Embedded Tech Trends: Market Insights

Brian Arbuckle, Senior Market Analyst, 0044 (0) 7973 336459, brian.arbuckle@ihsmarkit.com

22 January 2018

© 2018 IHS Markit
Another year on and what has changed?......
World VITA Boards and Systems Revenue (Preliminary data)

<table>
<thead>
<tr>
<th>Sales Revenue</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>% diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ Million USD</td>
<td>2014</td>
<td>2015</td>
<td>2016</td>
<td>2015-16</td>
</tr>
<tr>
<td><strong>Boards</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VME Boards</td>
<td>295</td>
<td>291</td>
<td>297</td>
<td>2.1%</td>
</tr>
<tr>
<td>3UVPX Boards</td>
<td>19</td>
<td>20</td>
<td>20</td>
<td>0.0%</td>
</tr>
<tr>
<td>6UVPX Boards</td>
<td>32</td>
<td>34</td>
<td>35</td>
<td>2.9%</td>
</tr>
<tr>
<td><strong>Total Boards</strong></td>
<td>346</td>
<td>345</td>
<td>351</td>
<td>1.7%</td>
</tr>
<tr>
<td><strong>Systems</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VME Systems</td>
<td>72</td>
<td>71</td>
<td>71</td>
<td>0.0%</td>
</tr>
<tr>
<td>3UVPX Systems</td>
<td>36</td>
<td>37</td>
<td>37</td>
<td>0.0%</td>
</tr>
<tr>
<td>6UVPX Systems</td>
<td>28</td>
<td>30</td>
<td>32</td>
<td>6.7%</td>
</tr>
<tr>
<td><strong>Total Systems</strong></td>
<td>136</td>
<td>138</td>
<td>140</td>
<td>1.4%</td>
</tr>
<tr>
<td><strong>Total Boards and Systems</strong></td>
<td>482</td>
<td>483</td>
<td>491</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

© 2018 IHS Markit
Defense dominates, niche applications elsewhere.

**Figure 53: The market for VITA boards by industry sector: World**

- Civil Aerospace
- Communications (Commercial)
- Defense
- Gambling/Gaming
- Industrial Automation
- Medical
- POS/POI and Digital Signage
- Railway
- Transportation (not Rail or Civil Aero)
- Other Sector, not listed above

Data issued: January 2018
Source: IHS Markit

© 2018 IHS Markit
Forecasting the future....
How do we forecast the next 5 years in practice?

- Start from the current base year data (2016) collected from questionnaire returns
- Apply a growth trend by product type/form factor based on historical data and views expressed in industry supplier interviews
- Apply composite trends from IHS Markit data sources:
  - GDP growth by country by year (IHS Markit data)
  - Industry sector growth by country by year (Janes Defence, IHS Markit Factory automation data)
  - Test outputs with the industry (let’s hear your views!)
Reviewing product trends

**VME/VPX Sales history**

- **VME Revenues ($M)**
- **VPX revenues ($M)**
Top 10 Countries = 74.3% of Global Defence Budget
Expectations for the US economy and defence budget in 2018

1. Economy gaining strength – but debt keeps rising
2. Defence budget increasing
3. Globe’s largest defence investment budget being maintained
4. Ballistic Missile Defence (BMD) plans front and center in FY18 Supplemental Budget request due to geo-political issues and a challenging security environment
5. Shipbuilding funding increases continue; aircraft funding declines in FY18
6. Readiness issues continue – some years away from Full Spectrum Readiness
• Defence % of GDP decreasing: 4.6% in FY11 → 3.1% in FY22
• USD179 billion FY14 investment smallest in a decade – result of sequester
• Investment peaks in FY16 (32.4% of DoD); then maintains average of 31.7%

US Defence Investment Averages 31.7% through FYDP
DoD FY18 Budget by Mission Category (Janes)

FY18 Total Base + OCO + Supplemental Budget for Modernization Accounts in Current $ 212.6 billion

<table>
<thead>
<tr>
<th>Weapons Category / Mission Area</th>
<th>FY18</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aircraft &amp; Related Systems</td>
<td>50.07</td>
<td>23.5%</td>
</tr>
<tr>
<td>Shipbuilding &amp; Maritime Systems</td>
<td>30.46</td>
<td>14.3%</td>
</tr>
<tr>
<td>Ground Systems</td>
<td>11.21</td>
<td>5.3%</td>
</tr>
<tr>
<td>Missiles &amp; Munitions</td>
<td>17.38</td>
<td>8.2%</td>
</tr>
<tr>
<td>Missile Defense</td>
<td>11.26</td>
<td>5.3%</td>
</tr>
<tr>
<td>Space-based Systems</td>
<td>10.09</td>
<td>4.7%</td>
</tr>
<tr>
<td>C4I Systems</td>
<td>8.95</td>
<td>4.2%</td>
</tr>
<tr>
<td>Mission Support</td>
<td>60.04</td>
<td>28.2%</td>
</tr>
<tr>
<td>S&amp;T RDT&amp;E</td>
<td>13.20</td>
<td>6.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>212.65</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

Investment in USD billion (current $) Base + Supple.

includes Procurement, RDT&E and NDSF accounts
Preliminary forecast of world market for VITA boards and systems by form factor to 2021 based on VME sales reducing, VPX increasing.

**Figure 8: The market for VITA boards by form factor: World**

- VME
- 3U VPX
- 6U VPX

Data issued: January 2018
Source: IHS Markit © 2018 IHS Markit

**Figure 9: The market for VITA systems by form factor: World**

- VME-Based
- 3U VPX-Based
- 6U VPX-Based

Data issued: January 2018
Source: IHS Markit © 2018 IHS Markit
Resulting VME/VPX forecast

VME/VPX Sales Forecast

- VME Revenues ($M)
- VPX revenues ($M)
Reviewing the forecast for VITA boards and systems

• VME standard is “ageing well” so far.
• VPX seems a long way away from overhauling VME.
• Sales dominated by the U.S defence market so growth largely supported/constrained by the US defence budget.
• Niche applications in industrial automation and rail transportation markets remain relatively small and the expected growth will have little effect on total sales.
• Any forecast describes just one scenario from the information to hand at the time of preparation so we may need to consider alternatives and certainly review annually.
Other issues which may affect the forecast

• Software-centric solutions have disrupted the xTCA market- will VME/VPX remain immune?

• Security is a growing issue across embedded computing and “Securely Connecting the Embedded World” was the main conference topic at Embedded World 2017.

• DARPA is now investigating the resilience of COTS systems. The Consec programme aims to remove “excess functionality”. Openness and security tend to pull in opposite directions!

• Security starts with the processor and two major flaws, code named ‘Meltdown’ and ‘Spectre’ could make the security of a large number of computers vulnerable. How will this effect COTS systems already deployed?

• Threats of new disruptive technologies (e.g. Quantum Computing/ AI) are not yet impacting but grow as key companies invest in developing capabilities.

• Unknown unknowns always represent a challenge!
What’s your view?