Speaking of the Future
Making the World a Better Place

Haden Land

Vice President, Engineering & CTO
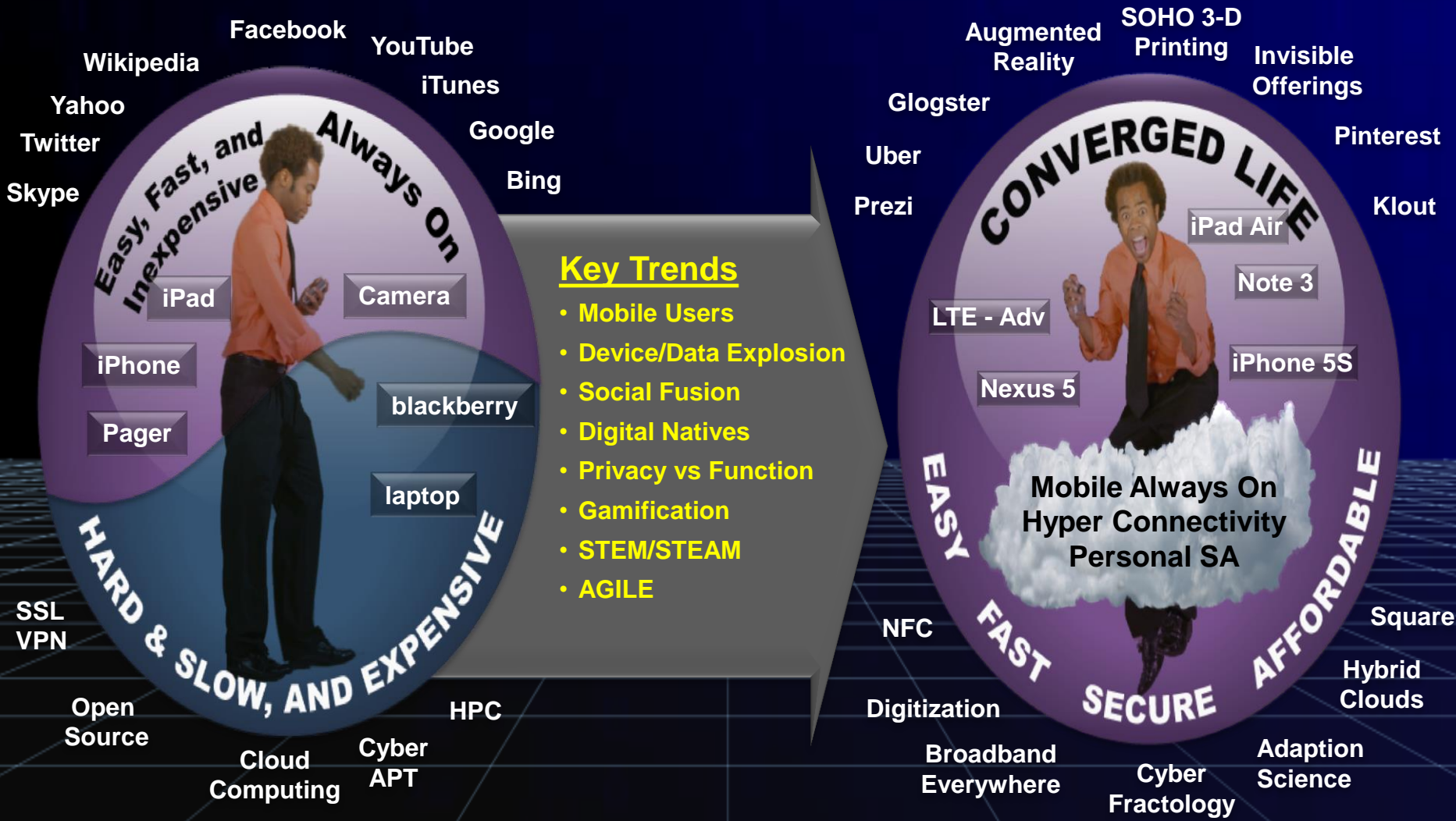
Lockheed Martin ISGS - Civil

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

Where We Are:
- Wikipedia
- Yahoo
- Twitter
- Skype
- Facebook
- YouTube
- iTunes
- Google
- Bing

Easy, Fast, and Inexpensive / *Always On*
HARD & SLOW, AND EXPENSIVE

- iPad
- Camera
- iPhone
- blackberry
- Pager
- laptop
- SSL VPN
- Open Source
- Cloud Computing
- Cyber APT
- HPC

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

Where We Are Headed:
- Augmented Reality
- SOHO 3-D Printing
- Invisible Offerings
- Glogster
- Pinterest
- Uber
- Prezi
- Klout

CONVERGED LIFE
EASY FAST SECURE AFFORDABLE

- LTE - Adv
- iPad Air
- Note 3
- Nexus 5
- iPhone 5S

Mobile Always On Hyper Connectivity Personal SA

- NFC
- Square
- Digitization
- Hybrid Clouds
- Broadband Everywhere
- Cyber Fractology
- Adaption Science

