



## *2015 State of the VITA Technology Industry*



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# State of the VITA Technology Industry October 2015

by: Ray Alderman, Chairman of the Board, VITA

*This report provides the reader with updates on the state of the VITA Technology industry in particular and of the board and system industry in general, from the perspective of Ray Alderman, the Chairman of the Board of VITA. VITA is the trade association dedicated to fostering American National Standards Institute (ANSI) accredited, open system architectures in critical embedded system applications. The complete series of reports can be found at [Market Reports](http://www.VITA.com/MarketReports). ([www.VITA.com/MarketReports](http://www.VITA.com/MarketReports))*

## Introduction

This issue of the “State of the VITA Technology Industry” recaps our current economic conditions. A further update on the situation in the middle east and how it impacts our defense spending is presented. Looking into the future of technology reveals some interesting developments that will impact high performance computing. Merger and acquisition activity across many industry segments kept the heat up during the summer.

## Business Conditions

The International Monetary Fund (IMF) downgraded world Gross Domestic Product (GDP) growth to 3.3% in early July, based on weakness in the U.S. economy.<sup>1</sup> Back in April, the IMF said the world was stuck in a period of stagnation with few growth prospects for many years to come.<sup>2</sup> In June, the World Bank revised their world growth rate down to 2.8%.<sup>3</sup> But at the micro level, the U.S. economy is doing much better now than Europe, Japan, or China. Growth and prosperity will be unequally distributed in the developed nations, mostly associated with their demographics, tax structure, and their governmental and economic philosophies.

- 1 Reuters, “Sluggish U.S. Economy Weakens Global Growth”, The Fiscal Times, July 9, 2015, <http://www.thefiscaltimes.com/2015/07/09/Sluggish-US-Economy-Weakens-Global-Growth>
- 2 Ambrose Evans-Pritchard, “Exhausted world stuck in permanent stagnation warns IMF”, The Telegraph, April 7, 2015, <http://www.telegraph.co.uk/finance/economics/11520098/Exhausted-world-stuck-in-permanent-stagnation-warns-IMF.html>
- 3 Anna Yukhananov, “World Bank sees slower global growth, urges Fed to wait on rates”, Reuters, <http://www.reuters.com/article/2015/06/10/us-worldbank-economy-idUSKBN0OQ2JF20150610>

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In the U.S., Q1 GDP declined by 0.7% in first estimates and was then upgraded to minus 0.2% in later estimates. The Commerce Department blamed the usual suspects: bad winter weather, a West Coast dock strike, lower oil prices, and I suspect, the phase of the moon.

Q2 U.S. GDP came in at 2.3% growth (first estimate) while Q1 was revised up to 0.6% growth (third estimate) instead of a slight contraction of 0.2% in the second estimate.<sup>4</sup> Second estimates for Q2 U.S. GDP came in at 3.7% growth, and the final third estimate came in at 3.9% growth.<sup>5</sup> How can the Q1 GDP numbers range from 0.7% contraction to 0.6% growth? And how could Q2 estimates go from 2.3% growth to 3.9%? This margin of error raises significant doubts about the validity of the numbers, especially when the Q3 forecast is for 1.8% growth.<sup>6</sup>

Canada's economy dropped by 0.8% in Q1 and 0.5% in Q2. This is of concern since they are a natural resources export-based economy and live off their oil revenues and Molson beer exports.<sup>7</sup> Canada is seeing negative GDP growth as the demand for oil, lumber, and ores decline worldwide. The Looney (Canadian Dollar) was at parity with the USD in 2011 and now it's worth 76 U.S. cents.

Greece got a left-handed bail-out deal from the EU, but they are doomed under required austerity measures. They have a new government, the same people they had before Prime Minister Tsipras resigned. Even Tsipras is back, and his mandate is to take the money and ignore any EU conditions.

China, Singapore, Taiwan, and South Korea are exporting their cheap labor to build electronics, while their GDP is also declining.<sup>8</sup> The underlying trend here is that any country dependent on tourism (Greece and Puerto Rico), or exporting their natural resources and labor (Argentina, Brazil, China, Singapore, Canada, Taiwan, and South Korea) is in trouble. Argentina defaulted on their bonds in Q2 while Brazil faces a huge financial mess with things getting worse and the 2016 Olympics around the corner.<sup>9</sup> Venezuela is collapsing financially.<sup>10</sup> Puerto Rico defaulted on their sovereign bonds in August. At this point, Puerto Rico makes Argentina look well managed.

In Europe, Q1 came in with 0.5% growth, even with Greece hanging around their necks. And Q2 EU GDP came in at 0.4% growth.<sup>11</sup> We don't know yet what the massive immigration wave from Syria will do to the EU economies and budgets in the near future, but 0.4% growth is not very exciting. The VW diesel emissions scandal might pull Germany's GDP down and that could have a ripple effect in the EU.

Japan came in with 3.9% growth in Q1 after reducing interest rates, starting a massive Quantitative Easing program, raising sales taxes, and devaluing their currency.<sup>12</sup> China came in with 7% GDP growth in Q1 and the same for Q2, even though most analysts were predicting something less than 6% for Q2.<sup>13</sup> Given all the other poor manufacturing

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4 Andy Kiersz, "Here are the revisions made to GDP growth over the last three years", Business Insider, July 30, 2015, <http://www.businessinsider.com/q2-2015-gdp-revisions-2015-7>

5 Andrea Riquier, "GDP Growth, Consumer Sentiment Both Revised Up", Investor's Business Daily, September 25, 2015, <http://news.investors.com/092515-772751-rising-consumer-confidence-and-spending-boost-gdp.htm?ven=yahoocp&src=aurll&ven=yahoo>

6 Richard Leong, "U.S. economy on track to grow 1.8 percent in third quarter: Atlanta Fed", Reuters, September 28, 2015, <http://www.reuters.com/article/2015/09/28/us-usa-economy-atlantafed-idUSKCN0RS1WD20150928>

