Current and Future Information Sharing, Dissemination, Collaboration and Standardization
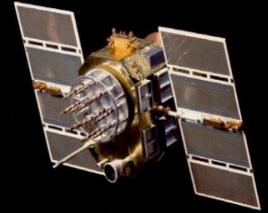
International Cooperation "The Challenge"

ICG Workshop on GNSS Spectrum Protection

and

Interference Detection and Mitigation

June 8, 2012

Hank Skalski

U.S. Department of Transportation

Overview

- **Background**
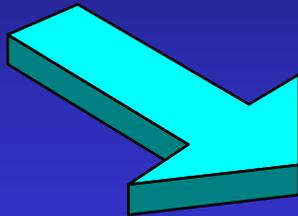
- **Challenges**

- **Way-ahead**

Background

The characteristics of GNSS signals create unique challenges,

Our role should make those challenges transparent to the user by providing the best IDM support possible.
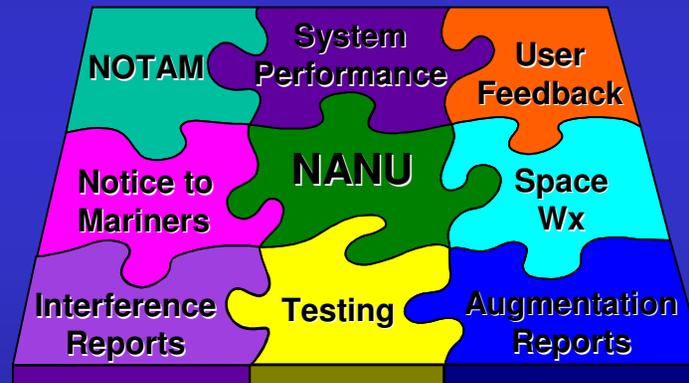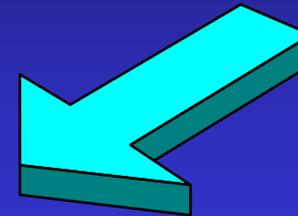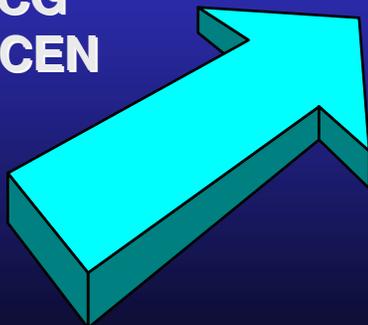
Background

AFSPC
GPSOC

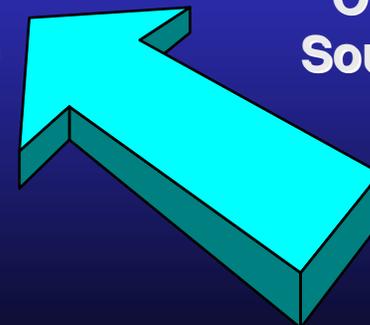FAA
NOCC

NOTAM · System Performance · User Feedback

Notice to Mariners · NANU · Space Wx

Interference Reports · Testing · Augmentation Reports

USCG
NAVCEN

Other Sources

In the mid-90's, prior to GPS FOC, it was discovered that the dissemination and coordination of GPS information and events required improvement
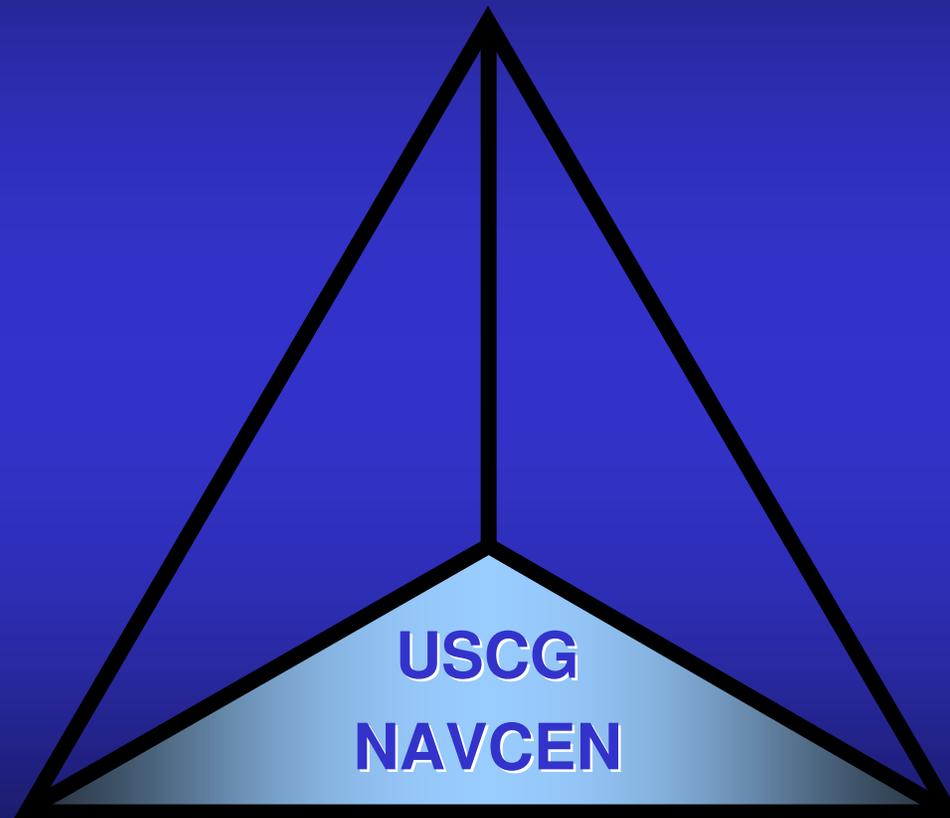
Background

Interagency Dissemination Coordination Team (IDCT)

