Estimated Benefits of GPS for U.S. Civil Aviation

National Space-Based Positioning, Navigation, and Timing (PNT) Advisory Board Meeting

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Introduction

• GPS Usage by U.S. & International Aircraft
  – Thousands of U.S. and international aircraft flying in U.S. airspace are equipped with GPS
  – Significant Federal Investment in GPS for aviation

• NextGen benefits dependent on GPS
  – GPS receivers are already used for NextGen navigation, and are planned for NextGen surveillance and trajectory-based operations

• Safety & Efficiency Benefits of GPS
  – GPS applications are vital to transportation safety & efficiency
Civil Aircraft Operators with GPS

• FAA oversees 35,000 instrument flights per day + visual flights

• Civil aircraft operators have invested ~$3 - $5 billion in current GPS equipment.
  – 5,800 – 7,250 passenger, cargo and regional U.S. operated aircraft;
  – 2,800 to 4,000 international operators’ aircraft from 105 countries;
  – 61,000+ IFR-approved GPS navigation and general aviation and air taxi aircraft; and
  – 310,000 pilots without instrument ratings
  – +DOD aircraft and state/government aircraft
Aviation Infrastructure

• GPS use in the National Airspace System (NAS)
  – Wide Area Augmentation System (WAAS)
  – Automatic Dependent Surveillance-Broadcast (ADS-B)
  – Precise timing source
    • En route and terminal automation
    • Time-tagging radar data
    • Embedded within terrestrial communication networks
  – Ground-Based Augmentation System (GBAS)

• Over $3 billion in FAA investment as of FY11
GPS Impact to NextGen Operations

• GPS is critical to NextGen Implementation
  – Performance Based Navigation (PBN) implementation
  – Parallel approaches using GNSS
  – Safety enhancements through moving map and surface display of traffic for flight crew

• Total planned FAA NextGen and GPS investments through 2018 around $12 Billion.
  – ~ $1 Billion for WAAS and GPS
  – ~$11 Billion for NextGen infrastructure (which depends on GPS)
GPS Aviation Safety Benefits

• Accident Categories Mitigated by GPS:
  – Approach and Landing
  – Controlled Flight into Terrain (CFIT)
  – Runway Incursion
  – Night Flight (GA-only)
GPS Saves Lives

FAA analysis indicates GPS saves lives:

- 9 Air carrier accidents might have been averted with Terrain Alerting and Warning Systems (TAWS)
  - 51 deaths resulted from 4 of those 9 accidents

- An estimated 73 fewer General Aviation deaths have occurred annually over the past 5 years due to increased use of GPS technology.

- Estimates are conservative – serious injuries and property loss are also being averted.
GPS Aviation Efficiency Benefits

• **Economic Benefits for Aviation:**
  – Greater runway capability,
  – Reduced separation standards which allow increased capacity in a given airspace without increased risk, and
  – More direct enroute flight paths.

• **Estimated $200 million in economic benefits per year.**