Global Digital Economy: Opportunities For Russia In The Next Industrial Wave

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Future Horizons In Russia/CIS + ELINT SP

Future Horizons

- Active In Russia/Eastern Europe Since Founded In 1989 (100+ Visits Since)
- East-West Electronics Moscow Office/Research Representation (1991)
- Strategic Partnership With Electronintorg/ELINT SP (1993)

ELINT SP (Previously Electronintorg SP)

- Successor To Electronintorg V/O & Electrointorg Co. Ltd Face Of Soviet & Russian Electronics Industry Since 1968
- Focus In Business Development, Representation, Marketing, Business Support, Electronics Industry Exhibitions & Professional Translation

World’s Premier Authority On The Russian Electronics Industry
Plus 5 Decades Experience In The Global Semiconductor Market
SC Market Update

2017 Was The Year Of Recovery (+22%)

- This Time Around The Economic Growth Held
- FH Was First To Predict:
  ... 2017 Capacity Shortages (Sep 2016)
  ... $400b Milestone (May 2017)
  ... 20% Growth (Sep 2017)
- Recovery Rolled Out Exactly As We Said

2018 Outlook

- Further Double Digit Growth Inevitable
  ... Contrary To Industry Opinion!
- Market Should Reach $500b in 2018
- Capacity Constraints Squeezing Supply
  ... Wafers & Passives Too
- Economic Crash Sole Recovery Risk
  ... Plenty Of Issues; So Far So Good!
Ongoing Industry Disruptive Innovation

- **Invention Of Transistor** (Shockley, Bardeen, Brattain: 1947)
- **Invention Of The IC** (Kilby: 1958 / Noyce: 1959)
- **Microprocessor Development** (Faggin, Shima, Hoff, Mazor: 1970s)
- **Fabless/Foundry Model** (Chips & Technology / TSMC: 1980s)
- **SoC/IP** (MIPS, ARM, Imagination Technology etc: 1990s)
- **AI/IoT/Data/Robotics** (Alibaba, Amazon, Apple, Facebook, Google etc: 2010s)
Third Wave Industry Challenges

- Traditional Semiconductor Companies Being Squeezed … By Vertically Integrated Organisations
- Few Start-ups Can Fantasize About Challenging Incumbents Head-On … But They Can Readily Either Find A Profitable Niche Or Be Acquired
- Raising Money For Hi-Tech Chip Start-Ups In 2015-16 Was A Nightmare … Big, Acquisition-Hungry Tech Are Now Re-Targeting Semiconductors
- China Has Shown A Particular Interest In Developing New A.I. Chips … Russia Should Too
- Need To Stay In Control Of The IP … Co-Operation/Partnerships Can Be A Double-Edged Sword
- Need To Develop A Collaborative Culture in Russia … Both Horizontally & Vertically To Apply Industry Pressure On Establishment

Collaboration WORKS!
~45 Years Professional & Personal Experience (Since 1972)
## Bottom Up (IP / Fabless / SMEs)

