A Global Service Provision Perspective

Munich Satellite Navigation Summit

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OUTLINE

Evolving Organization
- Global Service Center
- Organization and Management
- Outreach

Common Challenges
- Mapping
- Finance
- Timing
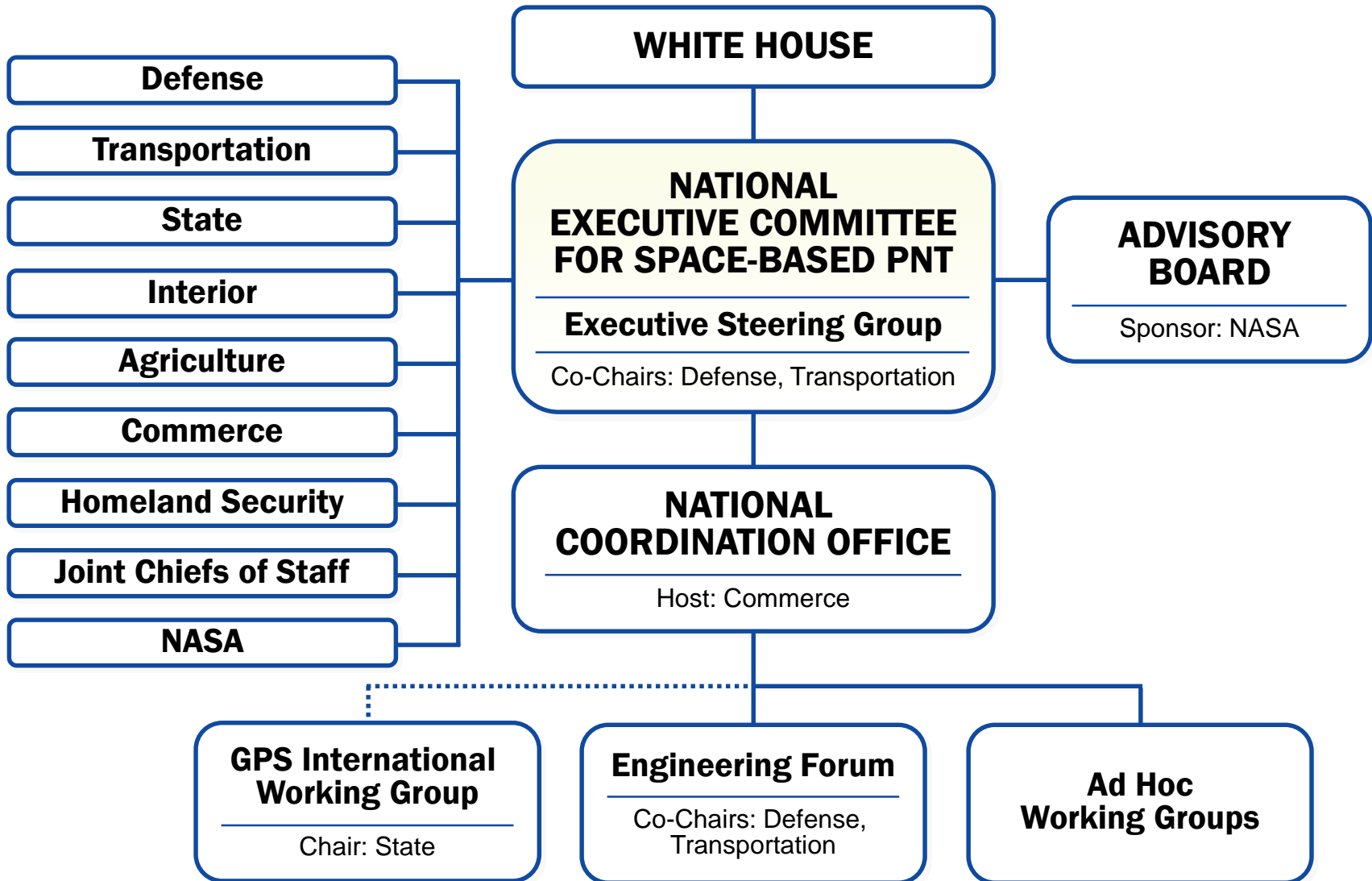- Search and Rescue
- Service Center Cooperation

A Global Service Center

- NAVCEN has U.S. government **designation** as civil service center for GPS

- Website, RSS feeds and e-mail list servers **distribute** all operational GPS data products and interface documents

