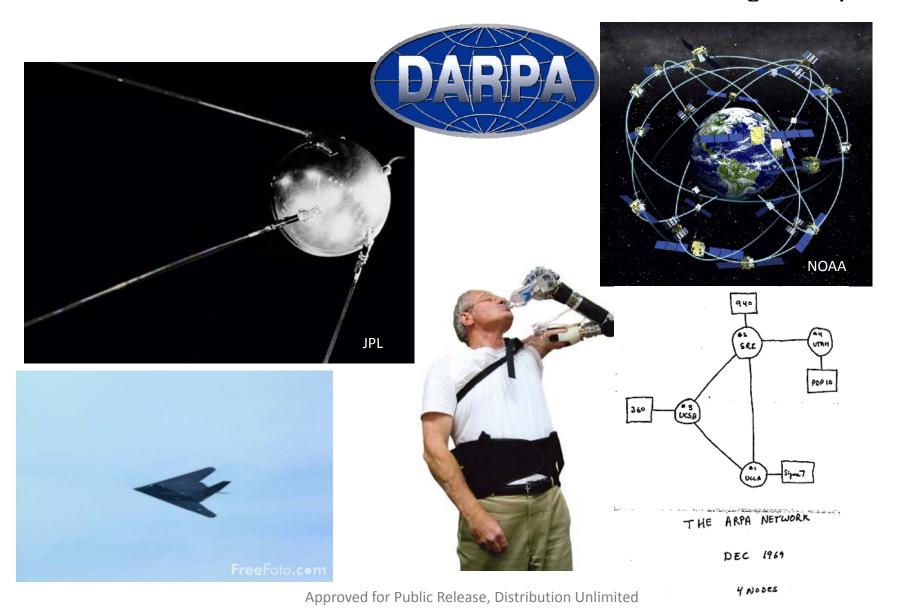
Developments at DARPA

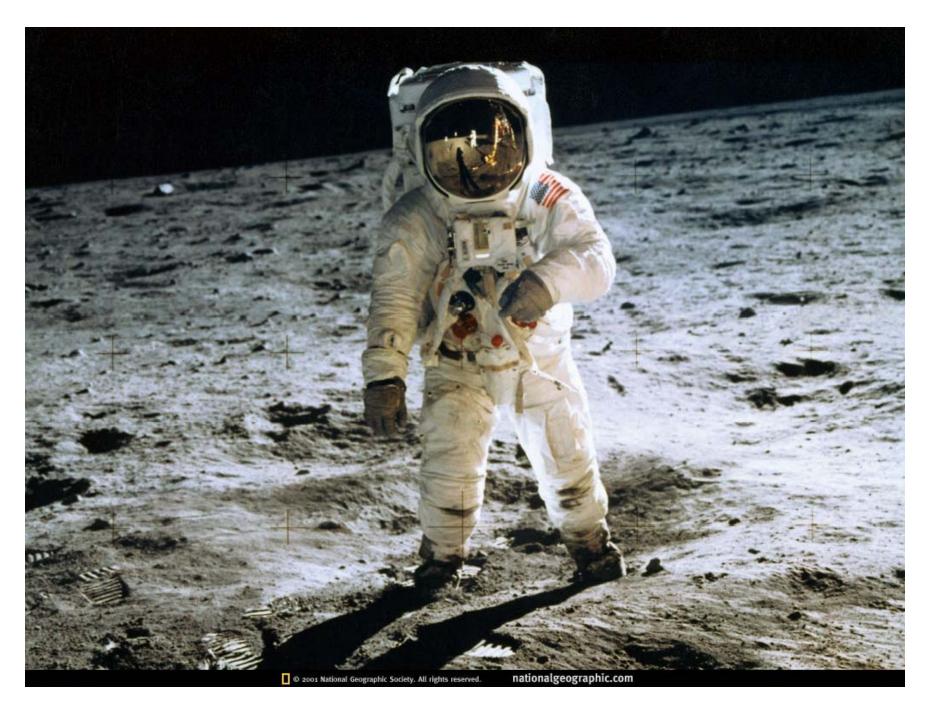
Peter Lee
February 2010
CRA Leadership Summit



