Computing and Mass Mobilization

Peter Lee

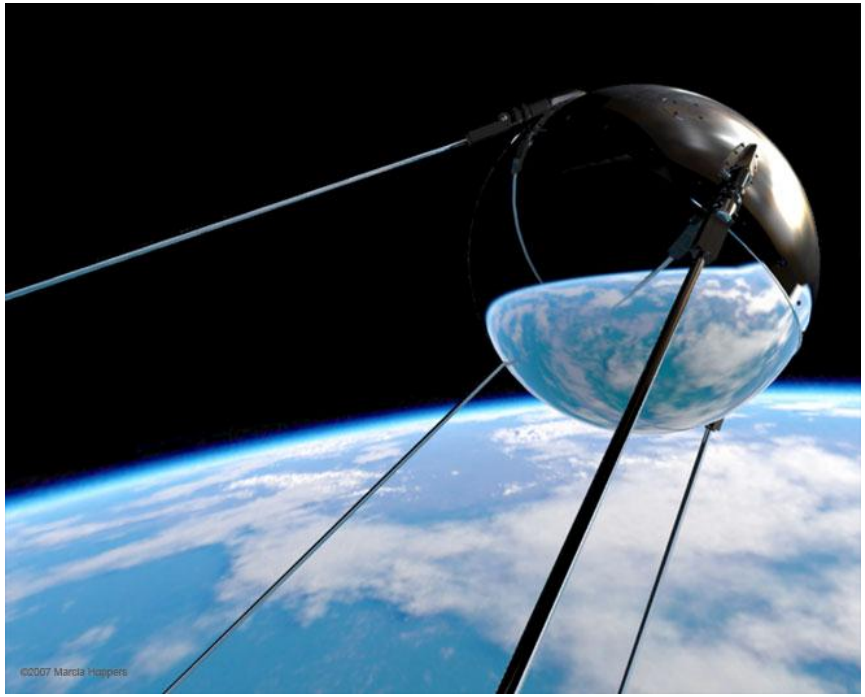
Microsoft Research

October 2010

HOTEL O'COMMODORE
NICE
JAIPUR HOTEL
JAIPUR
HOTEL
ROYAL DANIELI
VENEZIA
VICTORIA
CAIRO
HOTEL
GALILEE
NAZARETH
HOTEL SAVOIA MAJESTIC
GENOVA

Source: New York Times

Dr. Regina Dugan, Director
DARPA



Launch of Sputnik in 1957…

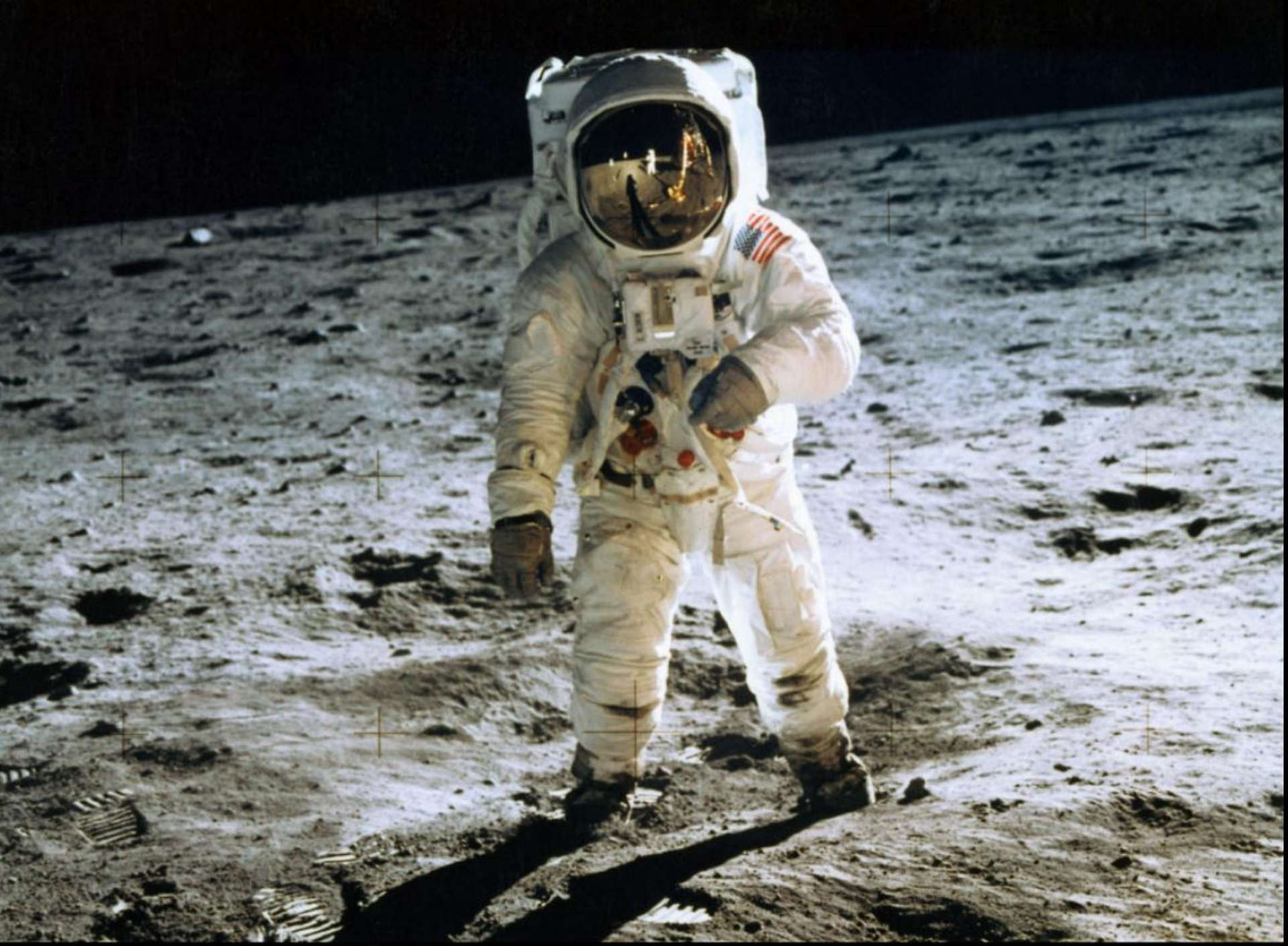
…led to the creation of (D)ARPA in 1958

DARPA™

- A mission-oriented agency
- Responsible for, or major contributions to,
  - Space satellites
  - GPS
  - Miniaturized GPS receivers
  - ARPAnet
  - Advanced prosthetics
  - Unmanned aerial vehicles
  - …

I thought I was supposed to run a computing research office…

- The mission I was given:
- Create a new technology office that will
  - focus on technological surprise,
  - "challenge the DoD world view", and
  - "create discomfort".



