



SPACE-BASED POSITIONING
NAVIGATION & TIMING
NATIONAL COORDINATION OFFICE



Space-Based Positioning, Navigation and Timing (PNT):

A National Perspective...

GPS Partnership Council

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GPS Today



- **Over the past decade, the Global Positioning System (GPS) has grown into a worldwide utility providing:**
 - **Space-based positioning, navigation and timing (PNT) information**
 - **Augmentations improve performance even further**
 - **Consistent, predictable, dependable policy and performance**
 - **Innovative entrepreneurship and investment by private industry**
- **Like the Internet, GPS has grown into a critical component of the global information infrastructure**
 - **Scalable applications enabling broad new capabilities**
 - **Used in partnership with other technologies, i.e. Geographic Information Systems, Remote Sensing, etc.**
 - **Facilitating innovations in efficiency, safety, environmental, public security, and science**



U.S. Space-Based PNT Policy



GOAL: Ensure the U.S. maintains space-based PNT services, augmentation, back-up, and service denial capabilities that...

ASSURE SERVICE

Provide uninterrupted availability of PNT services

MEET DEMANDS

Meet growing national, homeland, economic security, and civil requirements, and scientific and commercial demands

LEAD MILITARILY

Remain the pre-eminent military space-based PNT service

STAY COMPETITIVE

Continue to provide civil services that exceed or are competitive with foreign civil space-based PNT services and augmentation systems

INTEGRATE GLOBALLY

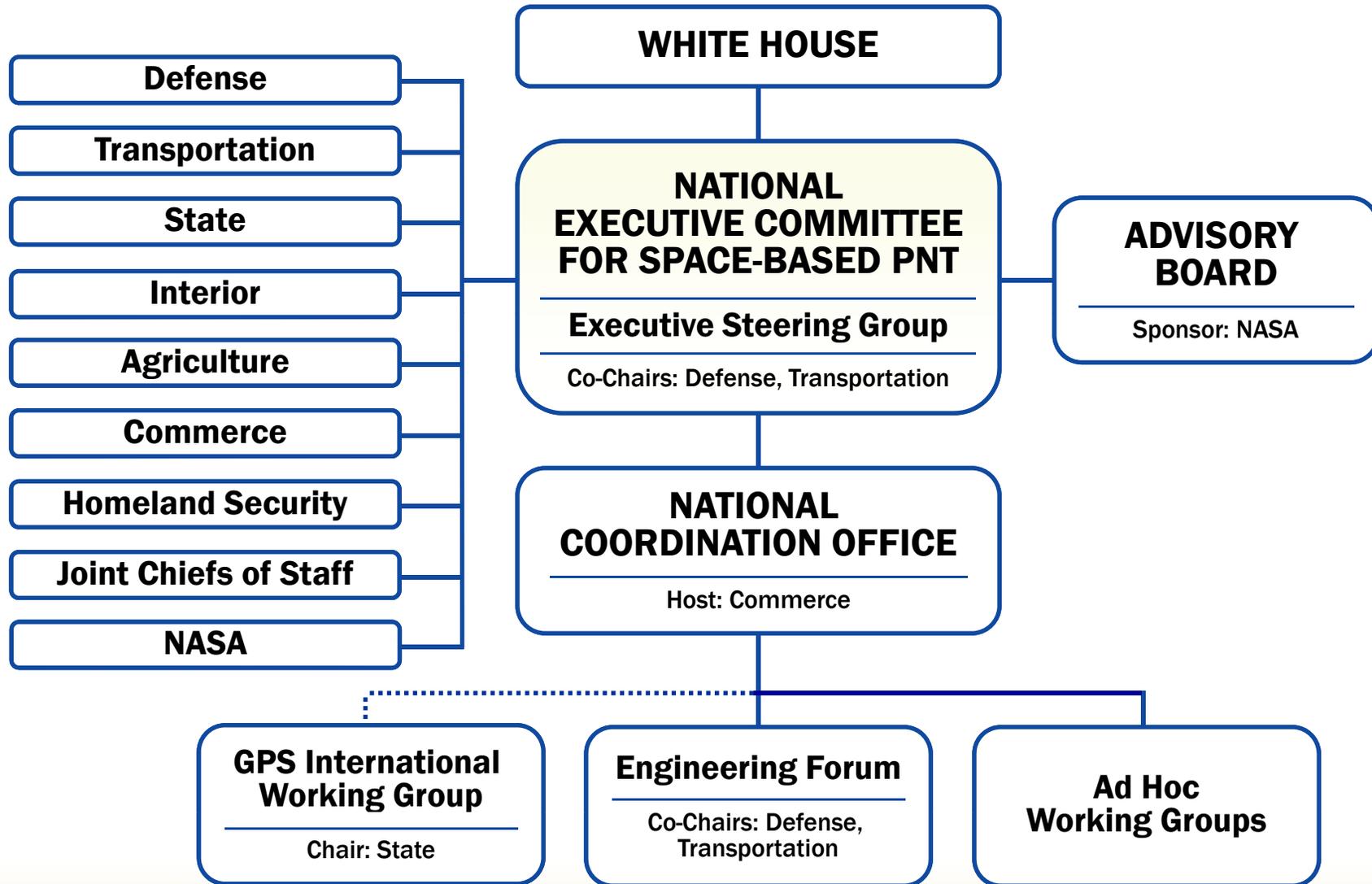
Remain essential components of internationally accepted PNT services

