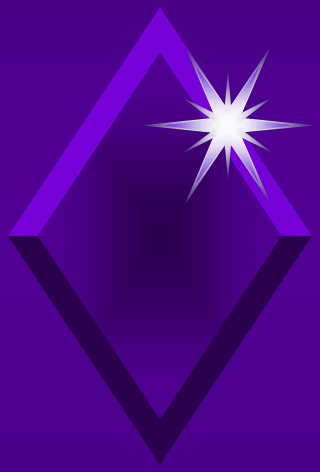


Internet Future
CRA Biennial Conference

Snowbird, Utah

Vint Cerf
MCI

July 11, 2004

30th Anniversary of TCP/IP

- May 1974: “A Protocol for Packet Network Interconnection,” Vint Cerf and Bob Kahn, IEEE Transactions on Communications
- A copy of this was auctioned for $3,000 in 2002!

Internet - Global Statistics

22.5 Million Hosts
(Bellcore June 1997)

50 Million Users
(NUA Jul 1997)

250 Million Hosts
(ISC Apr 2004)

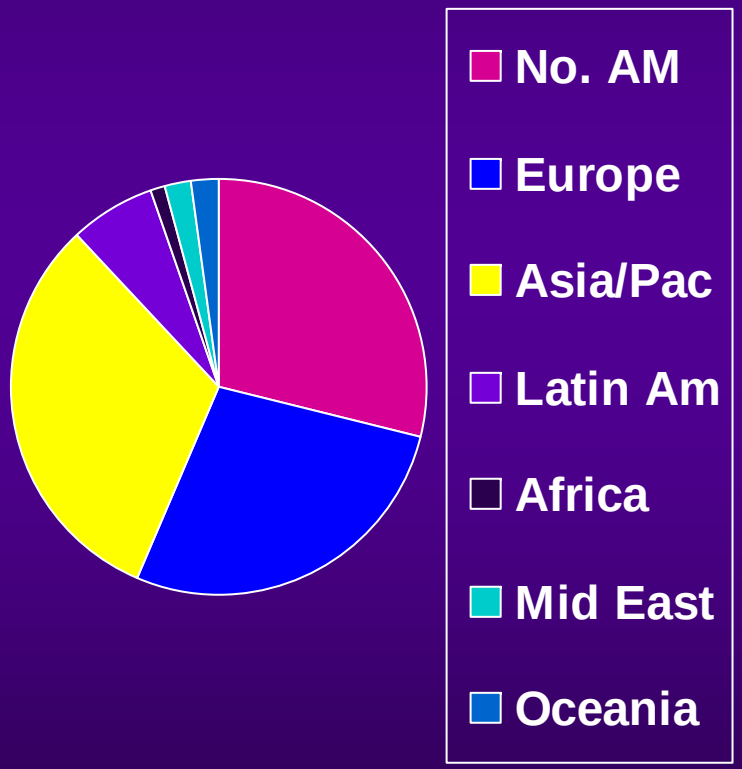
745.3 Million Users
(InternetWorldStats.com April 2004)
[Other estimates range from 850M-950M]

(approx. 2.3 Billion Telephone Terminations,750 Million PCs)

Internet Penetration May 2004

- Asia/Pac - 235.1M
- No. Amer. -216.1M
- Europe - 204.6M
- Latin Am - 49.5M
- Africa - 10.1M
- Mid-east - 14.5M
- Oceania- 15.7M