Distribution "A": Approved for Public Release, Distribution Unlimited

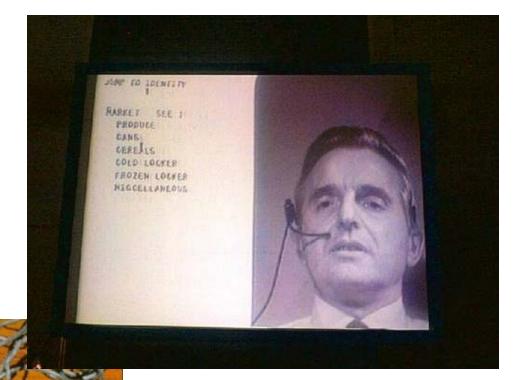
Formed in 1958 to **PREVENT** and **CREATE** strategic surprise





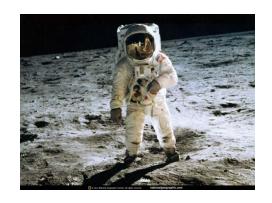
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"By 'augmenting human intellect' we mean increasing the capability of a man to approach a complex problem situation, to gain comprehension to suit his particular needs, and to derive solutions to problems. We do not speak of isolated clever tricks that help in particular situations...



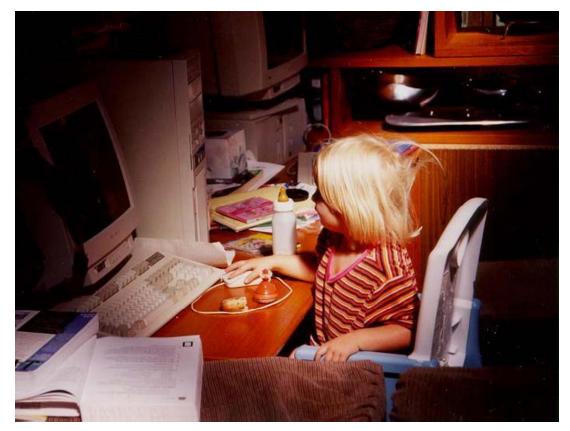
...We refer to a way of life in an integrated domain where hunches, cut-and-try, intangibles, and the human 'feel for a situation' usefully coexist with powerful concepts... and high-powered electronic aids."

— Doug Englebart, 1962



Which had more impact?





Source: Pat Lincoln, SRI

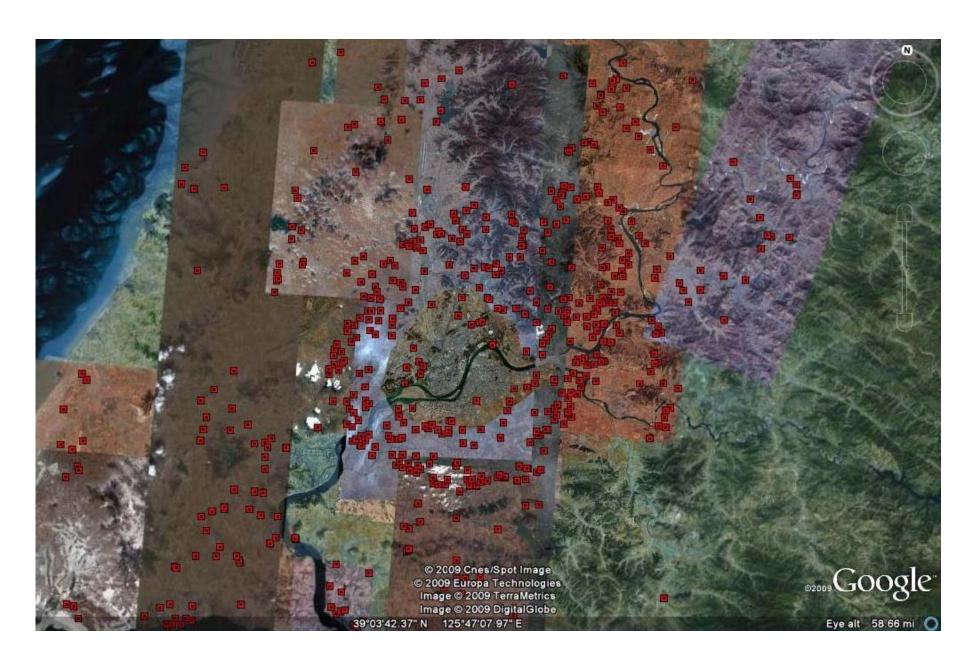
Has your child been to the moon?