"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

Personal Safety AI

Dimensional Audio

Building & Infrastructure Management

New routes to market via intelligent objects

Cameras & microphones widely deployed

Everything has a URL

Quantum Health

Seamless Translation

Content & services via connected products

Holographics

Situational Decision Support

Digitization

Reality Augmented

Life Coaches

Virtual Banking

Digitization

In 60 Seconds …

370,000+ MINUTES **OF VOICE CALLS ON**

100,000 TWEETS

693,800 GB of IP data transferred
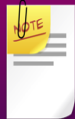
77,244 Wi-Fi CONNECTIONS MADE ON **iPhone**

510,000 COMMENTS **on FACEBOOK**

20 NEW VICTIMS OF IDENTITY THEFT

IN **60** SECONDS...

1,500 BLOG POSTS

OVER **2 MILLION GOOGLE SEARCH** QUERIES

60 WWW **DOMAINS** REGISTERED

600 New **VIDEOS** on

217 NEW MOBILE WEB USERS

571 NEW WEBSITES

47,000 APPLE APPSTORE DOWNLOADS

OVER **200 MILLION** EMAILS

Big Data… What is it? What is it good for?
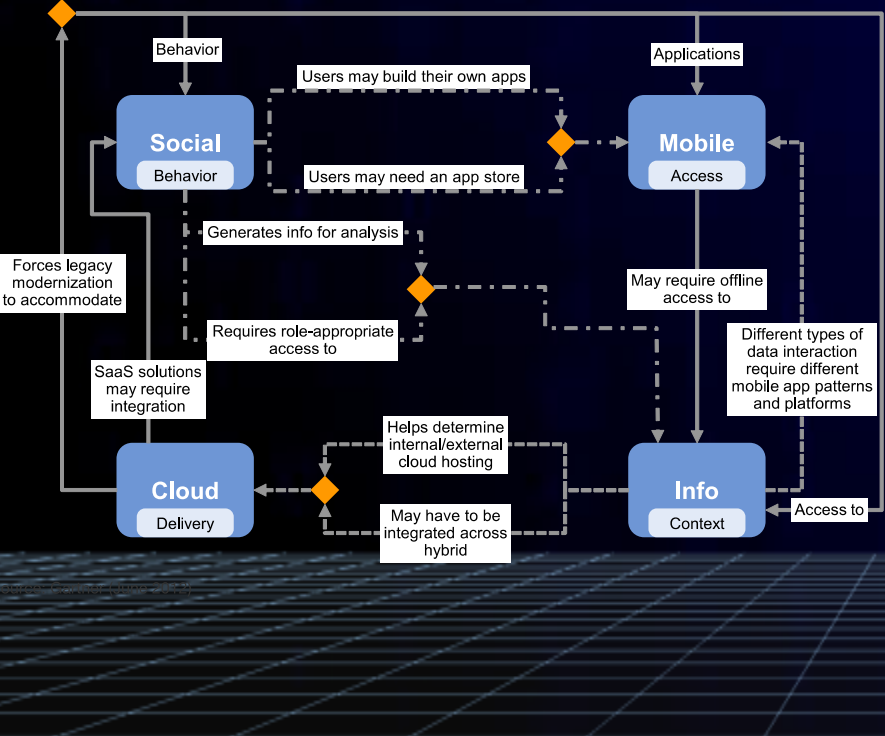
VARIETY

