

NSF and Next Generation Internet Research

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Next Generation Internet: A Foundation for Our Future

- The Internet is critical infrastructure now and into the future.



Next Generation Internet: A Foundation for Our Future

- It is *not* a solved problem. There is still a great deal of research and innovation to be done.
 - Technical Foundations
 - Applications and Verticals



Next Generation Internet: A Foundation for Our Future

- The work crosses discipline, sector, and community boundaries—we must work together!



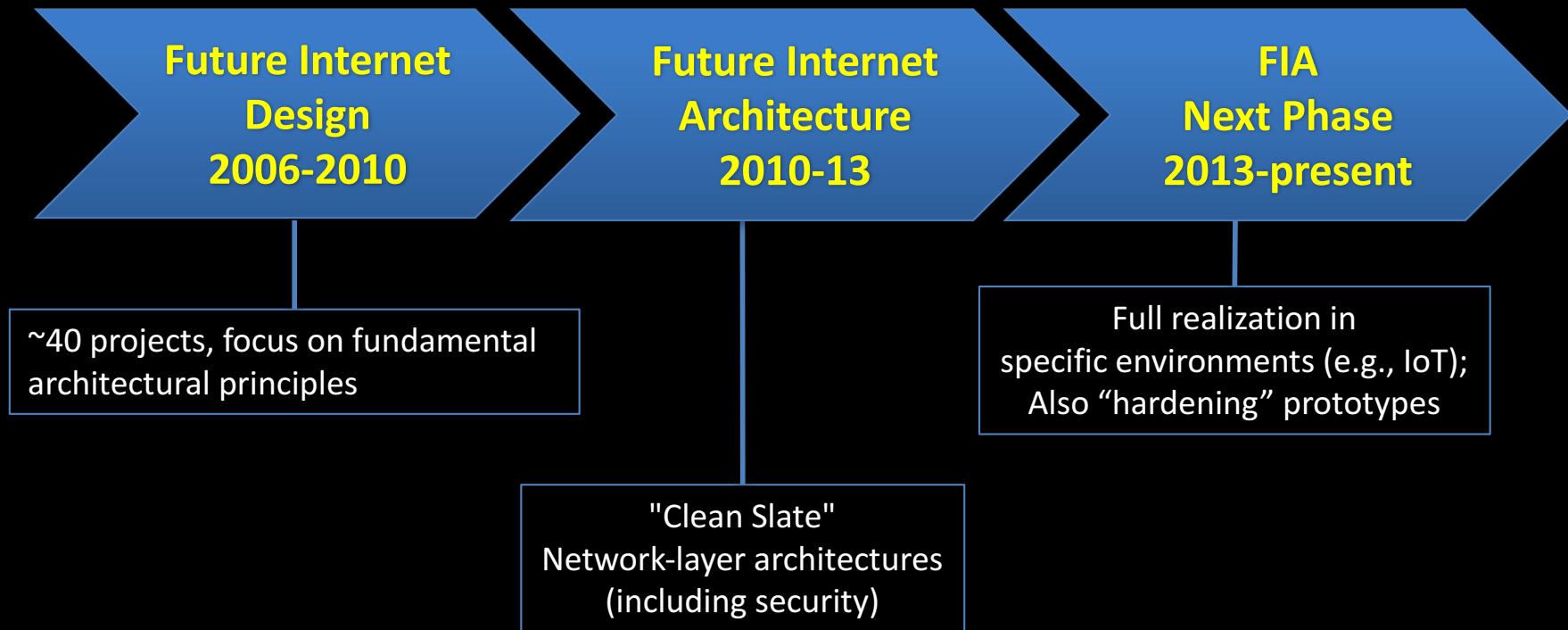
NSF Supports Research on All Aspects of NGI

Security and Privacy

- Foundations and Technology
 - Future Internet Architecture
 - Platforms for Advanced Wireless Research
- Applications and Verticals
 - Smart and Connected Communities
 - Cyber-Physical Systems
- Future Directions
 - Harnessing the Data Revolution
 - Work at the Human-Technology Frontier