7 "Canadian Q2/15 GDP declined modestly", RBC, September 1, 2015, <http://www.rbc.com/economics/economic-reports/pdf/other-reports/cdn-national-gdp-accounts.pdf>

8 Anthony Mirhaydari, "U.S. Stocks Can't Keep Shrugging Off Global Pressures", The Fiscal Times, August 5, 2015, <http://www.thefiscaltimes.com/Columns/2015/08/05/US-Stocks-Can-t-Keep-Shrugging-Global-Pressures>

9 Joseph Adinolfi, "Brazil's economy will likely get worse before it gets better", Market Watch, September 10, 2015, <http://www.marketwatch.com/story/brazils-economy-will-likely-get-worse-before-it-gets-better-2015-09-10>

10 Sebastian Boyd, "Venezuela's Inflation Nightmare Signals Default May Come Sooner", Bloomberg, July 15, 2015, <http://www.bloomberg.com/news/articles/2015-07-15/venezuela-s-772-inflation-means-default-may-come-a-lot-sooner>

11 Paul Hannon, "Eurozone economy growth revised higher", Market Watch, September 8, 2015, <http://www.marketwatch.com/story/eurozone-economy-growth-revised-higher-2015-09-08>

12 Tetsushi Kajimoto and Leika Kihara, "Japan GDP unexpectedly accelerates in Q1 as firms boost investment", Reuters, June 8, 2015, <http://www.reuters.com/article/2015/06/08/japan-economy-gdp-idUSL3N0YQ2JX20150608>

13 Lilian Lin, "China's Q2 GDP rises stronger-than-expected 7%", Market Watch, July 14, 2015, <http://www.marketwatch.com/story/chinas-q2-gdp-rises-stronger-than-expected-7-2015-07-14>

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and export data coming out of China, it's pretty clear that the reported growth numbers are questionable.<sup>14</sup> The official answer from the Chinese seems to be 7% growth, no matter what their economy is actually doing.

Russia's economy is declining by about 3.5% annually, if not more, and the ruble has declined in value by more than 50%.<sup>15</sup> In Q2, their GDP declined by 4.6%, and Q1 was down by 2.2%.<sup>16</sup> It takes an economy and a stable currency to be a regional or world power, and Russia doesn't seem to have either. If low oil and gas prices persist, we could see Russia go belly-up again, like they did in 1998.

The upshot of all this financial news is that the problems that were bad are getting worse. At the macro level, we have some new problems added to the mix. How long can the U.S. economy grow when the rest of the world is going into economic decline? With the entire world awash in debt, interest rates historically low or negative, and central banks printing money like crazy, why is growth anemic throughout the world? The U.S. Federal Reserve in mid-September held interest rates unchanged because of concerns about throwing the rest of the world into economic chaos.<sup>17</sup> What the Federal Reserve doesn't seem to realize is that the world is already in financial chaos.

*“The upshot of all this financial news is that the problems that were bad are getting worse.”*

On the bright side, the U.S. has reopened our embassy in Cuba as a part of normalized relations with the Castro brothers. This creates new opportunities for the importation of sugar and Cuban rum for some enterprising businessmen. And, we could finally get Cuban cigars in the U.S. legally (I've been getting mine from Mexico and Canada for decades). If the Cubans made excellent 30 year-old single-malt scotch, I would recommend them for statehood. Additionally, Cuba is a huge potential market for U.S.-made auto parts, especially for cars made in the '40's and '50's.

## Markets

### Military and Aerospace

First, let's start with corrections to the predictions in my last white paper (April 2015):

- *Kim Jong Un didn't go bat-guano crazy during the joint U.S.-South Korea military exercises in April. He did fire a few missiles and made some noise about the exercises being a provocation for war. KJU cited "internal issues" for his abrupt cancellation of a planned visit to Russia in May. He executed 15 of his top officials in April, including his SECDEF and his uncle, so maybe he needed to stay for more official ceremonies.<sup>18</sup> If he keeps executing people left and right, including North Korean state orchestra musicians, it could damage the progress of his classical-music-in-lieu-of-food program. As his people starve to death, they can hum Mozart and Bach tunes in perfect key. North Korea is deteriorating faster than most people realize.<sup>19</sup>*

However, KJU did go nuts during planned South Korea - U.S. military exercises in August and things got very tense with exchanges of artillery fire over the DMZ. But meetings between North and South Korean leadership calmed

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14 Linette Lopez, "There's a dead giveaway that China's growth numbers are fake", Business Insider, July 16, 2015, <http://www.businessinsider.com/theres-a-dead-giveaway-that-chinas-growth-numbers-are-fake-2015-7>

15 Rob Garver, "Putin's Economy May Be in Even Worse Shape Than It Looks", The Fiscal Times, August 18, 2015, <http://www.thefiscaltimes.com/2015/08/18/Putin-s-Economy-May-Be-Even-Worse-Shape-It-Looks>

16 Anna Andrianova, "Russian GDP Plunges 4.6%", Bloomberg Business, August 10, 2015, <http://www.bloomberg.com/news/articles/2015-08-10/russian-economy-shrinks-4-6-as-oil-slump-risks-deeper-recession>

17 Elena Holodny, "One new phrase jumped out in the Fed's statement", Business Insider, September 17, 2015, <http://www.businessinsider.com/fed-now-monitoring-developments-abroad-2015-9>

18 Agence France-Presse, "Kim Jong-un executes 15 top officials, say South Korean spies", The Guardian, April 29, 2015, <http://www.theguardian.com/world/2015/apr/29/kim-jong-un-executes-15-top-officials-south-korean-spies>

19 Samuel Ramani, "The North Korean government is getting weaker and more vulnerable. That should scare you", The Washington Post, August 4, 2015, <http://www.washingtonpost.com/blogs/monkey-cage/wp/2015/08/04/the-north-korean-government-is-getting-weaker-and-more-vulnerable-that-should-scare-you/>

things down. North Korea is a mess, but they have reason to be proud. There is a claim from the Supreme Leader (KJU) that North Korea has landed the first man on the sun.<sup>20</sup> (It is on the internet so it must be true!)