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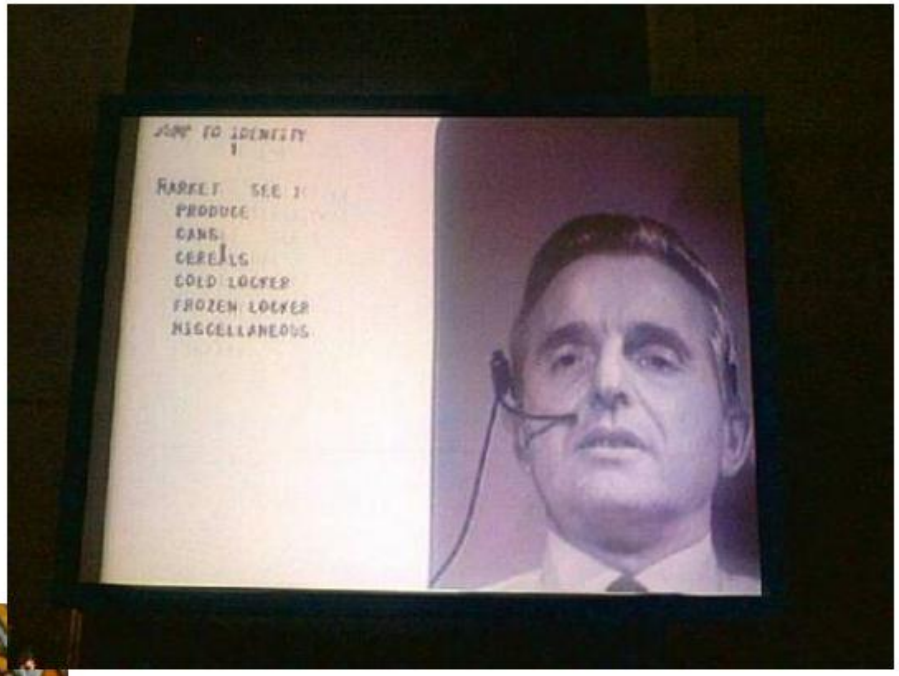
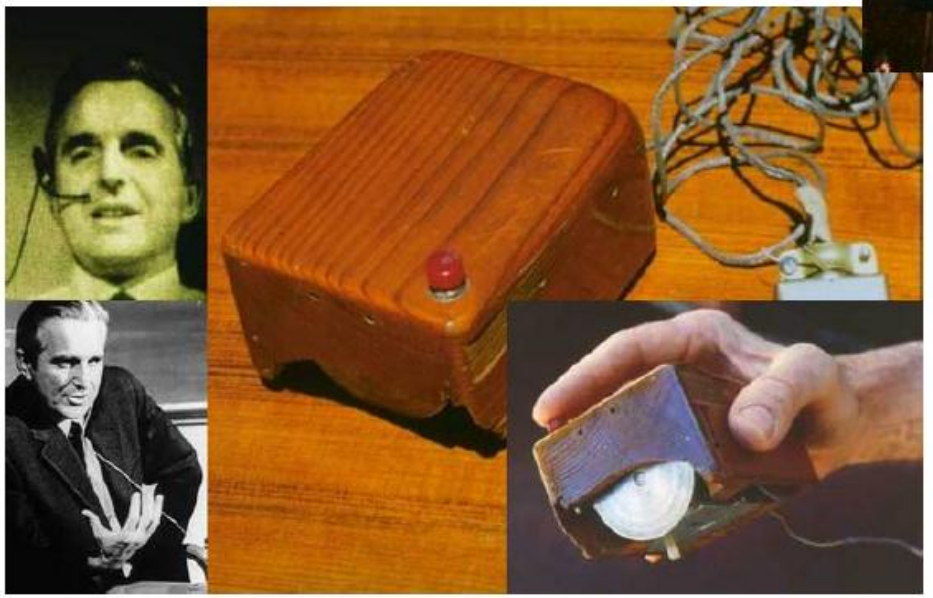
"By 'augmenting human intellect' we mean increasing the capability of a man to approach a complex problem situation, to gain comprehension to suit his particular needs, and to derive solutions to problems. We do not speak of isolated clever tricks that help in particular situations…





…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

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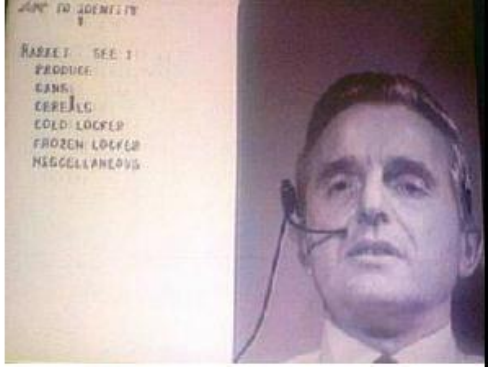
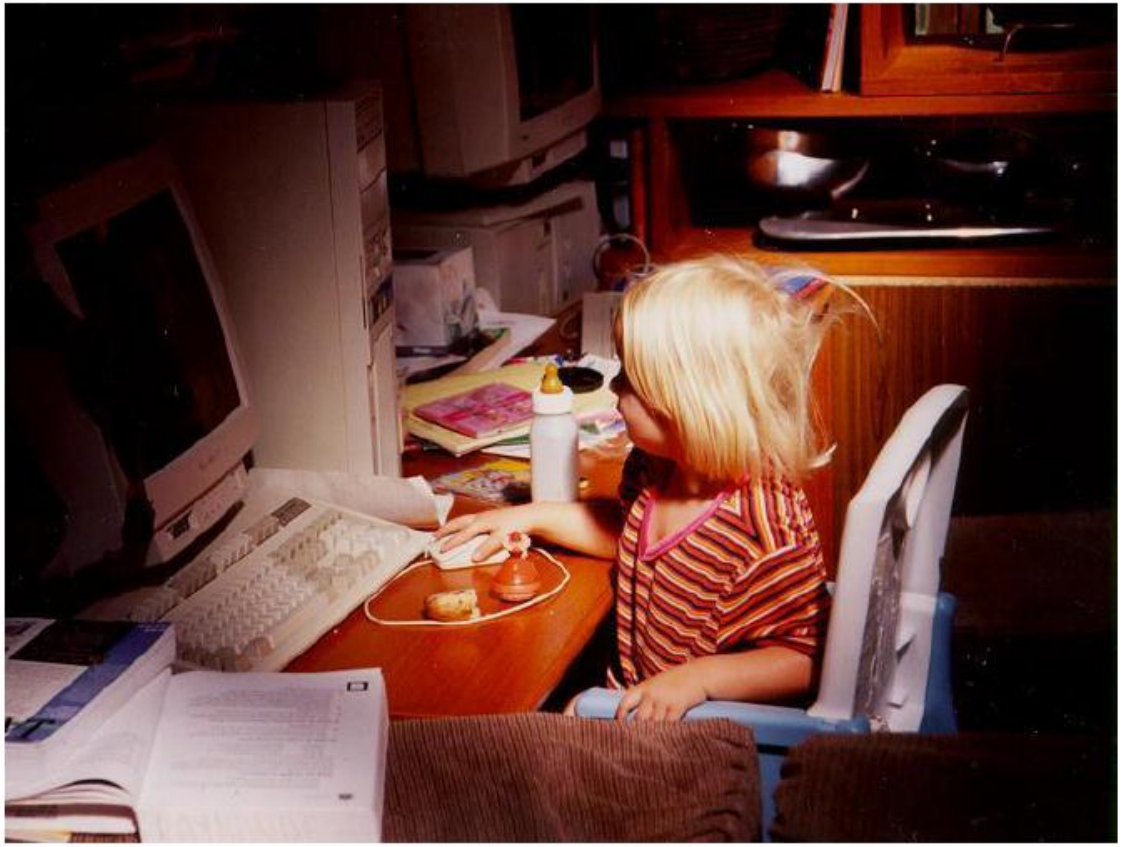
Which had more impact?