- 24/7/365 customer service **watch**

- **Answer inquiries** and disruption reports from around the world

- Represent user communities and **advocate** for civilian use of GPS at meetings of the GPS Program

- **Coordinate** operations with other Provider service centers

Dual-Service Management Activities

- Space-Based PNT Executive Committee - **Governance**

- National Coordination Office - **Policy**

- National Space-Based PNT Engineering Forum (NPEF) - **Analysis**

- Space-Based PNT Advisory Board - **Independent Review**

- Civil **Program Management** Review (PMR)

- Interagency Forum for **Operational Requirements** (IFOR)

- CGSIC – **User Forum**

National Space-Based PNT Organization

WHITE HOUSE

Defense

Transportation

State

Interior

Agriculture

Commerce

Homeland Security

Joint Chiefs of Staff

NASA

NATIONAL EXECUTIVE COMMITTEE FOR SPACE-BASED PNT

Executive Steering Group

Co-Chairs: Defense, Transportation

ADVISORY BOARD

Sponsor: NASA

NATIONAL COORDINATION OFFICE

Host: Commerce

GPS International Working Group

Chair: State

Engineering Forum

Co-Chairs: Defense, Transportation

Ad Hoc Working Groups

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CGSIC Organization for Outreach

- Organization established in 1989 to brief users on status of programs and solicit feedback on changing user requirements

- CGSIC Plenary Committee and Subcommittees
  - International Information Subcommittee
  - Timing Subcommittee
  - State and Local Government Subcommittee
  - Survey, Mapping and Geo-Sciences Subcommittee

Users reporting mapping problems

- "My Grandmother's address is wrong in GPS and I am worried about emergency services getting to her. You need to fix it."

- "My customers cannot find my business location in GPS, please fix it."

- "GPS is directing customers to a competitor's location instead of mine. The address is wrong and needs to be corrected."

- "GPS is sending trucks down our road that cannot fit. You have to stop them."

- "If you send one more car down my driveway in the middle of the night, I don't care, I'm putting out a spike strip."

Easy to dismiss but….

- These are your users and system as a whole is blamed

- Some are economically important business users:
    - Grocery Stores
    - Hotels
    - Dealerships
    - Tech industry
    - Gas Station
   - Government Services
    - Financial services

- Unless the address has been accurately recorded by the Google StreetMap car or other GIS data mapper, it may, in fact, not be in the correct location.

- Education is important and necessary

International Finance

- Machine assisted trading dominates
  - Requirement for precision timing
  - Soon requiring time stamping of ALL financial transactions
  - One US bank alone transacts over $35 Trillion dollars a day
  - NYSE averages over $15B in the first 2 minutes after the opening
- Challenges:
  - Developing a timing solution accurate to 1µS per transaction across a data center
  - Developing the ability to time stamp every transaction
  - Developing analytics to measure the performance of the transaction environment at 100's of millions of transaction per second.
- Market transparency
  - Did all market participants have fair and equal access?
  - Are all the markets seeing information at nearly the same time?

Timing compatibility

- Much of the world's precise timing comes from our GNSS satellites.

- Need to work towards compatible time in a system of systems

- One issue in the user community is the insertion of Leap Seconds

- CGSIC Timing Subcommittee has looked at the issue and issued an opinion which they have forwarded to the ITU