- **Established in 1995**

- **Coordination and Dissemination of GPS Operational Information**

- **Anomaly / Interference Reporting**

- **Coordination of GPS In-Band Testing, Exercise, and Training Events**
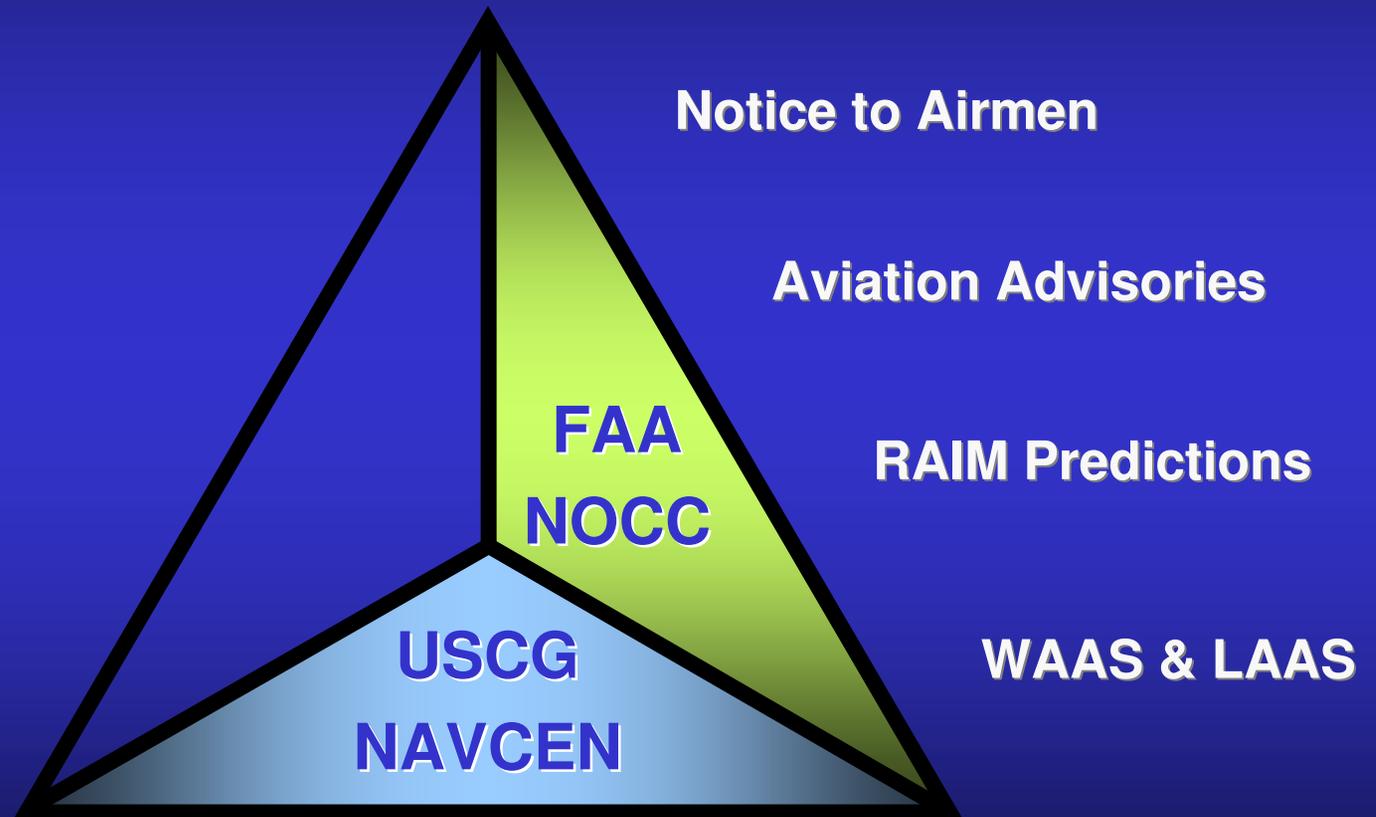
User Support Service

USCG
NAVCEN

Notice to Mariners   **NANU's**   **DGPS & NDGPS**

List Server Distribution   **General User Information**

User Support Service
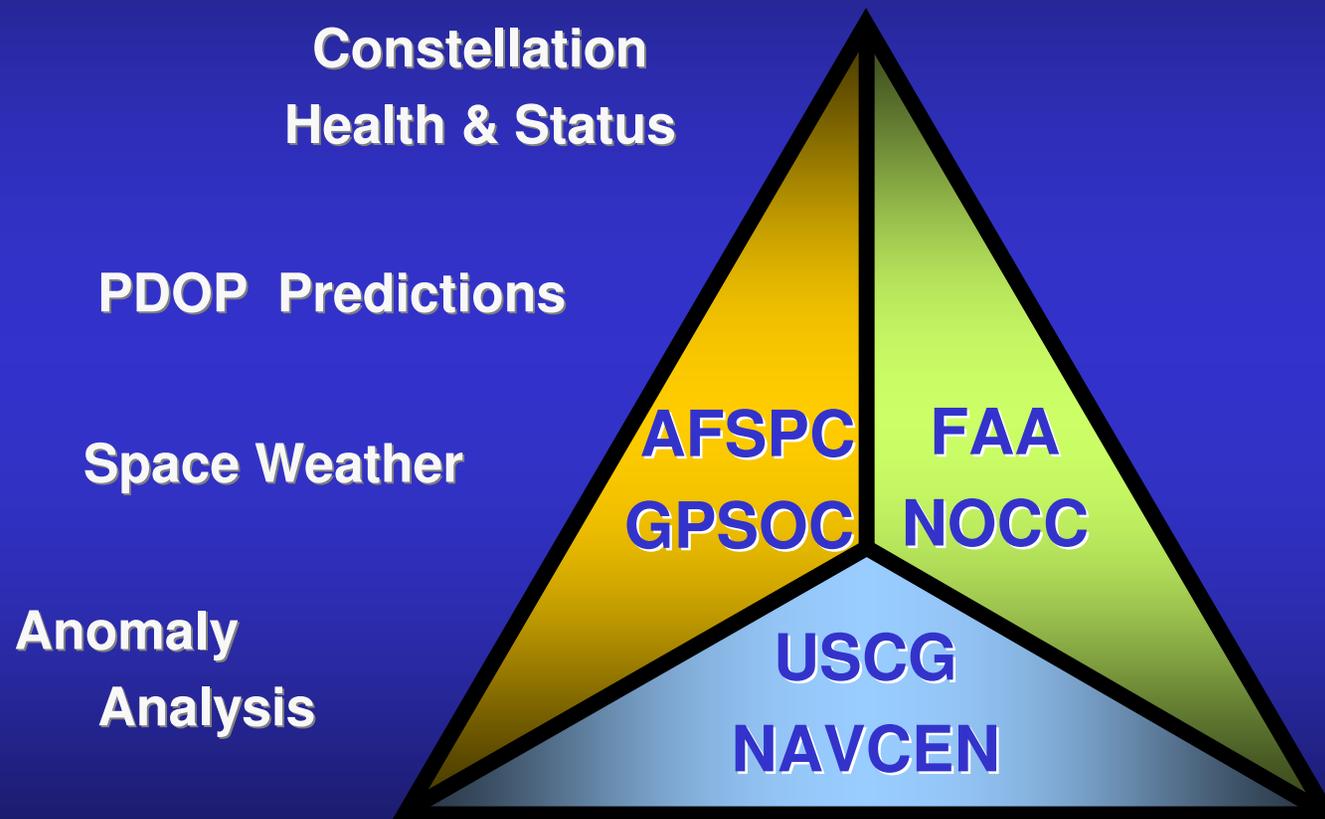
User Support Service

Constellation
Health & Status

PDOP Predictions

Space Weather

Anomaly
Analysis

AFSPC
GPSOC

FAA
NOCC

USCG
NAVCEN
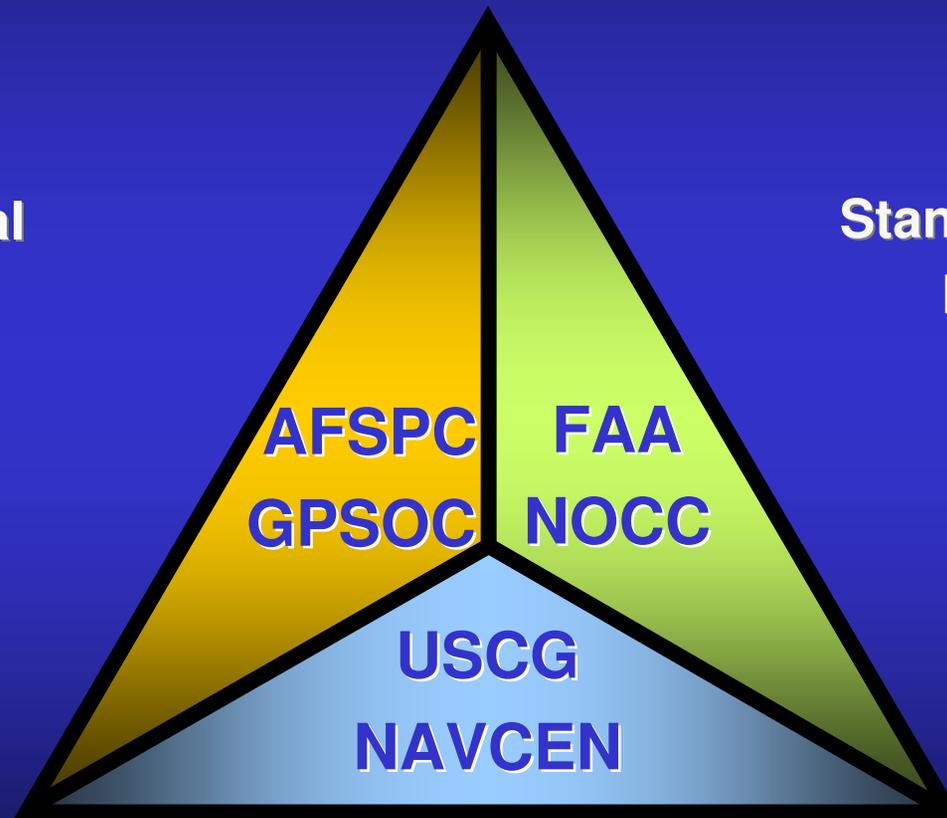
User Support Service

User Support Service

Are there similar international organizations or processes?

