Challenges of Third Party IP in Defense Systems
Discussion Panel on Trust and Integrity Issues

NDIA Trusted Microelectronics Workshop

Feb 2, 2017

Crystal City, VA

What is "Third Party IP" in this Context?

- Reusable design blocks purchased/licensed from others
  - Could be "hard" or "soft"
  - Could include software, etc.

- Some history
  - IP Industry started in '80's with verification models and dedicated logic simulation models (prior to widespread adoption of VHDL/Verilog)
  - Logic synthesis followed
  - 1990 HDL Systems offers a synthesizable MIPS core for $256k
  - 1991 ARM6 and Rambus interface
  - IP industry evolves, follows EDA model
  - ~$8B market by 2020
    - ~>30% CPU
    - Signs of life in the IoT category

Figure 2
The Semiconductor Ecosystem
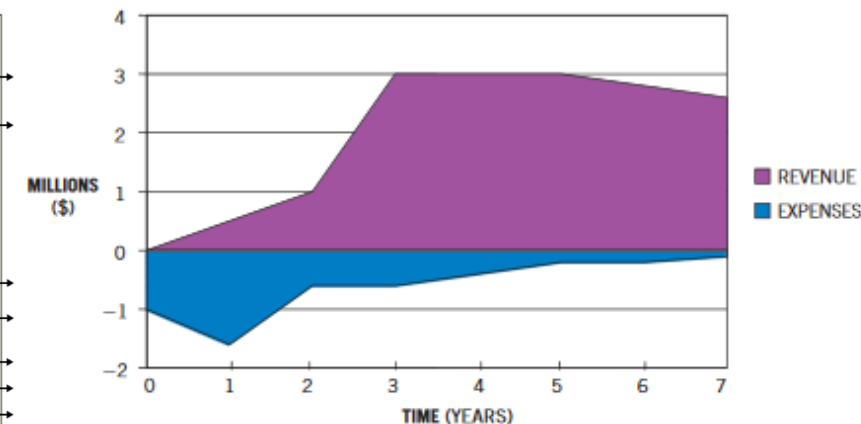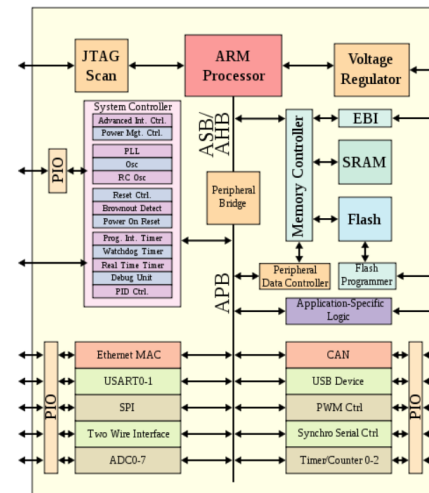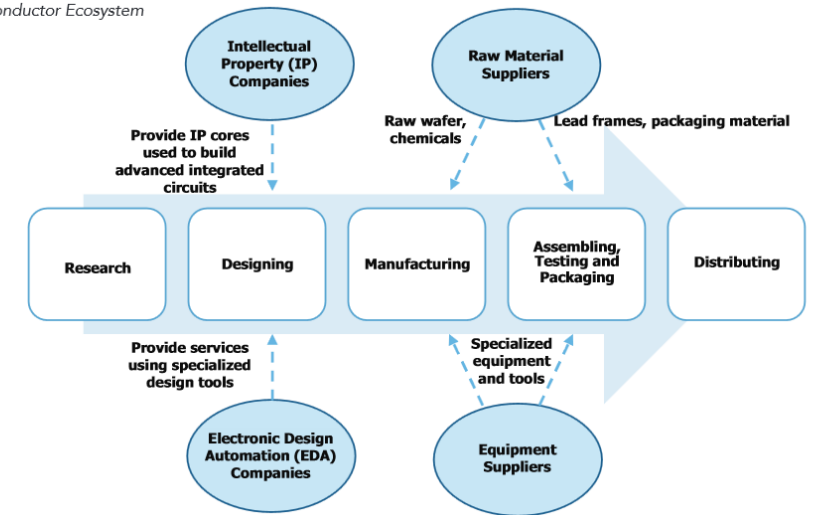
Top Merchant IP Suppliers

TABLE 1—TOP 10 IP-MARKET REVENUES

Rank	Company	2003 revenue (millions)	Growth (%)	Share (%)
1	ARM	$175.2	−6	17
2	Rambus	$118.1	21	12
3	Synopsys	$81.2	11	8
4	Artisan	$74.6	71	7
5	TTPCom	$73.5	4	7
6	MIPS Technologies	$40.3	−7	4
7	Virage Logic	$40	−16	4
8	Ceva	$36.8	−28	4
9	Imagination Technologies	$23.6	54	2
10	Mentor Graphics	$22.2	39	2
	Others	$326	0	33
	Total	$1011.5	4	100

Source: Gartner

2014 Rank	Company Name	2013 Revenue	2014 Revenue	Growth 2013-2014	2014 Share
1	ARM Holdings	1,060.6	1,234.4	16.4%	46.0%
2	Synopsys	342.1	371.1	8.5%	13.8%
3	Imagination Technologies	221.0	237.1	7.3%	8.8%
4	Cadence	125.4	125.8	0.2%	4.7%
5	Silicon Image	49.1	59.9	22.0%	2.2%
6	Ceva	48.9	50.8	3.9%	1.9%
7	Sonics	36.2	40.4	11.6%	1.5%
8	Rambus	34.3	35.7	4.1%	1.3%
9	eMemory	27.4	33.5	22.3%	1.2%
10	Vivante Corporation	25.0	27.6	10.4%	1.0%
	Top 10 Total	1,970.0	2,216.3	12.5%	82.6%
	Others	490.8	466.9	-4.9%	17.4%
	Grand Total	2,460.0	2,683.2	9.0%	100.0%

Note: All Revenue figures in US $ Millions

2003 ⟶ 2013/14

Some Challenging Issues with IP in Defense Systems

- Licensing, royalties, servicing practices
- Relationship model (foundry, direct, etc.)
- ASIC & FPGA IP
- Update processes
- Migration support
- Differentiated functions vs must haves
- **Security/assurance/trust**
- **Content/view**
- **Quality metrics, Production worthiness**
- **Evaluation of IP prior to implementation?**
- **Protocols and practices**
- **Limitations on use?**
- **Qualification of IP suppliers, vendor relations**
- **New sources?**
- **Impacts on internal designs and team capabilities/organization**

What are the most important challenges for Defense electronics companies to face with respect to 3rd party IP usage?

What IP security/assurance/trust challenges are best handled by individual companies and which one could be better addressed in a broad, coordinated program?

Who should take the lead? Does the DoD need to get more involved here?

Panel Discussion Groundrules

- Frank and open discussion is encouraged
- NOT for direct attribution (A summary of the panel will be produced by NDIA WG)
- No audio recording or photos of slides
- Each panel member will have 5 minutes for an uninterrupted opening statement
- Rest of time will be for open discussion, Q&A

Panel Members

- Dr. Michael Bear, Technical Director - Systems Engineering, BAE Systems
- Mr. Claude Goldsmith, Principal Engineer, Lockheed Martin Corporation
- Dr. Thomas Kazior, Senior Principal Fellow, Advanced Microelectronics, Raytheon Company
- Dr. Bill Phillips, Northrop Grumman Corporation
- Dr. Warren Snapp, Manager, Solid-State Electronics Technology, The Boeing Company