Foundations and Technology: NSF Future Internet Programs

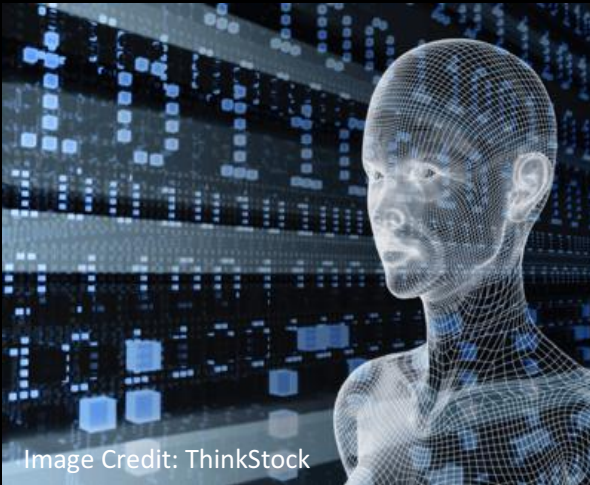


Ongoing NSF-Funded FIA Projects

- **EXpressive Internet Architecture (XIA)**
 - Focus: Security, Evolution of the Infrastructure
- **MobilityFirst**
 - Focus: Security, Support for mobile endpoints
- **Named Data Networking (NDN)**
 - Focus: Security, Shift focus from "devices" to "data"



Foundations and Technology: Secure and Trustworthy Cyberspace (SaTC)



- Fundamental scientific advances and technologies to:
 - Protect against malicious behavior
 - Preserve privacy...while promoting usability in cyberspace
- Multiple directorates + industry
- Focus areas: Core, Privacy, Social/Behavioral, Education, Transition to Practice

