Unofficial Notes:

STS Global Tech Day

August 15, 2017
Stonybrook, NY

NOTICE: These notes were taken live at the 2017 STS Global Tech Day. They are a good faith representation of our impressions of the events and what was said by participants. However, we cannot guarantee the accuracy of any specific comment. They are not endorsed by STS Global in any way. This document is not a recommendation to buy or sell any security. Please consult with appropriate professional advisors before making significant business decisions.

Executive Summary

We attended STS Global's second annual Tech Day on August 15th at its Stonybook, NY headquarters. About 75 industry professionals attended.

The day was filled with solid presentation and detailed discussions about a range of issues impacting the satellite sector. This year's line-up was notable in that much of the information was relevant across the telecom sector. Perhaps this is a reflection of increase technology convergence?

The presentations also highlighted the massive amount of change facing the satellite sector. No area is immune – data storage and optimization, satellite antennas and other ground equipment, telecom protocols, last mile communication technology, power management, and cyber security.

Note: STS added many of the presentations to their website. They are available at: http://www.stsglobal.com/blog/

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A. Breakfast

- Continental breakfast in the building atrium. [Armand's Comment: Nice conversation, but no crepe stand as promised last year.]

B. 9:00 to 9:15am - CEO Welcome

Speaker:

David Hershberg (STS Global)

- 3rd year in business
- Likes the STS Global arrangement with SUNY Stonybrook
    - No state income tax for 10 years due to deal university affiliation
    - May put in a teleport on campus and partially staff with interns

C. 9:15 to 9:55 AM - The Revolution Continues: Current & Next-Gen Data

As the world digitizes and moves everything to data driven architectures, a foundation is needed to set a new course for company data. This discussion will focus on an integrated and comprehensive survey of key concepts such as cloud, NoSQL, data leaks, analytics, AI, and application driven systems. This allows follow up into other key resources and top entities within the community.

Speaker:

Peter Cresse (Javlin/ Entropy)

- Data is measured in terms of storage, not transmission
- Data is getting more valuable
    - Chief Data Officers are getting more powerful
- New companies are driven by data (Uber, Instagram, etc.)
    - Drives opportunities for integrators
- Database administrator is now an IT manager or Chief Data Officer and manages data from multiple sources
    - Lots of sources that need integration
- IT services are more software than hardware now
    - All managers need to deal with data analytics
- Data architects are needed for marketing – general qualitative brand discussion is a thing of the past
- Create value by integrating data and transforming it for a target
    - Data at rest has no value – applications drive revenue
    - Words to images, from graphs to visualizations
        - Need to find ways to visualize data
- Cloud is high growth – what data do you put on the cloud and how do you manage it?
    - What are you computing and what are you storing?
    - All data has to have a delivery to get to the cloud
- New services/Trends

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    - Cloud constellation – SpaceBelt 2.0 – not as deeply regulated and layers of security – just need a small amount of data on satellites for it to be jurisdictionally interdependent (e.g., blockchain)
    - Data Lake – data warehouse – can put unstructured data and structured data together and lots of people can participate and access
    - NoSQL – data not tied to a complex database. Can access with simple reader
    - Containers/Micro stacks – whole applications in a single package that can share hosts
        - Can be organized into micro-services
        - Dramatically reduces overhead
    - Analytics moving from "what happened" to "what will happen" to "what should happen" to "assisting something to happen"
    - Artificial intelligence – hard to manage qualitative questions, but it's all about the algorithm – we are manipulated by them, but their errors are usually exposed eventually
    - IoT – not just a connected kitchen.
        - Can network things together that normally work on different standards.
        - Logistics are moving fastest to IoT
- Media Data Drivers
    - Nielson is not as relevant anymore as it only gets people watching linear TV in their living room
    - Turner, ViaCom, Fox have created OpenAP (With Accenture)to get better data
    - Social media is a better indicator of what people really think
        - Mobile devices are critical to capture experience
    - Operations – metadata is critical – data about the data – that's where everything is happening
- Telecom
    - Integration – believe they will be acquired by major content company [Armand's Comment: Goes to battle between content and distribution]
    - IoT will drive data load and complex ties to networks
    - Mobile connectivity is growing – much more data will be stored and managed
    - Saturation – more data driven services
    - Security – customers are demanding more protection
- Teleports and Data
    - Need to come together and be linked
        - Transport and data must be connected especially with respect to disaster recovery
    - US is not best environment for data – will see greater growth of data outside of the US – international teleports
- Fintech Data Drivers
    - Growth of real time data processing and real time access

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  - Middleman margin is getting squeezed – payment processing is a high growth vertical
  - Blockchain growth – need all parts to get deal done
    - Can create your own currency with blockchain technology
  - Banks are pulling all of your information at once to create new areas of growth
- Each industry has own strategy for data

D. 10:00 to 10:55 AM - Considerations for LTE over VSAT

The presentation will introduce the terminology/technology and topologies for todays 3G and 4G networks, highlighting the differences which serve to illustrate why LTE/4G should be considered the preferred solution going forward for providing mobile broadband services over VSAT (whether licensed or unlicensed). We will then introduce LTE optimizations concepts and explain how those technologies benefit the Mobile Network Operators (MNOs) and provide for a better Quality of Experience (QoE) for end users.