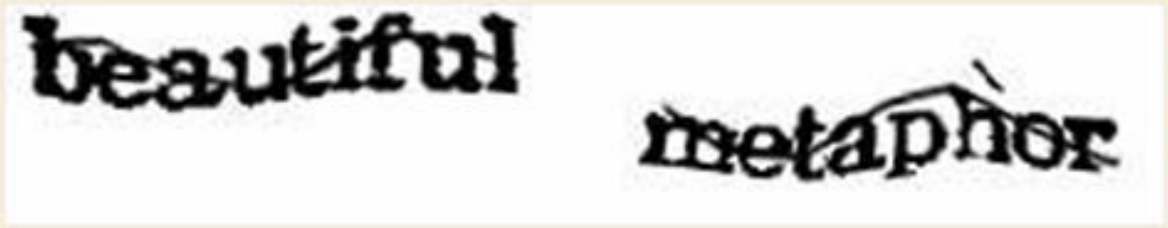


Has your child been to the moon?

The surprisingly disruptive effects of technology democratization

ticketmaster

Security Check



Try another

Vision Impaired

Help

Type both words separated by a space below

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Continue

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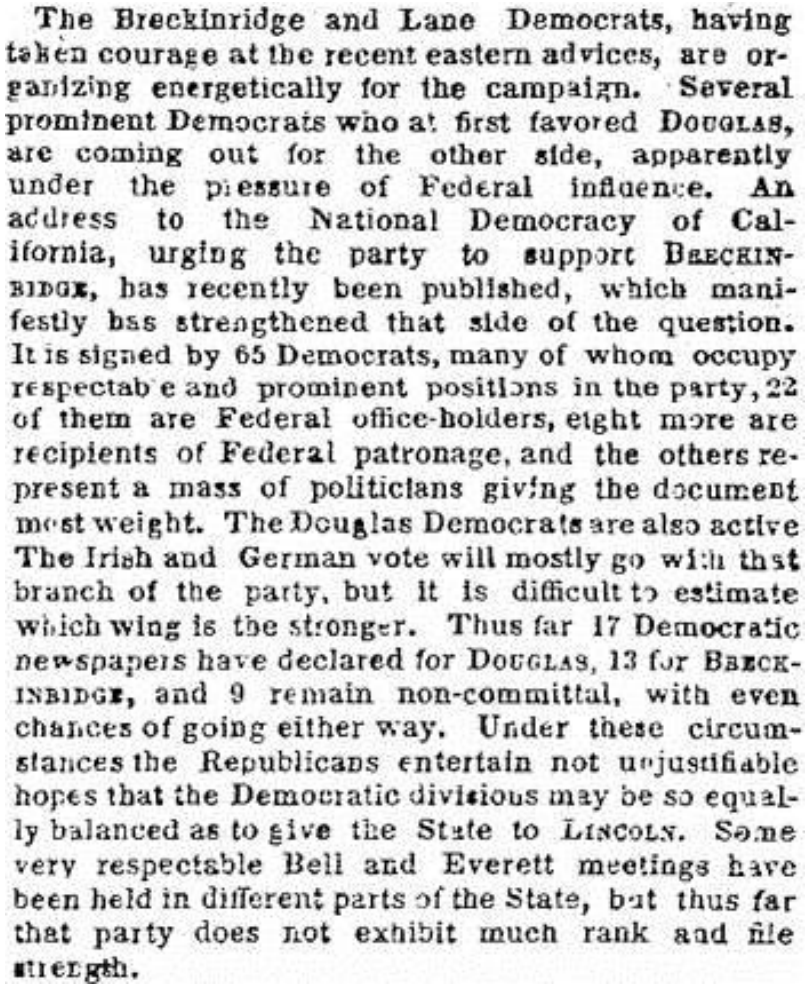
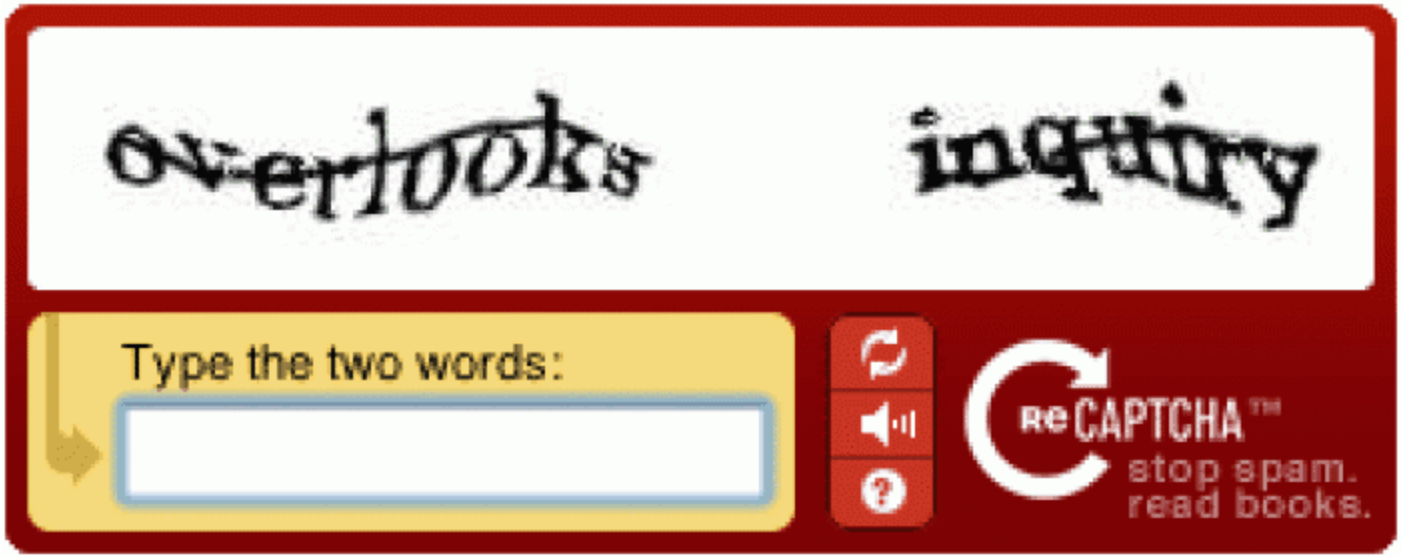