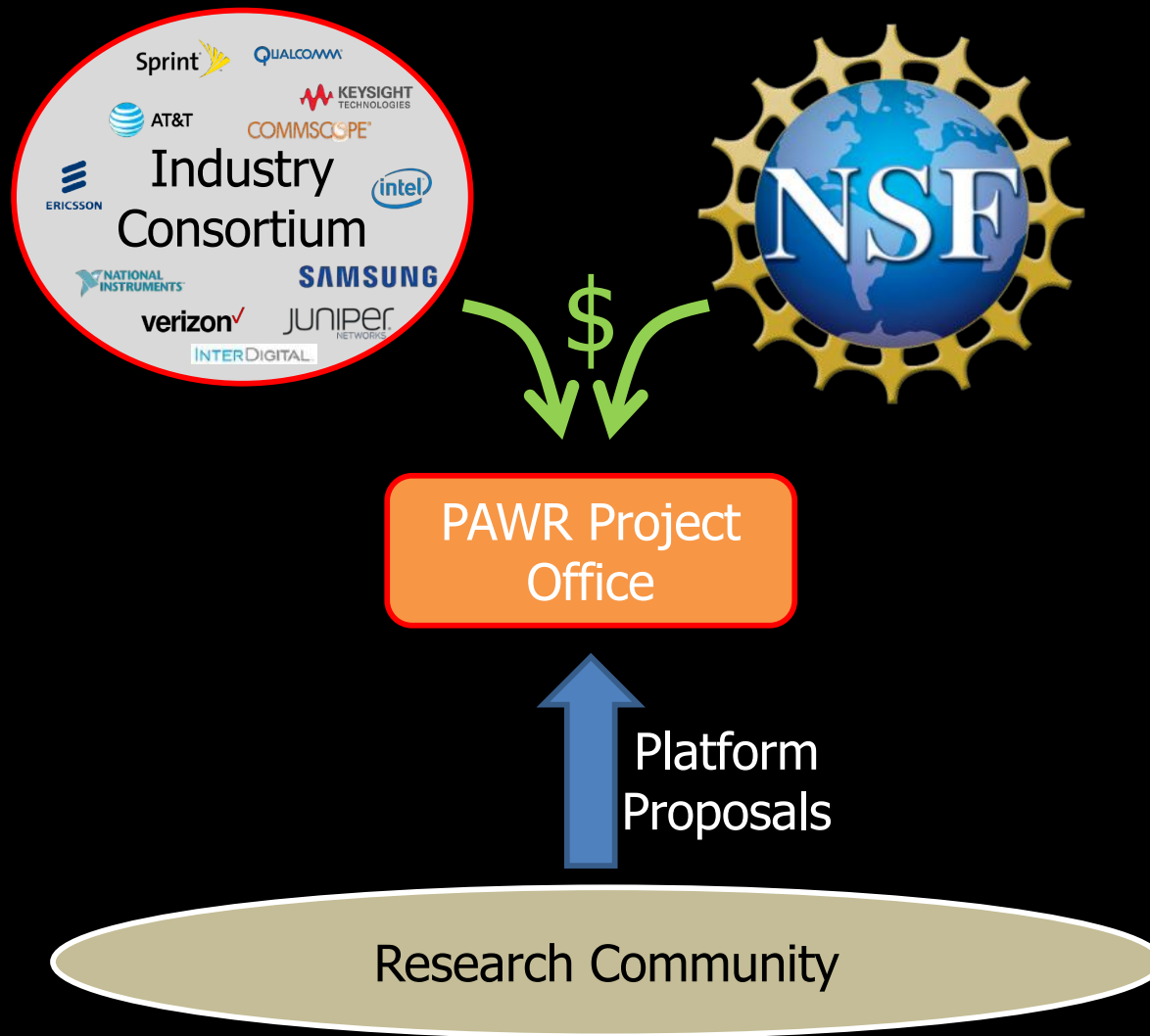


Foundations and Technology: Platforms for Advanced Wireless Research (PAWR)

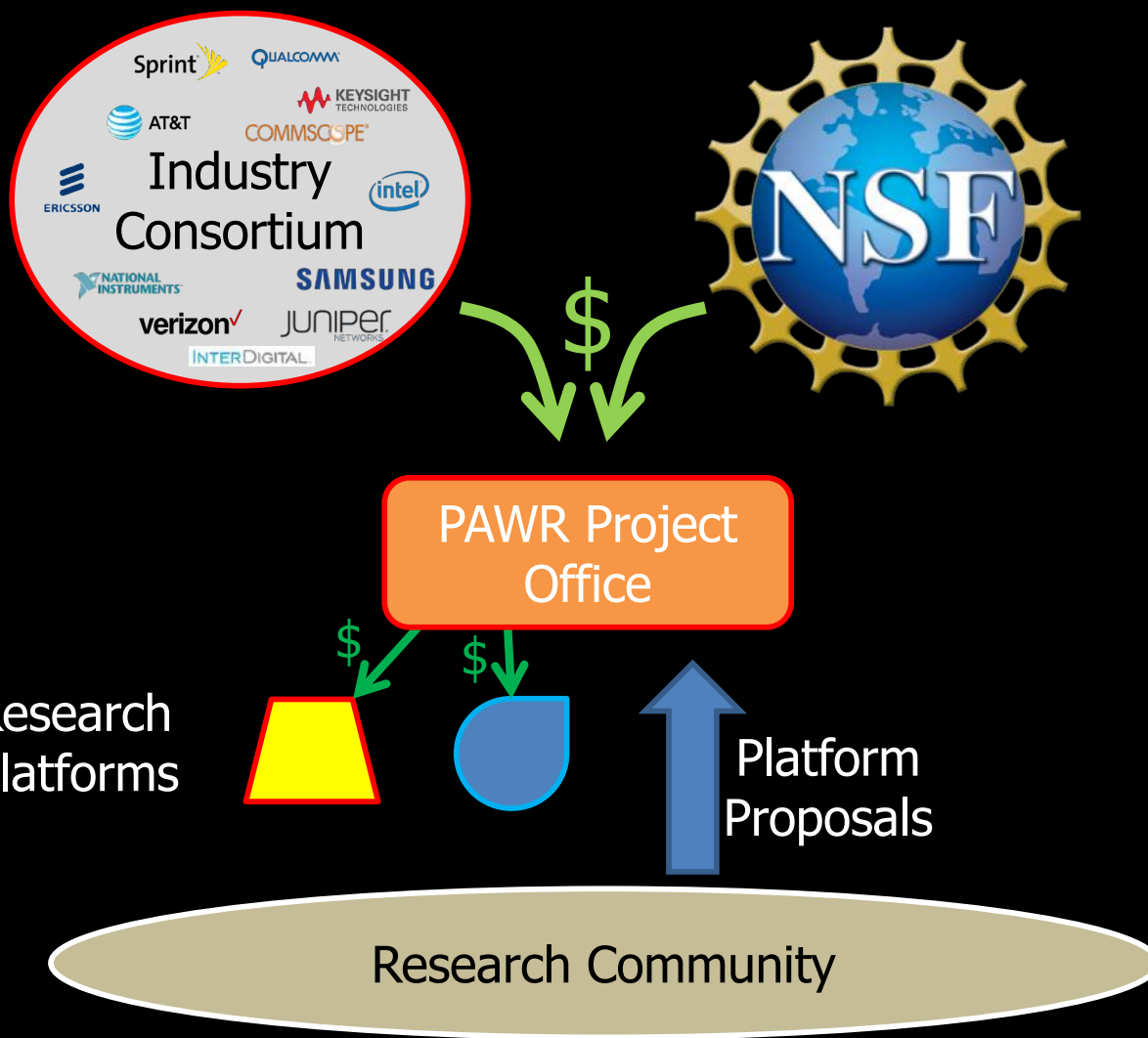
- Public-private partnership
 - Industry Consortium: ~25 members from all sectors of wireless ecosystem
- Goal: deploy an array of experimental platforms
- City-scale (not necessarily city-sized)
- Pre-competitive research areas (3-8 years out)
- Four platforms over the next five years



