USING SPACEAPP CONNECT® FOR PNT DISRUPTION PREPAREDNESS

Introduction

SpaceApp Connect® is a robust platform designed to enhance **Positioning, Navigation, and Timing (PNT)** resilience. This guide outlines how to integrate SpaceApp Connect® into governance, cyber-risk, and business continuity frameworks to mitigate the risks of PNT disruptions effectively.

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1. Integrating PNT Resilience into Risk Management Frameworks

Identifying and Documenting Fallback Strategies

- Assess and document enterprise reliance on PNT for operations.
- Develop contingency plans addressing different PNT outage durations (1 min, 1 hour, 1 day, 1 week, 1 month).
- Prioritize safety-critical systems and set measurable thresholds for switching to backup modes.
- Ensure annual audits of PNT dependencies and validate supplier adherence to best practices.

Governance and Strategy Considerations

- Embed PNT loss scenarios into risk management and cyber resilience strategies.
- Assign responsibility for monitoring PNT risks within enterprise governance structures.
- Conduct regular training and awareness programs for employees and stakeholders.

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2. Testing System Responses to PNT Disruptions

Building a Disruption Risk Database

- Identify common PNT disruption risks such as power outages, signal interference, and cyber threats.
- Develop a comprehensive disruption response testing suite.
- Simulate outages to assess system behavior and refine response protocols.

Annual PNT Disruption Testing

- Implement an annual disruption testing day, akin to a fire drill.
- Validate system responses to short (minutes/hours) and long (days/weeks) outages.
- Verify integrity mechanisms to detect and report degraded PNT accuracy.

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3. Mitigation Strategies for PNT Resilience

Tiered Response Strategy

- Develop plans that allow continued operation for varying outage durations.
- Establish backup PNT solutions and redundant systems.
- Implement automated failover mechanisms and clear manual override protocols.

Acceptable Degraded Operations

- Define thresholds for degraded operational modes (e.g., switching to manual navigation in transport logistics).
- Identify key operational timeframes requiring alternative mitigation strategies (e.g., financial market openings, shipping schedules).
- Utilize cryptographic authentication for secure PNT data validation.

Example Mitigation Plan for Delivery Fleets

Outage Period	Power Loss	Communication Loss	Physical Damage	Weather Disruptions	Interference
1 min	Pull over safely	Monitor comms	Use backup maps	Be aware of degradation	Wait for interference to pass
1 hour	Use paper maps	Monitor comms	Replace damaged components	Adjust navigation	Identify interference sources
1 day	Request replacement system	Plan routes manually	Implement temporary solutions	Adjust to weather impact	Use alternative vehicles
1 week	As above	Utilize alternative comms	Replace system	Maintain situational awareness	Adjust travel routes
1 month	As above	As above	As above	Utilize long-term mitigation	Use alternative PNT sources

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4. Detecting PNT Disruptions in Real Time

Establishing Detection Methods

- Conduct Failure Modes and Effects Analysis (FMEA) to predict system behavior under disruption.
- Develop a real-time monitoring dashboard integrated with SpaceApp Connect®.
- Enable early warning mechanisms for anticipated disruptions (e.g., space weather alerts, cyber threats).

Example Disruption Detection Table for Fleet Operators

Disruption Type	Detection Method
No PNT Data	Position stops updating
Power Failure	Device displays no power indication
Communication Loss	Error messages, missing comms
Interference	Signal degradation, incorrect position/time

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5. Ensuring Operational Continuity and Safety

Incident Response Actions

- Deploy response teams to implement mitigation plans.
- Maintain clear communication with operators and external authorities.
- Monitor response effectiveness in real time using performance dashboards.

Transitioning Back to Standard Operations

- Conduct system integrity checks before resuming normal operations.
- Phase in primary systems gradually to prevent cascading failures.
- Document lessons learned and update continuity plans accordingly.

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6. Post-Disruption Evaluation and Reporting

Assessing Mitigation Effectiveness

- Conduct After-Action Reviews (AARs) to evaluate response outcomes.
- Analyze performance of backup systems and decision-making processes.
- Identify areas for improvement and update contingency plans.

Sharing Lessons Learned

- Report findings to stakeholders, regulatory bodies, and industry peers.
- Ensure transparency with customers and end-users regarding disruptions.
- Incorporate updated strategies into broader risk management frameworks.

By integrating SpaceApp Connect® with governance frameworks and business continuity strategies, enterprises can ensure resilience against PNT disruptions. Regular audits, testing, and structured response plans will enhance operational stability, safety, and security in the face of evolving threats.

For more information please contact us at customer.service@spaceapp.org .