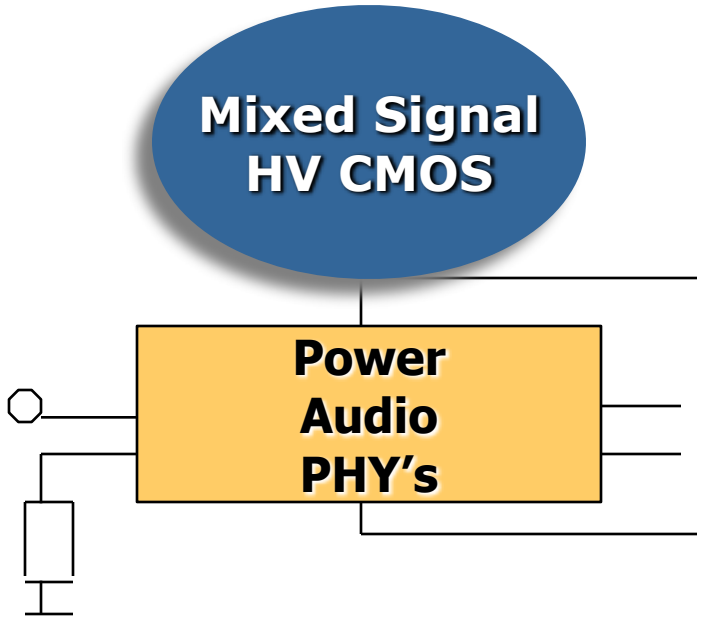


A Space of Diversity…

Smart Phone, Multimedia Phone & Wireless PDA

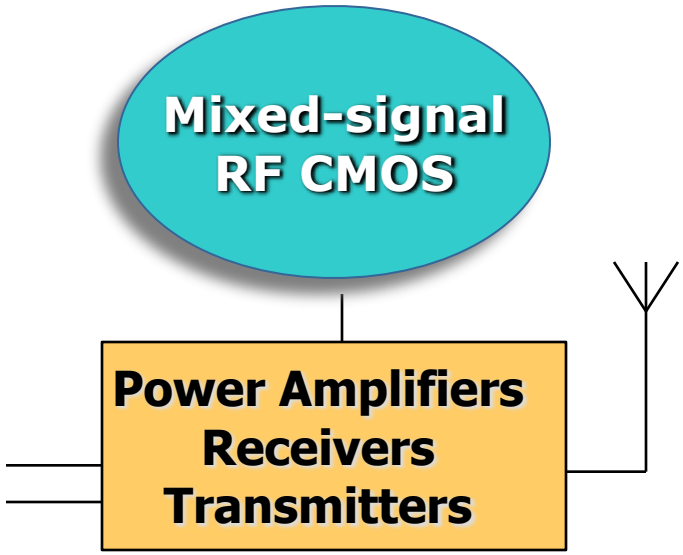


… Complexity and Performance



- **Audio** – 96dB dynamic range, 192kHz sampling, sound effects, line, headphone, loudspeaker and microphone interfacing…
- **Energy conversion** – DCDC conversion (buck, boost and automatic buck-boost) up to 1A with over 90% efficiency
- **Voltage conversion** – Low DropOut up to 300mA with/without external capacitor
- **Battery Management** – Constant-Current/Constant-Voltage for NiCd, LiPoly, Li+ and NH with constant charging current up to 1A
- **Interfacing** – Multi-mode Front-Ends for Cellular (2G/2.5G/3G), Wireless (BT, WLAN, WiMax, ...), Wireline (HPNA, PLC, xDSL, ...), ...

… Complexity and Performance



- **3G –** 2GHz RF, 2MHz of Signal Bandwidth, Fully Integrated and Low Power
- **WLAN –** 802.11a/b/g/n, 2.4GHz and 5.2GHz, Zero-IF or High-IF Fully Integrated and Low Power
- **GPS –** L1 and L2 bands (1.2-1.6GHz), GALILEO capable in L1, L2, E5 and E6 bands,
- **DVB-H –** VHF, UHF and L-Band, Fully Integrated, MBRAI compliant
- **Analog or Digital Interface –** Multi-mode, Reconfigurable Analog Baseband

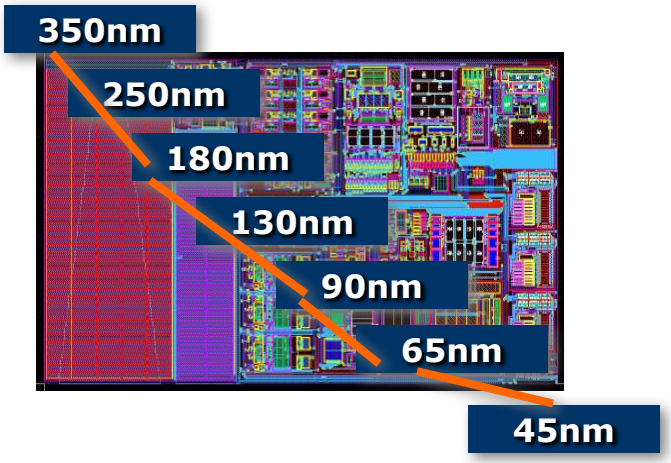
Where demand drives applications...