  - Leap seconds should cease to be inserted in the near future

  - UTC should become a unique and continuous reference time scale

  - A period of at least 5 years be allowed so that operators of navigational systems can make adequate preparations.
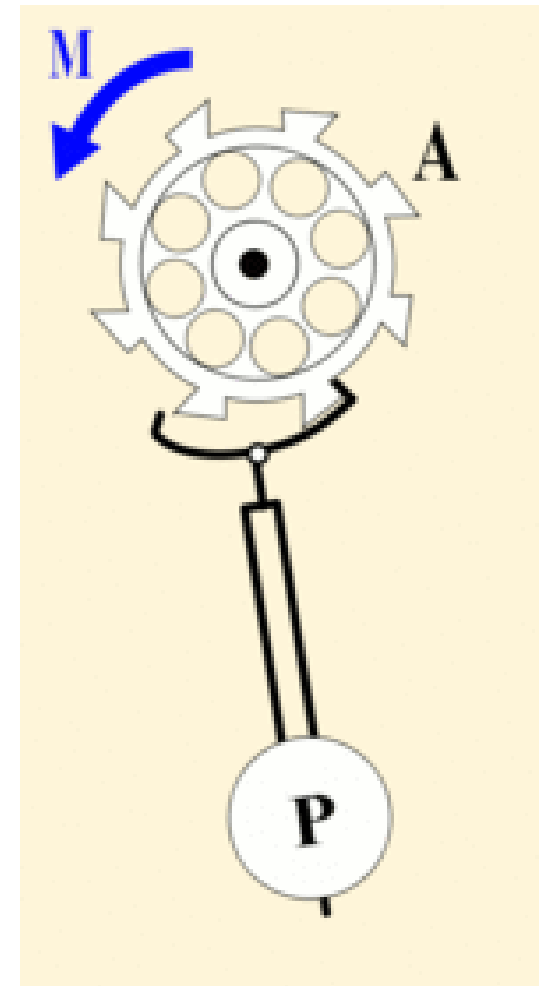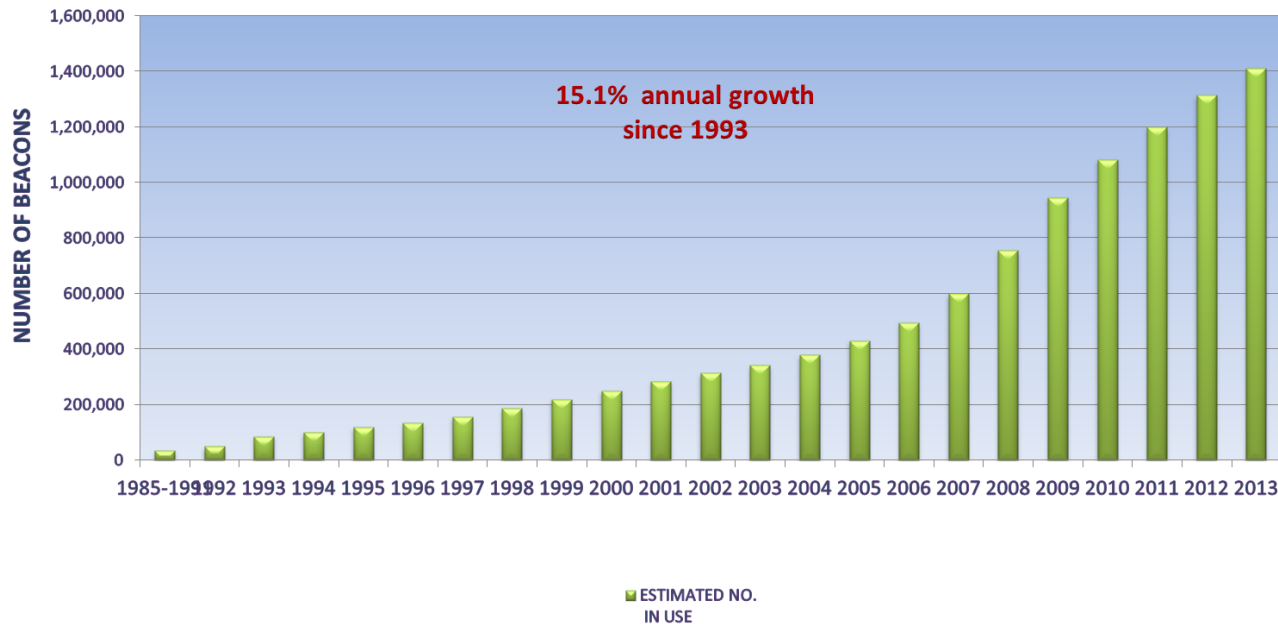
GNSS Search and Rescue

- **48 beacon manufacturers participated in 2014 survey**
- **Over 1,411,000 beacons were in use at the end of 2013**

406 MHZ BEACON POPULATION

15.1% annual growth since 1993

(Chart: NUMBER OF BEACONS vs. years 1985-1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013)

ESTIMATED NO. IN USE

156,100 beacons were produced in 2013 worldwide, including :