The Breckinridge and Lane Democrats, having taken courage at the recent eastern advices, are organizing energetically for the campaign. Several prominent Democrats who at first favored DOUGLAS, are coming out for the other side, apparently under the pressure of Federal influence. An address to the National Democracy of California, urging the party to support BRECKINRIDGE, has recently been published, which manifestly has strengthened that side of the question. It is signed by 65 Democrats, many of whom occupy respectable and prominent positions in the party, 22 of them are Federal office-holders, eight more are recipients of Federal patronage, and the others represent a mass of politicians giving the document most weight. The Douglas Democrats are also active The Irish and German vote will mostly go with that branch of the party, but it is difficult to estimate which wing is the stronger. Thus far 17 Democratic newspapers have declared for DOUGLAS, 13 for BRECKINRIDGE, and 9 remain non-committal, with even chances of going either way. Under these circumstances the Republicans entertain not unjustifiable hopes that the Democratic divisions may be so equally balanced as to give the State to LINCOLN. Some very respectable Bell and Everett meetings have been held in different parts of the State, but thus far that party does not exhibit much rank and file strength.

The **Hreckinridge**' and Lane Democrats, having taken courage at the recent eastern **advises**, are [**xxxxxxxxxx**] energetically for the campaign: Several prominent Democrats who at first favored **DonoLea**, are coming out. for the other **aide**, apparently under the [**xxxxxxxx**] of Federal [**xxxxxxxxx**]. An address to the National Democracy of **,1ifornia**, urging the party to support **HaeeslipslDas**, has recently been published, which manifestly **bss** strengthened that **aide** of the [**xxxxxxxxx**]: It is signed by 65 Democrats, many of whom occupy **respectab e** and prominent positions in the party, 22 of them are Federal office-holders, [**xxxxx**] more are recipients of Federal patronage, and the others represent a mass of politicians giving the document [**xxxx**] [**xxxxxx**] **mTheDcu8las** Democrats are also active The Irish and German vote will mostly go with **ths#** branch of the party, but it is [**xxxxxxxxx**] to [**xxxxxxxx**] [**xxxxx**] [**xxxx**] [**xx**] the stronger. Thus far 17 IT newspapers have declared for **DonGres**, 13 for **Base$- laaIDGS** and 9 remain non-committal, with even chances of going either way. Under these circumstances the Republicans entertain not unjustifiable hopes that the Democratic divisions may be so **equal,- ly** balanced as to give the State [**xx**] **LIaCOLV**. **Same** very [**xxxxxxx**] Bell and Everett meetings have been held in different parts of the State, **bat** thus far that party does not exhibit much rank **sad ale air en**.



Recaptcha: Luis von Ahn

The ESP Game

2:05
Time Left

The ESP Game

0090
score

Taboo Words

USO

BANNER

PEOPLE

Your Guesses

CROWD

STAR

STARS

BLUE

WHITE

BLACK

Type your next guess:

Pass

Your partner has entered a guess

Flag

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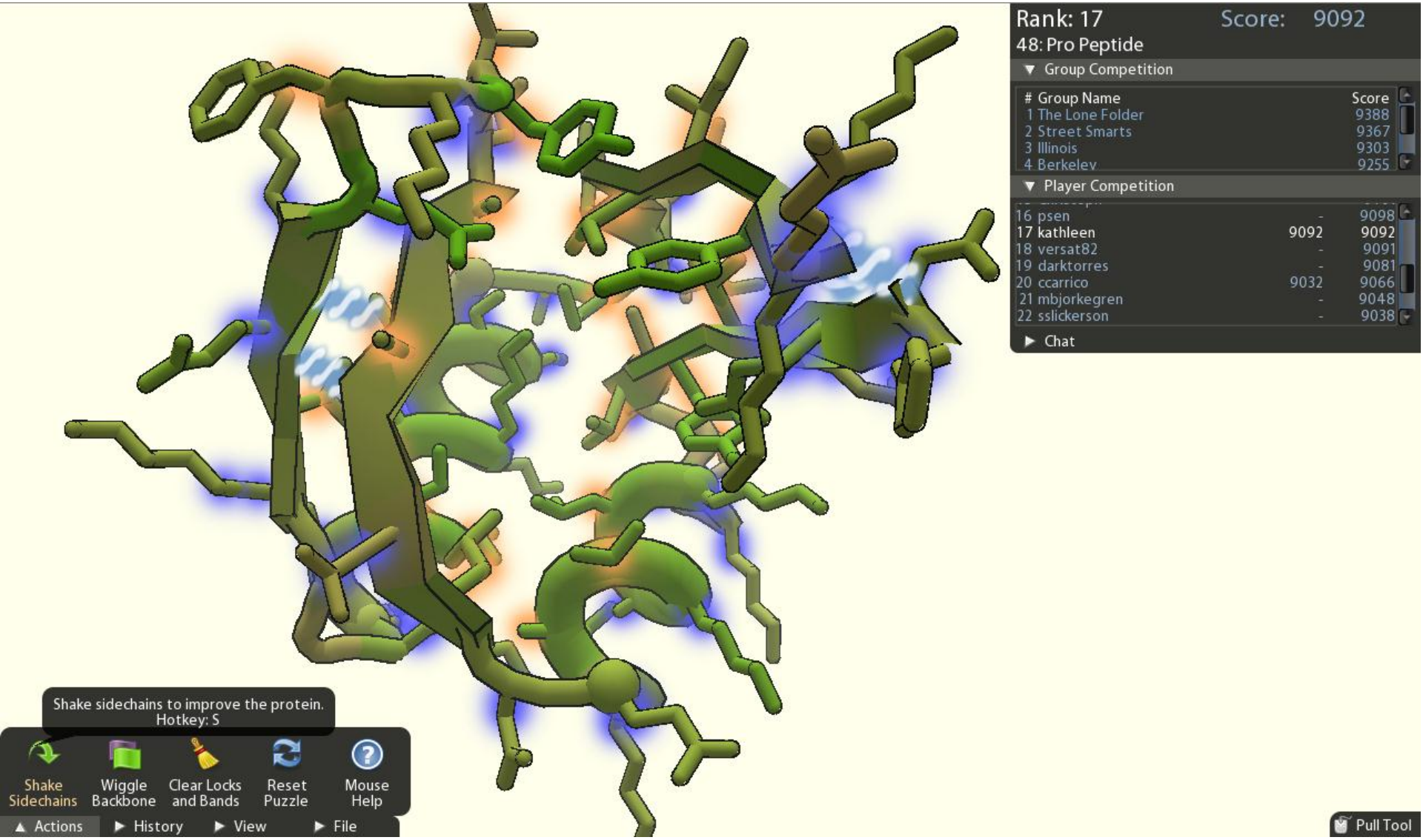
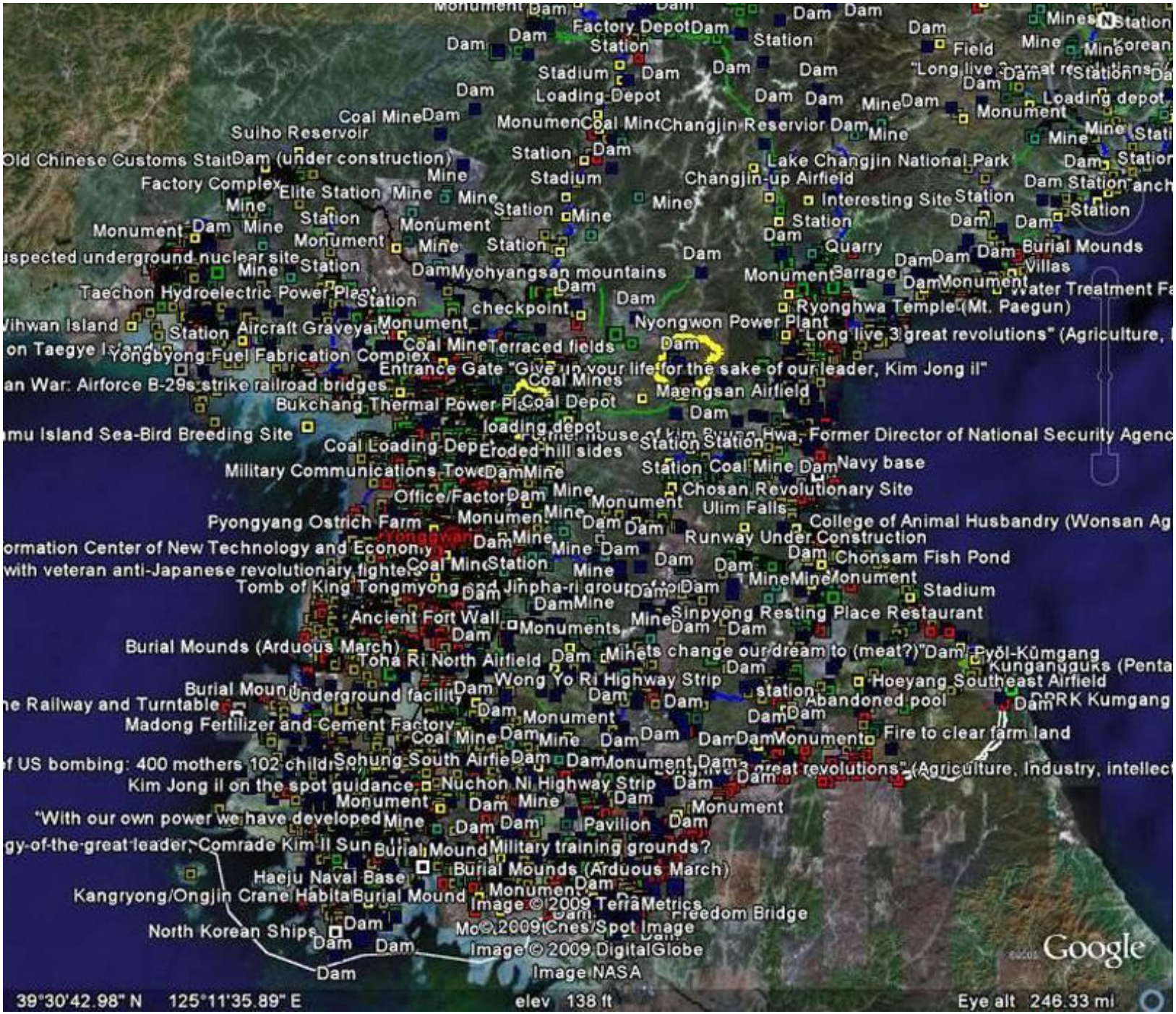
gwap
ESP Game
Tag a Tune
Verbosity
Squigl
Matchin
You play the games
Computers get smarter
Everyone benefits!
Learn More
email
password
Sign in
Register
remember me
forgot password?
gwap
Squigl
Ready, set... Trace!
Description
Top 5 Players
You and a partner try to trace the same object. If your outlines match, you earn points and teach computers to see.
PLAY NOW



fold.it: Adrien Treuille

10 minutes with the Secretary of Defense

AT&T
2:46 PM
trapster .com
Options
0.5 mi
Torrey Pines
CA84
North Campus
Genesee Ave
San Diego Fwy
Sorrento Valley Rd
805
University of California San Diego
School of Medicine
La Jolla Village Dr
Nobel Dr
Nobel Athletic Area
La Jolla Village
Doyle Community Park
La Jolla Heights
University City
Google
Report


Suiho Reservoir
Changjin Reservior Dam
Lake Changjin National Park
Changjin-up Airfield
Myohyangsan mountains
Taechon Hydroelectric Power Plant
Ryonghwa Temple (Mt. Paegun)
Nyongwon Power Plant
Yongbyong Fuel Fabrication Complex
Entrance Gate "Give up your life for the sake of our leader, Kim Jong il"
Maengsan Airfield
Bukchang Thermal Power Plant
Pyongyang Ostrich Farm
College of Animal Husbandry (Wonsan Ag
Chonsam Fish Pond
Tomb of King Tongmyong
Ancient Fort Wall
Sinpyong Resting Place Restaurant
Burial Mounds (Arduous March)
Toha Ri North Airfield
Wong Yo Ri Highway Strip
Hoeyang Southeast Airfield
Madong Fertilizer and Cement Factory
Fire to clear farm land
Kim Jong il on the spot guidance
Nuchon Ni Highway Strip
"With our own power we have developed
Military training grounds?
Haeju Naval Base
Kangryong/Ongjin Crane Habita
North Korean Ships
Freedom Bridge
Image © 2009 TerraMetrics
Image © 2009 DigitalGlobe
Image NASA
Google
39°30'42.98" N 125°11'35.89" E
elev 138 ft
Eye alt 246.33 mi