"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

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

Federal

CLOUD

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

Source: Gartner, 2012

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

Source: Federal CIO Council, 2012

MOBILE

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

Source: Google, 2012

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

62% of Fed Agencies **allow BYOD**
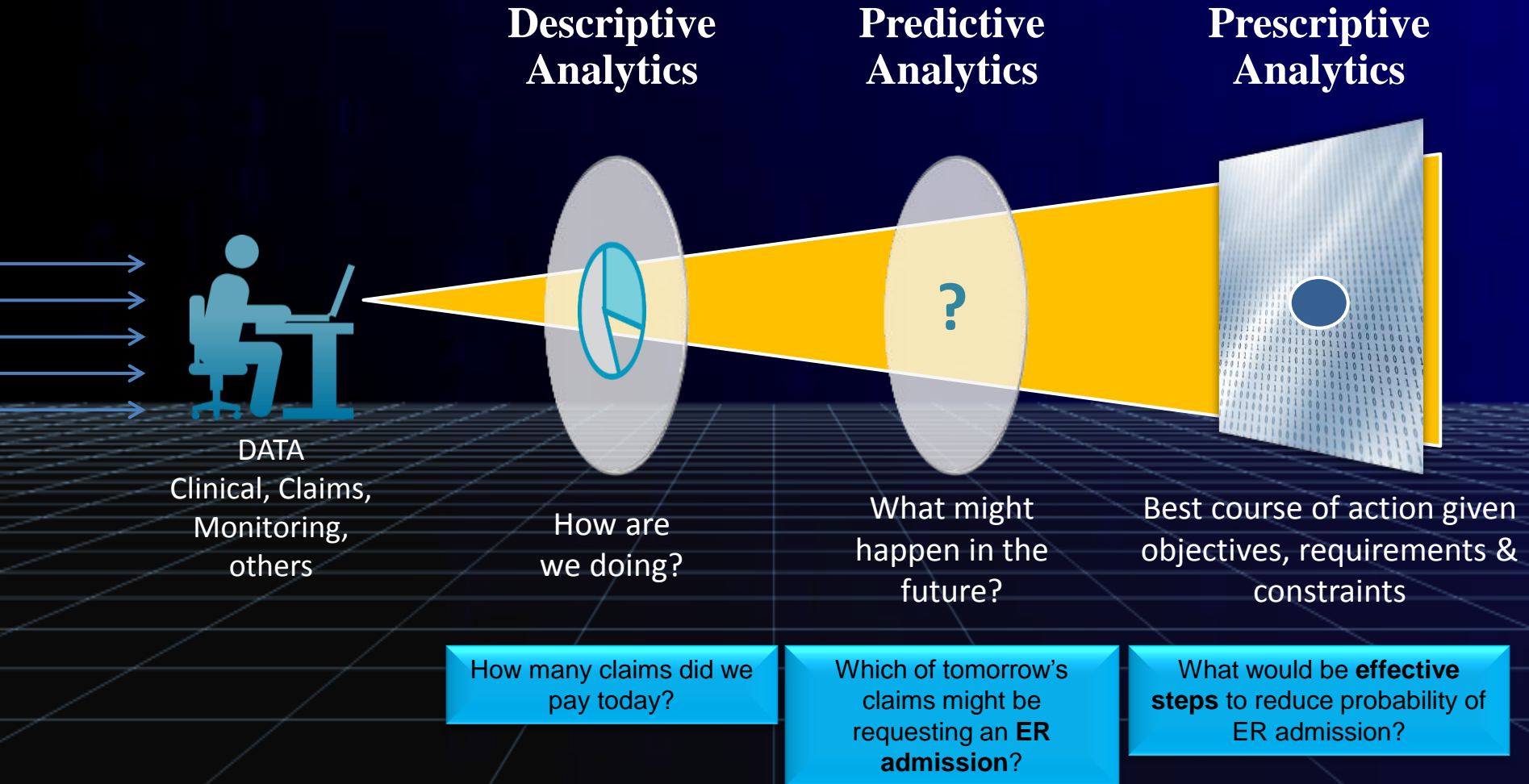
Source: CDW Federal Mobility Report, 2012

- *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

Descriptive Analytics

Predictive Analytics

Prescriptive Analytics

?

DATA
Clinical, Claims, Monitoring, others

How are we doing?

What might happen in the future?

Best course of action given objectives, requirements & constraints

How many claims did we pay today?

Which of tomorrow's claims might be requesting an **ER admission**?

What would be **effective steps** to reduce probability of ER admission?

*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
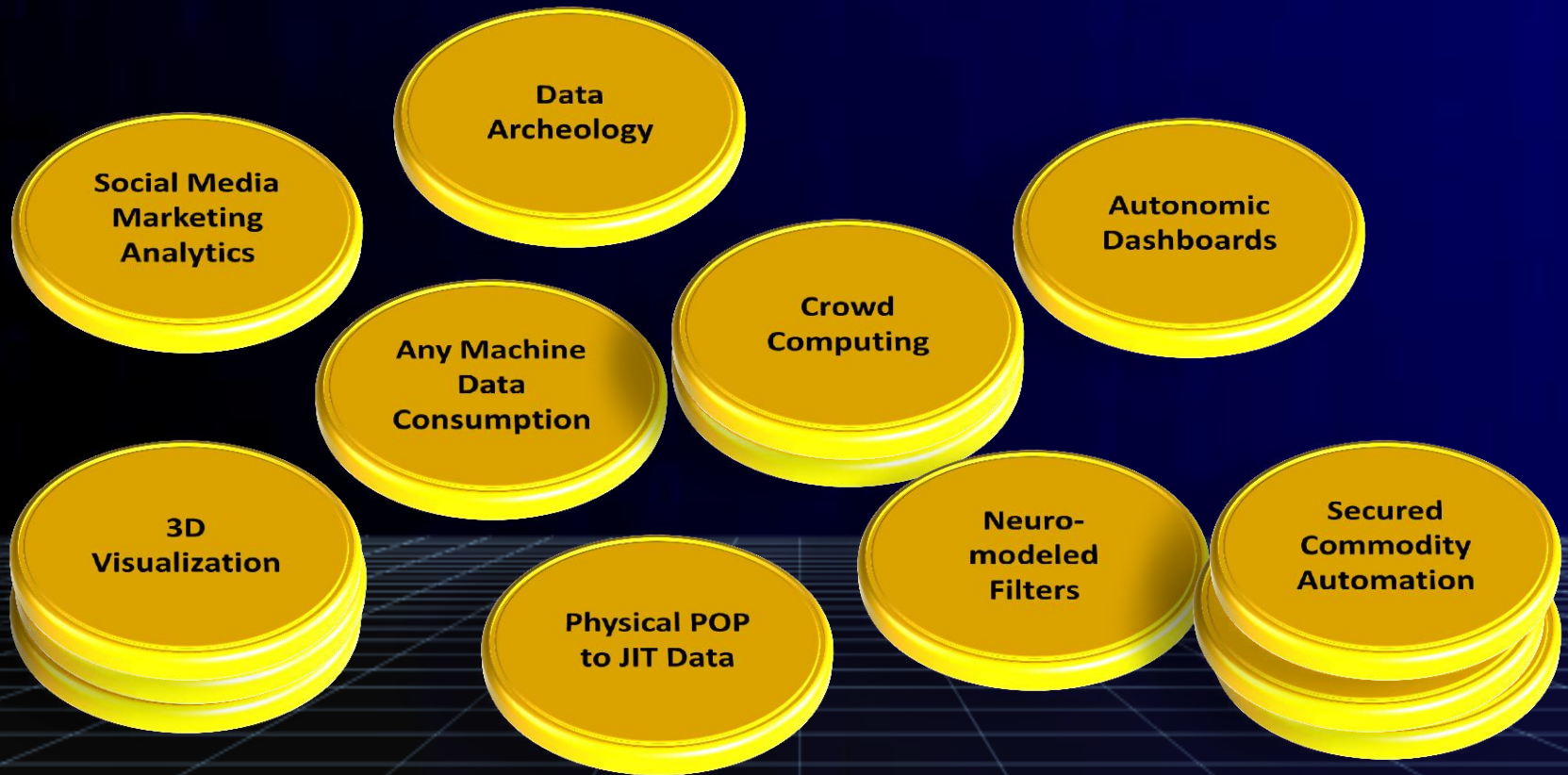
4 **Security**: More data = Greater spill risk