- 68,900 **EPIRBs**
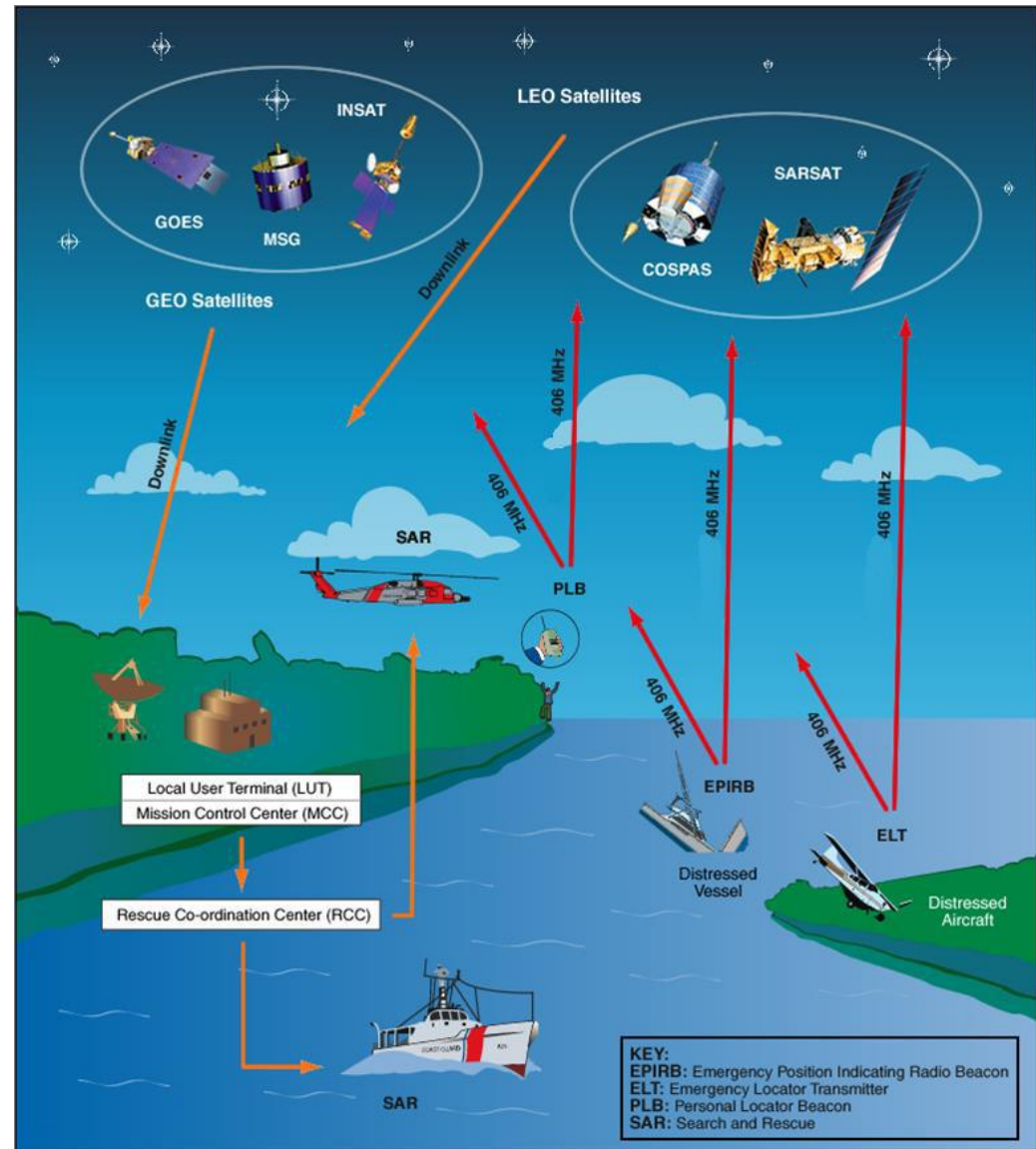- 23,200 **ELTs**
- 64,000 **PLBs**

COSPAS-SARSAT

5 Low Earth Polar Orbiting Search And Rescue (LEOSAR)

7 Geostationary Orbiting Search And Rescue (GEOSAR) with 2 under test

3 Medium Earth Orbiting Search and Rescue (MEOSAR)

30 mission control centers

MEOSAR will replace the LEO SAR portion of the program when the LEO satellites reach end-of-life.