LEAD TECHNICALLY

Promote U.S. technological leadership in applications involving space-based PNT services



U.S. Space-Based PNT Structure



GPS is Essential to Our Economy and National Critical Infrastructures



Satellite Operation



Surveying & Mapping



Power Grids



Precision Agriculture



Transit Operations



NextGen



Trucking & Shipping



IntelliDrive



TeleComm



Disease Control



Personal Navigation



Oil Exploration



Fishing & Boating



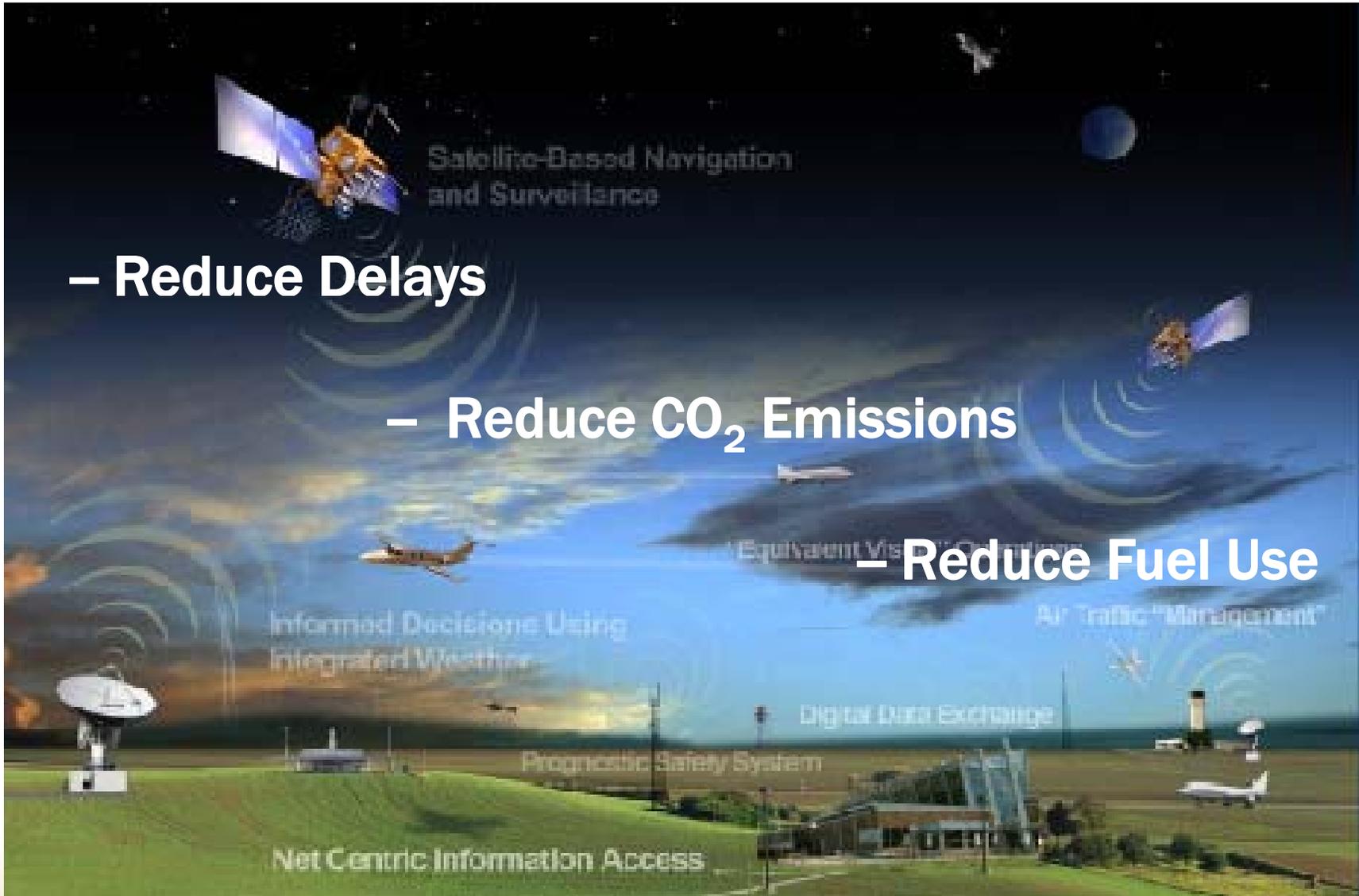
NEXTGEN



– Reduce Delays

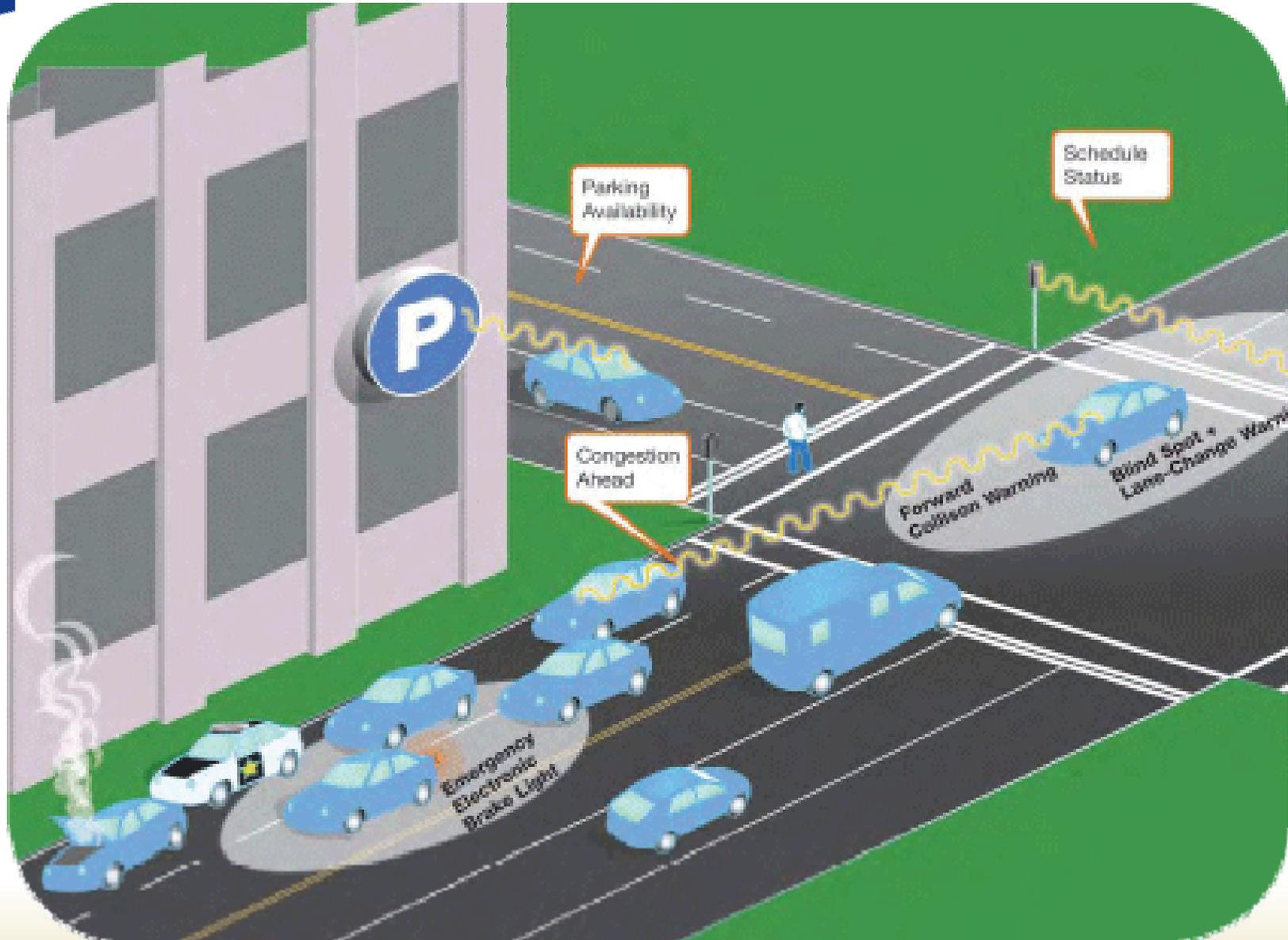
– Reduce CO₂ Emissions

– Reduce Fuel Use





IntelliDrive





“Shelley”