Need to establish GNSS operator to operator coordination.

AFSPC
GPSOC

FAA
NOCC

USCG
NAVCEN

Global Challenge

GPS Interference Reporting

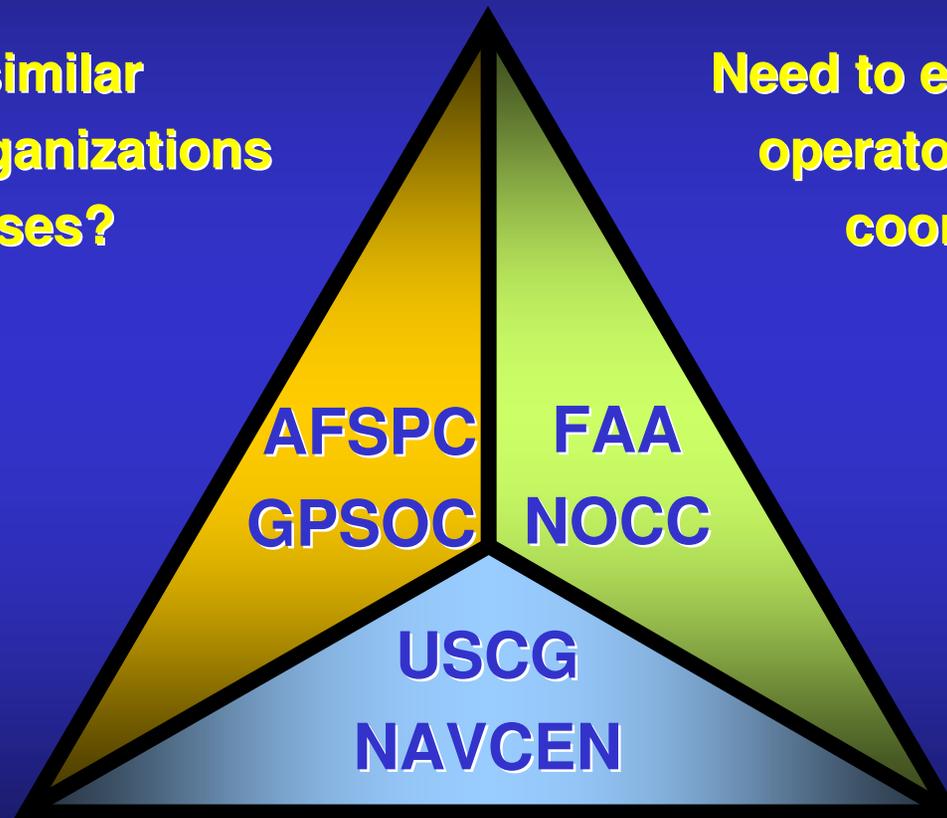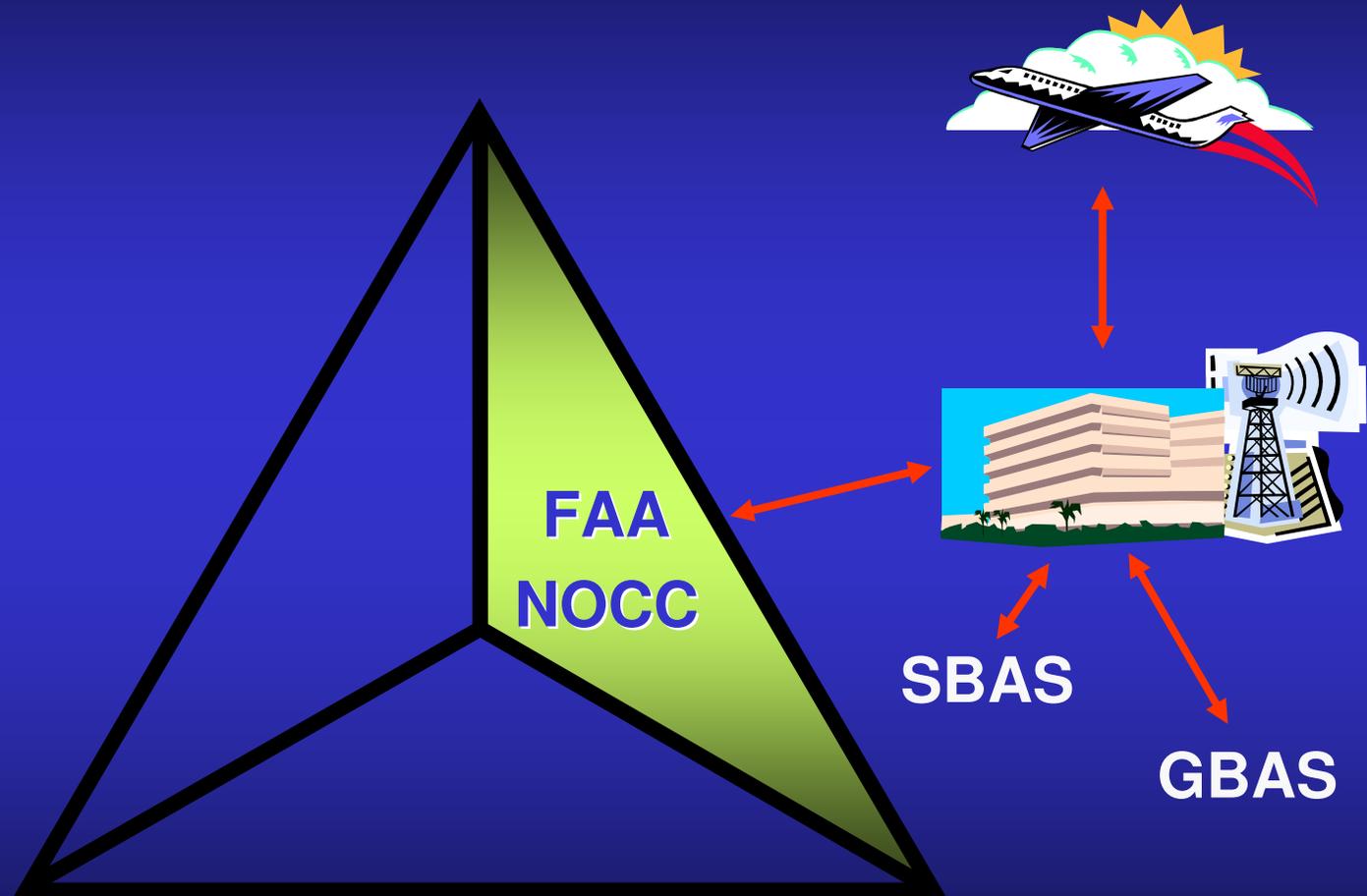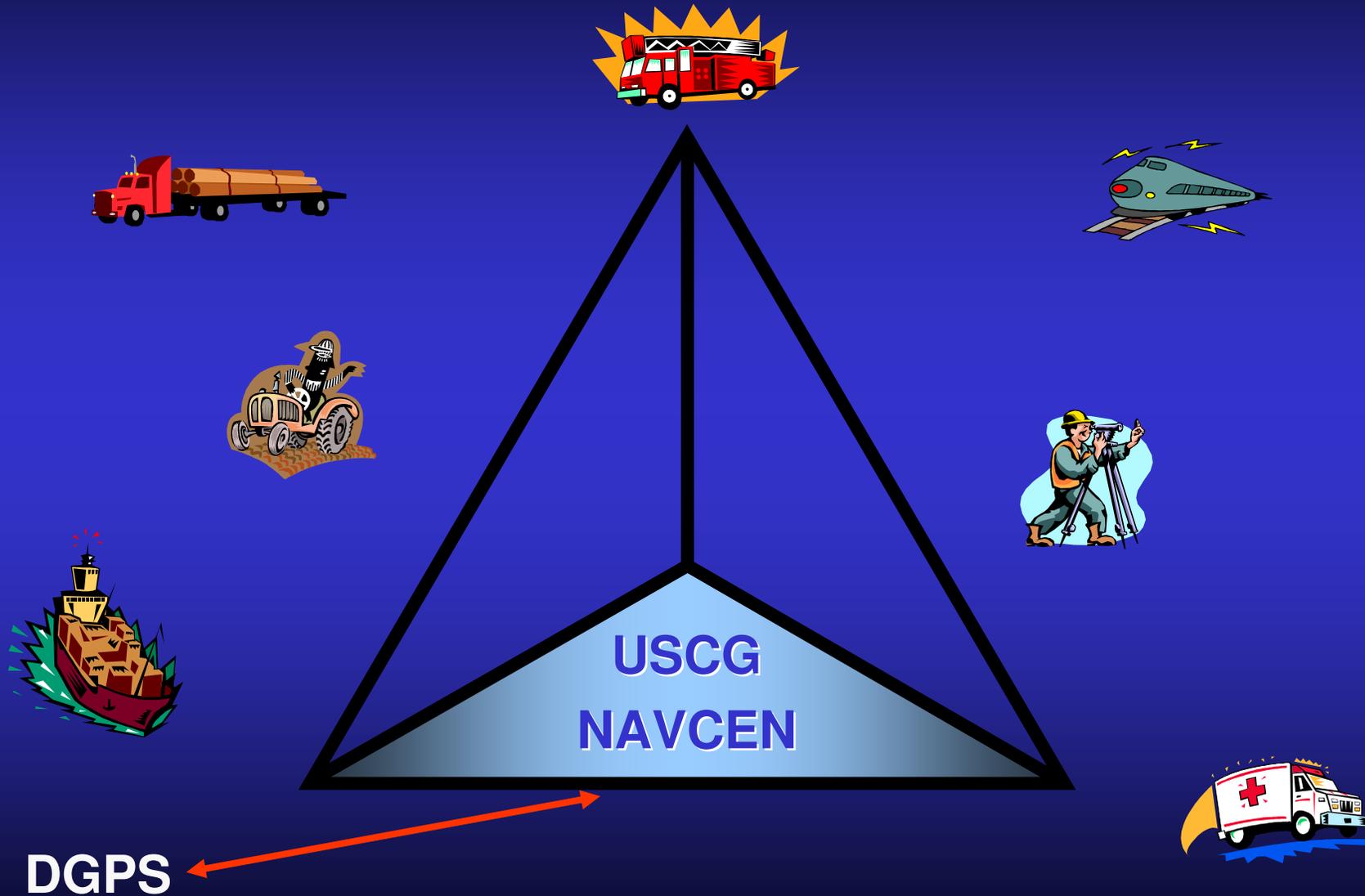The Tri-lateral relationship of the **GPSOC, NOCC & NAVCEN** user support services provides the ideal entry point for GPS interference event reporting.