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Station Dam
Old Chinese Customs StaitDam (under construction)
                                                                                  Lake Changjin National Park
                                                                          Changjin-up Airfield
              Factory ComplexElite Station, Mine Mine
                                                         Stadium
                                                                                                               Dam Station anch
                                                                                   □ Interesting Site Station
                                                                      Mine
                                                     Station Mine
                                Station
                                                                                   ■ Station
                                           Monument
         Monument Dam Mine
                                                                                                DamDam Dam Burial Mounds
                               Monument Mine Station
uspected underground nuclear site Station
                                          DamMyohyangsan mountains
                                                                                MonumentBarrage DamMonumentater Treatment Fa
        Taechon Hydroelectric Power PlaStation
                                                                                    Ryonghwa Temple (Mt. Paegun)
                                                checkpoint,
                                                                    Nyongwon Power Plant Long live 3 great revolutions" (Agriculture,
Vihwan Island Garage Station Aircraft Graveya Monument
on Taegye I Yongbyong Fuel Fabrication Complex Burnance Gate "Give up your life for the sake of our leader, Kim Jong il"
an War: Airforce B-29s strike railroad bridges
                                                                      Maengsan Airlield
                             Bukchang Thermal Power P Coal Depot
ımu İsland Sea-Bird Breeding Site
                                                               Nouse Station Station Hwa, Former Director of National Security Agenc
                                  Coal Ecading Deperoded hill sides
                                                                     Station Coal Mine DamNavy base
                       Military Communications ToweDamMine
                     Office/Factor Dam Mine Chosan Revolutionary Site

Pyongyang Ostrich Farm Monumen Mine Dam Dam Runway Under Construction

Technology and Economy Dam Mine Dam Runway Under Construction
                                                  DamMine Dam
ormation Center of New Technology and Economy
                                                                                     Dam Chonsam Fish Pond
                                                                      Dam
with veteran anti-Japanese revolutionary fighte Coal Min Station
                                                                               MineMineMonument
                         Tomb of King Tongmyong pam Jinpha-ri grouppama Dam MineMine John Stadium DamMine Ancient Fort Wall Monuments, MineSinpyong Resting Place Restaurant Dam Dam
            Hoeyang Southeast Airfield
                                                                                                             DamRK Kumgang
ne Railway and Turntable
of US bombing: 400 mothers 102 child Schung South Airfie Dam Dam/Jonument Dam a great revolutions (Agriculture, Industry, intellect
             Kim Jong il on the spot guidance a Nuchon Ni Highway Strip Dam
                            Monument Dam Mine Dam Monument
   With our own power we have developed Mine Dam Dam Dam Pavilion Dam
gy-of-the-great leader, Comrade Kim II Sun Burial Mound Military training grounds?
                                            □ Burial Mounds (Arduous March)
       Haeju Naval Base Monumen Dam Monumen Dam Kangryong/Ongjin Crane Habita Burial Mound Image © 2009 Terra Metrics
               North Korean Ships Dam Dam
                                                 Mo© 2009 Cnes/Spot Image
                                                 Image © 2009 DigitalGlobe
                                                         Image NASA
                                                                                                        Eye alt 246.33 m
 39°30'42.98" N
                125°11'35.89" E
                                                       elev 138 ft
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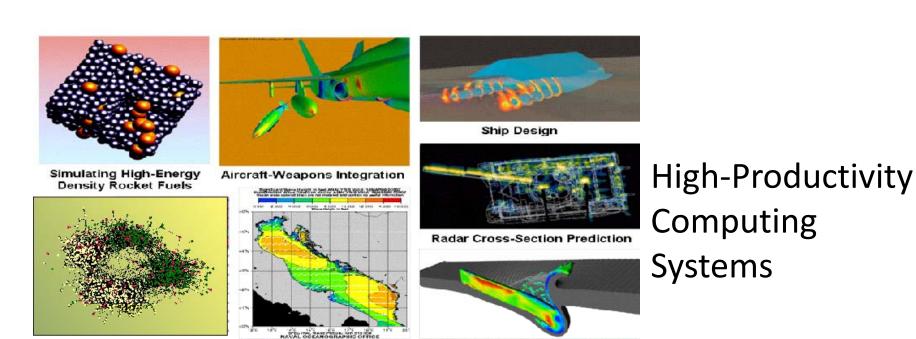