MEOSAR

The COSPAS-SARSAT Program uses some MEOSAR constellation already.   Includes 3 satellites with an operational L-band downlink repeater: 1 Glonass-K1 and 2 Galileo IOV satellites (IOV-3 and IOV-4)

- Experimental Distress Alerting Satellite System (DASS) repeaters with S-band downlink aboard all IIR-M and IIF GPS satellites

- 16 active now

- DASS scheduled for all GPS-III satellites to #8

- #11 and beyond planned to have the new GPS-SAR L-band payload.
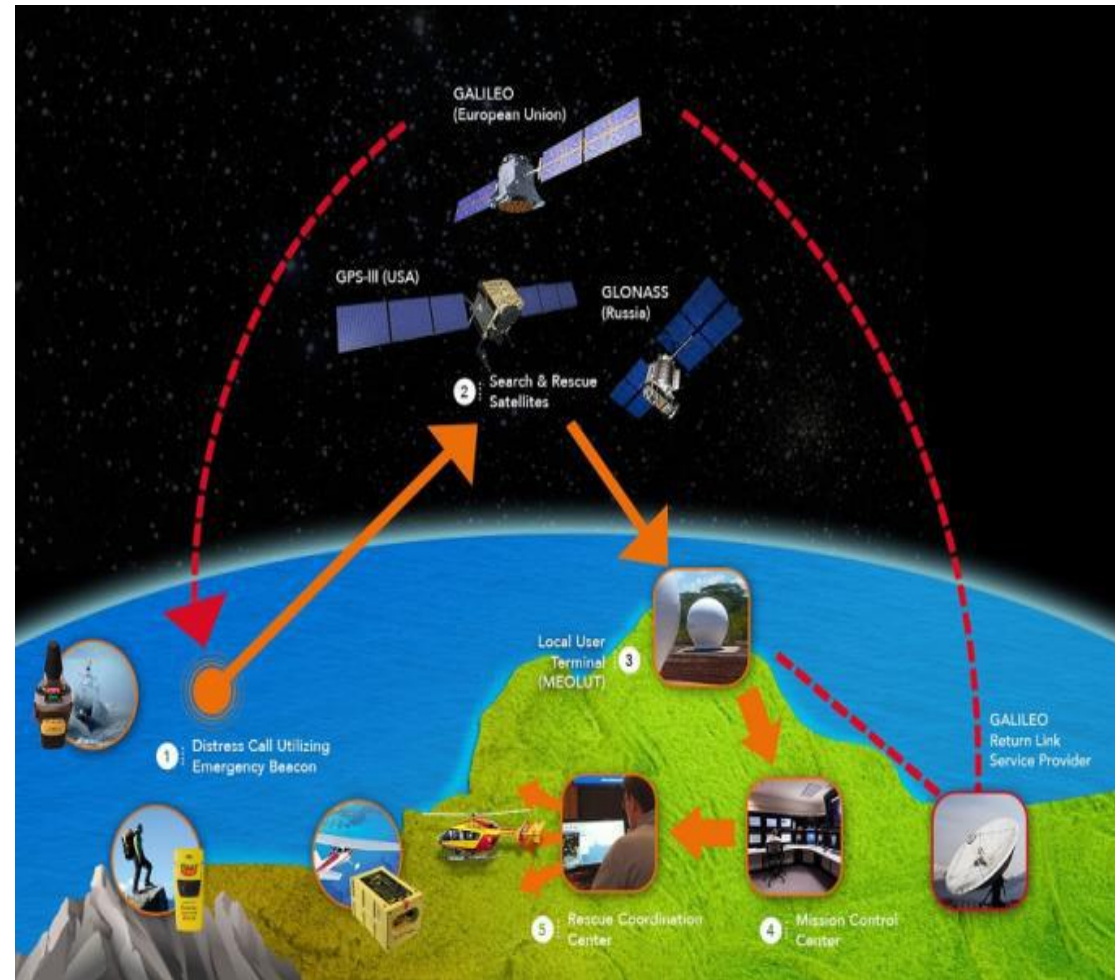
Cooperation between Global Service Centers

- Work on interoperability, compatibility and transparency in our systems through the International Committee on GNSS

- Work country-to-country through official bi-lateral GNSS talks to improve communications between centers

- Connect our service centers together for day-to-day operations to benefit user communities of the world

- Improve processes for Information sharing to respond to the needs of equipment manufacturers and user communities.

Civil GPS Service Interface Committee (CGSIC)
Contact Information

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