- *The caliphate leader of ISIS, Abu Bakr al-Baghdadi, was not hiding in Syria as previously stated. He was hiding on the border with Syria near Mosul, Iraq. Having been wounded twice in U.S. air attacks before, he was keeping a low profile in lightly patrolled western Iraqi areas. But according to HUMINT sources in Iraq, his luck ran out again on March 18. He was riding in a convoy in western Iraq when a U.S. drone hit the vehicles on the roadway.<sup>21</sup> ISIS denies that Baghdadi was hurt and claim he is still in control. Reports say he suffered a critical spinal injury in the explosions. The new temporary leader of ISIS, according to HUMINT, is a physics teacher, named Abu Alaa Afri.*

Things have been very active in the Middle East for the past six months. After capturing Mosul in June of 2014, ISIS captured Ramadi in May as the Iraqi Army and police ran from their posts during the attack, shedding their uniforms as they departed.<sup>22</sup> ISIS also captured Fallujah in January of 2014, putting most of Anbar Province under their control. This includes the Northern Iraqi border with Syria. So now, Iraqi troops and Shiite military are attacking Fallujah in order to take it back.<sup>23</sup> The plan is to continue the operations and eventually take back Ramadi and Mosul, returning Anbar Province to Iraqi control. Since Iraq is barely a country today, I have serious doubts they could hold Anbar province against an attack by a Girl Scout troop throwing cookies.

Syrian President Assad (Shia) in Syria keeps pulling his troops back closer to Damascus as he holds on to his presidency by his fingernails and ISIS takes over more of his country.<sup>24</sup> In May, ISIS took control of the Syrian city, Palmyra. Assad's army is worn out from fighting ISIS (Sunni) on one side, and the anti-Assad (Sunni) rebels on the other. Now, the Russians and Iranians are sending troops, tanks, and ships into Syria to save Assad's regime.<sup>25</sup>

If Assad takes his ill-gotten booty and goes to England in the dark of the night, it will create a power vacuum in the country. Iran (Shia), ISIS (Sunni), al Nusra (Sunni) and the Kurds (mostly Sunni) will rush to fill it, just like they are doing in Iraq now. Syria and Iraq would both be failed countries in the end.<sup>26</sup> While this situation deteriorates, ISIS has basically destroyed al-Qaeda in the process, but al-Qaeda still shows up committing a suicide attack from time to time.<sup>27</sup> ISIS wants to win in Syria and make Damascus the capital of the caliphate.<sup>28</sup> The present capital of the ISIS is Raqqa, Syria for now, which is like having the capital of the United States in Cleveland. For the caliphate to be recognized, it must be in an important ancient city.

*“Since Iraq is barely a country today, I have serious doubts they could hold Anbar province against an attack by a Girl Scout troop throwing cookies.”*

20 “North Korea Lands First Ever Man On The Sun, Confirms Central News Agency”, Waterford Whispers News, January 21, 2014, <http://waterfordwhispersnews.com/2014/01/21/north-korea-lands-first-ever-man-on-the-sun-confirms-central-news-agency/>

21 David Blair, The Telegraph, “Abu Bakr al-Baghdadi seriously injured in U.S. air strike and may never regain command of ISIL, Iraq says”, National Post, May 3, 2015, <http://news.nationalpost.com/news/world/israel-middle-east/abu-bakr-al-baghdadi-seriously-injured-in-u-s-air-strike-and-may-never-regain-command-of-isil-iraq-says>

22 Cheryl Chumley, “ISIS Captures Iraqi City of Ramadi”, WND, May 18, 2015, <http://www.wnd.com/2015/05/isis-captures-ramadi/>

23 Dominic Evans, “Iraq launches offensive to drive Islamic State from biggest province”, Reuters, July 13, 2015, <http://www.reuters.com/article/2015/07/13/us-mideast-crisis-iraq-idUSKCN0PN00620150713>

24 Nicholas Blanford, “Admitting military ‘fatigue,’ Assad pulls back, redeploys Syrian forces”, Aljazeera America, July 27, 2015, <http://america.aljazeera.com/articles/2015/7/27/with-armys-fatigue-assad-pulls-forces-back.html>

25 “Russia, Iran sending military forces to save Assad’s regime”, The Jerusalem Post, <http://www.jpost.com/Middle-East/Russia-Iran-sending-military-forces-to-save-Assads-regime-415864>

26 Armin Rosen, “This map proves that Iran doesn’t really want to defeat ISIS in Iraq and Syria”, Business Insider, April 30, 2015, <http://www.businessinsider.com/this-map-proves-that-iran-doesnt-really-want-to-defeat-isis-in-iraq-and-syria-2015-4>

27 Shiv Malik, Ali Younes, Spencer Ackerman and Mustafa Khalili, “How Isis crippled al-Qaida”, The Guardian, June 10, 2015, <http://www.theguardian.com/world/2015/jun/10/how-isis-crippled-al-qaida>

28 Riyadh Mohammed, “How the Dominoes Will Fall After ISIS Takes Damascus”, The Fiscal Times, July 13, 2015, <http://www.thefiscaltimes.com/2015/07/13/How-Dominoes-Will-Fall-After-ISIS-Takes-Damascus>

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An ISIS affiliate attacked Egyptian Army troops in Sinai and hit one Egyptian Navy vessel with a missile in early July.<sup>29</sup> In late June, terrorists attacked locations in France, Tunisia, and Kuwait.<sup>30</sup> ISIS claimed responsibility for the Kuwait attack.