The disruptive effects of

- technology democratization and
- going beyond the DoD world view.



Focus on strategic surprise; Pursue diverse approaches to innovation; Challenge the DoD world view. Defense **Sciences Office** Strategic Technologies Office **Transformational** Information Adaptive Convergence **Processing** Execution **Techniques** Technology Office Office Office **Tactical** Technologies Office Microsystems **Technology** Office Improve quality of tech transition; Encourage better partnerships; Create "skunkworks" environment.



NCSA Blue Waters (in construction)

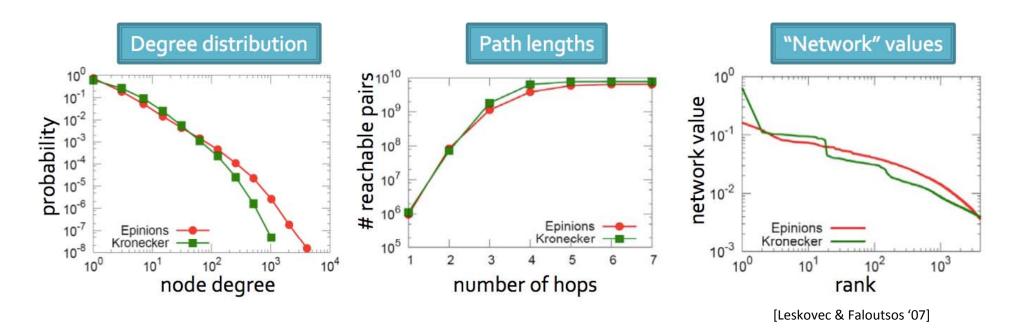
Graph Analytics



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Networked Systems science

New computer science models and fast analysis algorithms shed light on the structure and evolution of real-world human-machine networks