5 **Visualization** – Complex challenge in providing Peta-byte data understanding for humans; let alone Yotta-byte

Big Data Trends

Data Archeology

Social Media Marketing Analytics

Autonomic Dashboards

Crowd Computing

Any Machine Data Consumption

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

The StEaM Ecosystem

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

Quantum Linguist – Holistic Access of All Knowledge regardless of language

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

**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.

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

Strategic Enablers

Innovate Our World

Nanocomposite Engineer

Neuromorphic Architect

Microfluidics Engineer
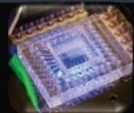
Creating the next generation of innovators through left brain, right brain fusion.

Crypto-Privacy Engineer

Securing the Future

Our Perspective - The "Five Domains"....Secured

Air

Space

Sea

Land

Cyber

Quantum

Security
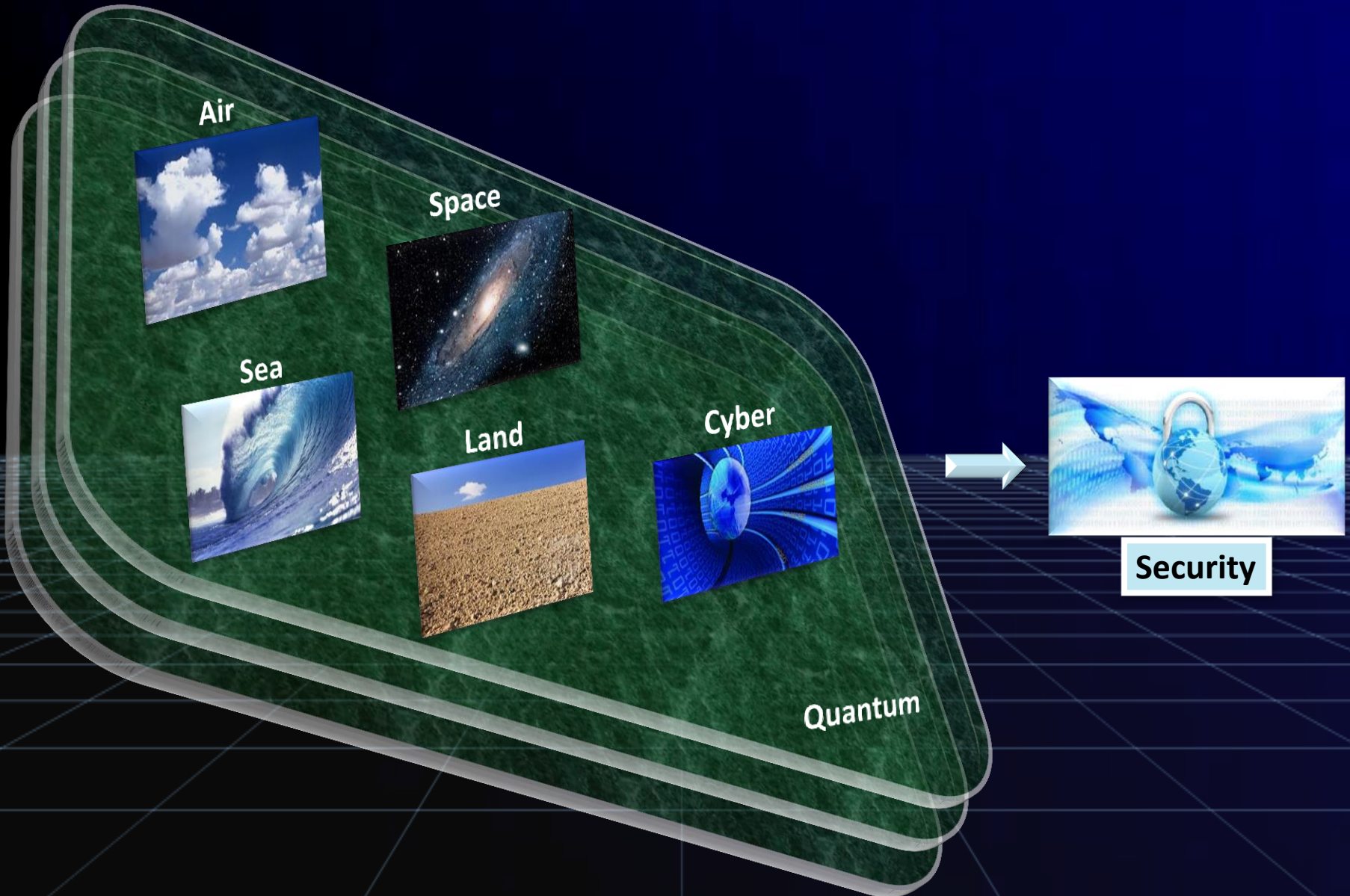
Global Spend to Defend!