Speakers:

Michael DiPaolo (Comtech EF Data)

- Supports sales staff and partners at Comtech – [Armand's comment: very technical presentation]
- UMTS (3G) did not succeed with satellite
  - Not able to deliver MNO expectations
    - Availability, delay, etc.
    - Wireless protocols are very sensitive – even 10 ms delay can be a problem and jitter will slow the uplink
  - Expects 1 MB per session, but packet loss and congestion control reduces to 160kbps or less
  - Lots of data in 3G is signaling and lots of overhead (over 50%)
  - IUB data has, on average, 27% overhead
  - Hard to optimize the traffic as it behaves like ATM
  - Can have large frames – need jumbo frame support – lots of wastage
  - QOS – some signaling element must be transmitted with zero loss
  - 3G conclusions:
    - Need to minimize delay and jitter
    - Need to support for high pps rates
- LTE Over Satellite
  - 1st rolled out over Cat 3 or 4 networks supporting 100/150 Mbps over 20 MHz spectrum
  - Carrier aggregation evolved to raise capabilities
  - 2/3/4Ca not now prevalent

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        - race to 1G using 100 MHz spectrum or 4CA with 4x4 MIMIO (and newer 256QAM MCs)
    - Throughput is determined by RF Performance or receiving handset
    - 90% of people are medium to far from tower, further lowering performance
    - Now pushing outbound oversubscription rate of 3:1 and still deliver full bandwidth when everyone is using
    - Carrier aggregation – can add overlays of higher frequencies to improve performance
        - Opens-up a lot of options including CA with supplemental downlink
    - LTE requires you be able to move at 100 kph and stay connected
    - LTE with satellite is still in early stages
- 5G is just going into trials in urban areas – not ready for 5G over satellite
- Optimizing LTE
    - Main advantage of LTE eNb vs 3G RNC/NodeB is the unification of the radio resource and packet management into the eNb
    - LTE is very efficient at the radio level **BUT** it comes with significant overhead. Considering L2 transport, each GTP packet has 94bytes of overhead.
    - Web complexity has grown – lots of host inquiries to get info to download each page
        - TCP requires three-way handshake
        - Small files lead to slow performance as it overwhelms TCP windows
        - Facebook uses autoplay on all media
        - Encryption adds a new level
    - Expect 90% encryption over next few years
    - Can get a lot of improvement via compression for voice
    - Many of the other techniques don't deliver much additional improvement, especially for applications, like internet, with small file sizes
- New Markets
    - Small cells: fill "blank" spots in network coverage.
    - Metro-edge market: provide high speed LTE overlay capacity to existing terrestrial backhaul.

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E. 11:00 to 11:55 AM - SATELLITE - Connecting the Unconnectable

Fifty years ago, having access to communication equipment and services was a luxury that was only avalaible in major cities. In today's world, communications almost become a primary need for the human race. Being connected is a standard for the modem world. How do you connect the unconnectable at a reasonable price using the latest telecommunication technology: Hybrid solutions: Satcom, Wimax, fiber…?

Moderator: Lou Zacharilla (Society of Satellite Professional International)
Speakers:
Alan Rossi (Consultelar)
Mark Stogdill (Hammer Fiber)
Steve Yablonski (STS Global)

- Lou Z
  - Microsoft will try to close broadband gap by using TV white spaces
  - Government needs to make some investments in infrastructure and then let the private sector continue
- Alan Rossi
  - Video will dominate IP traffic – esp. in high income economies
  - End-user traffic is moving closer to the network edge
    - Due to security and economics
  - Economic impact
    - A 10% increase in basic access to internet increases economy by 1.1%.
    - Increase to broadband increases economy only slightly to 1.25%
    - Above suggests basic access combined with local storage could go a long way
    - But maintenance of broadband networks in developing countries is harder
- Mark Stogdill
  - Satellite best for absolute hardest to reach places, but there is a convergence of fiber and wireless to meet requirements at the edges of coverage
  - Expects Microsoft will have problems with white space initiative as 600 MHz spectrum is hard to work with
  - 34 million people don't have access to FCC's definition of broadband
  - Use LTE for both mobile and fixed internet coverage in rural areas
  - Not just fiber and wireless buildout, but also data centers