GPS Interference Reporting

FAA
NOCC

SBAS

GBAS

Aviation Reports

GPS Interference Reporting

USCG NAVCEN

DGPS

Maritime and All Other Reports

GPS Interference Reporting

Standardized Outage Report used by NAVCEN, NOCC and GPSOC

Report logged into the PNT Incident Portal

Interference reports and status shared in real time

Standardized event priority code assigned

USCG NAVCEN

Maritime Outage Report

GPS Interference Reporting
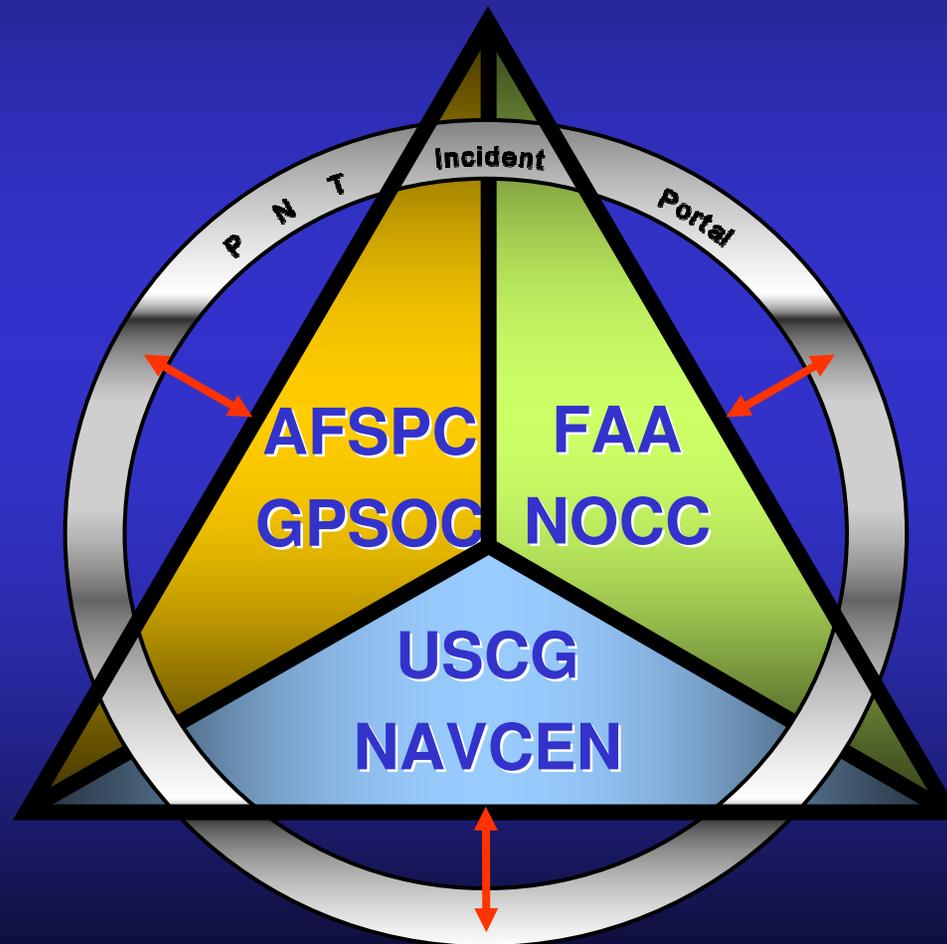
Identification of Service Disruption