Course Map

Length - 12.42 Miles
 Surface - Pavement & Gravel
 Turns - 156
 Elevation at Start - 9,390 ft.
 Elevation at Finish - 14,110 ft.
 Length of Plus Grade - 61,626 ft.
 Maximum Plus Grade - 10.5%
 Length of Negative Grade - 3,934 ft.
 Maximum Negative Grade - 10.0%
 Average Grade - 7%





Precision Agriculture

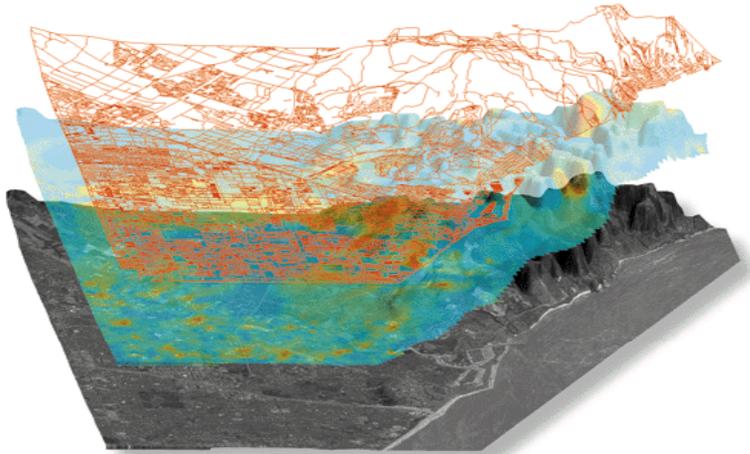


- **Maximize use of resources**
 - Optimize plowing of crop rows
 - Tailor applications of seeds, fertilizer, water, pesticides
 - Improve management of land, machinery, personnel, time
 - Greater crop yields
 - Net benefit: \$5-14 per acre
- **Minimize environmental impacts**
 - Localize identification and treatment of distressed crops that reduces chemical use
 - Precisely level fields to prevent fluid runoff





Surveying/Mapping/GIS



- **Sub-centimeter accuracy**
- **100%-300% savings in time, cost, labor**
- **Most major development projects require surveying**
 - Rural electrification
 - Telecom tower placement
 - Pipeline installation
 - Dam construction
- **Port dredging operations**
- **Oil, gas, and mineral exploration**
- **Flood plain mapping**





Endangered Species



ANNUAL CIRCUIT

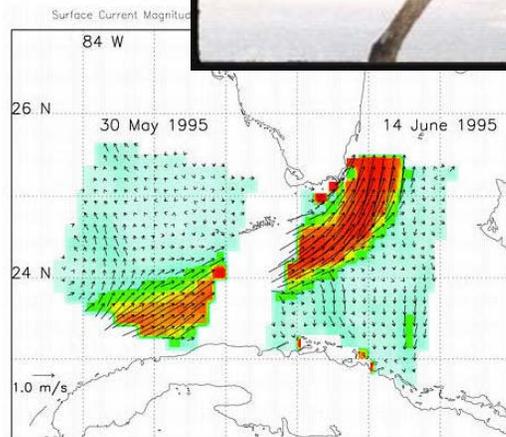
- May-September**
Birds breed in Wood Buffalo National Park in northern Canada
- October-November**
Fall migration south
- November-March**
Winter at Aransas National Wildlife Refuge on the Texas Gulf coastline
- March-late April**
Spring migration north

Most whooping cranes stop here every year to rest and feed, most for a day or two but some for as much as two weeks.





GPS Applications Scientific Research



- **Monitoring geological change**
 - Glaciers, tectonic plates, earthquakes, volcanoes
- **Wildlife behavior**
- **Atmospheric modeling**
 - Water vapor content
- **Oceanic studies**
 - Tidal patterns
 - Surface mapping
- **Time transfer**
- **Space Exploration**



Web-based Information



- ***PNT.gov*** established to distribute information on the U.S. National Executive Committee to include:
 - U.S. Policy, Executive Committee membership, Advisory Board and frequently asked questions
 - All recent public presentations
- ***GPS.gov*** established for public information about GPS applications
 - Available in English, French, Spanish, Arabic and Chinese
 - Contains additional links to various other web sites



Closing



- **Continuing to improve GPS and U.S. Augmentations**
 - Civilian agencies are responsible for funding new, civil-unique GPS capabilities
- **Stable, predictable national policy**
 - No direct user fees; open market-driven competition
- **International cooperation is a priority**
 - Compatibility and Interoperability
- **GPS is critical to our national infrastructure and economic security**

GPS Modernization program is enhancing capabilities for tomorrow



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