In March, Houthi (Shia) rebels took over much of Yemen and ousted the president of the country. Then, they attacked Saudi Arabian (Sunni) forces. So, the Saudis started bombing Houthi positions near their border. A cease fire was declared in late July that lasted all of 5 hours.<sup>31</sup>

After an ISIS suicide bomber blew herself up on a street in the Turkish border town of Suruc in July, the Turks finally decided to join the fight against ISIS. But this adds more factors to the Middle East equation. After agreements to allow U.S. fighter jets to launch attacks on ISIS in Iraq and Syria from their bases, Turkey then bombed ISIS positions in Syria. They took the opportunity to bomb Kurdistan Workers' Party (PKK) positions in Iraq too. The Kurds have been a thorn in the side of the Turks for decades, wanting to establish a new Kurdish nation independent of both Turkey and Iraq.<sup>32</sup> About 20% of the Turkish population is Kurdish, and the PKK is an ally with the U.S. in the fight against ISIS. Turkey seems more interested in ousting Assad, and using ISIS to do it, rather than ousting ISIS.

When Turkey (Sunni) gave their approval of Saudi Arabia's (Sunni) attacks on the Houthi (Shia) rebels in Yemen, Iranian (Shia) hackers took control of Turkey's power grid and shut down the electricity to 44 of 81 of their provinces.<sup>33</sup> The Turks then made a deal with Saudi Arabia to support the rebels trying to overthrow Assad, since Turkey is Sunni and Assad is Shia.<sup>34</sup> You can't figure-out who's fighting who over there right now, even with a program. What we basically have here is the ancient fight between the Sunni and Shia, with a few Kurds thrown in.

Here's where we are: al Qaeda, al Nusra, the Houthis, the Syrian rebels, Hezbollah, Ahrar al Sham, Assad, the Kurds, Hezbollah, Iran, Saudi Arabia, Turkey, and America all trying to influence the outcome in the Middle East. The only Arab organization not yet in this fight is the Islamic Women's Garden Club.

On the bright side, our military folks have been busy too. In mid-May, U.S. SPECOPS soldiers killed top ISIS financial man, Abu Sayyaf, in a raid in Syria.<sup>35</sup> If he had just surrendered, he would be eating Cuban food in the sunshine right now and giving PowerPoint presentations on ISIS' financial structure to the CIA guys at Guantanamo.

In June, a U.S. airstrike took-out al Qaeda terrorist Mokhtar Belmukhtar in Libya.<sup>36</sup> Also in June, a U.S. drone strike took-out terrorist Nassar al-Wuhayshi, the leader of al Qaeda in the Arabian Peninsula (AQAP) in Yemen.<sup>37</sup> In early July, a drone strike eliminated top ISIS commander Shahidullah Shahid in Afghanistan. Also in early July, another drone

*“The only Arab organization not yet in this fight is the Islamic Women's Garden Club.”*

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29 Amos Harel, “Sinai's ISIS Offshoot Is Most Effective in Mideast, Senior IDF Official Says”, HAARETZ, July 27, 2015, <http://www.haaretz.com/news/diplomacy-defense/.premium-1.667978>

30 Haroon Siddique and Raya Jalabi, “Terror attacks: separate attacks in Tunisia, France and Kuwait leave more than 60 dead – as it happened”, The Guardian, June 27, 2015, <http://www.theguardian.com/world/live/2015/jun/26/tunisia-beach-resort-attack-multiple-deaths-live-updates>

31 “Yemen conflict: Saudi-led coalition resumes air strikes despite truce”, BBC, July 27, 2015, <http://www.bbc.com/news/world-middle-east-33675387>

32 Martin Matishak, “Is Turkey More Interested in Fighting Kurds Than ISIS?”, The Fiscal Times, August 27, 2015, <http://www.thefiscaltimes.com/2015/08/27/Turkey-More-Interested-Fighting-Kurds-ISIS>

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34 Desmond Butler, AP, “Turkey, Saudi Arabia Join Forces to Help Anti-Assad Rebels”, U.S. News & World Report, May 7, 2015, <http://www.usnews.com/news/world/articles/2015/05/07/apnewsbreak-turkey-saudi-in-pact-to-help-anti-assad-rebels>

35 Ted Thornhill, “Blown to pieces”, Daily Mail, May 13, 2015, [http://www.dailymail.co.uk/news/article-3080090/Islamic-State-s-second-command-killed-alongside-dozens-followers-coalition-air-strike-Iraqi-mosque.html?ITO=1490&ns\\_mchannel=rss&ns\\_campaign=1490](http://www.dailymail.co.uk/news/article-3080090/Islamic-State-s-second-command-killed-alongside-dozens-followers-coalition-air-strike-Iraqi-mosque.html?ITO=1490&ns_mchannel=rss&ns_campaign=1490)

36 “Mokhtar Belmukhtar: Top Islamist 'killed' in US strike”, BBC, June 15, 2015, <http://www.bbc.com/news/world-us-canada-33129838>

37 “Yemen al-Qaeda chief al-Wuhayshi killed in US strike”, BBC, June 16, 2015, <http://www.bbc.com/news/world-middle-east-33143259>



strike neutralized Hafeez Saeed, another Islamic State commander.<sup>38</sup> Again in July, al Qaeda leader in Syria, Muhsin al Fadhli, was killed during close encounter with U.S. ordinance in an air strike in Syria.<sup>39</sup> In August, a U.S. airstrike mission eliminated ISIS' #2 man, Fadhil al-Hayali, their logistics commander.<sup>40</sup> In late August, an American drone strike killed Junaid Hussain, an ISIS computer hacker and recruiter in Raqqa, Syria.<sup>41</sup>

After all this hard intelligence and targeting work, our forces finally got a "freebie": the one-eyed leader of the Taliban in Afghanistan, Mullah Omar, died of natural causes in April.<sup>42</sup> The Afghani-Taliban now has a new leader, Mullah Mansour. He took over Kunduz, Afghanistan as his first act.<sup>43</sup>

Back at home, the U.S. Army announced that they are reducing their forces by 40,000 soldiers and 17,000 civilians over the next two years.<sup>44</sup> About 5,000 to 8,000 officers and 5,000 to 6,000 sergeants will be adjusting to civilian life soon. It's clear that we will fight future wars with drones and planes, not regular soldiers (other than highly trained SPECOPS forces).

