Speaking of the Future
Making the World a Better Place

Haden Land
Vice President, Engineering & CTO
Lockheed Martin ISGS - Civil
Agenda

• The Connected Planet
• Digitization
• New Careers and Innovation
• Securing the Future
• Trends and Big Plays
• Takeaway’s
The Connected Planet
Where We Are…Where We Are Headed

Key Trends
• Mobile Users
• Device/Data Explosion
• Social Fusion
• Digital Natives
• Privacy vs Function
• Gamification
• STEM/STEAM
• AGILE

“When we change the way we communicate, we change society” – Clay Shirky
The Internet of Tomorrow?

Over 50% of Internet connections are things
2013: 15+ billion permanent, 50+ billion intermittent
2020: 30+ billion permanent, >200 billion intermittent; Zettabytes of streamed data

Remote sensing of objects & environment

Cameras & microphones widely deployed

Dimensional Audio

Building & Infrastructure Management

New routes to market via intelligent objects

Random URL

Everything has a URL

Holographics

Quantum Health

Personal Safety AI

Situational Decision Support

Seamless Translation

Virtual Banking

Life Coaches

Digitization

Content & services via connected products

Over 50% of Internet connections are things
Digitization
In 60 Seconds …

- 370,000+ minutes of voice calls
- 510,000 comments on Facebook
- 1,500 blog posts
- 60,000+ new domains
- 217 new mobile web users
- 571 new websites
- 47,000 new Apple App Store downloads
- 693,800 GB of IP data transferred
- 77,244 Wi-Fi connections made on iPhone
- 20 new victims of identity theft
- 510,000 Google search queries
- 1,500 blog posts
- 200 million emails
- 600 new videos on YouTube
- 470,000 new videos on www.domains

Big Data... What is it? What is it good for?

“Big Data Solutions” –
A new generation of technologies and architectures, designed to:

1. **Economically** extract **value** from very large or complex data sets.

2. **Improve** performance and **reduce** O&M of existing Data Warehouses

VOLUME

VARIETY

VELOCITY
Hyper Connected World

Digital Hyperconnectivey Framework: Independent forces becoming interdependent

- Interact & reinforce one another and are associated through complex dependencies
- Leverage this convergence; but requires rethinking design, build, & delivery of systems
- Cyber Security has broad content and applicability supporting digitization evolution
Technology Surveys

**Commercial**

By 2016, **50% of global 1,000 companies** will have stored customer sensitive data in the public cloud.

Source: Gartner, 2012

96% of the US population has a mobile phone, **40% now own a smartphone**.

Source: Google, 2012

**Federal**

100% of Fed agencies experimenting with cloud, targeting **$20B in IT spend**

Source: Federal CIO Council, 2012

35% of Fed Workers use smart phones, **43% by 2013**

62% of Fed Agencies allow BYOD

Source: CDW Federal Mobility Report, 2012

• **42% of respondents agree that Cloud computing is risky**
• **54% of respondents agree that mobile platforms are risky**

Source: IBM Global Risk Study
Greater Insights Need Improved Analytics

Today: Analytics is about what happened
Tomorrow: Analytics will be how we do business

Descriptive Analytics
- How are we doing?
- How many claims did we pay today?

Predictive Analytics
- What might happen in the future?
- Which of tomorrow's claims might be requesting an ER admission?

Prescriptive Analytics
- Best course of action given objectives, requirements & constraints
- What would be effective steps to reduce probability of ER admission?

DATA
- Clinical, Claims, Monitoring, others

*Adapted from CMS KDI by Vish Sankaran, CMS Advisor
Big Data “Top Five” Challenges

1. **Information Explosion**: Data growth in 5 years is 650%, most unstructured.

2. **Legacy Environments**: Can’t easily support new fast and large datasets.

3. **Analytics**: Too slow with current normal compute and processor abilities.


5. **Visualization**: Complex challenge in providing Peta-byte data understanding for humans; let alone Yotta-byte.
Big Data Trends

- Social Media Marketing Analytics
- Data Archeology
- Any Machine Data Consumption
- Crowd Computing
- Autonomic Dashboards
- 3D Visualization
- Physical POP to JIT Data
- Neuro-modeled Filters
- Secured Commodity Automation
Data Scientist Profession Preparedness

Lockheed Martin to launch Data Scientist LifeJourney... to inspire millions of students about big data.

"The Data Scientist LifeJourney is one of 250 LifeJourney experiences led by leading companies like Lockheed Martin (click here to see the list) LifeJourney will allow students around the country and around the world to experience one of the most interesting and fulfilling careers as it utilizes both the analytical and creative elements of the STEAM skillset (science, technology, engineering, arts and math)."

Haden Land
V.P. of Engineering and Chief Technology Officer, Lockheed Martin
New Careers and Innovation
Web Archeologist – Collector of non-digital information. Relates data to perspectives based upon time and culture.