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- Most companies that are going to be successful will be using licensed frequencies
  - To many QOS problems with unlicensed spectrum
  - Licensed service providers have not been interested in rural areas
    - Gov't providing subsidies to make it viable
    - Lots of broadband deserts
    - Unclear that government subsidies, etc. will be enough to get data centers, etc. at the edge of coverage
  - Will have fiber to a point and then connect with wireless
- Now have an undersea cable, right over the arctic circle! – provides lowest latency between the US and Asia

- Steve Yablonski
  - Can provide universal service via satellite and it's viable

F. 12:00 to 12:55 PM - LUNCH

- Good conversation over sandwiches in the building atrium

G. 1:00 to 1:55 PM - Power Versus Size: Can We Do More With Less?

50 years ago, we had to install 20+ meters to carry simple voice traffic to the next continent. Today the latest technology can effectively carry voice, video, and data over a sub meter terminal. The satellite technology equipment has evolved so much this past 50 years that it has enabled us to do more with less… From the antenna to the HPA and modems, we will discuss what will be the latest technology that will allow us to minimize and simplify ground station equipment

Moderator: Kendall Russell (Via Satellite)
Speakers:
Mike Gold (Terrasat)
Bill Anton (Alpha Satcom)
David Liddle (Liddle Int')
Uri Kerstein (NovelSat)

- David Liddle
  - A lot is happening in satellite industry
    - Can improve spectral efficiency – bits/Hz
  - GaN technology is growing due to smaller, lighter packages

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- Better RF performance – 16W vs. 200W
- Teleport – case study
  - Antenna prices coming down
  - Antennas getting smaller
  - Echo cancellation has been very helpful
  - Oil and gas using satellite for seismic data and other new technologies
  - With maritime, the uplink is becoming a larger issue as people want to upload photos, etc.
- Not sure if the LEO systems will work? What are the new applications that will make it work today when it didn't work before?

- Mike Gold
  - TWTA tubes invented in 1930, and are still in use
  - Now solid state RF – originally gallium arsenide to now gallium nitride
    - Allows smaller, lighter equipment
  - BUCs [Block upconcerters] are still used in remotes
  - Why Innovate
    - Billions spent on new satellite capacity
    - Ground baseband is becoming much more powerful
    - Users want to upload and flexibility is needed
  - GaAs vs. GaN
    - Some companies have been reluctant to upgrade for cost despite more power and less weight
      - very concerned about CapX – need a very clear business case
  - Still working on the implications of LEO/MEO as it really changes the physics of the industry
    - Smallsats and cubesats are providing information as opposed to reflecting or moving it

- Bill Anton
  - Antennas need to be more precise with 2-degree spacing, Ku-band, extended band frequencies, reduction in guard bands, and more complex antenna control units (ACU).
  - Smaller antennas with better performance
    - Increased structure pointing capability
    - Smaller feed form factors
    - Carbon fiber manufacturing – works well with heat and for higher and higher frequencies
  - Antenna Challenges

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    - More precise and reasonably priced ARC's for COTM systems
    - Improved time to market
    - Shorter field installation times
    - Photogrammetry is important for larger Ka-band antenna
    - Lower cost

- Uri Kerstein
    - Now offering 2% roll-off with Novelsat provided NS4
        - Can increase capacity and efficiency
        - Higher link margins
    - Can now use more of the bandwidth
        - Reduces both OPEX and CAPX
        - Increased resiliency
    - Took echo cancellation further
    - As intelligence moves to the satellite itself, you can make it smaller
- Need to show more than a compelling ROI to sell new technology

H. 2:00 to 2:55 PM - Cybersecurity – Cut yourself off from threats

Every industry – now more than ever – faces evolving cyber-attacks by criminals, terrorists, and nation-states. The cyber threat environment is complex, and the stakes are high. In response to these ongoing threats, satellite communications technology can provide a safer solution to these challenges: What are the Network Security steps Network and Teleport Operators can take to protect their infrastructure and its customers data and services?

Moderator: Lou Zacharilla (SSPI)
Speakers:
Chris Faletra (ComSat)
David Hershberg (STS Global)

- Dave Hershberg
    - Answer to cyber security is to get people off the Internet and use satellite
        - Design private networks so that a teenager can't get into it [Armand's comment: Quote of the day!]
        - Assume most data comes from network itself
        - Need to build HTS satellites that don't connect to the Internet
        - Has applied for some patent protection

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  - Have SCIFF – secure facility that is not connected to the Internet
    - Can't let people into SCIFF [Sensitive Compartmented Information Facility] with a thumb drive
  - Lots of private network opportunities

- Chris Faletra
  - His firm does Internet connectivity for 8500 private jets and some government jets
  - Has a security offering that does risk assessments on aircraft
    - Very detailed testing
    - Also, does ongoing security monitoring and analysis
  - IOT increases the risk as more devices are connected

I. 3:00-3:30 PM closing remarks

Speaker:

David Hershberg (STS Global)

- Thanks for coming - Hope you come next year!

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