- **Consumer, "Wearable" Electronics**
  - ◇ One gadget with all, now and to run all day!!
  - ◇ "Wireless access" to information, communication, anywhere, any time, to anyone...
  - ◇ to "see, listen, feel", adapt to people...
  - ◇ ... and have low power in the palms of their hands.

…Bandwidth and reach challenge media

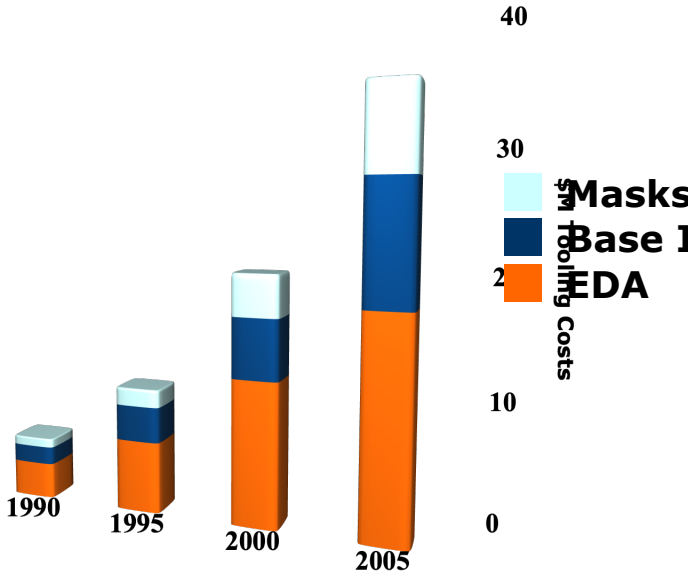
- **Multiple Transmission Media** at Home
  Copper, Coax, Power, etc
- **Multiple Standards** for Mobility
  Bluetooth, 3G, 4G, Wimax, DVB-H/T, etc
- **Vertical Integration** of Mobile Technology
  Networking and cellular
- **Horizontal Integration** of Mobile and Home Technology
  Power, Copper or Coax to Wireless

… Manufacturing challenges design



- Multiple foundries, no standard processes
- "Node waves": 180nm, 130nm, 90nm, 65nm… shrunk versions...110nm, 80nm…
- Different Flavors in each process node
- SOC or SIP?...

- Increased design, productization and manufacturing costs
- Increased design/manufacturing cycles
- Higher product investments… but gadgets are cheap!



It is Challenging!

Narrower windows to enter ….

… huge opportunities to succeed!

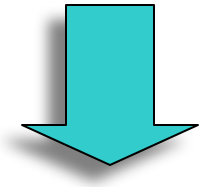
Addressing the "obscure" side of the industry....




The "obscure" side of the industry

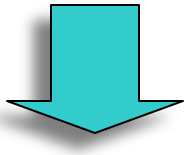
- While most of discussions are related to "leading-bleeding" digital algorithm and/or state-of-the-art architectures, **Mixed-Signal, Power and RF challenges are often ignored !**

Transmission



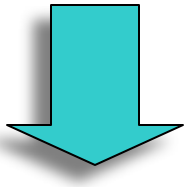
Mixed-Signal RF systems

Connectivity Power



Mixed-Signal Power Systems

Reception



Mixed-Signal RF systems

…The "obscure" challenges of design

- Difficult to define (no standards, the devil is in the detail)
- Higher complexity in smaller geometries
- Supply voltage shrinks
- Leakage escalates
- Difficult to implement and even more difficult to verify
- System partitioning and packaging

…cannot be ignored anymore !

…The "obscure" challenges of business

- Money supply can tame the escalating costs of tools, masks, packages and testers…
- … but it does little to remove the bottlenecks of limited Expertise and Engineering Resources that take time to create and develop.
- Analog supply chain is still highly fragmented into pockets of single function expertise and lacks the system level perspective and application know-how.

…cannot be ignored anymore !