2014: $100 Billion +

2013: $86 Billion

2012: $60 Billion

2011: $55 Billion

Gartner 2013 Projections

Evolving Cyber Landscape & Threat Vectors…Internet of Everything

Cyber Actors → **Threats** → **Emerging Attack Surfaces**

Cyber Actors

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

Threats

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

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

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
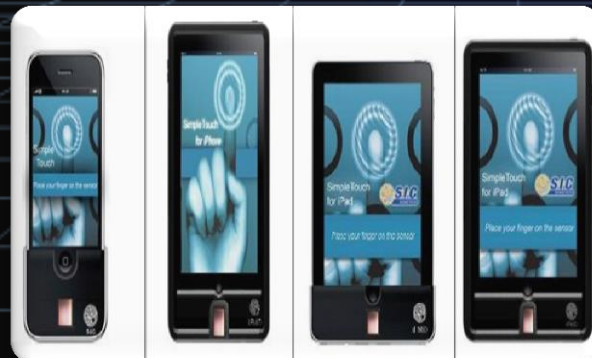- Quick response: "Detain or Release"
- Subject personal information

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

Android iPhones Tablets Laptops Type I Devices

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

LOCKHEED MARTIN
FoneFire
Weaponizing your smartphone

Securing & Supporting The Digitally Connected

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**

Cyber Incubator

Government

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

- **Positioning**
- **Intimacy**
- **Network**

Collaboration Spheres

- **Talent**
- **Curriculum**
- **Accreditation**

- **Future**
- **Visionary**
- **Evolution**

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
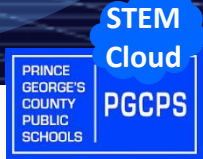
The Future