The key take-away from all this information is that our advanced intelligence and surveillance systems are getting better at finding, fixing, and finishing terrorists in the Middle East (seven in the past 6 months, and one freebie). We have a political deal with Iran over their nuclear weapons program, but Congress has concerns about side deals U.S. Secretary of State Kerry made with the Iranians. Winter will soon be setting-in for Russia, the Middle East, and China, and that may put a damper on all the craziness that's been going on, unless Taliban and al Qaeda go for something big in Europe. If Syria falls, and Assad bolts, things could get a lot worse. There are no political or military solutions to the Middle East problems on the horizon. China and Russia are declining economically, which keeps them occupied, and Iran will strive to gain nuclear weapons no matter what the new agreement says. That means that Israel, at some point, will probably be the ultimate solution to the Iranian nuclear weapons program.

Kerry's Iranian nuclear agreement has disturbed our allies in the Middle East and Asia. Saudi Arabia is trying to buy their own nuclear weapons from Pakistan now (a Sunni ally). Saudi Arabia, Qatar, UAE, Taiwan, and South Korea are buying Patriot missile systems like there's no tomorrow.<sup>45</sup> Japan is beefing-up their military. Our Asian allies have grave concerns about the consequences of the Iran deal and have discounted U.S. military support in potential conflicts with China and North Korea. Israel knows they are on their own against Iran at this point. All this information

**Lines in the Sand: Shiites as % of Muslim Population**



38 Siobhan Fenton, "Senior ISIS Leader Hafiz Saeed 'killed in drone strike in Afghanistan,' reports intelligence agency", Independent, July 11, 2015, <http://www.independent.co.uk/news/world/middle-east/senior-isis-leader-hafiz-saeed-killed-in-drone-strike-in-afghanistan-reports-intelligence-agency-10382640.html>

39 Associated Press, "Senior al-Qaida figure, Muhsin al-Fadhli, killed in US air strike in Syria, officials say", The Guardian, July 21, 2015, <http://www.theguardian.com/world/2015/jul/22/senior-al-qaida-figure-muhsin-al-fadhli-killed-in-us-airstrike-in-syria-officials-say>

40 Associated Press, "A US airstrike killed ISIS' No. 2 in command", Business Insider, August 21, 2015, <http://www.businessinsider.com/isis-fadhil-ahmad-al-hayali-killed-in-airstrike-2015-8>

41 "UK jihadist Junaid Hussain killed in Syria drone strike, says US", BBC, August 27, 2015, <http://www.bbc.com/news/uk-34078900>

42 Masoud Popalzai, Laura Smith-Spark and Eliott C. McLaughlin, "Taliban confirm Mullah Omar's death, name new leader", CNN, July 31, 2015, <http://www.cnn.com/2015/07/30/asia/afghanistan-mullah-omar/>

43 Sune Engel Rasmussen, "Taliban capture key Afgan provincial capital Kunduz", The Guardian, September 28, 2015, <http://www.theguardian.com/world/2015/sep/28/taliban-attempt-to-invade-key-afghan-city-kunduz>

44 Michelle Tan, "Army lays out plan to cut 40,000 soldiers", Army Times, July 10, 2015, <http://www.armytimes.com/story/military/pentagon/2015/07/09/army-outlines-40000-cuts/29923339/>

45 Marcus Weisgerber, "Saudi Arabia Responds to Iran Deal: Give Us 600 Patriot Missiles", Defense One, July 29, 2015, <http://www.defenseone.com/management/2015/07/saudi-arabia-responds-iran-deal-give-us-600-patriot-missiles/118688/>

says things will probably not get much better in the Middle East, or in the Koreas for that matter. Russia and China continue to take over Mediterranean ports and Pacific islands (respectively) sensing no significant consequences from America or Europe. Where this is all leading is unknown at this stage.

## Technology

Facebook, through its Open Compute Project (OCP), is making waves that are changing the data center market. Their "Group Hug" open server initiative (now called "Yosemite") has gained some traction with Intel heavily involved in order to protect their interest.<sup>46</sup> Chinese electronic contract manufacturers (ECMs) can make these boards in their sleep, and make them cheaper than anyone. There is no traditional backplane in these designs. Intel's interest is to be the primary chip supplier for the OCP reference designs. While Facebook makes their data center standards open and available, Apple and Google keep theirs proprietary, available only to their closest partners. That makes their standards a "Group Hug" initiative from what I can tell.



"Group Hug" server

*"That makes their standards a "Group Hug" initiative from what I can tell."*

In July, the DoD announced that they are funding a new consortium focused on optical interconnects and architectures.<sup>47</sup> Among other things, they are concentrating on high-performance embedded computing applications in electronic warfare (EW), SIGINT, RADAR, and sensors. The DoD funding of this new effort proves the points I have made here over the years, that the semiconductor and connector industries have been imprudently focusing on the commodity commercial low-margin data center applications and ignoring the high-reliability military segments for optical technologies. It's almost time for us to abandon the antiquated and problematic copper-based backplanes, along with all nasty signal integrity issues pawned-off on us by the semiconductor and connector vendors.

Intel and Micron announced their new 3D XPoint memory technology in July.<sup>48</sup> It's 1,000 times faster, uses much less power, is 1,000 times more durable than FLASH, and 10 times the density of conventional memory. This new technology is a welcome solution to the storage bandwidth bottleneck we presently endure.

