



cyber **innovation** center

*Collaboration • Research • Technology*

# Cyber Research/ Education/ Economics

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# Did You Know?



# Gathering Storm

**Knowledge Capital** – federal government funding of R&D as a fraction of GDP has *declined* by 60 percent in 40 years.

**Human Capital** – over two-thirds of the engineers who receive PhDs from United States universities are not United States citizens.

**Creativity** – United states firms spend over twice as much on litigation as on research. United States K-12 education, which on average is a laggard among industrial economies, costs more per students than any other OECD country.



- Our overall public school system—or more accurately 14,000 systems—has shown little sign of improvement, particularly in mathematics and science. Many other nations *have* been markedly progressing, thereby affecting America’s relative ability to compete effectively for new factories, research laboratories, administrative centers—and jobs.
- “The only promising avenue for achieving this latter outcome, in the view of the *Gathering Storm* committee and many others, is through *innovation*.”

# A Few Factoids



- **China is now second in the world in its publication of biomedical research articles, having recently surpassed Japan, the United Kingdom, Germany, Italy, France, Canada and Spain.**
- **The United States now ranks 22<sup>nd</sup> among the world's nations in the density of broadband Internet penetration and 72<sup>nd</sup> in the density of mobile telephony subscriptions.**



- In 2009, 51 percent of *United States* patents were awarded to non-United States companies.
- The World Economic Forum ranks the United States 48<sup>th</sup> in quality of mathematics and science education.
- Of Wal-Mart's 6,000 suppliers, 5,000 are in China.
- IBM's once promising PC business is now owned by a Chinese company.
- The legendary Bell Laboratories is now owned by a French company.



- **Hon Hai Precision Industry Co. (computer manufacturing) employs more people than the worldwide employment of Apple, Dell, Microsoft, Intel and Sony combined.**
- **Only four of the top ten companies receiving United States patents last year were United States companies.**
- **United States consumers spend significantly more on potato chips than the government devotes to energy R&D.**
- **In 2000 the number of foreign students studying the physical sciences and engineering in United States graduate schools for the first time surpassed the number of United States students.**





- **Federal funding of research in the physical sciences as a fraction of GDP fell by 54 percent in the 25 years after 1970. The decline in engineering funding was 51 percent.**
- **GE has now located the majority of its R&D personnel outside the United States.**
- **Manufacturing employment in the U.S. computer industry is now lower than when the first personal computer was built in 1975.**
- **China has now replaced the United States as the world's number one *high-technology* exporter.**
- **Eight of the ten global companies with the largest R&D budgets have established R&D facilities in China, India or both.**





- **In a survey of global firms planning to build new R&D facilities, 77 percent say they will build in China or India.**
- **Sixty-nine percent of United States public school students in fifth through eighth grade are taught mathematics by a teacher without a degree or certificate in mathematics.**
- **Ninety-three percent of United States public school students in fifth through eighth grade are taught the physical sciences by a teacher without a degree or certificate in the physical sciences.**
- **The United States ranks 27<sup>th</sup> among developed nations in the proportion of college students receiving undergraduate degrees in science or engineering.**



- **The United States graduates more visual arts and performing arts majors than engineers.**
- **The total *annual* federal investment in research in mathematics, the physical sciences and engineering is now equal to the *increase* in United States healthcare costs every nine weeks.**
- **China's Tsinghua and Peking Universities are the two largest suppliers of students who receive PhD's—in the United States.**
- **All the National Academies Gathering Storm committee's recommendations could have been fully implemented with the sum America spends on cigarettes each year—with \$60 billion left over.**



- **According to the ACT College Readiness report, 78 percent of high school graduates did not meet the readiness benchmark levels for one or more entry-level college courses in mathematics, science, reading and English.**



# A Regional Solution...

- A regional solution that addresses national problems:

*Investment*  
*Infrastructure*  
*Education*  
*Collaboration*  
*Innovation*



# Investment: CIC / NCRP Overview

- State and Local Government Initial Investment of \$107M
- 501c3 Not-for-Profit Corporation
- 3,500 Acre R&D zoning overlay (Park Controlled)
- Phase 1 - 64 Acre Tract; 135k sq. ft. building
- Hardened and Survivable
  - Anti-terrorist and Force Protection code compliant
  - 40K sq. ft. SAP/SAR classified, high density computing space
  - 4 fiber loops (1 research, 3 commercial)
  - Internal loop configuration
  - Two 2.8 megawatt diesel powered generators – Pad for 3<sup>rd</sup> Gen, UPS to match



# Investment: NCRP Phases 1- 4

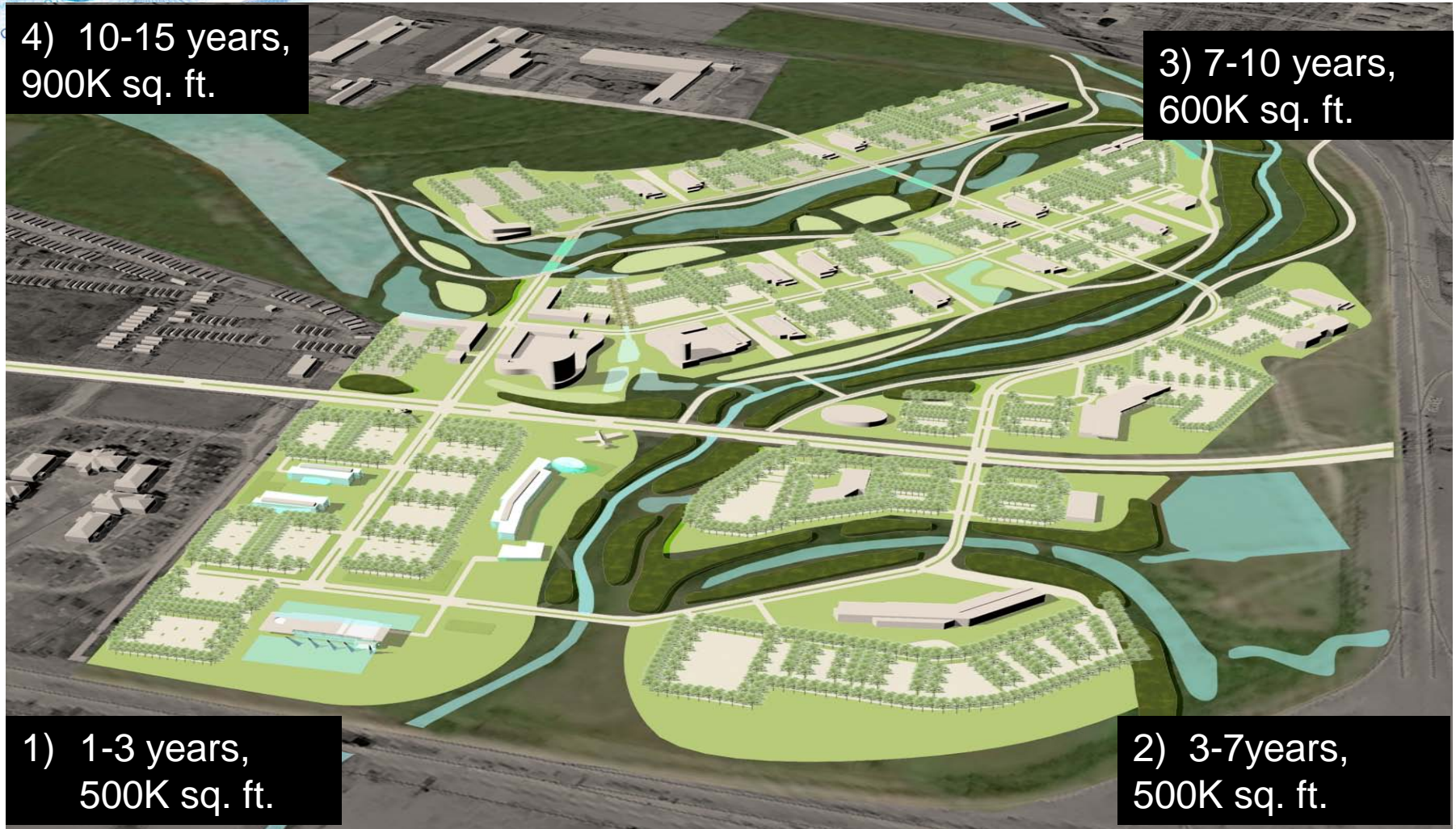


4) 10-15 years,  
900K sq. ft.