- Total - 745 M

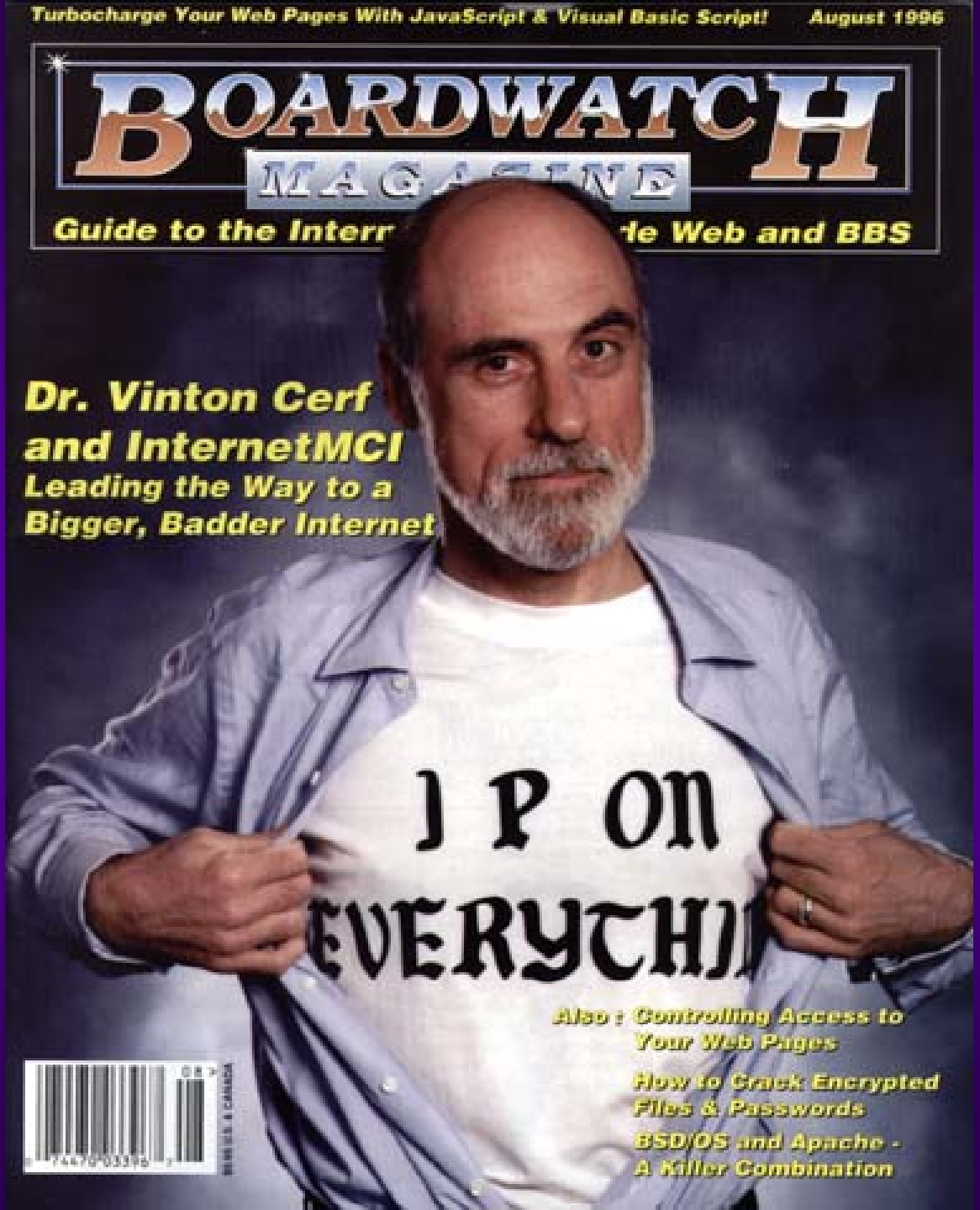


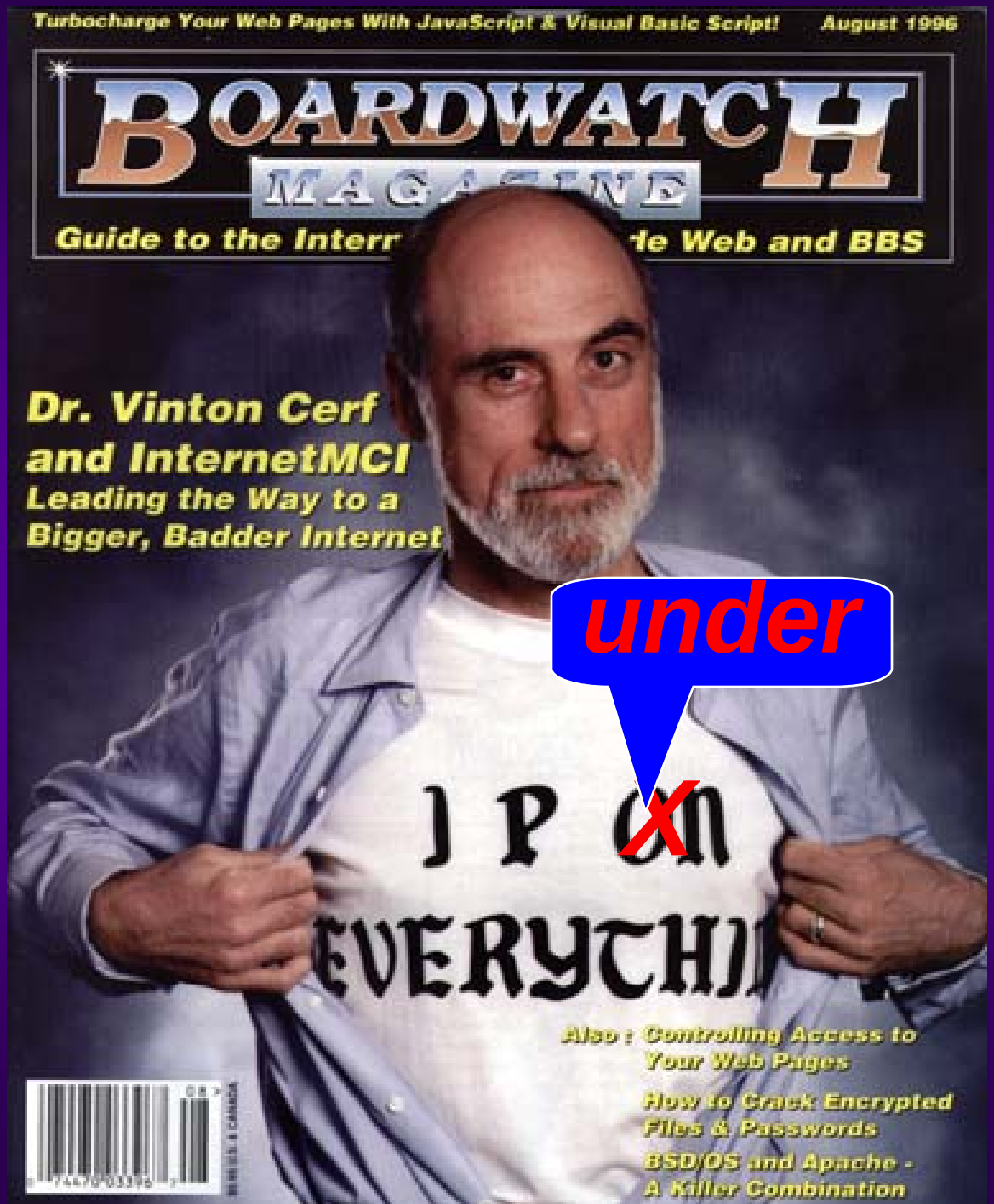
(Source www.internetstats.com

Internet expansion

The Power of IP

- Layering of Protocols
- IP decouples application from transmission/transport
  - IP does not care what transport is used (satellite, fiber, twisted pair, radio, ATM…)
  - IP does not care what application it is carrying (video, audio, web, email…)
- Profound impact on regulatory models
- Integration of all communication modes under IP control.


Turbocharge Your Web Pages With JavaScript & Visual Basic Script!
August 1996
BOARDWATCH
MAGAZINE
Guide to the Interr
de Web and BBS
Dr. Vinton Cerf
and InternetMCI
Leading the Way to a
Bigger, Badder Internet
I P ON
EVERYTHI
Also : Controlling Access to
Your Web Pages
How to Crack Encrypted
Files & Passwords
BSD/OS and Apache -
A Killer Combination


Turbocharge Your Web Pages With JavaScript & Visual Basic Script!
August 1996
BOARDWATCH
MAGAZINE
Guide to the Interr
le Web and BBS
Dr. Vinton Cerf
and InternetMCI
Leading the Way to a
Bigger, Badder Internet
under
Also : Controlling Access to
Your Web Pages
How to Crack Encrypted
Files & Passwords
BSD/OS and Apache -
A Killer Combination

Internet-enabled Appliances

Presence

- Instant messaging
  - First “presence” application
  - Smooth spectrum of communication (text, voice, video, shared applications, group collaboration)
- Presence may vary by application and by community
  - Apparent presence can be tailored
  - Alternative communication media a function of requesting party and medium requested

SIP Telephony

- Session Initiation Protocol Telephones
- Cisco Systems, Pingtel, etc.
- “email” addressing
- ENUM:

1.1.9.3.0.6.5.3.0.7.1.e164.arpa = sip:vinton.g.cerf@mci.com

(any domain name)

NAPTR (naming authority pointer)

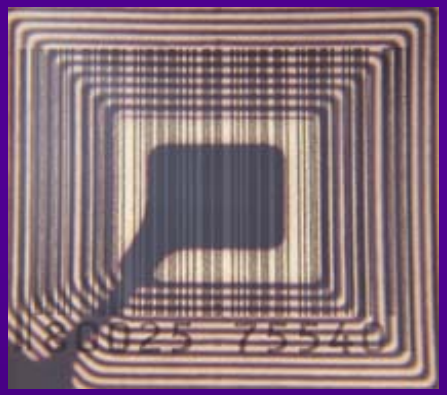
The power of SIP

Videoconferencing online

- Video-conferencing is a reality.
- High speed access is preferable but it can be made to work at dial up speeds (jerkily)
- Microsoft Messenger; Santa Cruz Networks Viditel

RFID

- Toll-Road passive transponder
- Consumer product identifier (like UPC)
- Drug/Food shelf-life and identification
- Patient identification



Internet-enabled Devices

- Programmable – Java, Python, etc.
- Examples:

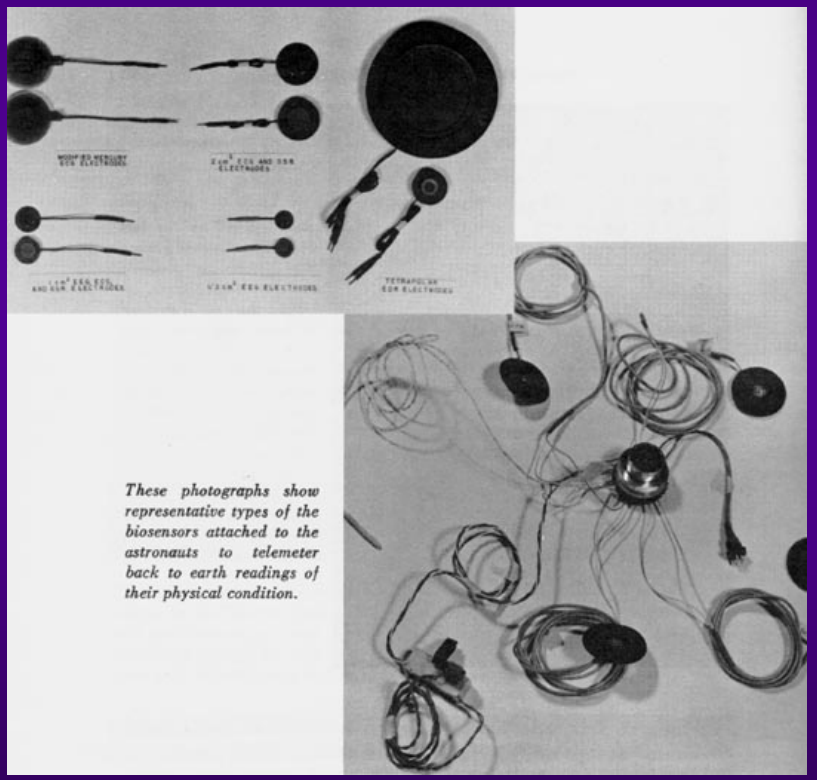
  WebTV, Palm-Pilot, Mobiles,Video games, Picture Frames, Washing Machines, Surf Board!
- Refrigerator (and the bathroom scales)
- Automobiles (Japan, Germany)
- Internet-enabled wine corks (also note new quantum theory of wine: Schrödinger's wine bottle)
- Internet-enabled socks
- Universal Remote Control

IPv6

- 128 bit address space (10^{38})
- IPSEC requirement
- Eliminates need for Network Address Translation
- Consumer electronics IPv6 enabled
- Dual-stack migration strategy

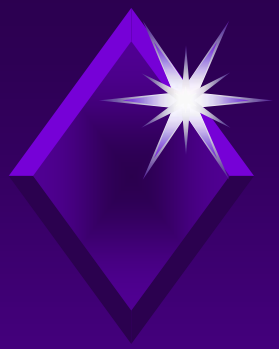
Remote diagnosis/detection

- Astronauts – as far back as the Mercury Program
- Telemetry by radio back to ground data collection systems