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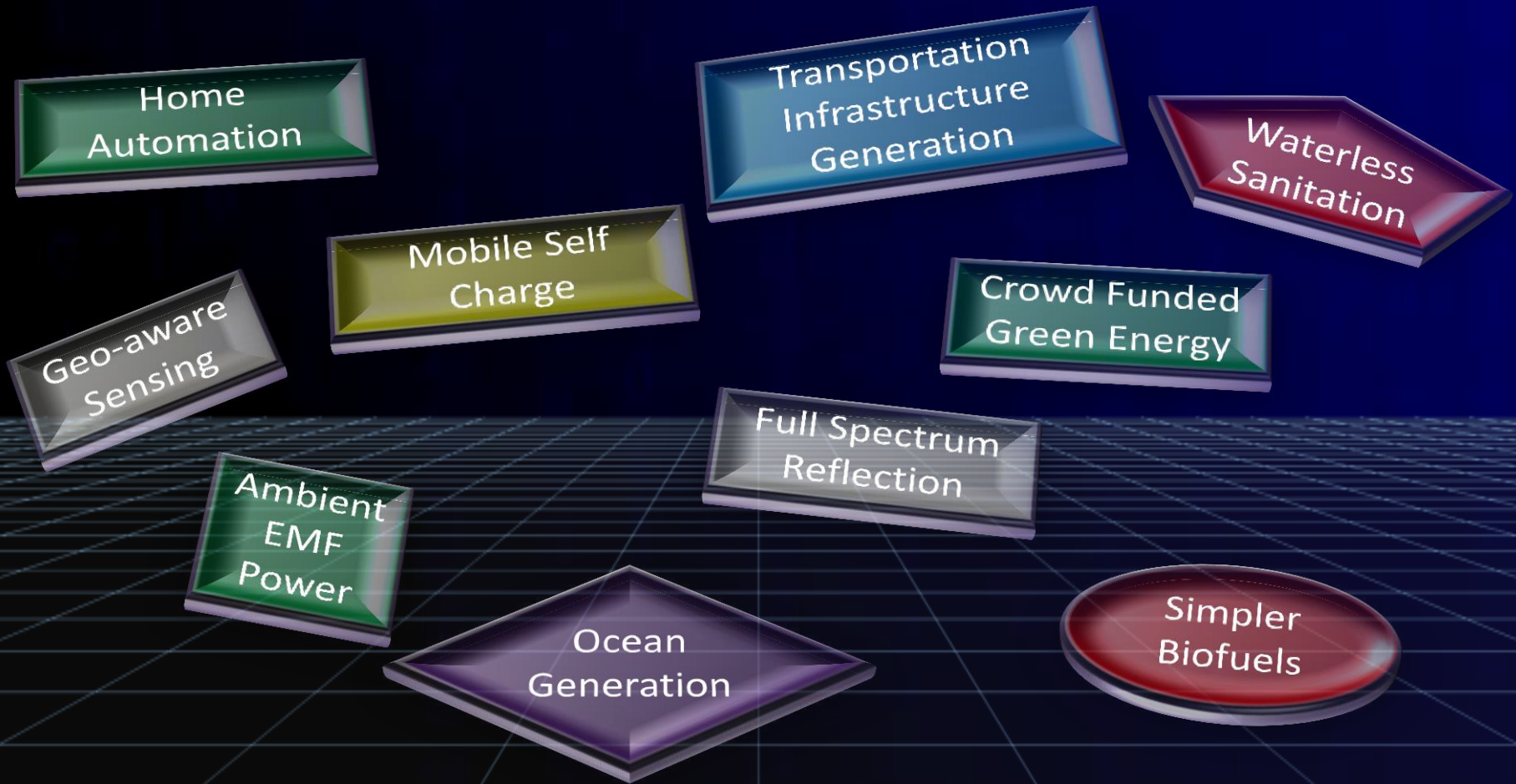Collaborative R&D
Technology Parks
Life Journey