Speaking of memory, SK Hynix announced their new HBM1 high-bandwidth 3D DRAM chips with a 1,024 bit-wide memory bus.<sup>49</sup> They claim it uses 50% less power than traditional DRAM, and can move 128 GB/sec for GPGPU, ASIC, and FPGA memory arrays. Memory has always been a bottleneck in high-performance embedded systems. Many new ideas and technologies are tackling that problem now.<sup>50</sup> In Europe, several universities have been researching photonic memory.<sup>51</sup>

46 Julie Bort, "How Facebook is eating the \$140 billion hardware market", Business Insider, June 14, 2015, <http://www.businessinsider.com/facebook-open-compute-project-history-2015-6>

47 "Integrated Photonics Institute for Manufacturing Innovation (IP-IMI)", Manufacturing.gov, July 2015, <http://manufacturing.gov/ip-imi.html>

48 Antony Leather, "Intel And Micron Announce Breakthrough Faster-Than-Flash 3D XPoint Storage Technology", Forbes, July 28, 2015, <http://www.forbes.com/sites/antonyleather/2015/07/28/intel-and-micron-announce-breakthrough-faster-than-flash-3d-xpoint-storage-technology/>

49 "SK Hynix Ramps Production of High Bandwidth Memory", Business Wire, June 16, 2015, <http://www.businesswire.com/news/home/20150616005757/en/SK-Hynix-Ramps-Production-High-Bandwidth-Memory#.VcGLP3jRxJ1>

50 Brian Bailey, "Electronics Butterfly Effect", Semiconductor Engineering, August 27, 2015, <http://semiengineering.com/electronics-butterfly-effect/>

51 Jesse Allen, "Power/Performance Bits", Semiconductor Engineering, September 22, 2015, <http://semiengineering.com/powerperformance-bits-sept-22/>



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The boys and girls at NIST recently accomplished quantum teleportation over a distance of 60 miles.<sup>52</sup> It works on the principles of Einstein's quantum entanglement theory, "spooky action at a distance", that exhibits no latency. One day, this could lead us to Quantum Data Interconnects (QDI) for embedded systems. Just think about a world of high-performance embedded systems with no connectors, no backplanes, no latency, and no enumeration or tree structure like PCIe.

In May, security researcher Chris Roberts claimed that he hacked into a United Airlines in-flight entertainment system box under his seat with a special cable and connector, got into the flight control computers on the aircraft, and manipulated the speeds of the engines during flight.<sup>53</sup> Boeing says the systems are (sort-of) totally isolated and Robert's claim is impossible. The FBI is looking into it, while the Boeing guys are digging through their systems to insure that the flight control network is secure. For your knowledge, a commercial airliner contains about 15 million lines of code today, according to a recent report.<sup>54</sup>

In July, security researchers Charlie Miller and Chris Valasec hacked into a late model Chrysler Jeep from 10 miles away, while it was being driven on a highway by Wired Magazine editor Andy Greenberg. Miller and Valasec gained electronic access through the uConnect cellular internet connection feature in the vehicle. While Greenberg was driving, the researchers sent pictures of themselves to the dashboard display of the car, disabled the accelerator, turned the air conditioning on full blast, changed radio stations, turned on the wipers and sprayed washer fluid on the windshield, and disabled the brakes causing the Jeep to go into a ditch. Chrysler now has a software update available if you have a uConnect system in your car.

Speaking of out-of-control cars and all the hoopla surrounding Google's self-driving cars, a new Volvo XC60 owner was demonstrating the self-parking feature to some people in May. As they stood by watching, the car ran into them.<sup>55</sup> Seems that this particular car did not have the pedestrian detection system installed (the owner evidently didn't pay for that \$3,000 option). The collision-detection and automatic braking option was installed on the car, it worked, and no one was seriously hurt. Just for your knowledge, a premium car today contains 100 million lines of code, according to a recent report. That's a bit disturbing, considering that a passenger jet contains only 15 million lines of code. It makes me wonder what the aircraft programmers left out, besides the pedestrian detection and self-parking feature

## Mergers and Acquisitions

Cheap money, major economic slowdowns in China and Europe, lower DoD budgets, and a total lack of organic growth have inspired a host of mergers and acquisitions across major market segments.

### Semiconductor

NXP bought Freescale, Intel bought Altera, Global Foundries bought IBM's semiconductor division, Avago bought Broadcom along with Emulex, LSI, and PLX, and Cypress bought Spansion.<sup>56</sup> Now, an offer to buy Micron is on the table from Tsinghua Unigroup (a Chinese company).<sup>57</sup> Another possibility is that Intel will buy ARM, but that rumor

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52 Rachel Feltman, "Scientists just smashed the distance record for quantum teleportation", The Washington Post, September 23, 2015, <https://www.washingtonpost.com/news/speaking-of-science/wp/2015/09/23/scientists-just-smashed-the-distance-record-for-quantum-teleportation/>

53 Kim Zettler, "Is It Possible for Passengers to Hack Commercial Aircraft", Wired, May 26, 2015, <http://www.wired.com/2015/05/possible-passengers-hack-commercial-aircraft/>

54 Ann Steffora Mutschler, "What Is A System Now?", Semiconductor Engineering, June 25, 2015, <http://semiengineering.com/what-is-a-system/>

55 Kashmir Hill, "Volvo says horrible 'self-parking car accident' happened because driver didn't have 'pedestrian detection'", Fusion, May 26, 2015, <http://fusion.net/story/139703/self-parking-car-accident-no-pedestrian-detection/>

56 Mike Gianfagna, "Consolidation Creates Confusion", Semiconductor Engineering, July 30, 2015, <http://semiengineering.com/consolidation-creates-confusion/>

57 Diane Bartz, Noel Randewich and Andrea Shalal, "Reported Chinese offer for Micron faces far too many hurdles", Reuters, July 14, 2015, <http://www.reuters.com/article/2015/07/15/us-micron-tech-m-a-tsinghuaunigroup-idUSKCN0P002B20150715>

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has running around for years, and the Federal Trade Commission (FTC) and Department of Justice (DoJ) would probably not like that combination from an anti-trust perspective.