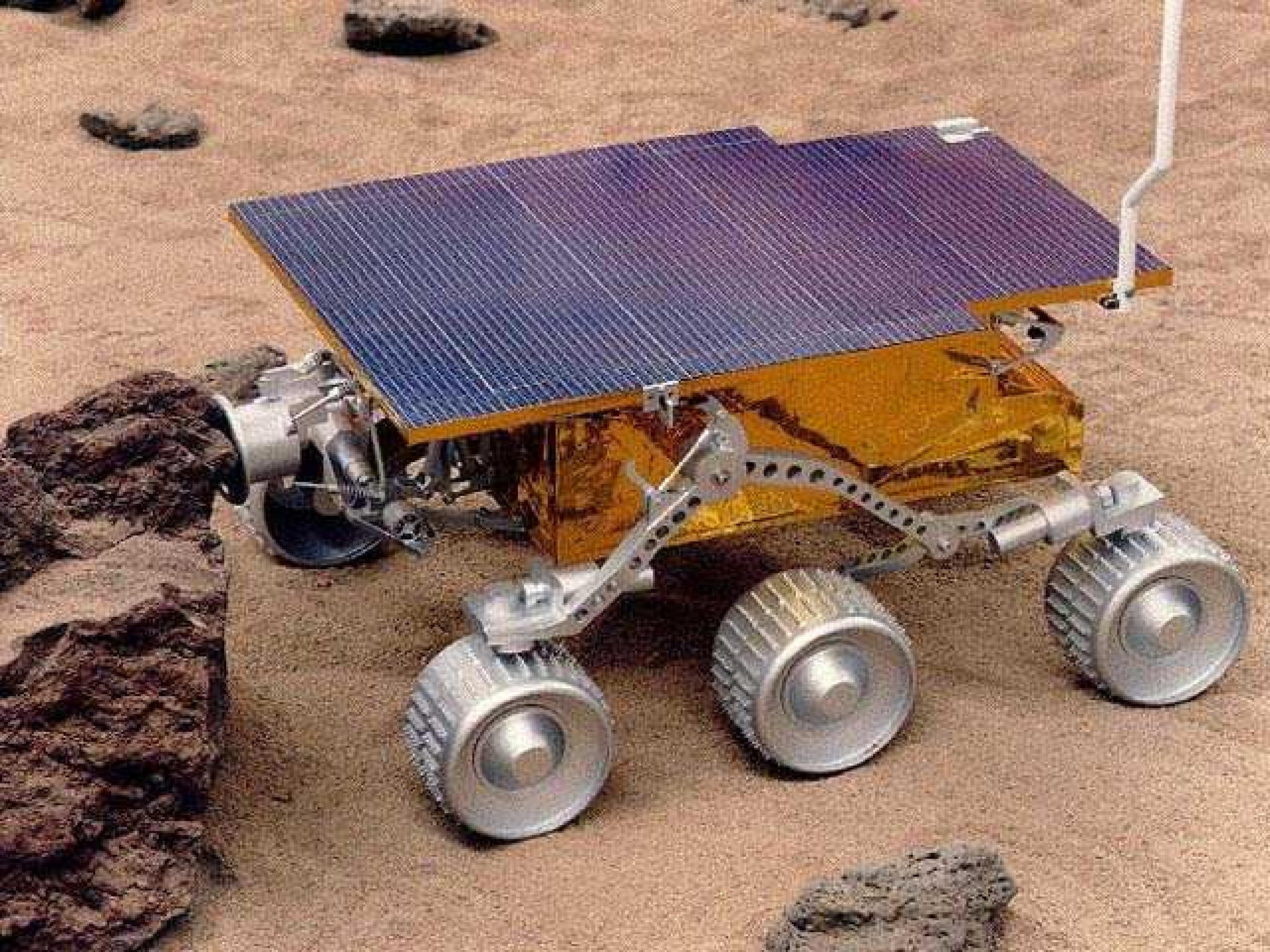


Indexing of unstructured data

- The standardization of information representation (HTML, XML)
- The creation of web crawlers/search engines (alta-vista, google…)
- Association of media with text (indexing of images, video, audio, etc.)
- Powerful tools for finding otherwise unstructured information (cf. weblogs)