STEM Cloud PGCPS

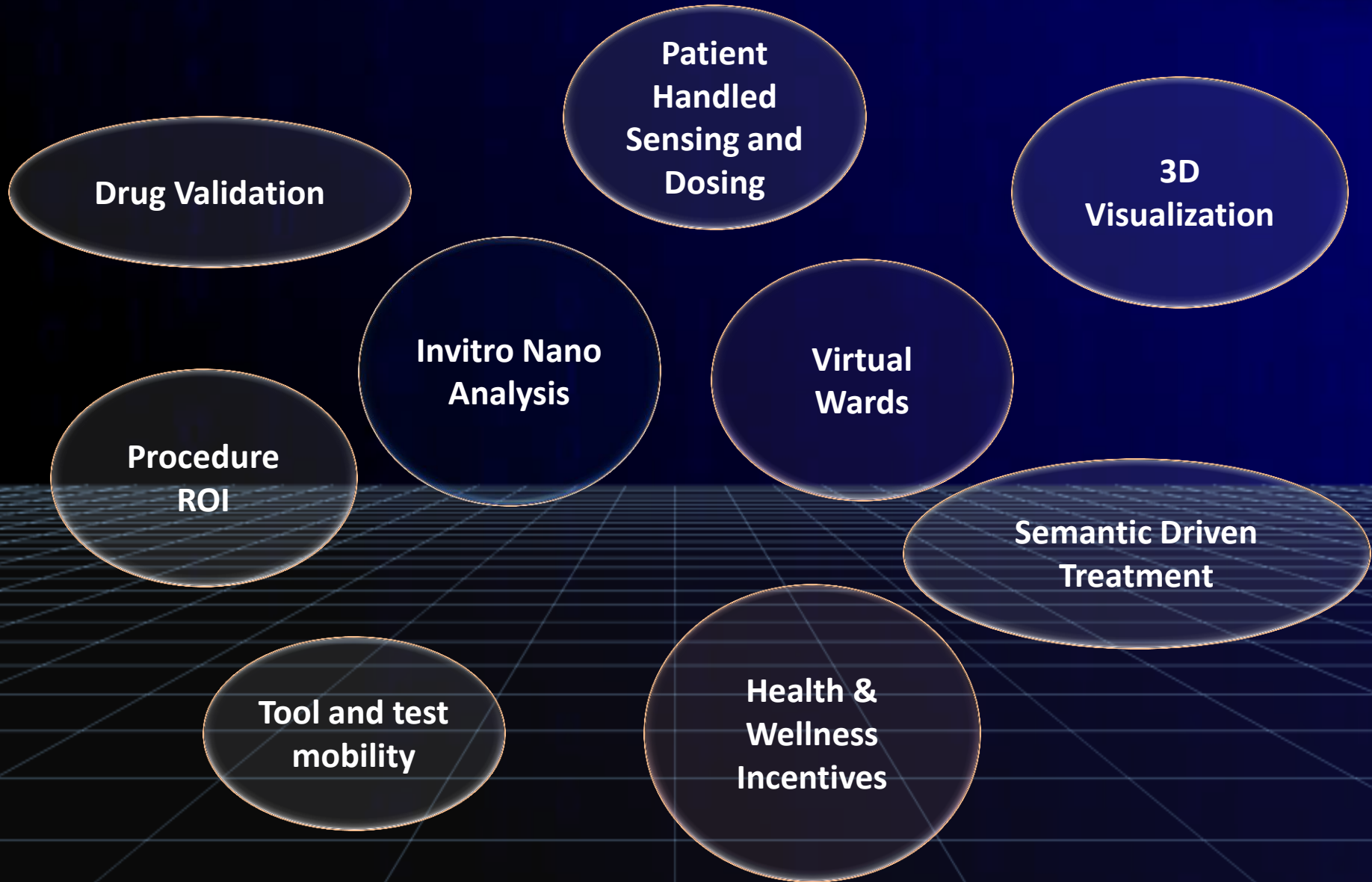*Life Journey* Find your passion

Outreach-Driven Innovation Evolution

Trends and Big Plays

Energy Trends

Healthcare Trends

Patient Handled Sensing and Dosing

3D Visualization

Drug Validation

Invitro Nano Analysis

Virtual Wards

Procedure ROI

Semantic Driven Treatment

Tool and test mobility

Health & Wellness Incentives

Big Plays

Hybrid Air Ships