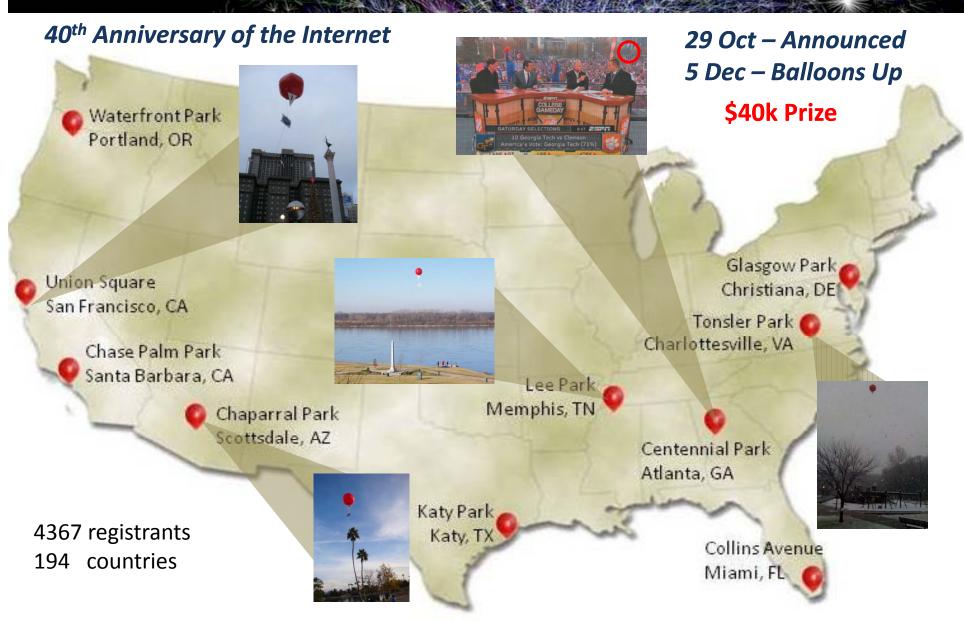


Core computing research areas of interest:

- computer systems and architectures
- networked systems science
- cybersecurity
- software systems (systems and languages)
- AI (including robotics and vision)

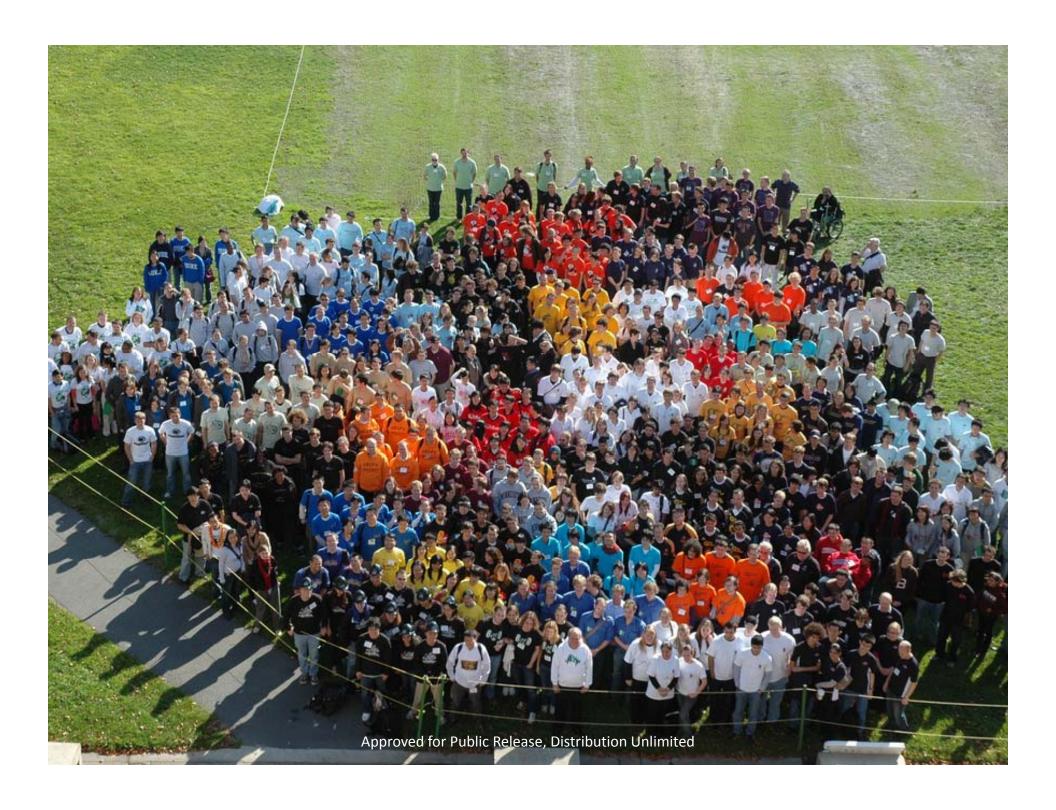
DARPA NETWORK CHALLENGE DARPA







Acquisition that is fully IT-enabled, social media-enabled, and warfighter-empowered?