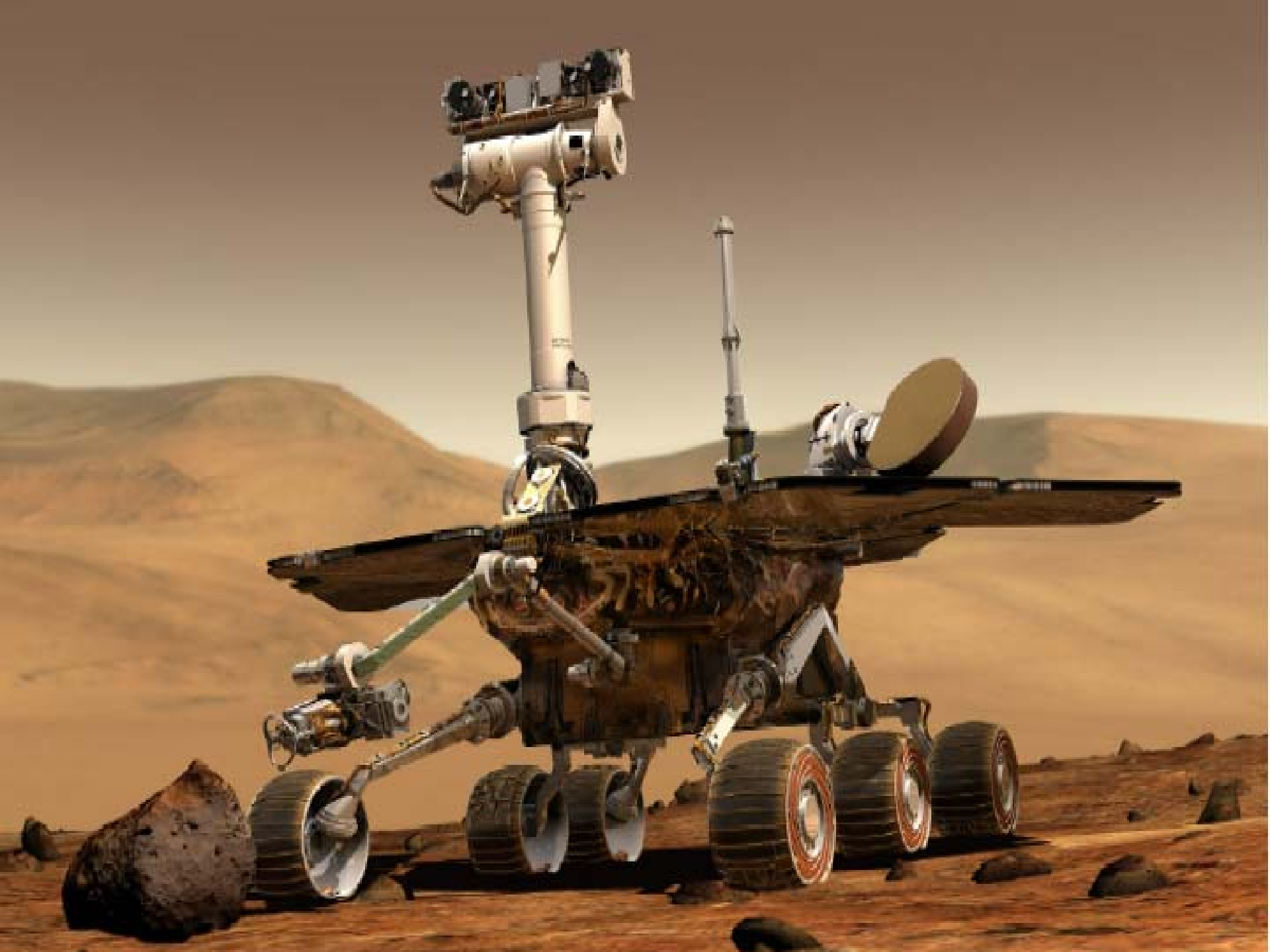


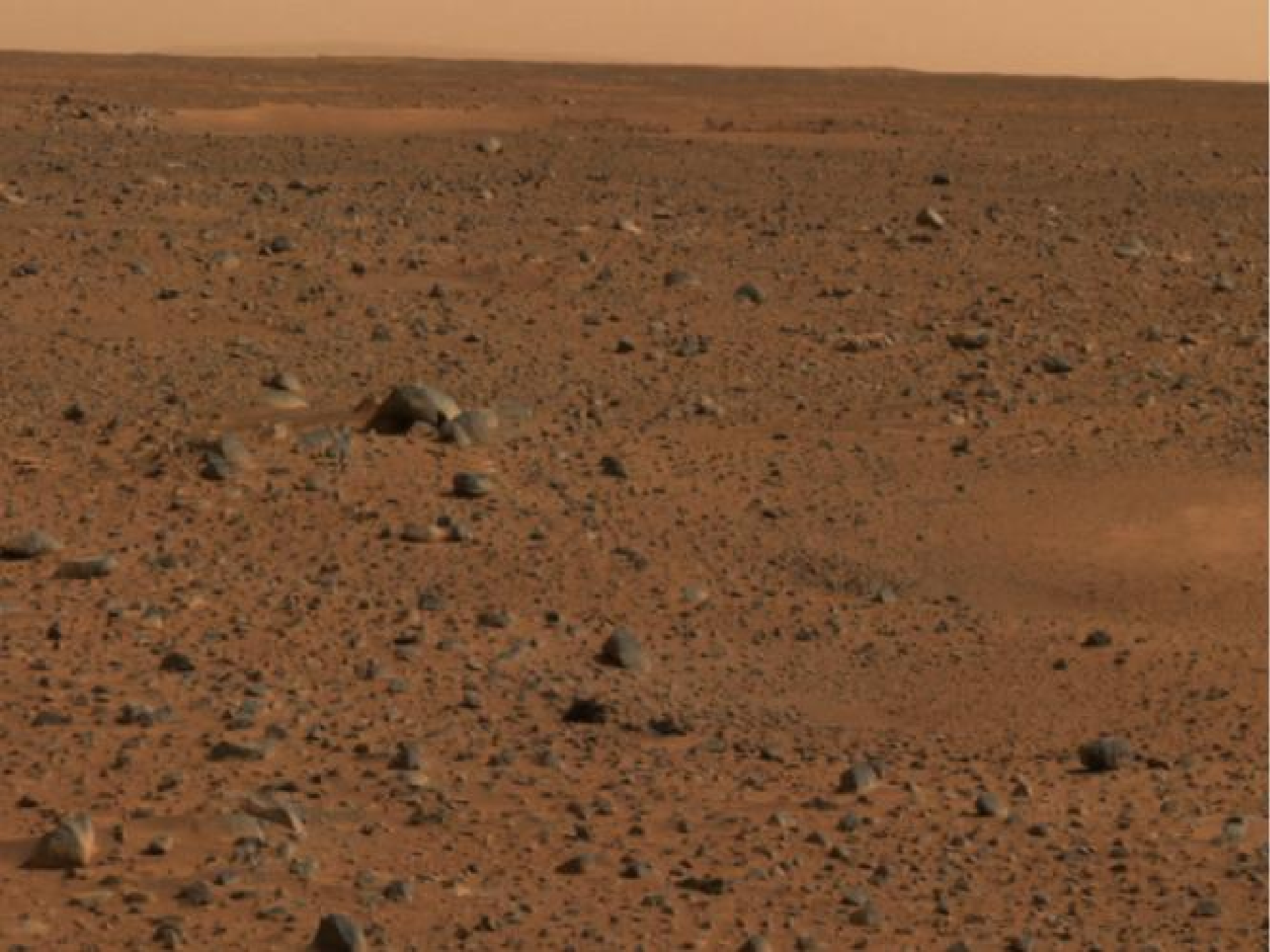
Future look



2003-2004 Missions to Mars

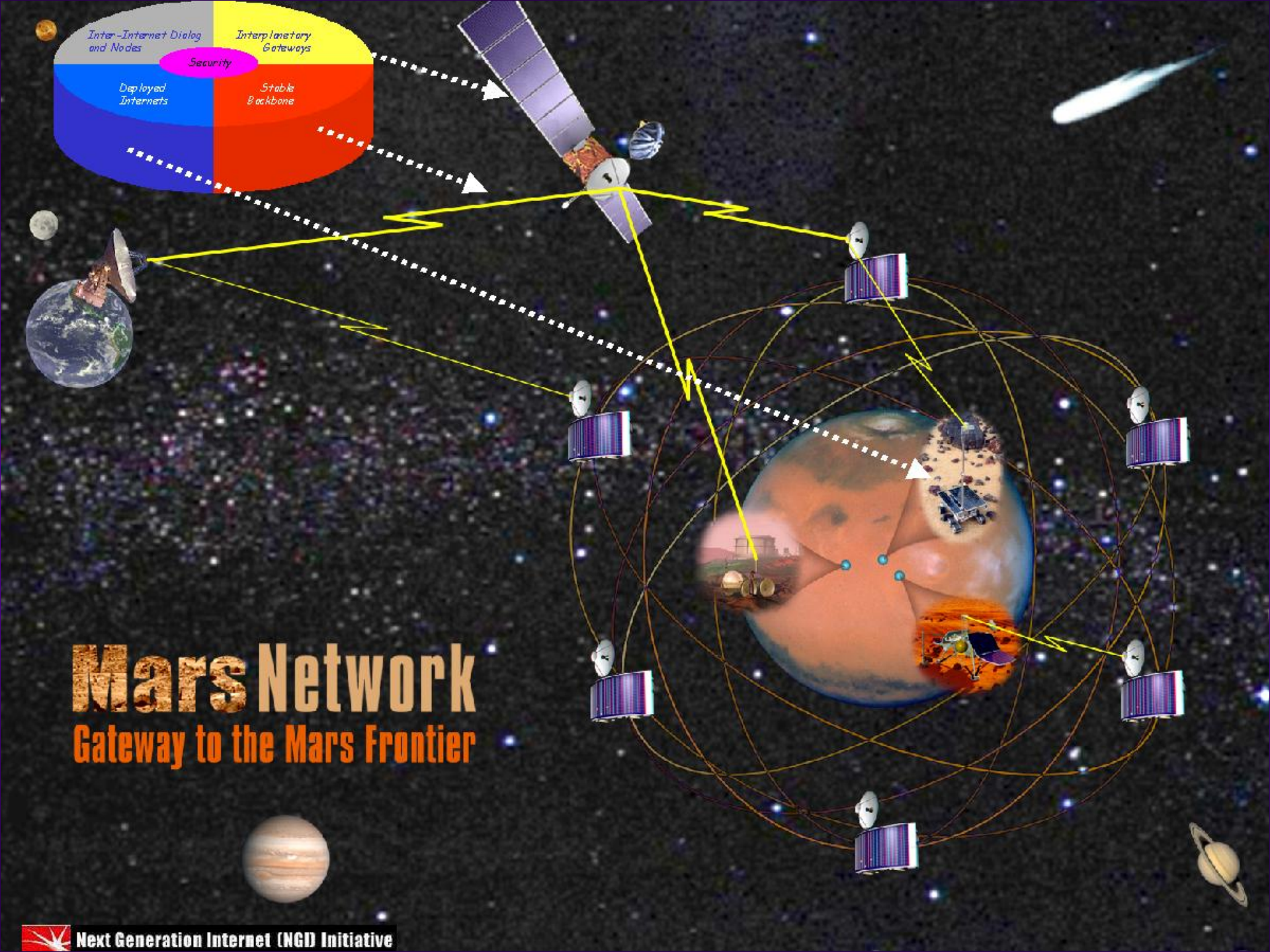
- Spirit
  - launched 6/10/2003
  - arrived Jan 4, 2004
  - Gusev Crater in Gusev Plain
- Opportunity
  - Launched 7/7/2003
  - arrived Jan 25, 2004
  - Meridiani Planum





Interplanetary Internet: “InterPlaNet”

- Planetary internets
- Interplanetary Gateways
- Interplanetary Channel Protocol
  - “bundles” encapsulated in CCSDS link and higher layer transport (Licklider Transport Protocol)
  - .earth.sol.int, .mars.sol.int
- Functional Layers of Protocol
- Interplanetary Network and Information Systems Directorate (old DSN)
- Project supports Mars mission plans


Inter-Internet Dialog and Nodes
Interplanetary Gateways
Security
Deployed Internets
Stable Backbone
Mars Network
Gateway to the Mars Frontier
Next Generation Internet (NGI) Initiative

Cerf's slides and other Internet information can be found at:

www.mci.com/cerfsup

www.isoc.org/internet

livinginternet.com

www.ipnsig.org