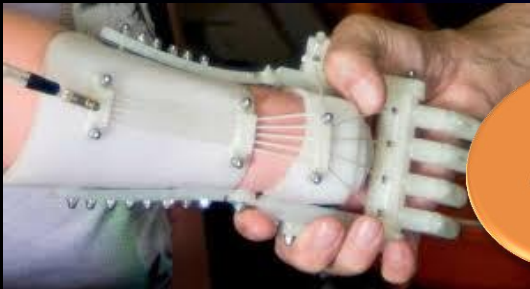
3D Bio Printing

Fusion Cylinders

100 Years of Innovation

Quantum Biology

Asteroid Mining

Adaption Science

Shared "Make a Difference" Goals

Global Team Effort

Pull the Future Back

STEAM

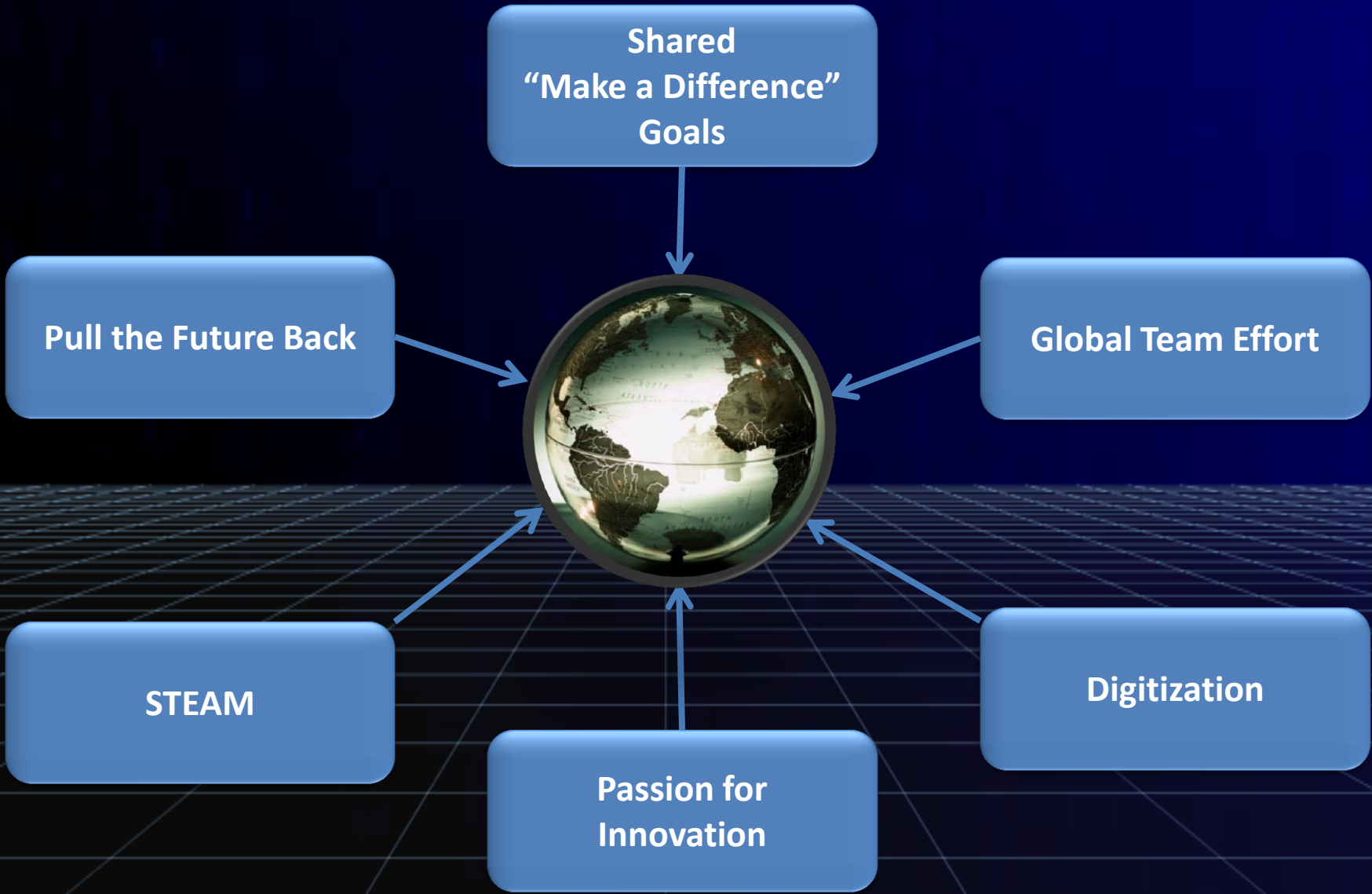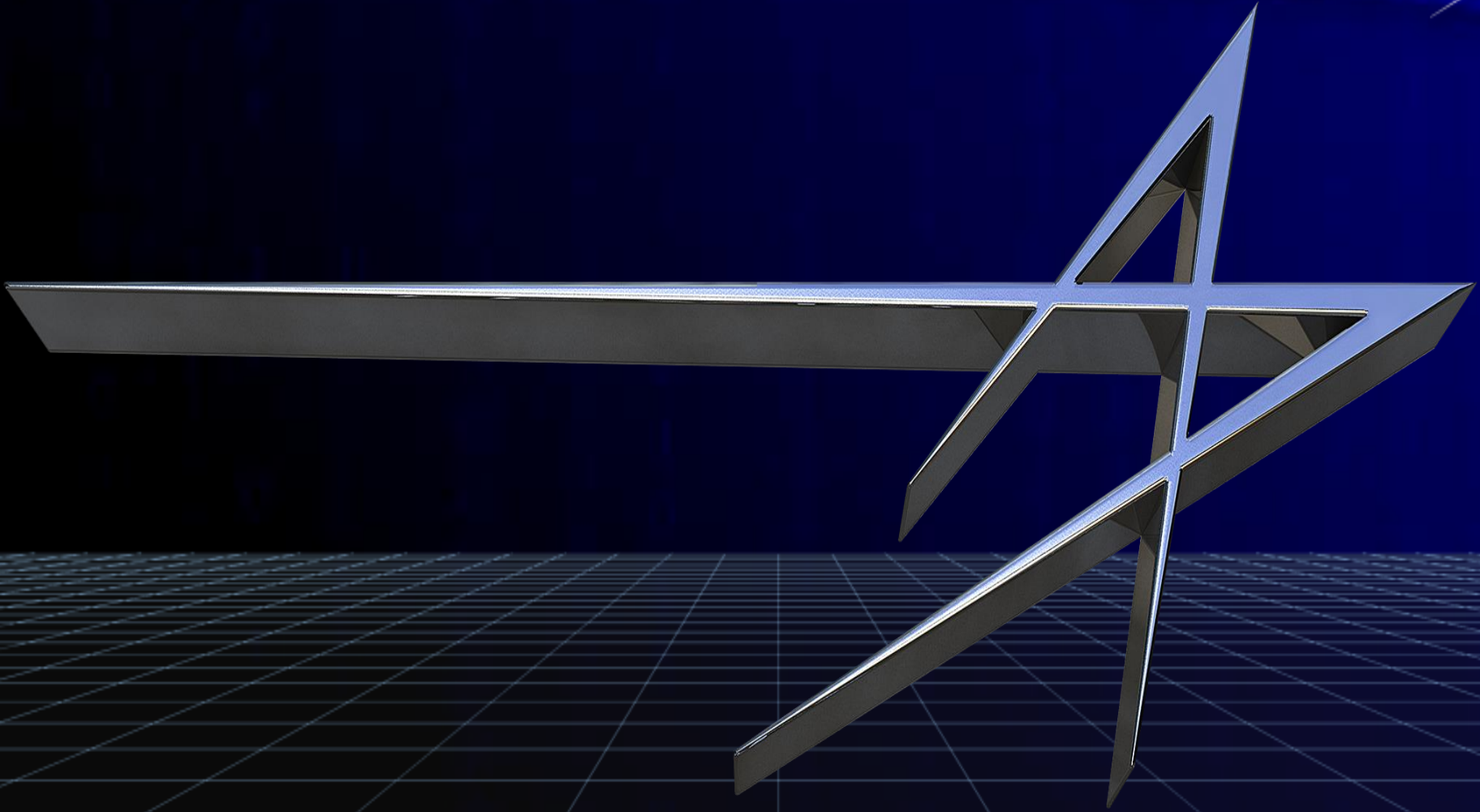Passion for Innovation

Digitization

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