Threatening and limiting factor

- The “obscure” challenge – Analog/Mixed-Signal, Power and RF - is a **threatening and limiting factor** for the Communications industry

We need Solid, Diverse, State-of-the-Art Technology Foundation & Methodology

- **Solid** Analog/Mixed-Signal Technology foundation and Methodology that supports rapidly changing requirements, geometries and processes, while being **predictable and reliable**.

- **Diverse** Analog/Mixed-Signal solutions to support **multiple application areas** (Power and Battery Management, Audio, Video, TV, Connectivity, RF, etc.)

- **State-of-the-Art** Analog/Mixed-Signal Technology to support **challenges of new specifications**, optimized for performance, cost and power.

We need Consolidated Analog System Solutions…

- Solutions that combine analog design expertise with system and application know-how to achieve **global optimization**.
- Solutions that provide high-level design platforms that can be efficiently supported by top-down methodologies, tools and flows to **increase productivity**.
- Solutions that can trim sourcing channels and **improve the efficiency of the supply chain**, both in cost and in time.

Dependable…

Partnering to:

- **Short Design Cycle?**
- **Good Record of delivering ?**

- Deliver **"first time right"** analog/ mixed-signal solutions
- **Reduce time to Market** with proven Technology and Know-How

- **Work closely to overcome difficulties?**

- Reassure **world-class support** at every stage
- Support **top-class foundries** and master their processes

Scalable…

Partnering to:

- **Have distinctive features ?**
- **Scale Technology**!… combining a broad array of baseline functions to create complex high-added-value analog sub-systems.
- **Know what's in the future?**
- **Drive Analog/Mixed-Signal Integration** for Communications and Consumer Electronics!

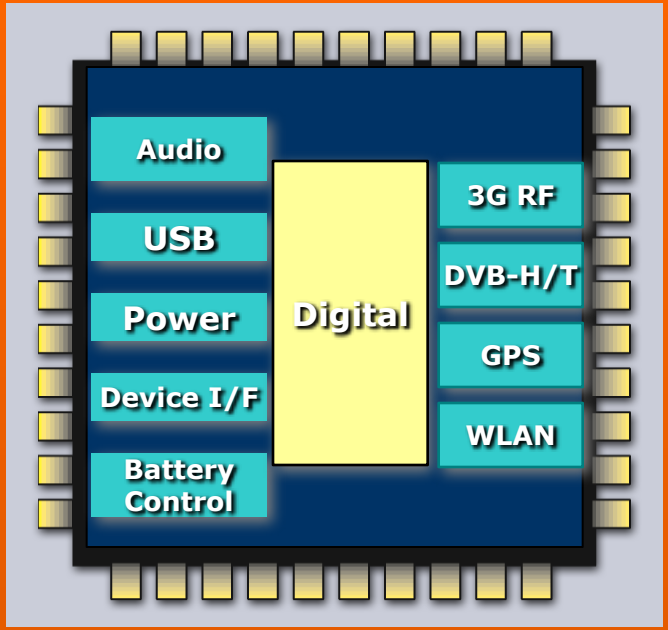
Integrated…

Partnering to:

- Works closely to overcome difficulties?

Analog/Mixed-signal solutions for embedded IP to enable SOC

- **Enable System On Chip Integration on 130nm, 90nm, 65nm…**



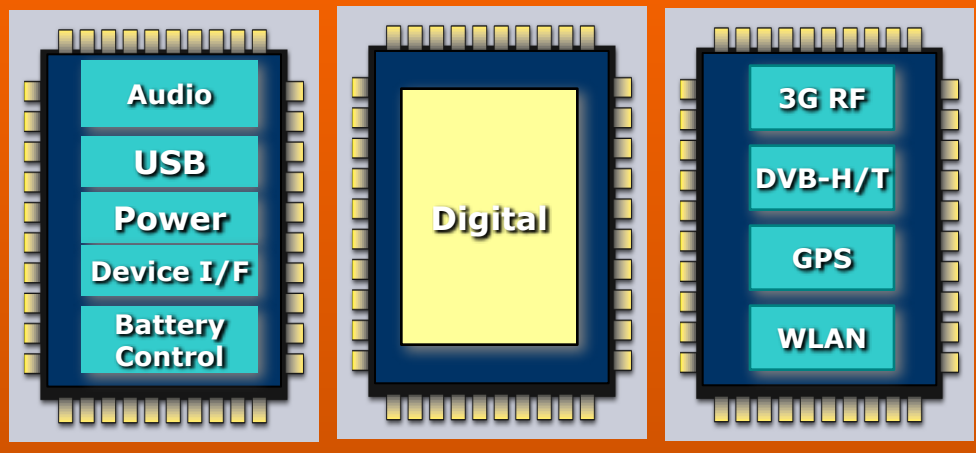
Disintegrated…

Partnering to:

- **Works closely to overcome difficulties?**

Analog/Mixed-signal system solutions to enable SIP

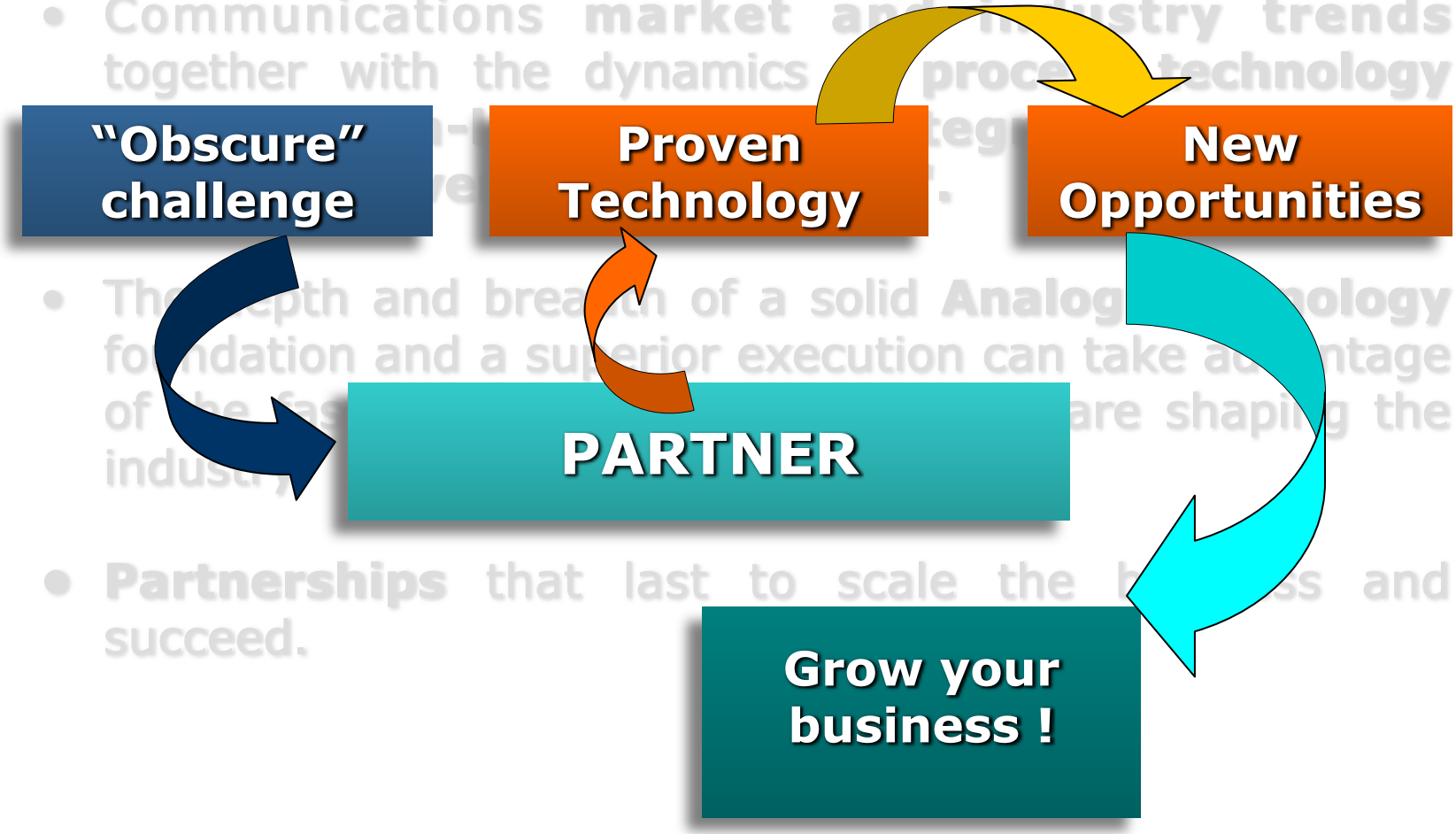
- **Enable System In Package Integration**



Summary

- Analog/mixed-signal technology will remain an ubiquitous element of the communications and digital electronics industry.
- Still a space of diversity and fragmentation, it will be driven towards consolidation to address prevailing challenges:
  - ◇ of scarce human resources;
  - ◇ of cost effective supply chains;
  - ◇ of dependable, scalable design;
  - ◇ of increased system integration, both in silicon and at board level.

We need to keep"mixing the signals to stay in tune"



Thank you!