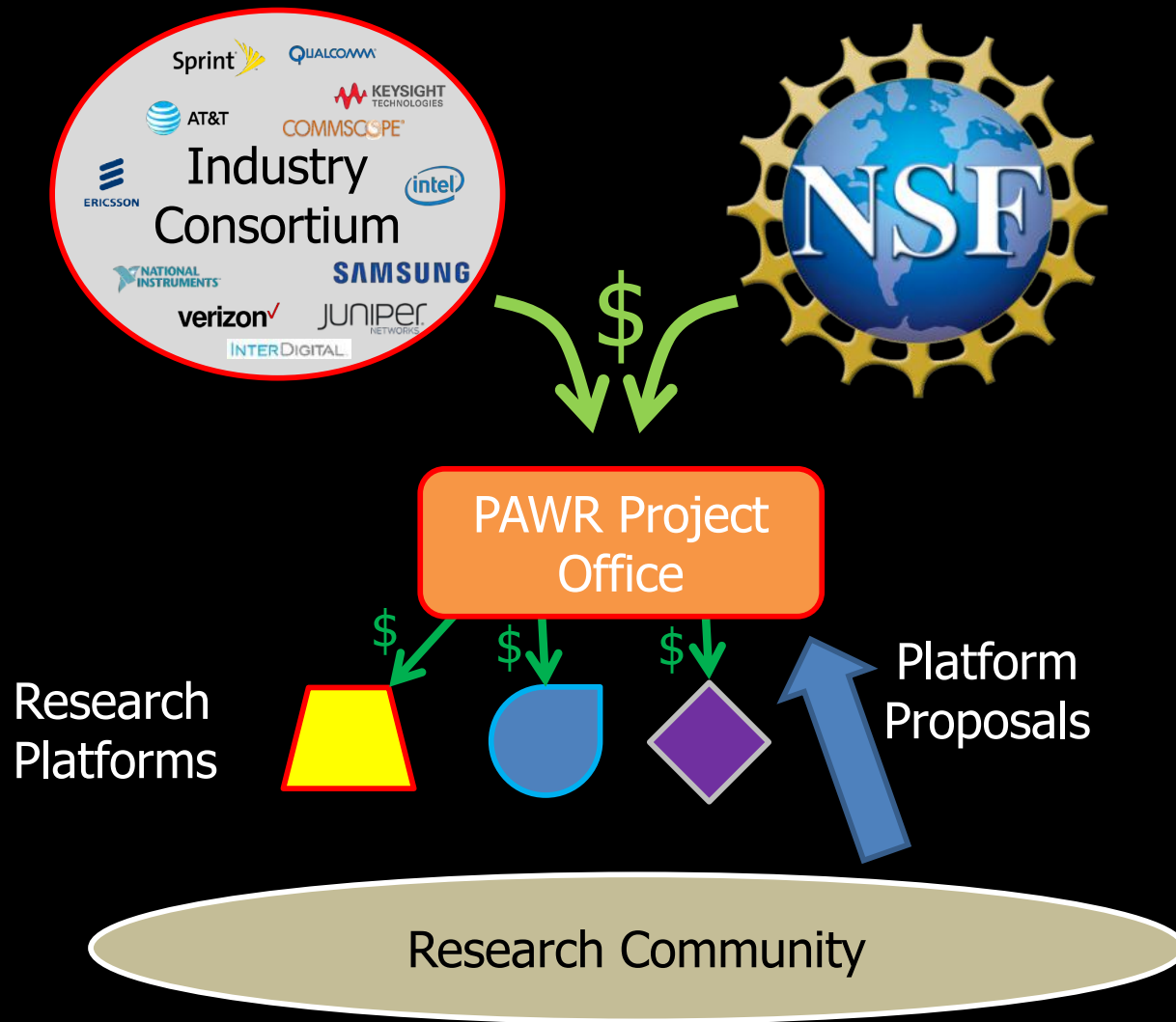
PAWR Structure



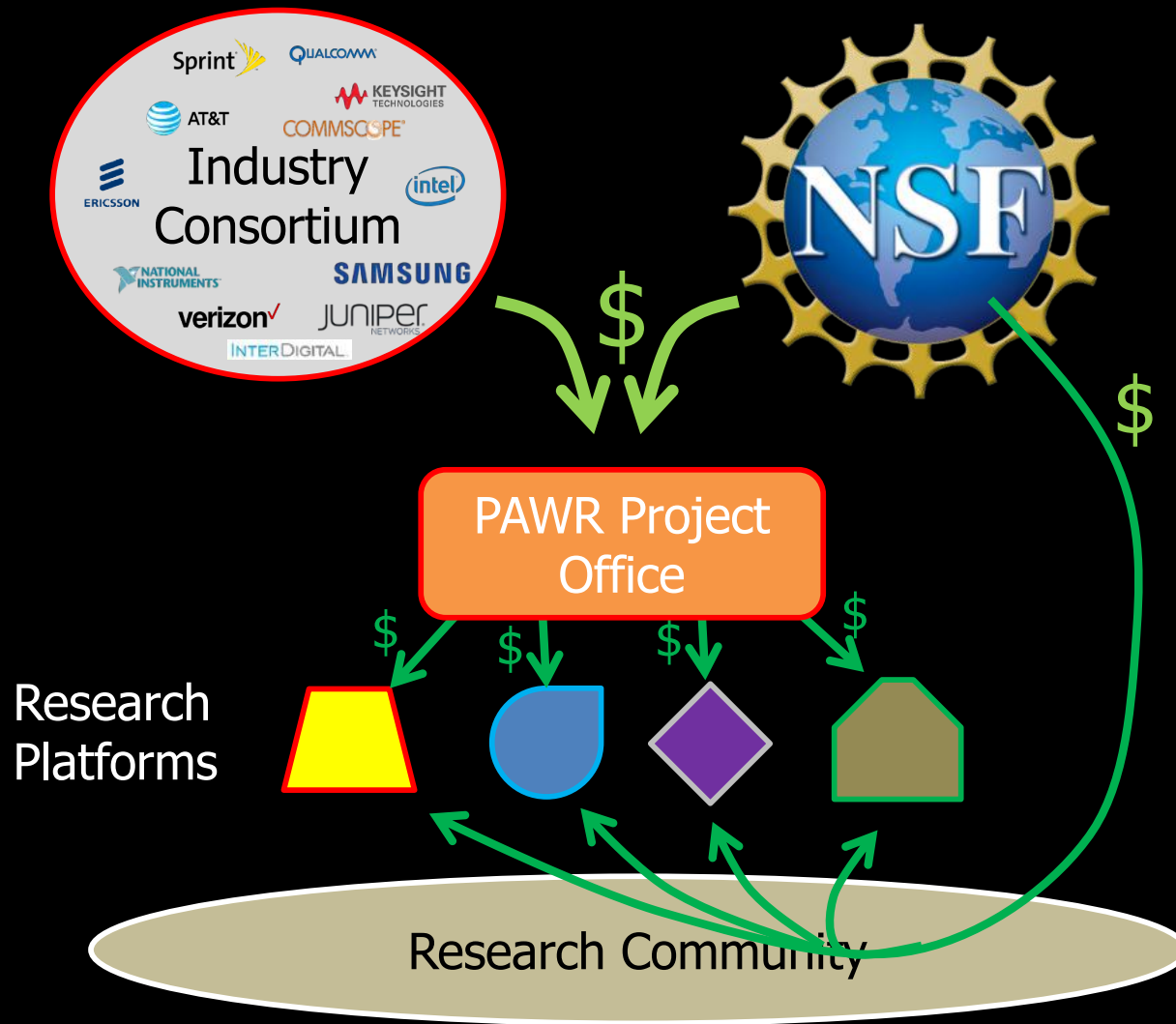
PAWR Structure



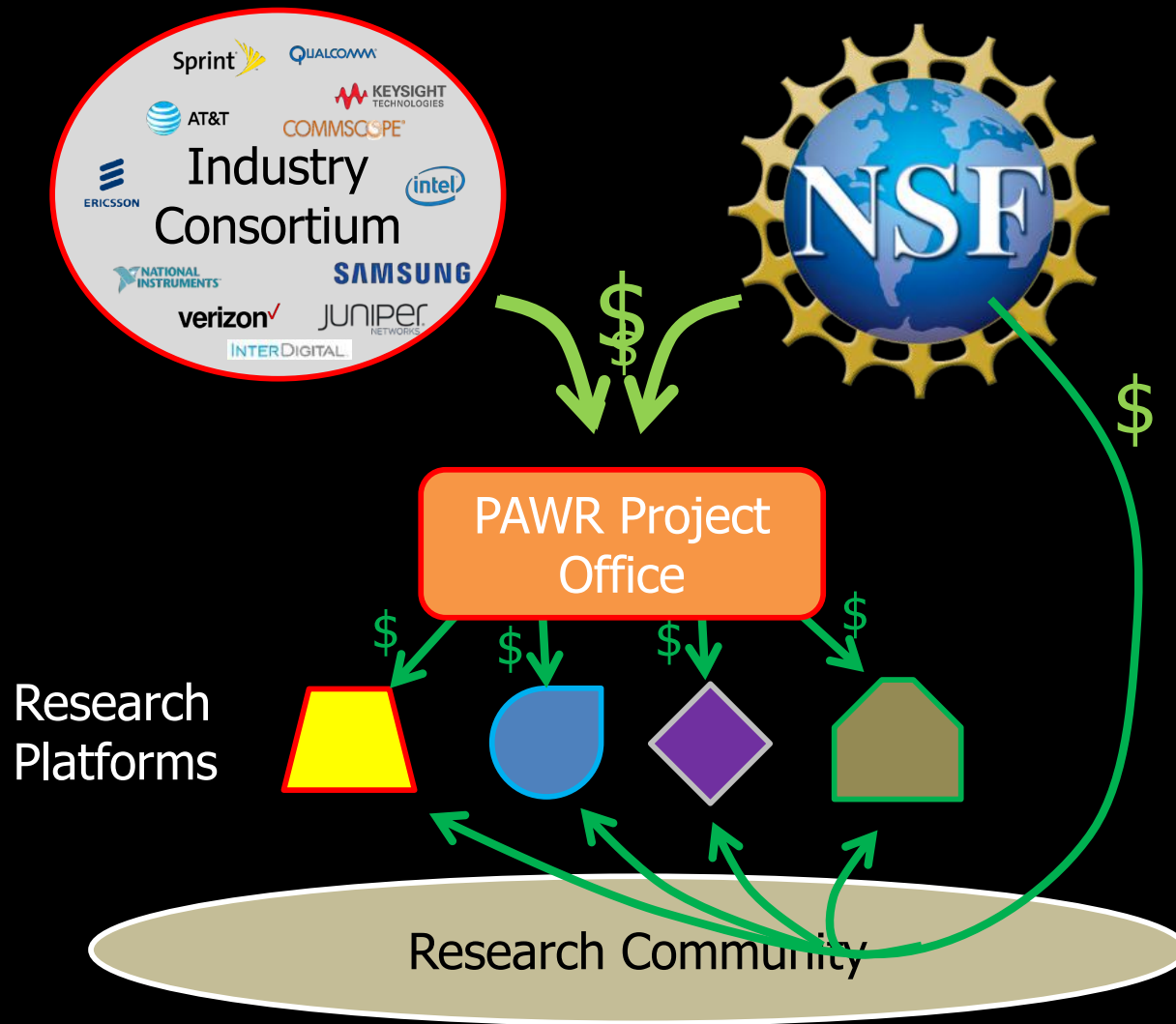
PAWR Structure



PAWR Structure



PAWR Structure



PAWR Leverage

- Companies and NSF pool resources
- Expanded capabilities for academic researchers
- Companies access NSF's community of 400+ wireless researchers
- Academics access industry's know-how and real-world challenges
- Communities "live in the future"