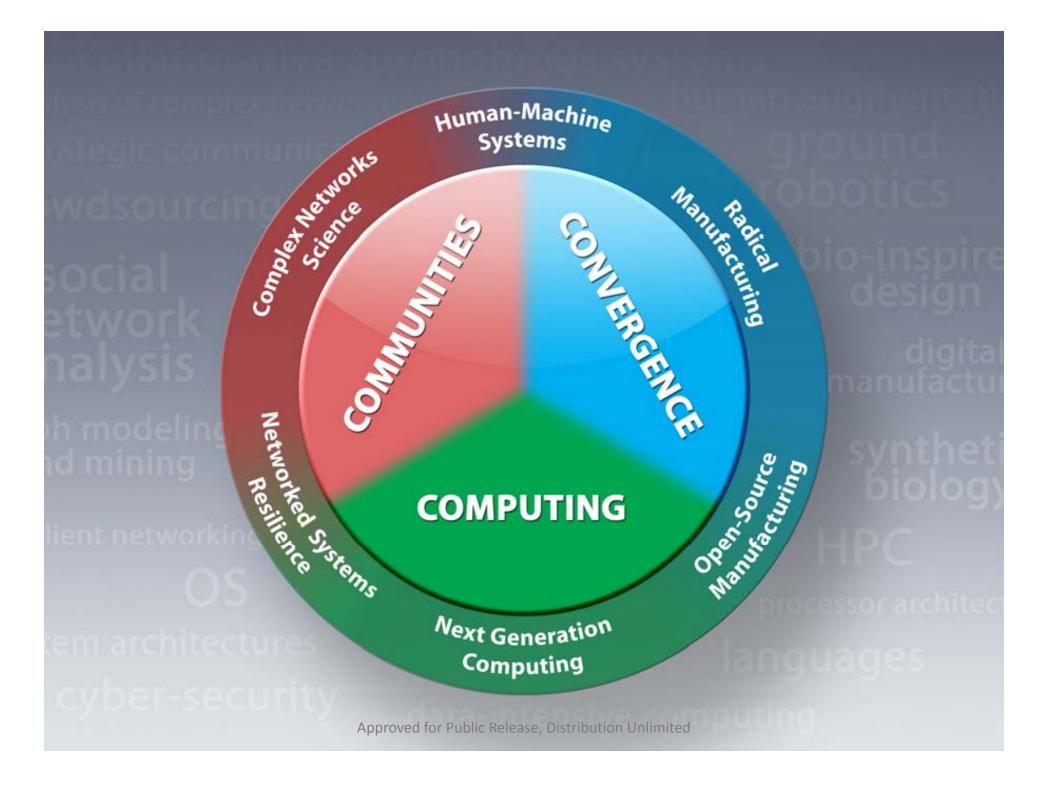
"Autonomous Robotic Manipulation" http://www.darpa.mil/IPTO/solicit/baa/BAA-10-28_ARM-S.pdf

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"Crowd-sourcing algorithms for Spacecraft Cluster Control" http://www.darpa.mil/tto/programs/inspire

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Current status

- 6 program managers
 - Initial plan for 8 this year (up to 10)
 - Highly selective recruiting process
- Three new solicitations in pre-release process
 - Plus a new CSSG class and computing-oriented YFA
- Funding is just beginning to flow
- Several new programs in development

Science

Pentagon Research Director Visits Universities in Bid to Re-energize Partnerships

By JOHN MARKOFF Published: October 6, 2009

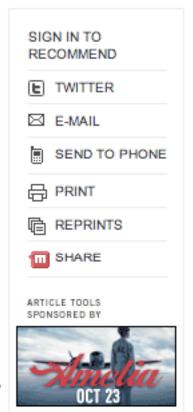
The new director of the Pentagon's research arm has started visiting university campuses around the country in an effort to rebuild bridges that were severed under the Bush administration.