Starting a DARPA office with almost no money…

DARPA NETWORK CHALLENGE

DARPA

40th Anniversary of the Internet

29 Oct – Announced
5 Dec – Balloons Up

$40k Prize

Waterfront Park
Portland, OR

Union Square
San Francisco, CA

Chase Palm Park
Santa Barbara, CA

Chaparral Park
Scottsdale, AZ

Glasgow Park
Christiana, DE

Tonsler Park
Charlottesville, VA

Lee Park
Memphis, TN

Centennial Park
Atlanta, GA

Katy Park
Katy, TX

Collins Avenue
Miami, FL

4367 registrants
194 countries
922 submissions
370. correct locations

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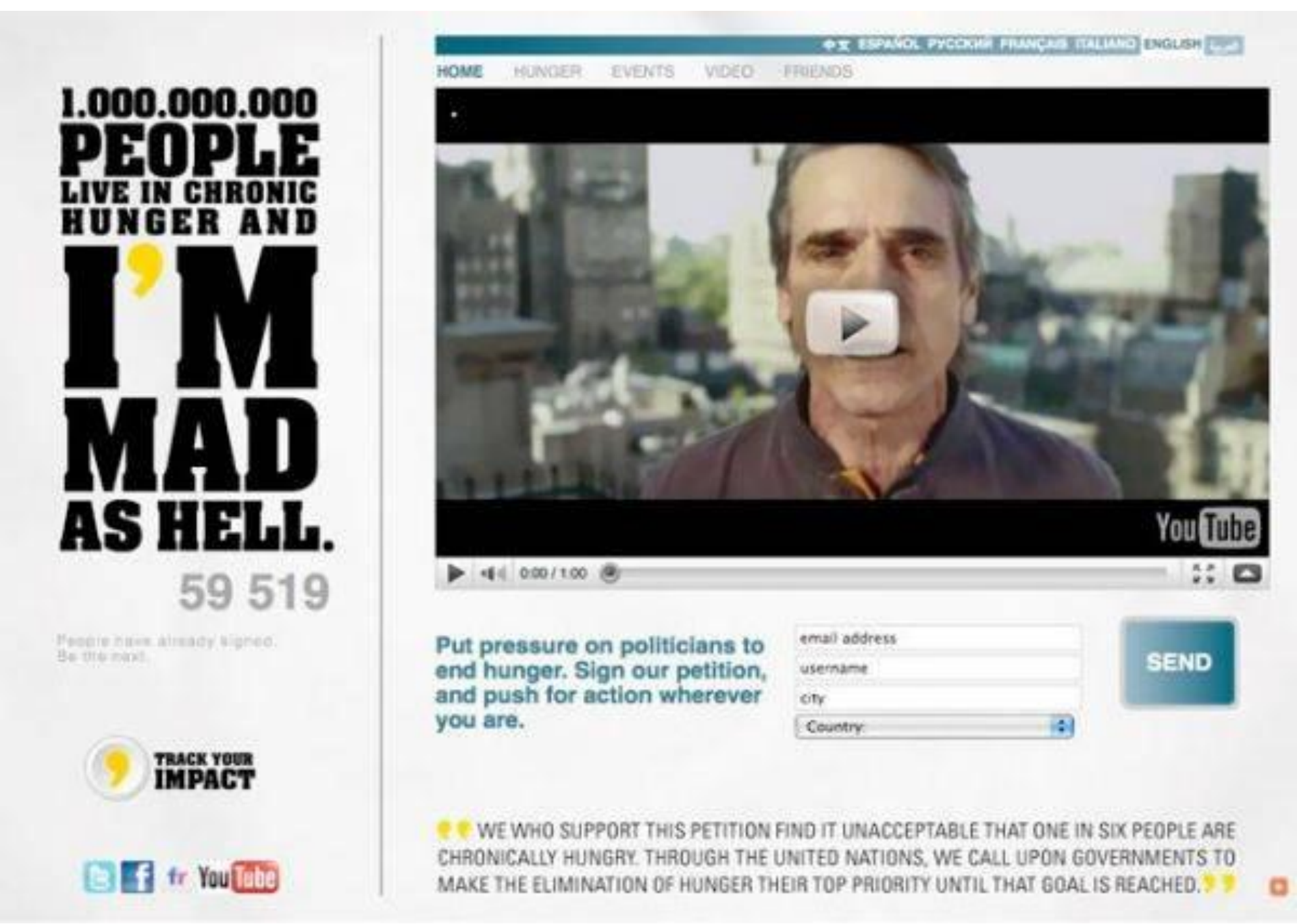
DARPA Network Challenge Results

- A total cost of $79,000
- Almost 4,400 teams from around the world
  - Teams from Sudan, Iran, Russia, India, Brazil, …
- The winning MIT team found the balloons in less than 9 hours
  - Stiff competition from GaTech, NerdFighters, many others
- 9 novel approaches used by the top 50 teams
- Results briefed throughout DoD leadership