GPS Interference Reporting

Constellation
Health & Status

PDOP Analysis

Space Weather

Data Analysis

P N T   Incident   Portal

AFSPC
GPSOC

Identification of Service Disruption

GPS Interference Reporting

Identification of Service Disruption

GPS Interference Reporting

GPS Service Outage/Interference Reporting Priorities

Priority 1 (P1) Incident

Service outage/interference is ongoing

Service outage/interference affecting multiple independent sites/users

One or more critical infrastructure sectors <u>SEVERELY</u> impacted

Poses a risk to safety-of-life

Priority 2 (P2) Incident

Service outage/interference has ceased or is intermittent

Service outage/interference affected multiple independent sites/users

One or more critical infrastructure sectors <u>SEVERELY</u> impacted

Posed a risk to safety-of-life

Priority 3 (P3) Incident

Service outage/interference is on-going

Service outage/interference affecting multiple independent sites/users

One or more critical infrastructure sectors <u>MODERATELY</u> impacted

Priority 4 (P4) Incident

Service outage/interference has ceased or is intermittent

Service outage/interference affected multiple independent sites/users

One or more critical infrastructure sectors <u>MODERATELY</u> impacted

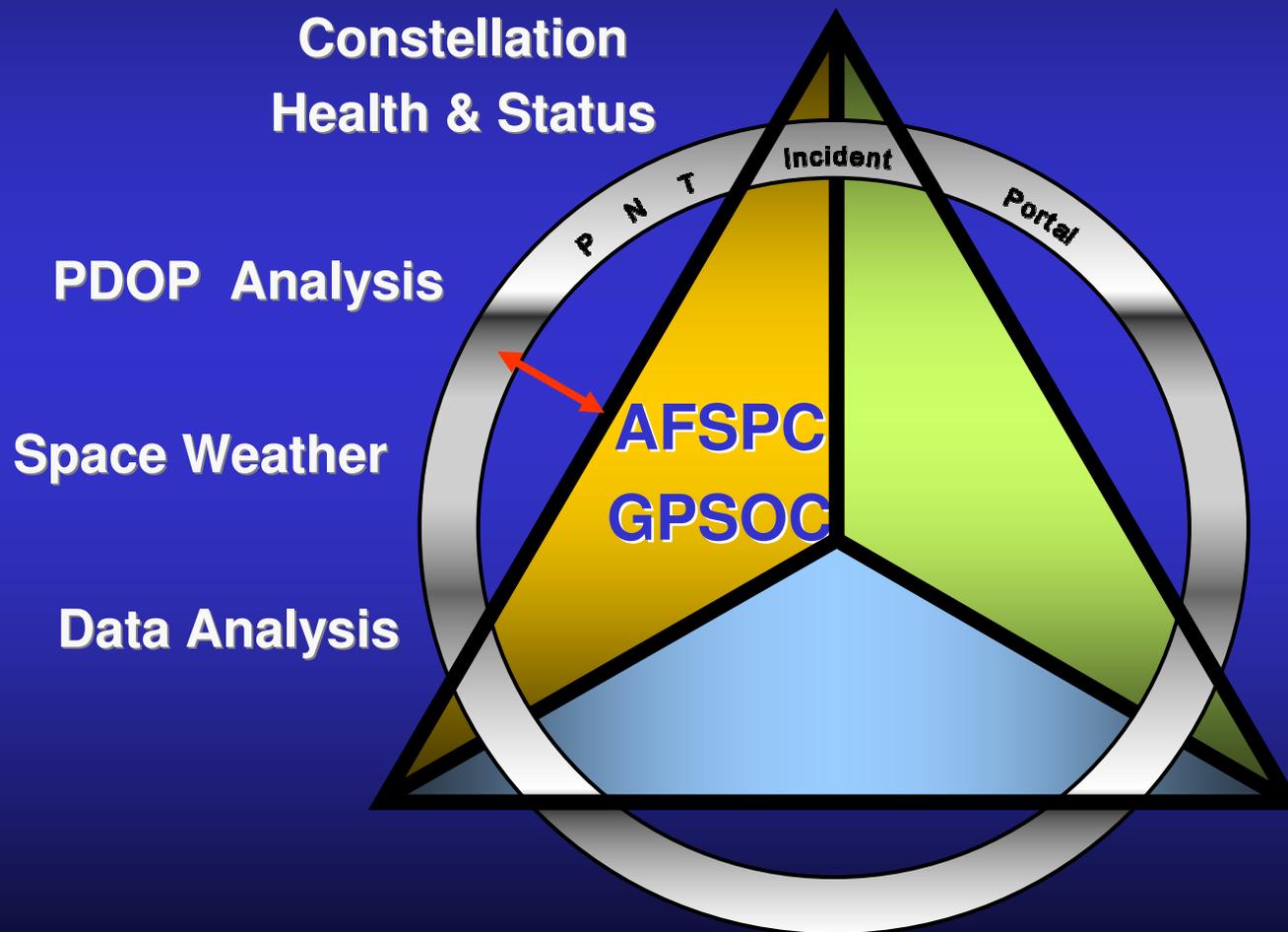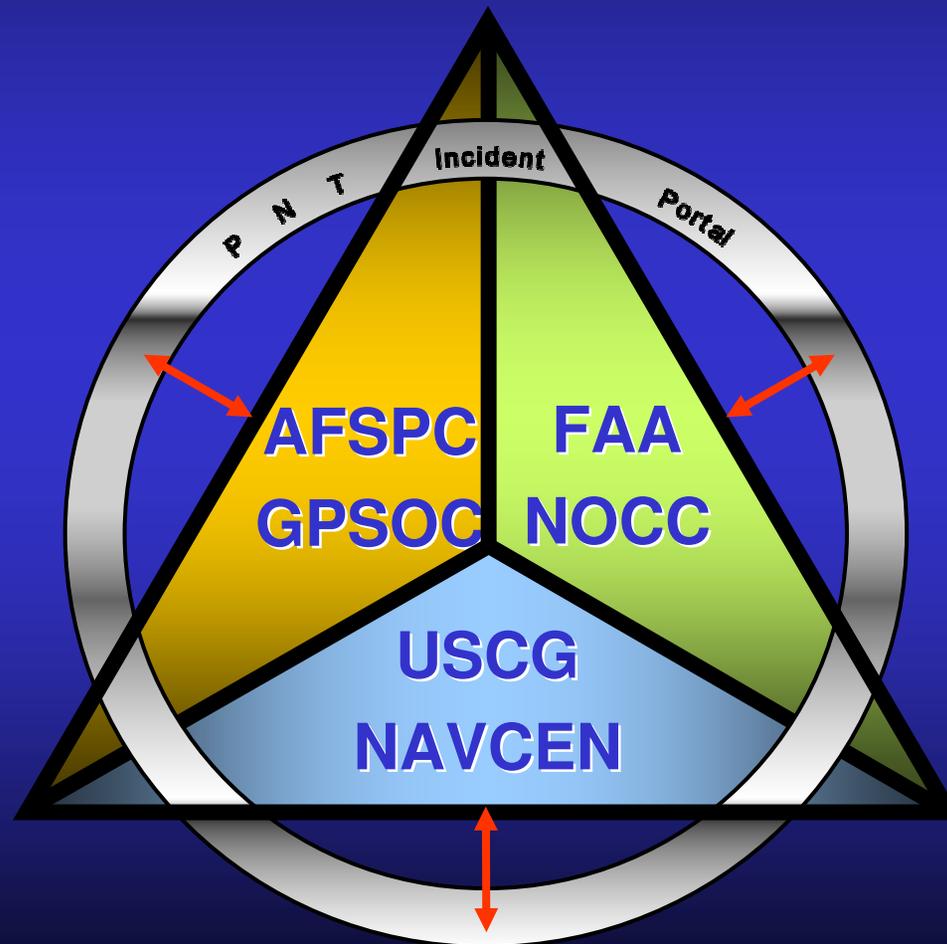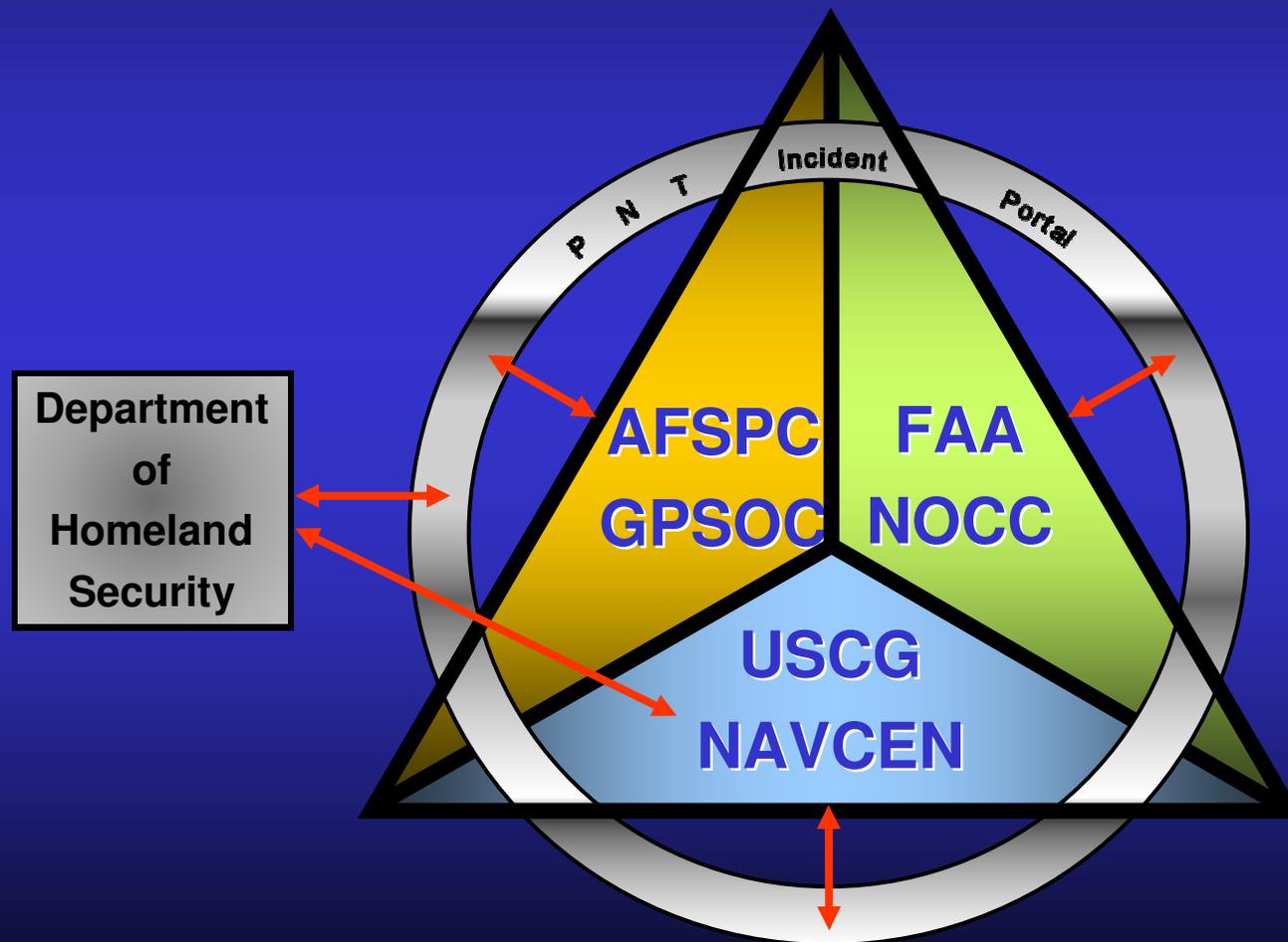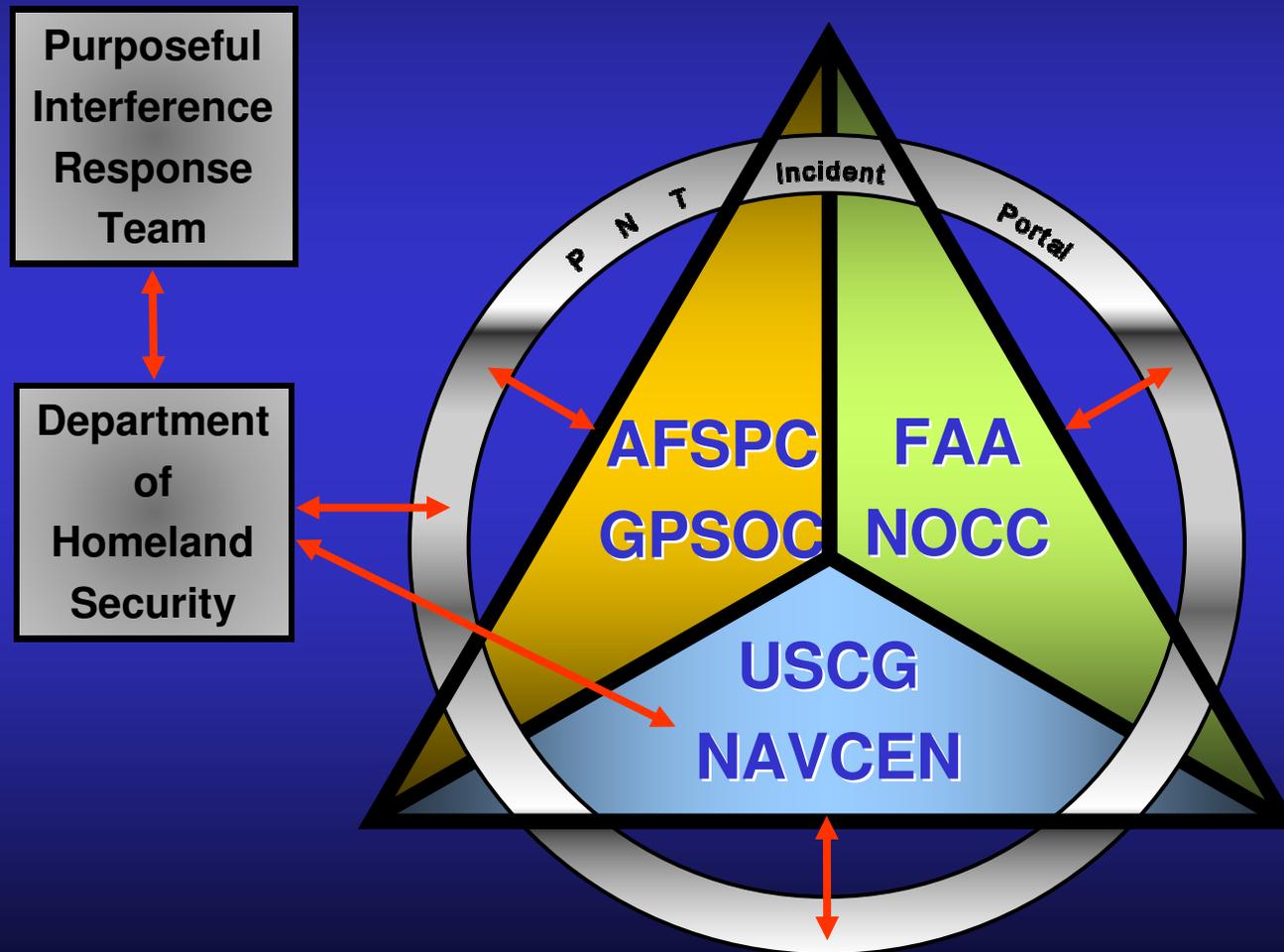**Priority 5 (P5) Incident** (All other service outages, reports, requests)
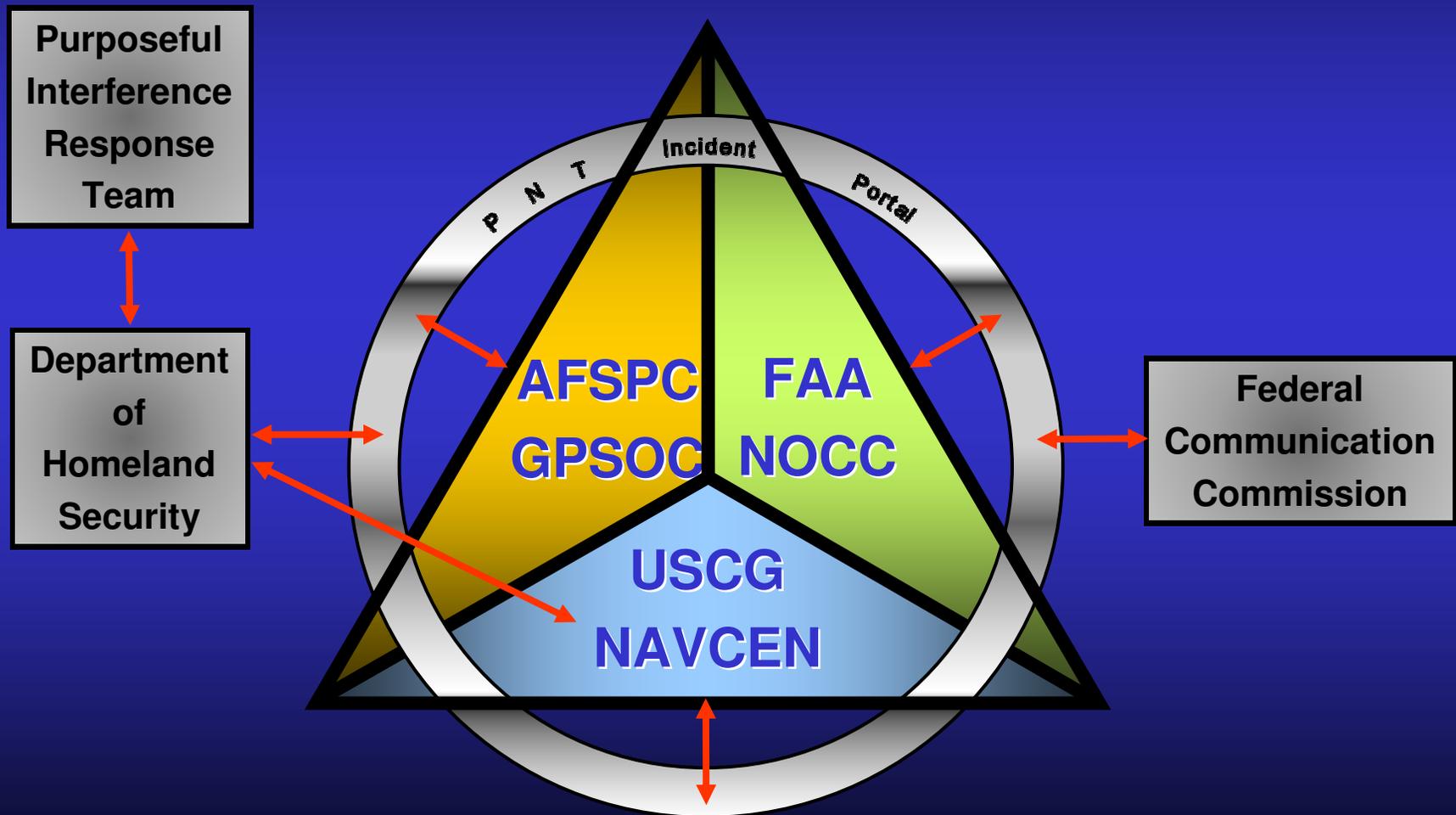
Minimal impact