3) 7-10 years,  
600K sq. ft.

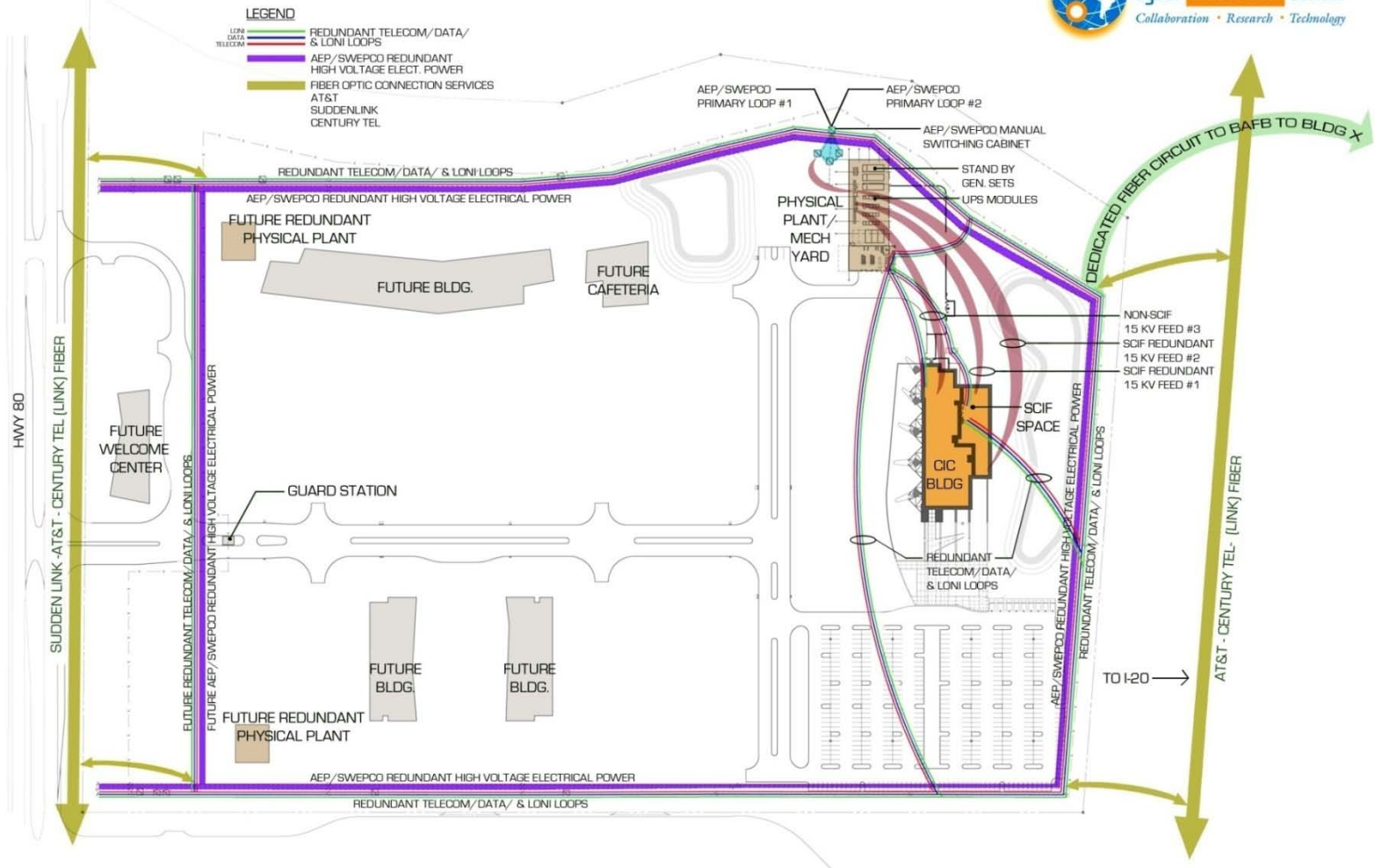
1) 1-3 years,  
500K sq. ft.