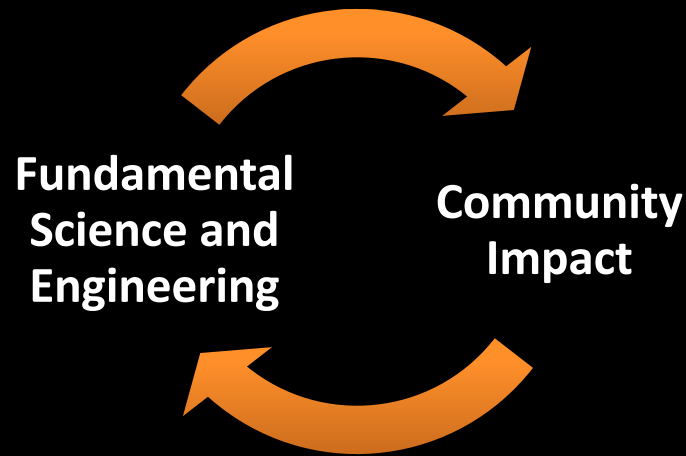


Applications and Verticals: Smart and Connected Communities

- Fundamental science and engineering research to address questions within/across disciplines
- Focus: community impact



Iterative Science and Engineering Research in Partnership with Communities



Partnerships enable piloting, testing, and future research in communities to improve community functioning and quality of life



Applications and Verticals: Cyber-Physical Systems

- Develop core system science needed to engineer complex cyber-physical systems
- Multiple NSF Directorates and US Government Agencies
- Multiple vertical application areas



Transportation



Energy and Industrial
Automation



Healthcare and
Biomedical

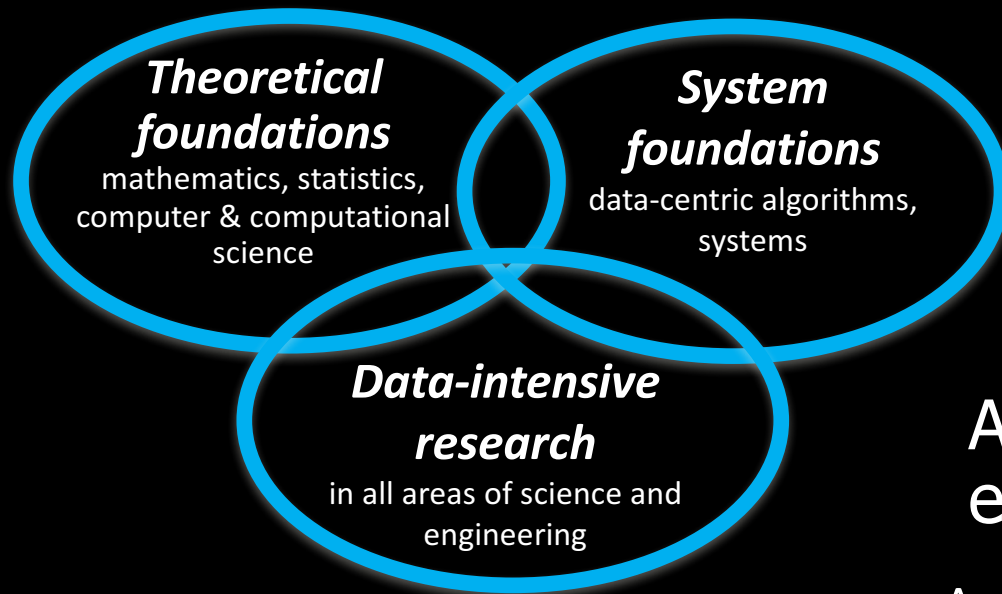


Critical Infrastructure



Future Directions: Harnessing the Data Revolution

Research across all NSF Directorates



Educational pathways



Innovations
grounded in an
education-
research-based
framework

Advanced cyberinfrastructure ecosystem

Accelerating data-
intensive research



Future Directions: Work at the Human-Technology Frontier

Emerging technologies and human-technology interactions are transforming the world of work and the lives of workers



Understanding how constantly evolving technologies are shaping our lives and how we in turn can shape those technologies, especially in the world of work

- Understand benefits & risks of new technologies: efficiency, quality, productivity, human dynamics
- Science and engineering: creating technologies that promise to enhance work lives
- Education: changing *workplace* demands changing *workforce*



Conclusion

- The Internet is critical infrastructure now and for the future.
- Not a solved problem – still a great deal of research and innovation to be done.
 - Technical Foundations
 - Applications, Verticals, Policy, ...
- It will require all of us working together to get there \Rightarrow *now is the time to engage!*



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