GPS Interference Reporting

Identification of Service Disruption

GPS Interference Reporting

Identification of Service Disruption

GPS Interference Reporting

Purposeful Interference Response Team

Department of Homeland Security

Federal Communication Commission

Incident

P N T

Portal

AFSPC GPSOC

FAA NOCC

USCG NAVCEN

Identification of Service Disruption

GPS Interference Reporting
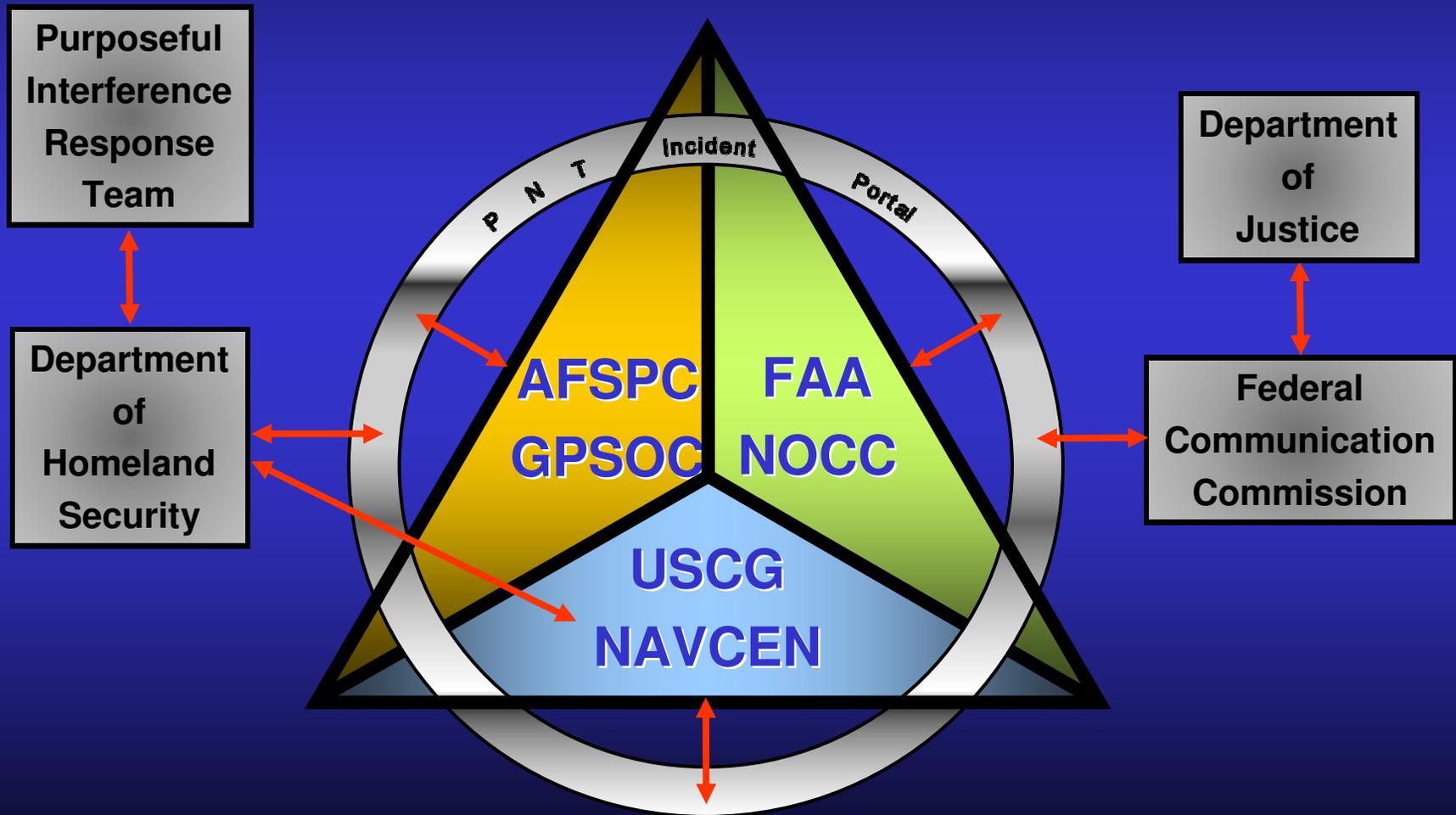
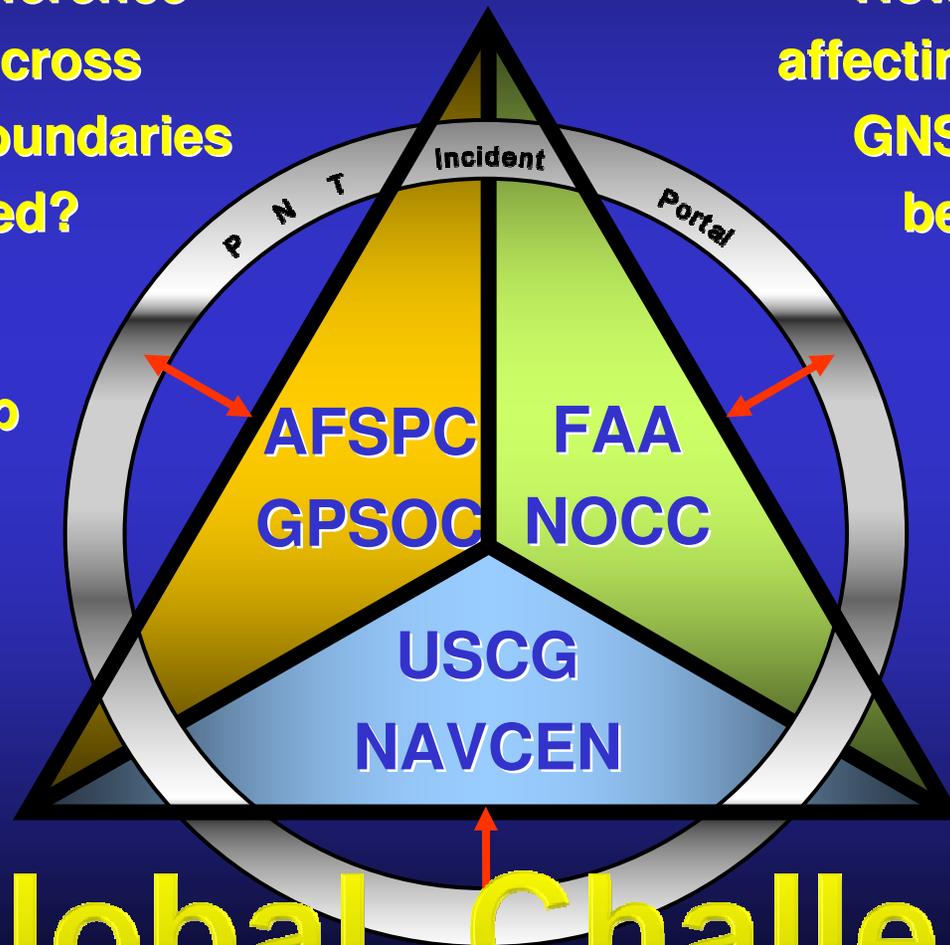**Identification and Mitigation of Service Disruption**