2) 3-7 years,  
500K sq. ft.



# Infrastructure

## CYBER INNOVATION CENTER - REDUNDANT CAPABILITIES DIAGRAM







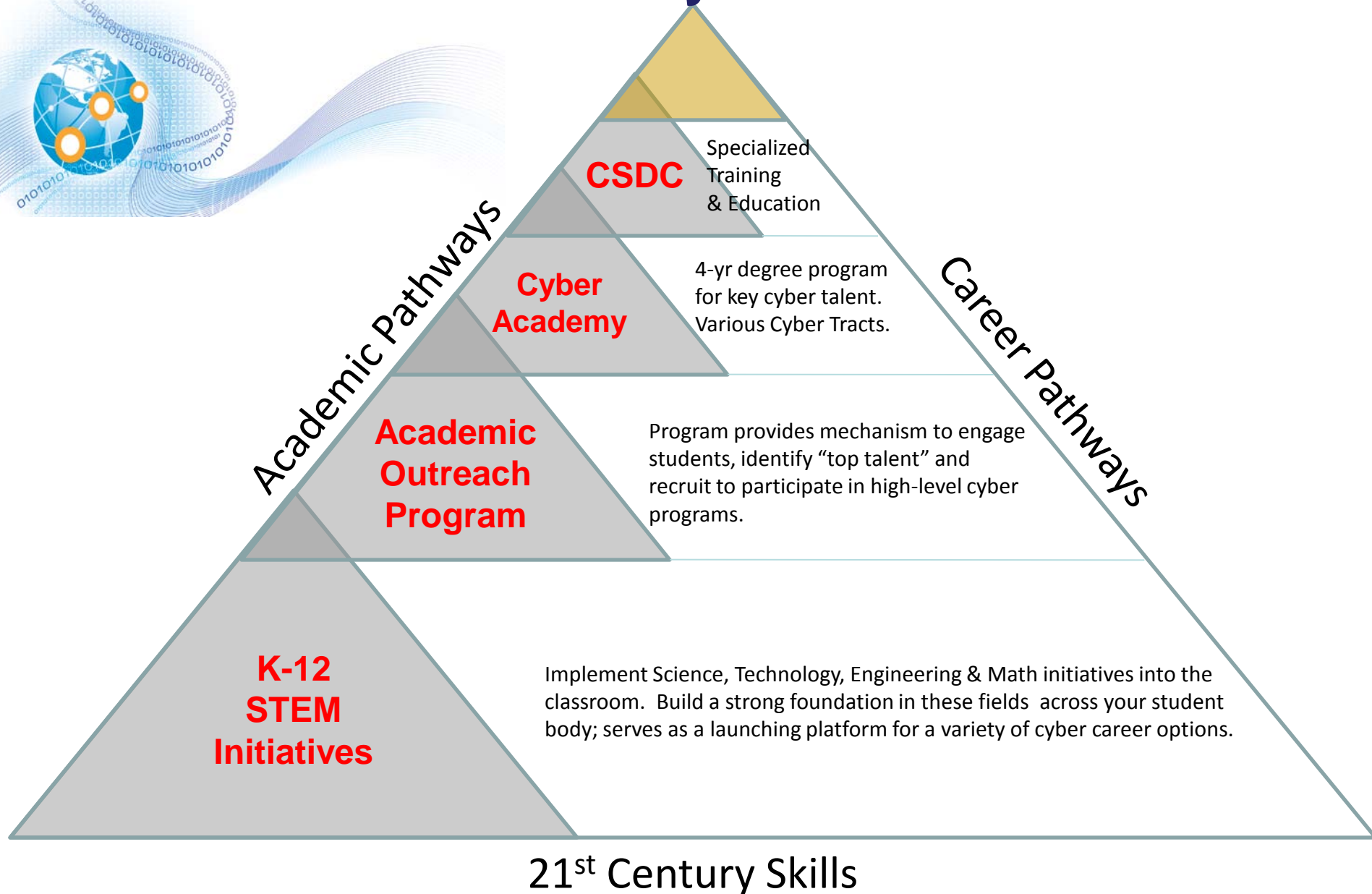
# Education: Academic Outreach

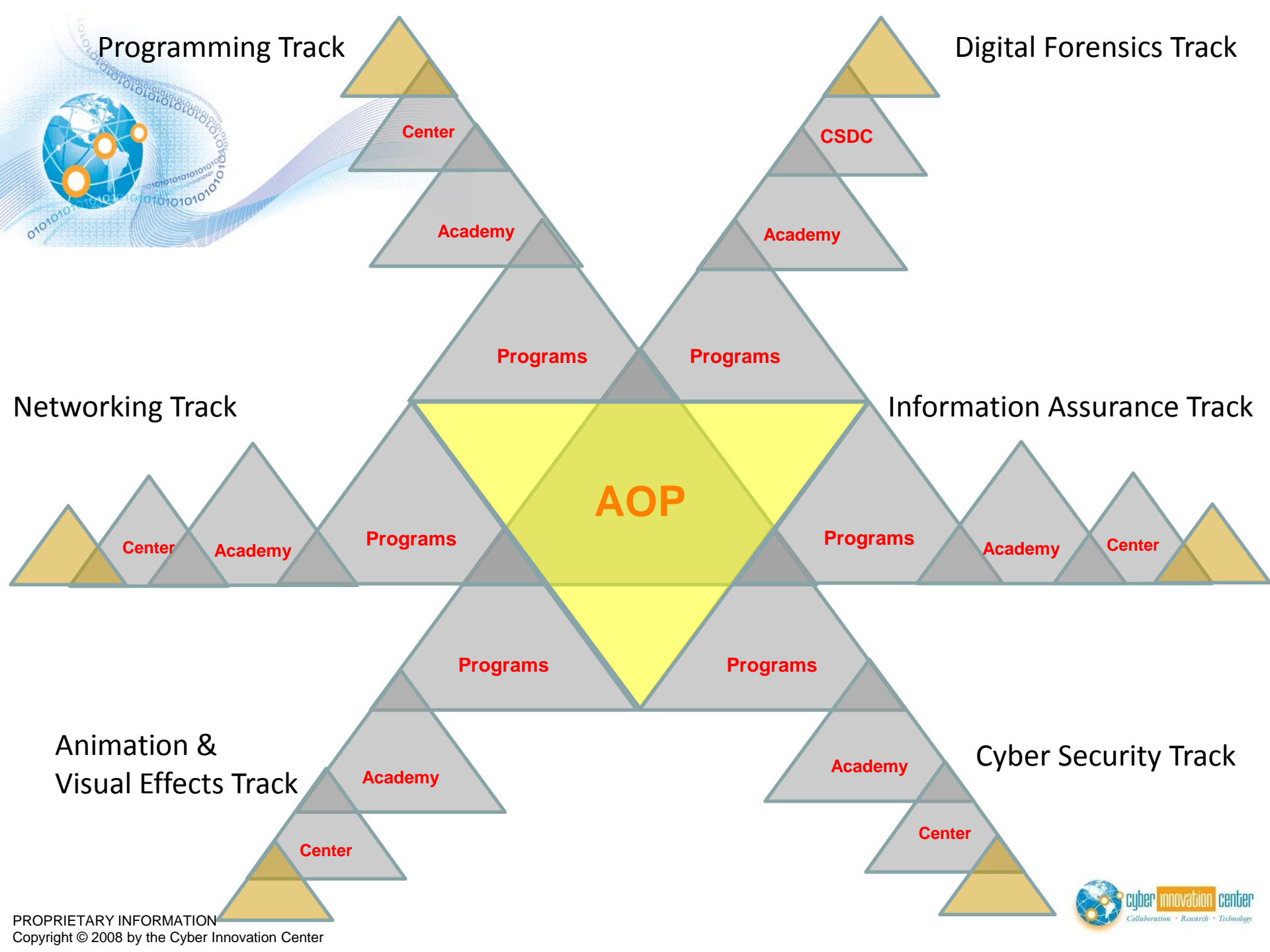
- Implement a Comprehensive Solution that Ensures Systemic Change
- **Emphasize Professional Development for K-12 Teachers!!!**
- Take Formal & Informal Approaches
- Incorporate Traditional and Non-Traditional Methods
- Focus on the students across elementary/middle (K-8), secondary (9-12) and post-secondary levels.
- Incorporate & Instill 21<sup>st</sup> Century Skills
- Build Upon Existing STEM related initiatives
- Provide Resources