Abilities: Has access to data snapshots of public content over time and can analyze interesting patterns of difference.

Neuromorphic Architect – “Just In Time” Knowledge

Abilities: Understands brain (not just human) morphology and the ways data moves into and out of it. Can break through barriers of data congestion and overload.

Quantum Linguist – Holistic Access of All Knowledge regardless of language

Abilities: Understands language constructs, tools involved, semantic / cultural reference, and disparate group interactions.

Medical Mathematician – Leverages algorithmic similarities between chemistry, human biology, environment, EM spectrum, and nano-scale structures.

Abilities: Understands human biology as a complex adaptive system.

Creating the next generation of innovators through left brain, right brain fusion.
Securing the Future
Our Perspective - The “Five Domains”....Secured
Evolving Cyber Landscape & Threat Vectors...Internet of Everything

Cyber Actors
- Insider Threat
- Nation States
- Cyber Crime
- Hactivist
- Cyber Terrorist
- Industrialized Hackers

Emerging Attack Surfaces
- Embedded Technologies
- Internet Of Everything
- Wearable Computing
- Mission/Critical Infrastructure
- BYOD: Mobility Device/Apps
- Cloud Computing & Virtualization
- Social Media
- Web Applications / Email
- Enterprise
- Data

Threats
- Mission Unique
- 20% Advanced Threat “Unknowns”
- 80% Known Threats Compliance
- Entrapment
- Supply Chain
- Physical Security

Evolving Cyber Landscape & Threat Vectors...Internet of Everything
Secure Mobile Apps and Smart Devices as Control Points

- **Situational Awareness**
  - Blue Force Tracking
  - Graphic Overlays
  - Digital map

- **GyroCam**
  - Streaming video
  - Camera control
  - High resolution day/night video

- **BioLert**
  - Facial recognition
  - Quick response: "Detain or Release"
  - Subject personal information

- **ISRTube**
  - Searchable INTEL repository
  - Query for videos, photos, reports
  - Post SPOT reports

BYOD:
If it is WiFi enabled, then it can securely connect.

Securing & Supporting The Digitally Connected

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Cyber Security Collaboration Ecosystem

Industry Collaboration
Cyber Maryland
Security Innovation Network™
Industrial Workforce Needs Council
Information Sharing & Activity Centers
Maryland Business Round Table
Hispanic IT Executive Council
CIO/CISO Keynotes
• Policy
• Technology
• Leadership

Collaboration Spheres
• Positioning
• Intimacy
• Network
• Talent
• Curriculum
• Accreditation

The Future
Complex Adaptive Systems
World Economic Forum
Kellogg Innovation Network
Collaborative R&D
Technology Parks
Life Journey

Academia
CISSE & CyberWatch
Potsdam University STEAM
Capitol College Cyber Battle Lab
PGCC Health & IT Middle/Early Colleges
Columbia, Stanford, Northwestern
PGC Public Schools STEM Cloud
MS&T CAS Conference
UMBC Data Science

Government
AFCEA
ACT-IAC
Department of Education
States of MD, VA, WV, NY
International Global Security Workshop
United Kingdom/Estonia
DHS/NSA/NIST
AUCC

Outreach-Driven Innovation Evolution

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Trends and Big Plays
Energy Trends

- Home Automation
- Mobile Self Charge
- Geo-aware Sensing
- Transportation Infrastructure Generation
- Crowd Funded Green Energy
- Waterless Sanitation
- Ambient EMF Power
- Full Spectrum Reflection
- Ocean Generation
- Simpler Biofuels
Healthcare Trends

- Drug Validation
- Procedure ROI
- Invitro Nano Analysis
- Tool and test mobility
- Patient Handled Sensing and Dosing
- Virtual Wards
- 3D Visualization
- Semantic Driven Treatment
- Health & Wellness Incentives

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Big Plays

100 Years of Innovation

- Hybrid Air Ships
- Fusion Cylinders
- 3D Bio Printing
- Quantum Biology
- Asteroid Mining
Adaption Science

- Shared “Make a Difference” Goals
- Pull the Future Back
- Global Team Effort
- STEAM
- Passion for Innovation
- Digitization

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Takeaway’s

• **The Connected Planet** – Greater access to knowledge will increase Global innovation synergies

• **Digitization** – Big Data plays a greater role in making important sense out of ever growing data stream chaos

• **New Careers and Innovation** – Lets explore new ways to foster STEM and STEAM campaigns

• **Securing the Future** – With more data there is more risk. We need to work together to find new ways to protect Privacy

• **Trends and Big Plays** – Without “Grand Visions” we can’t leverage the mind power of our collective innovation

• **Next Hype will be Application of Big Data to selective Complex Adaptive Systems**
The Next 100 Years