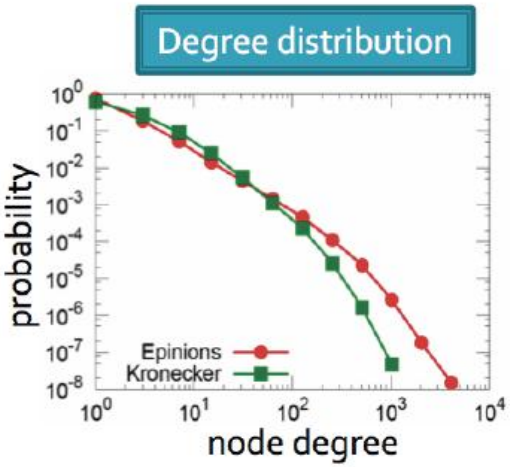
1billionhungry.org

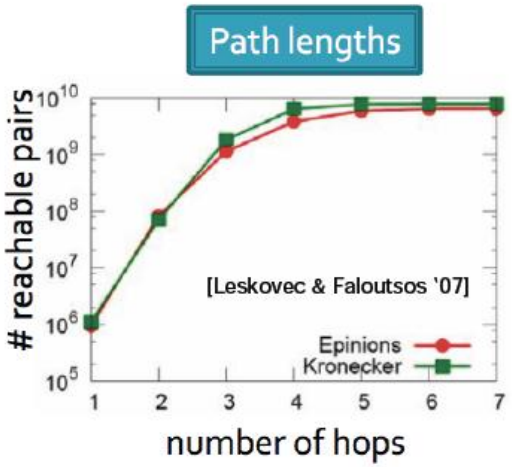
The Central Role of Computing Research

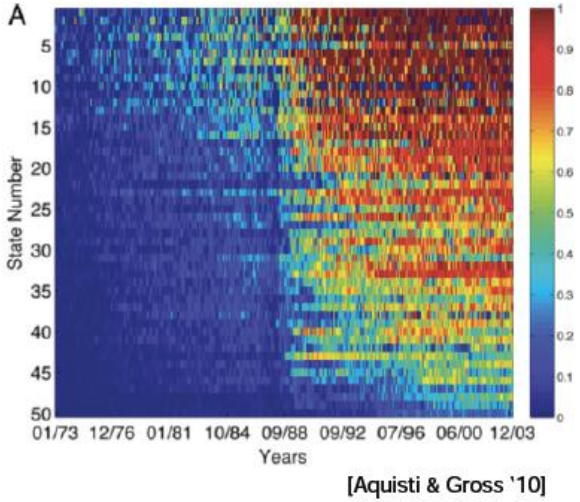
Investments in Core Computer Science

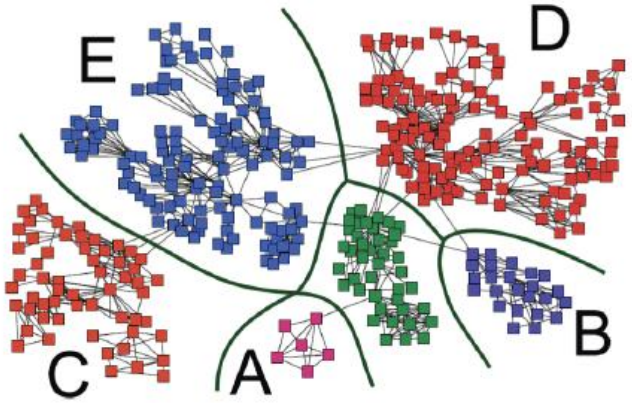
- Machine learning
- Social network analysis
- Large-scale computing systems
- Computer networking
- Computer security
- Algorithms and complexity
- Languages and program analysis
- CS education

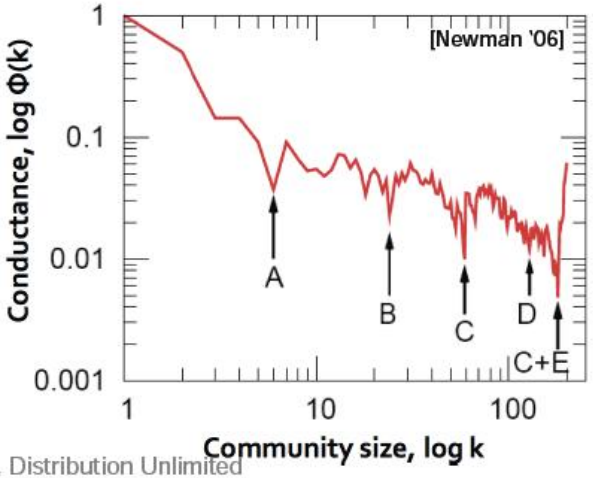
Social Computing











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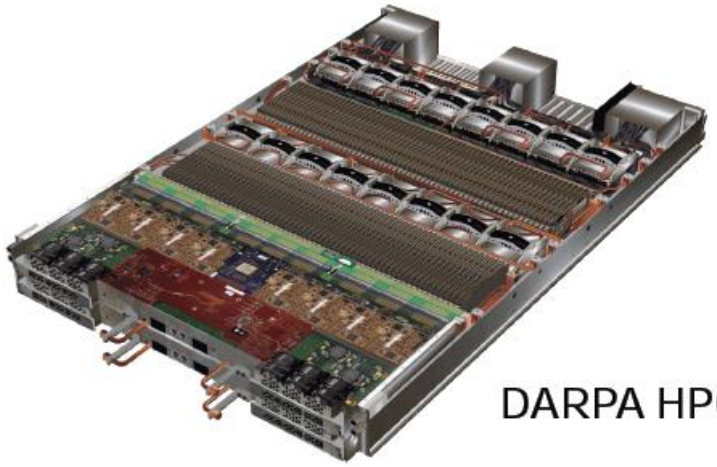
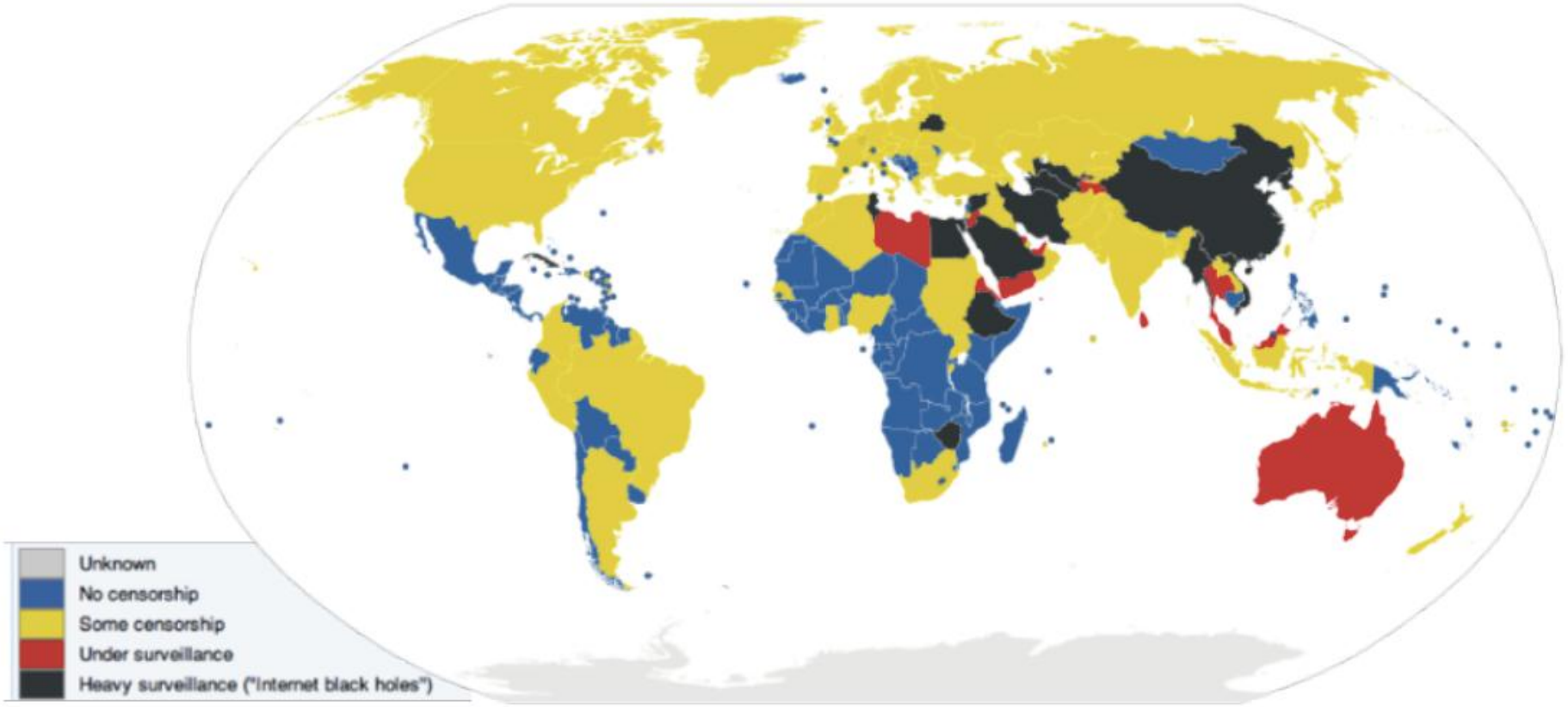
Data-intensive Computing Systems