<table>
<thead>
<tr>
<th>No</th>
<th>Team</th>
<th>City</th>
<th>Participant 1</th>
<th>Participant 2</th>
<th>May 29</th>
<th>May 30</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TIAC</td>
<td>Tomsk</td>
<td>Popov Artem</td>
<td>Alyaksandravich</td>
<td>+</td>
<td>+</td>
<td>Development of a universal test service for automatic construction and verification of mathematical models of microwave components</td>
</tr>
<tr>
<td>2</td>
<td>ASIC Lab</td>
<td>Moscow</td>
<td>Agrest Grgory</td>
<td>Alexandrovich</td>
<td>+</td>
<td>+</td>
<td>High-speed operational amplifier (OAU) with low power consumption, capable of amplifying the input signal with frequencies up to 250 MHz and used in a single-chip path as an ADC</td>
</tr>
<tr>
<td>3</td>
<td>CollDesign</td>
<td>Moscow</td>
<td>Komarow</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Design of a universal test system for 4G and 5G transmission systems</td>
</tr>
<tr>
<td>4</td>
<td>DefiSecurity</td>
<td>St. Petersburg</td>
<td>Abaturov Marina</td>
<td>Vladimirovna</td>
<td>+</td>
<td>+</td>
<td>Application of artificial intelligence to automate the response to information security incidents</td>
</tr>
<tr>
<td>5</td>
<td>ElSUN</td>
<td>Moscow</td>
<td>Tkachov Andrey</td>
<td>Vasilyevich</td>
<td>+</td>
<td>+</td>
<td>The development of the high-speed vision system for robots</td>
</tr>
<tr>
<td>6</td>
<td>GDS St. Petersburg</td>
<td>Kashaev Sergey</td>
<td>Veratina Erastava</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Development of the scheme of organization of complex equipment providing mobile polar exploration with a full range of communication and data transmission services</td>
</tr>
<tr>
<td>7</td>
<td>HaClever</td>
<td>Moscow</td>
<td>Ishchenko Yaroslav</td>
<td>Fedorovitch</td>
<td>+</td>
<td>+</td>
<td>Multi-functional universal game controller that allows you to control the character in the game of any kind and genre, through gestures, as well as to control a smart home</td>
</tr>
<tr>
<td>8</td>
<td>ProtelZhirovsky</td>
<td>Zhukovsky</td>
<td>Vitusov Andrey</td>
<td>Vasilyevich</td>
<td>+</td>
<td>+</td>
<td>Production of the antenna with the help of additive technologies with the possibility of integration into the body of the aircraft, ensuring the reduction of the weight of the aircraft by integrating the antenna into the body</td>
</tr>
<tr>
<td>9</td>
<td>RMIT_0StUT</td>
<td>Moscow</td>
<td>Komarev Kazimir</td>
<td>Vasilyevich</td>
<td>+</td>
<td>+</td>
<td>Autonomous radio network protected and moving objects and alarms from USW-SW radio opeaters. Designed for use in geographically dispersed alarm systems</td>
</tr>
<tr>
<td>10</td>
<td>Rapentez</td>
<td>Moscow</td>
<td>Verhkin Evgeniy</td>
<td>Nikolayevich</td>
<td>+</td>
<td>+</td>
<td>Electromagnetic device for control of upper limit interfaces based on artificial neural networks</td>
</tr>
<tr>
<td>11</td>
<td>WireBuster</td>
<td>Moscow</td>
<td>Indikov Ivan</td>
<td>Romanovitch</td>
<td>+</td>
<td>+</td>
<td>Technology that allows you to increase the speed of wireless information transmission on the frequency of wi-fi without harm to humans</td>
</tr>
<tr>
<td>12</td>
<td>Alfin</td>
<td>Moscow</td>
<td>Gribin Alexander</td>
<td>Sergeevich</td>
<td>+</td>
<td>+</td>
<td>Creation of a universal cybernetic platform for the construction of Autonomous mobile service robotic complexes designed for outdoor work in a wide climatic range</td>
</tr>
<tr>
<td>13</td>
<td>Gas Analyzers</td>
<td>Moscow</td>
<td>Davydov Sergey</td>
<td>Andreivich</td>
<td>+</td>
<td>+</td>
<td>Development in the field of optical measurements for the control of dynamic gasless media</td>
</tr>
<tr>
<td>14</td>
<td>Spark</td>
<td>Moscow</td>
<td>Beryakova Ksenia</td>
<td>Sergeevna</td>
<td>+</td>
<td>+</td>
<td>Development of a set of discrete electronic devices (ED) with increased area and variable dynamic range, allowing you to control the scattered EM field of the radar surveillance object by adjusting the efficiency of interaction between the integration of the ED and the efficiency of its converter in the testing electric field of the object, in permittivity space</td>
</tr>
<tr>
<td>15</td>
<td>Mailom</td>
<td>Moscow</td>
<td>Mailom Alexander</td>
<td>Yarivitch</td>
<td>+</td>
<td>+</td>
<td>Design of a mobile telepresence system for the control of the quality of mobile calls in terms of content and total content</td>
</tr>
<tr>
<td>16</td>
<td>OKSystems</td>
<td>Ulitsa</td>
<td>Scanerovskia mobile</td>
<td>Cislakwicz</td>
<td>+</td>
<td>+</td>
<td>Compact mobile telepresence system, which determines the quality of mobile calls in terms of content and total content</td>
</tr>
<tr>
<td>17</td>
<td>Panel Enterprises</td>
<td>Moscow</td>
<td>Koodov Mark</td>
<td>Vladimirovich</td>
<td>+</td>
<td>+</td>
<td>Creation of a universal measurement system for research and industrial applications</td>
</tr>
</tbody>
</table>

This is Not A Bad Start!
Top Down (Corporate Colossi)

- Entrenchment Of Superstar Firms In The World Economy
  - Reinvented Old (GE)
  - Emerging Champions (Samsung)
  - High-Tech Wizards (Google, Apple, Facebook etc)

- Admirable In Many Ways
  - Churn Out Products That Improve Consumer’s Lives
  - Provide $Billions Free Services

- Challenging The Chip Firms
  - OEM Direct
  - Designing Own SoCs (aka Apple)

- China’s Challenging Too
  - Russia Should be Too
  - Needs Bottom Up Drive Too
Know Your Value Proposition

$0.05 At The Chipless/IP Level
$4.50 At The Foundries
$9.00 For Semiconductors
$50 For OEMs
$450 For Services /Content

$50-$100 High-End MPU … $6-7 MCU/Std Logic/Memory

Need To Circumvent The Industry Bars (Quantum Layers)

Source: SEMI/Company Reports/Future Horizons
Need A Disciplined Approach

FH Value Test

1. What Problem Are You Solving
2. What Value Are You Creating
3. How Will You Make Money
4. Barriers To Entry
5. Competition (Companies Not Products)
6. Is The Market Big Enough / Growing
7. How To Validate Idea
8. Map Out Your World
9. PEST (Political, Economic, Social, Technological) Or SWOT
10. How To Overcome Customer Inertia
Summary

- Disruption Is Inevitable … It Brings New Opportunities
- Moore’s Law Is Not Just About Technology But Systems & Applications
- New Application Drivers Need Brain Power & Intellect
- Russia Can Drive Change Not Just Be Driven By It
- The Next Industrial Way Is A Natural Fit For Russia

We Can Help You Succeed

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mpenn@futurehorizons.com

Already Helped 50+ Firms Establish Business Relationships In Russia
(Incl. ADI, ASM-L, DEC, IR, LG, Mietec, Nikon, Samsung, Synopsys, TI...)

Slide 11
We Can Help You Too ...

Thank You

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