GPS Interference Reporting

How will interference events that cross international boundaries be handled?

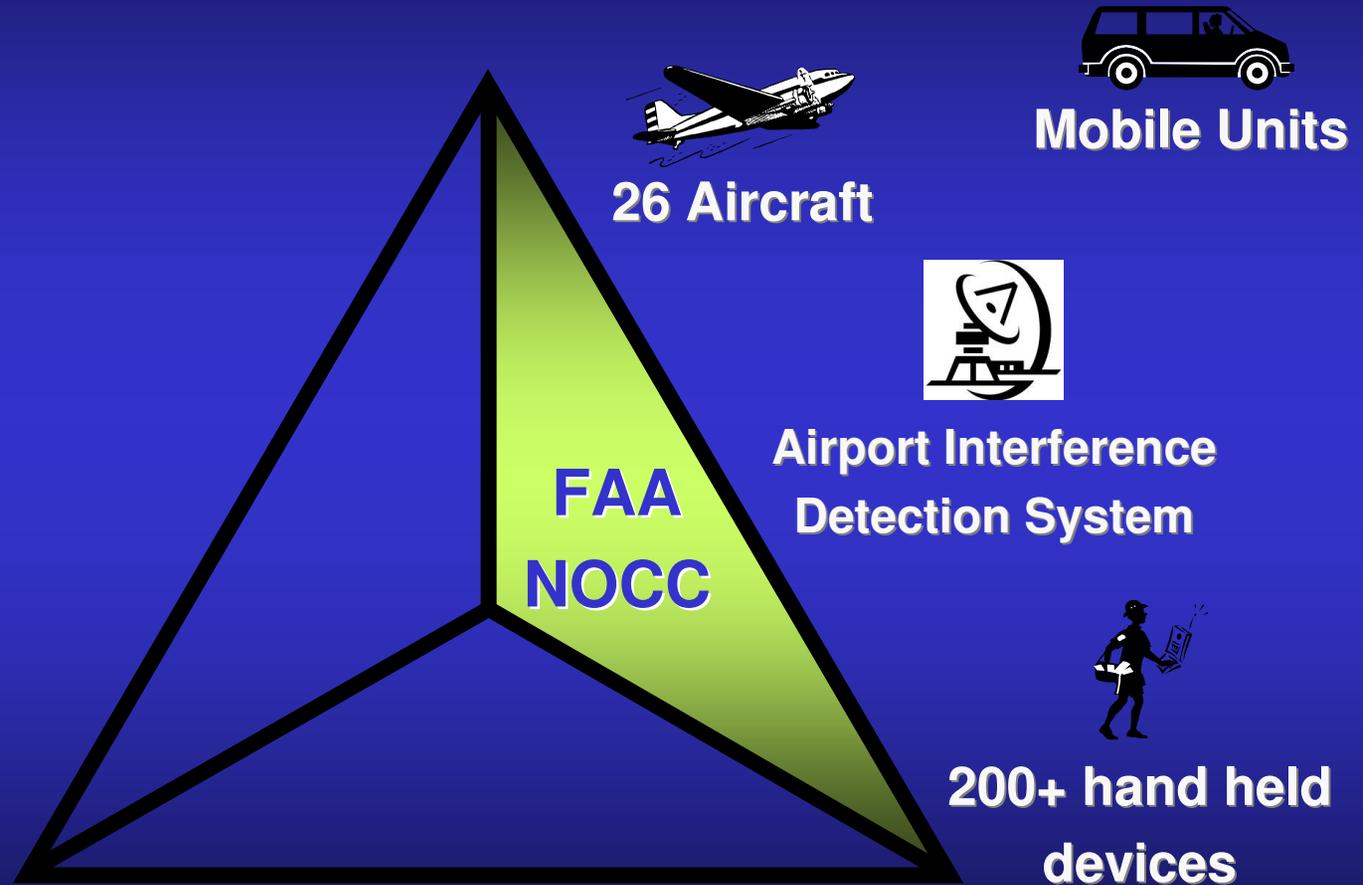How will events affecting multi-system GNSS receivers be handled?

Need to develop standardized reporting procedures.

Need to develop Real-time reporting system.

PNT Incident Portal

AFSPC GPSOC

FAA NOCC

USCG NAVCEN

Global Challenge

GPS Interference Reporting

26 Aircraft

Mobile Units

FAA NOCC

Airport Interference Detection System

200+ hand held devices

Identification and Mitigation of Service Disruption

Way-Ahead

- **Continue to look ahead and adapt**
  - **Adapt to new GNSS applications and threats**
  - **Improve and automate IDM processes**
  - **Continuously monitor and evaluate user support**
  - **Encourage ICG to promote international cooperation:**
    - **Between Service Provider Operations**
    - **Between Regulatory Organizations**
    - **Between Enforcement Organizations**
    - **With the ITU**