DARPA HPCS Program

Internet Freedom and Privacy



Computing and technological surprises

- Computing has always been a force for technology democratization…
- …and thus a source of technological surprises

- It even enabled a new computing research technology office to get fully funded and operational in less than a year! ☺

What I learned

- We sometimes think of computing as being about automation at scale
- But computing is also an enabler for community-building and mass mobilization
- As people around the world understand this, we should expect many new disruptions and surprises

Research

Microsoft Research

- ~850 PhD researchers over 6 labs and several satellite operations
  - Labs: Redmond, Beijing, Cambridge (UK), Bangalore, Silicon Valley, New England
  - Plus External Research, Extreme Computing Group, …

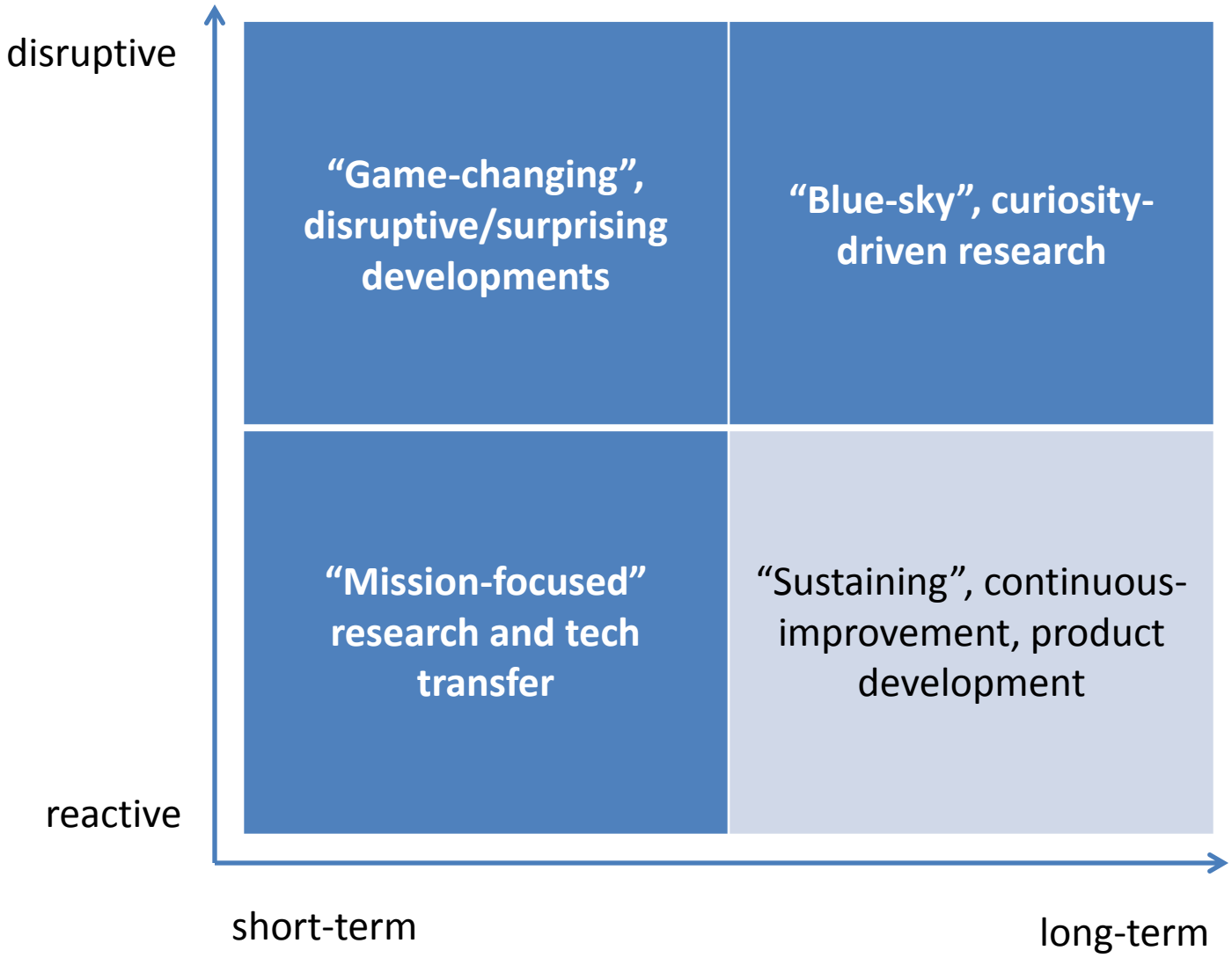
MSR Mission

- Advance the state of the art in the areas we choose to do research.
- When we have great ideas, work hard to get them into our products.
- Make sure the company, and the field more broadly, has a future.

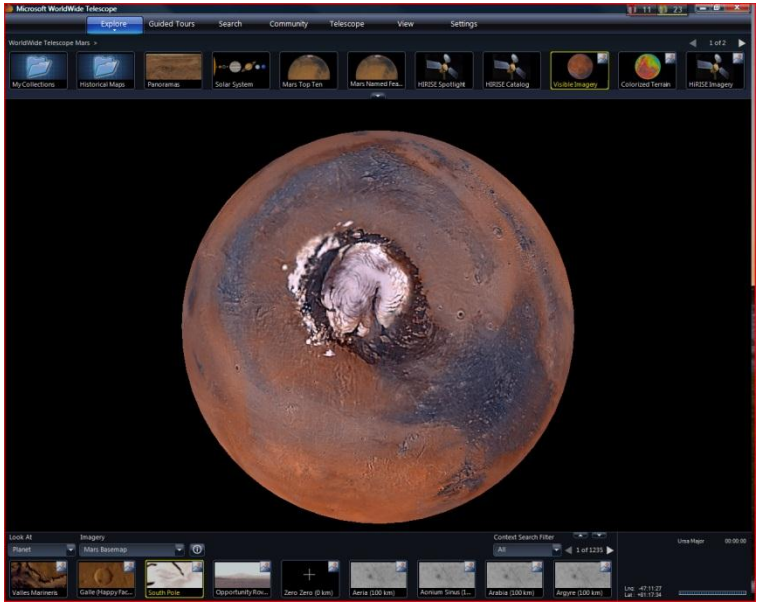
- Roughly, the strategy: Get the best people, make sure they are fully resourced, and then get out of the way

MSR Redmond

- The “mother ship” lab, founded in 1991
- About 350 researchers and engineers
  - engaged mainly in open research
  - opportunistic tech transfer
  - organized into 8 broad research divisions
  - plus an engineering division
- About 400 PhD student interns each summer
- Broad array of external programs and outreach



Roughly equal emphasis on all three “lanes” of research



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