RSS Feed

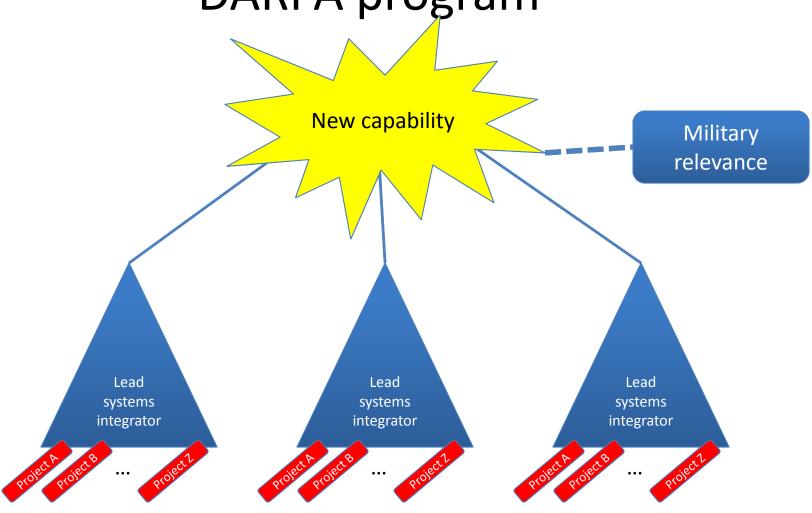
RSS Get Science News From The New York Times »

The director, Regina E. Dugan, who was appointed in July to lead the <u>Defense Advanced Research Projects</u> <u>Agency</u>, or Darpa, made visits last week to the <u>University of California</u>, <u>Berkeley</u>; Stanford University; the

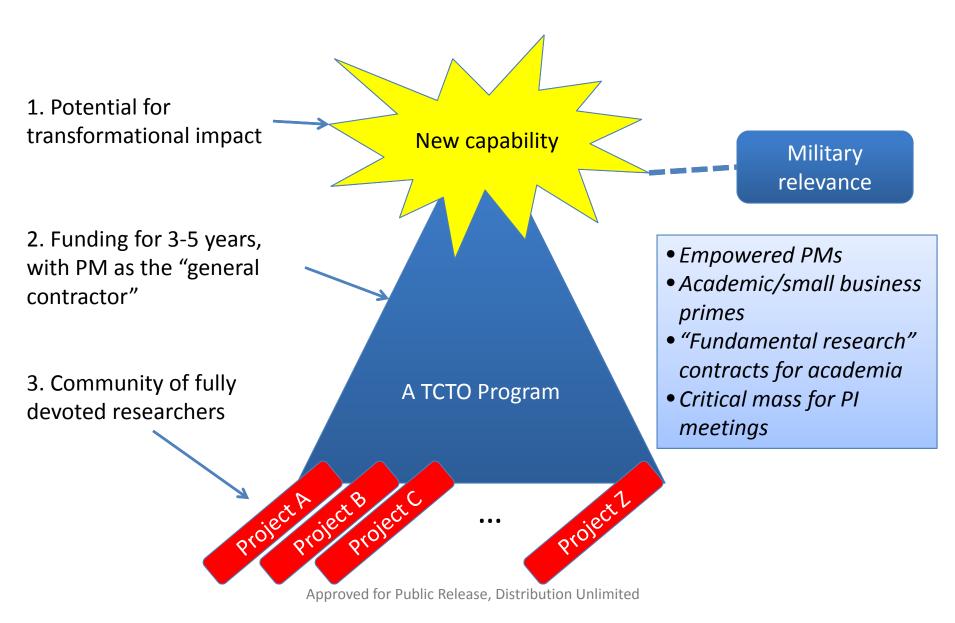
<u>University of California</u>, Los Angeles; and the <u>California Institute of</u>
<u>Technology</u>. She had previously visited Virginia Tech and Texas A&M.



Typical previous-style DARPA program



Back to the future



"I work for the Transformational Convergence Department.'
Gee, what if that was your job!"

NPR's John Hockenberry