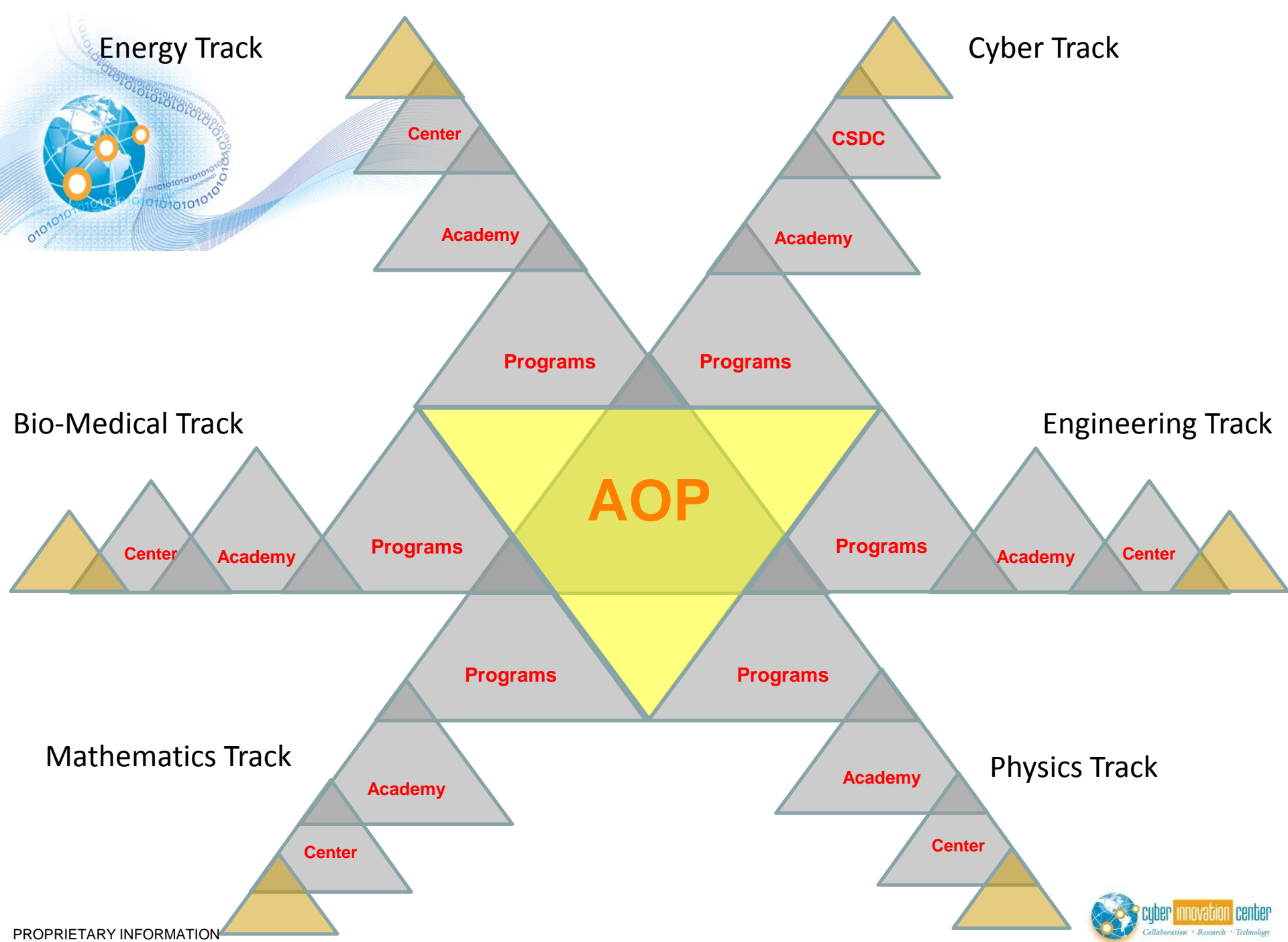
# Approach – 3 Pronged Attack

- **Generate “Buzz”, Create Interest/Awareness**
  - Establish/Build Relationships through...
    - Cyber Day Workshops (K-8)
    - Cyber Awareness Presentations (9-12)
    - Meet/Present to School Boards, Administrators, & Teachers (K-12)
- **Academic Outreach**
  - Establish Cyber Education Network
  - Program Development
    - Host Professional Development Workshops
    - Host Summer Cyber Camps
    - Host Local, Regional, and National Cyber Competitions
- **Workforce Development**
  - Partner with Industry
    - Incorporate industry needs into outreach and development
    - Establish certification programs
  - Partner with Universities
    - Offer new degree programs to meet industry and government needs

# Elite Cyber Talent









# Host Cyber Camps

- **Cyber Discovery Camp**
  - @ Louisiana Tech University
- **Cyber Forensics Camp**
  - @ Northwestern State University
- **Cyber AVE Camp**
  - @ Louisiana State University Shreveport
- **Cyber Programming Camp**
  - @ University of Louisiana Monroe



# Host Cyber Competitions

- **Mini-Urban Challenge**

- The purpose of this competition is to challenge high school students to design and operate a robotic car built from a LEGO® MINDSTORMS® Education kit that can accurately navigate through a LEGO® city.
- Bossier City has been named a Regional Host .

- **Northwest Louisiana Autonomous Robotics Competition (NWLA-ARC)**

- Piloted at Benton Middle School in Bossier Parish, this competition has grown to include schools from across Caddo and Bossier Parishes. The CIC is working with NWLA-ARC to expand the program across the 150 mile region. This competition feeds into the CIC's regional robotics initiatives.

- **Network Defense Competition**

- **Cyber Patriot II**

- **Cyber Slam**

- Hosted at Louisiana State University Shreveport, the competition is modeled after FYORG and includes a high intensity animation and visual effects digital media competition.