British semiconductor-maker, Dialog Semiconductor, bought Atmel in September for \$4.6 billion<sup>58</sup> to get business from Apple and Samsung. Dialog Semiconductor claims that Atmel's products will position them nicely for the explosive growth in IoT (Internet of Trash). If the Euro goes below parity with the USD, which the European Central Bank is busting their humps to do, this could be a great deal for Dialog. The EU is trying to fabricate fictitious growth by devaluing the Euro, so I see this transaction as more associated with Dialog riding the currency conversion curve than with technology.

## Health Care

In the health insurance industry, Aetna bought Humana in mid-July. In late July, Cigna bought Anthem. That leaves United Health Care the odd man out. From five competing insurers, we are now down to three. That will raise concerns from the DoJ and FTC as they review these mergers too.

## Telecom

The telecom segment is going through more consolidation. On the hardware side, Nokia bought Alcatel-Lucent.<sup>59</sup> The objective of this merger is to prove that if you tie two rocks together and throw them in the ocean, they will float. China's Huawei and ZTE have been killing the traditional telco equipment makers for nearly a decade now. There is serious doubt that a NOKALU combination can survive the onslaught of cheap Chinese telecom gear. On the services side, ATT bought Direct TV. T-Mobile and Sprint are still trying to figure out what to do.

*“The objective of this merger is to prove that if you tie two rocks together and throw them in the ocean, they will float.”*

## Military

In July, Lockheed Martin bought Sikorsky Aircraft Division, maker of helicopters for the military.<sup>60</sup> Remember that Boeing bought McDonald Douglas back in 1996. Boeing has reaped great benefits from their Apache helicopter sales over the years, along with their newer Little Bird and Hummingbird UAVs. That put LMCO behind the curve on rotary wing aircraft, so we'll have to see what new helicopters they come up with in the future.

At the micro level, we did see M&A activity in our part of the universe. In early July, Curtiss Wright sold their engineered packaging solutions business (Hybricon) to Atrenne Integrated Solutions.<sup>61</sup> Curtiss Wright bought Hybricon back in May of 2010. If you remember, SIE bought Mupac (Carlo Gavazzi) in 2009, another electronics packaging company. Then, Atrenne bought SIE in 2014. So now, the old Mupac and the old Hybricon are under the same corporate roof at Atrenne Integrated Solutions.

In July, Schroff, a backplane/packaging vendor, bought Pigeon Point Systems, a company making software for systems management.<sup>62</sup> This puts Schroff in the position of being the sole source provider for backplane and board companies needing high-level system management capabilities.

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58 “Dialog Semiconductor to acquire Atmel for \$4.6 Billion”, Dialog Semiconductor, September 20, 2015, <http://www.dialog-semiconductor.com/content/dialog-semiconductor-acquire-atmel-46-billion>

59 “Nokia and Alcatel-Lucent to Combine . . .”, Nokia, April 15, 2015, <http://company.nokia.com/en/news/press-releases/2015/04/15/nokia-and-alcatel-lucent-to-combine-to-create-an-innovation-leader-in-next-generation-technology-and-services-for-an-ip-connected-world>

60 Andrea Shalal and Lewis Krauskopf, “Exclusive: Lockheed to buy United Tech's Sikorsky for over \$8 billion”, Reuters, July 20, 2015, <http://www.reuters.com/article/2015/07/20/us-sikorsky-m-a-lockheed-idUSKCN0PT0MM20150720>

61 “Atrenne Integrated Solutions Acquires Hybricon”, Atrenne Integrated Solutions, July 2, 2015, <http://www.atrenne.com/index.php/press/news/26-atrenne-integrated-solutions-acquires-hybricon>

62 “Pentair acquires Pigeon Point Systems to expand its Schroff product portfolio for monitoring systems”, Pentair, August 3, 2015, [http://www.pentairprotect.com/wcsstore/AuroraStorefrontAssetStore/espots/pressreleases/sro1522\\_Schroff\\_PigeonPoint\\_en\\_na.pdf](http://www.pentairprotect.com/wcsstore/AuroraStorefrontAssetStore/espots/pressreleases/sro1522_Schroff_PigeonPoint_en_na.pdf)

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The major M&A transaction in our segment happened in mid-September when GE sold-off their MIL/Aero embedded business to Veritas Capital.<sup>63</sup> No surprise there, if you have been following GE at the macro-level. GE chairman and CEO Jeff Immelt has been selling-off everything GE has that is not glued, nailed, screwed, bolted, or welded to his focus on industrial markets and products. GE just bought a large steam turbine company in France (Alstom) to expand their reach in power generation. Additionally, Immelt has announced that he is moving GE's headquarters out of the high-rent Connecticut neighborhood because Congress did not recharter the Export-Import Bank of the U.S. (which financed sales of U.S. products to questionable international buyers through insurance and loans). It's unknown what Veritas will do with the GE MIL/Aero Embedded group just yet. They seem to buy companies, clean them up, and then sell them off for more than they paid. Or, they could clean it up and keep it as a cash cow. We'll have to wait and see what happens to our GE brethren in MIL/Aero.

It's interesting that two acquisitions in our market were in the packaging/backplane segment. Over the years, we have seen the board vendors become systems vendors with VME, VPX, CompactPCI, and ATCA technologies. Those system vendors have been vertically integrating backplane and packaging design and manufacturing into their existing operations. Is the market for backplanes and packaging actually growing? Maybe so, but it is becoming more captive and specialized inside the system vendor companies. As we move to high-reliability optical interconnects in embedded systems, the copper backplane and rack business may be left with only legacy applications and technologies. There used to be a plethora of companies in the backline/packaging business – we are down to only a few today.

## Summary

Declining world economic conditions could lead to civil unrest and regime change in Argentina, Brazil, and Venezuela. The financial decline in both Russia and China, depending on how bad it gets, could result in internal political and social problems for both. Even after Quantitative Easing, Europe is still flirting with stagnation, something Japan endured for more than a decade. If the price of oil, metals, commodities, and ores stays low, most of the natural-resource-exporting countries will go into recession. Economic uncertainty then leads to civil unrest, especially with the smaller nations.

In spite of all the economic turmoil around us, the U.S. economy is doing fairly well except for the big companies who depend on exports to the rest of the world. The U.S. stock market is reflecting this in the price decline of many blue chip stocks. America is still the best looking horse in the glue factory. We could see huge capital inflows from the declining nations into U.S. stock, real estate, and bond markets for safety. Money always goes where it is best treated. That would make the value of the dollar go up, exacerbating the problems for companies who depend on exports for a significant part of their revenues. There's a lot of scared money in the world right now.

The problems in the Middle East have gotten worse, as Russia has now come to play in the Syrian civil war. With armed fighter jets from Russia, Jordan, France, Turkey, and the U.S. now in the same Iraqi and Syrian airspace, it is just a matter of time before there's a confrontation. Russia needs the warm water ports for their navy and an airfield in Latakia, to be a regional power. Russia can play this game for a long time, even as their economy declines, since they don't have to pay the countries where they put their bases (Crimea and Syria). China doesn't have to pay for the islands they take either. But the U.S. has to pay for every military base we have around the world. That puts us at a disadvantage, financially speaking.

The DoD is shrinking our military manpower, which says (1) we don't want a war with anyone, and (2) if we have to fight, we will do it with technology instead of soldiers. The Chinese (grabbing some Japanese islands) and the Russians (grabbing Crimea and parts of the Ukraine) know this. At the same time, the U.S. DoD budget for advanced weapons and intelligence platforms is shrinking. The shifting of funds from military expenditures to social benefit programs is having unintended international consequences that will go on for years.

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<sup>63</sup> John McHale, "GE embedded computing business bought by Veritas Capital", Military Embedded Systems, September 23, 2015, <http://mil-embedded.com/4300-ge-embedded-computing-business-bought-by-veritas-capital/>

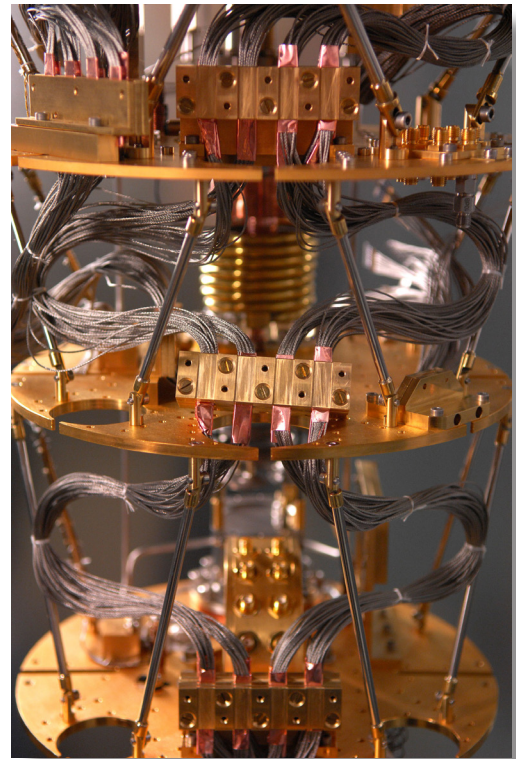
In spite of these fundamental shifts, our military people have been effective in the conflicts where the U.S. is deeply involved. Our intercept systems have been “finding” terrorists successfully, our direction-finding systems have been essential in “fixing” on them, and our weapons systems have been potent in “finishing” them off. The only real failures our soldiers have experienced have been inflicted upon them by the politicians. It is hard to watch our military people, trained to a razor’s edge, be put to work painting rocks on some army base.

Shrinking DoD budgets say that existing platform upgrades will become a larger percentage of total military electronics spending. New system acquisitions will probably be limited to RADAR, SONAR, SIGINT, COMINT, and electronic warfare where we can recognize 10X improvement or more. We have already seen the protested and re-awarded KC-46 tanker program slow to a crawl. We have seen Lockheed protest the award of the Humvee replacement program (the Joint Light Tactical Vehicle or JLTV) to Oshkosh. The new LRS-B (Long Range Strike Bomber) contract, to replace the aging B-1 and B-2 bombers, is due to be awarded at any moment. If you look at the DoD budget, the Air Force got the big bucks, the Navy got the next big chunk, and the Army got the crumbs (as punishment for spending so much money on the Future Combat Systems program, with very little results).

M&A activity in our industry will remain subdued, unless some company is motivated to sell out (as we saw in the GE sale of their MIL/Aero Embedded group to Veritas Capital). With the future uncertain, the price for Mil/Aero companies will be depressed. In the past, those companies have been selling for between 2.x and 3.x times sales. Sellers cannot demand those multiples when the DoD budget trend is down.

What we need to break out of this malaise is a new set of technologies that increase overall processor performance and interconnect speeds by a factor of 10. If we can show the military primes 10X improvement in certain applications, they will buy it and so will the DoD. Google, NASA, and NSA are all buying quantum computers now to solve complex problems that conventional processors suck at solving.<sup>64</sup> Go look at the D-Wave machines ([dwavesys.com](http://dwavesys.com)) for a preview of the future.

As Yogi Berra (1925-2015) once said, “The future ain’t what it used to be.”



D-Wave Cryogenic Fridge  
Courtesy of D-Wave Systems Inc.

64 Dave Gershgorn, “Google and NASA have a new quantum computer”, Popular Science, September 28, 2015, <http://www.popsoci.com/google-and-nasa-score-new-quantum-computer>

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