- **Cyber Storm**

- hosted at La Tech University. Cyber Storm is a network defense / cyber security competition







# Cyber Curricula

- **Cyber Science** – a foundational 18 week long course that will be offered to 9th and 10th graders.
- **Cyber Security** – curriculum will provide students with a basic understanding of computer hardware, software, networks, and encryption.
- **Computer Science** – curriculum will provides students with a basic understanding of computer science, engineering and mathematical concepts. Through an integrated curriculum, students will have a strong foundation from which to further their studies in a growing technology field.
- **Digital Media-** curriculum provides students with a basic understanding of digital media, animation, visual effects, and interactive command and control environments.
- **Digital Forensics** - curriculum provides students with a basic understanding of computer hardware, data storage and collection, networks intrusion, and data degradation.



# Academic Pathways

## 2 + 2 + 2 Articulation Agreements

### **AVE Articulation**

High School Cyber Courses → BPCC Telecommunications Division → LSUS Fine Arts Department

### **Digital Forensics Articulation**

High School Cyber Courses → BPCC CIT Division → NSU Criminal Justice Department

### **Cyber Security Articulation**

High School Cyber Courses → BPCC CIT Division → La Tech Cyber Academy

### **Computer Science Articulation**

High School Cyber Courses → BPCC CIT Division → La Tech Computer Science Department

**During grant period, the RCEC will work to establish articulation agreements with other community and technical colleges in the region.**



***Moving from a traditional education curriculum to a more project-based, 21<sup>st</sup> Century curriculum that's oriented towards innovation.***



# Workforce Migration





# Q & A