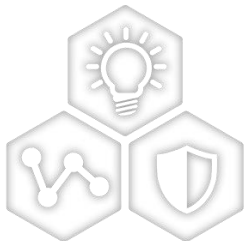


# The Business Case for Synchronization



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A Leading Provider of Smart, Connected and Secure Embedded Control Solutions



SMART | CONNECTED | SECURE

**Duke Buckner**

March 2023



# History Tells Us...

## Compelling Events Drive Adoption

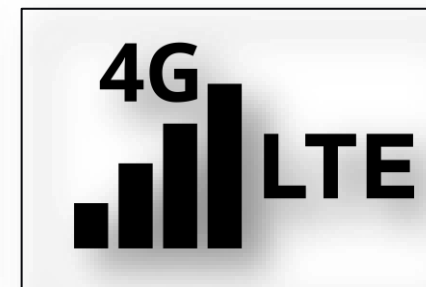
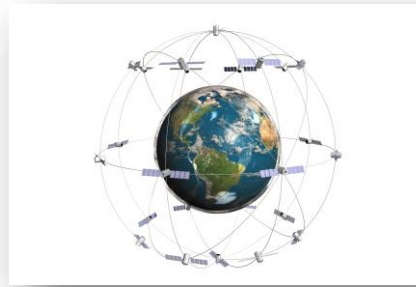
What Were the Events that Drove GPS  
Adoption?

1984





# Timeline of GPS Adoption



1980

1990

2000

2010

2020

KAL 007

AT&T Break  
Up

First GPS  
Receivers for  
Telecom

First LTE  
Deployments

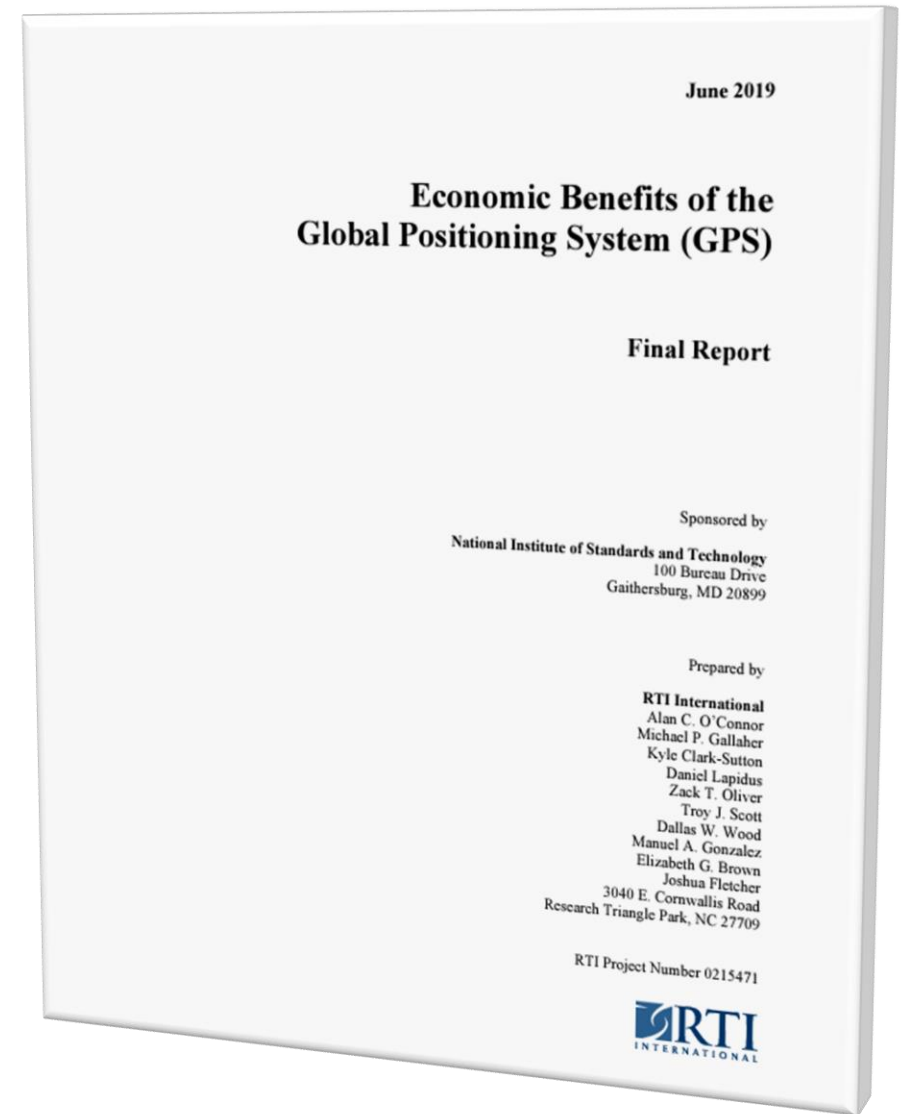
First 5G  
Deployments

Civilian Use  
of GPS  
Authorized

GPS Declared  
Fully  
Operational

# A Study on the Economic Impact

- 2019 US Department of Commerce, NIST
- \$1.4 trillion impact since 1985
- More than 50% came in telecom
  - 3G, LTE, 5G
  - Bandwidth was the largest driver
- A GPS outage can be is quantified as **\$1 Billion per Day**



# But GPS Has Challenges



Jamming and  
Spoofing



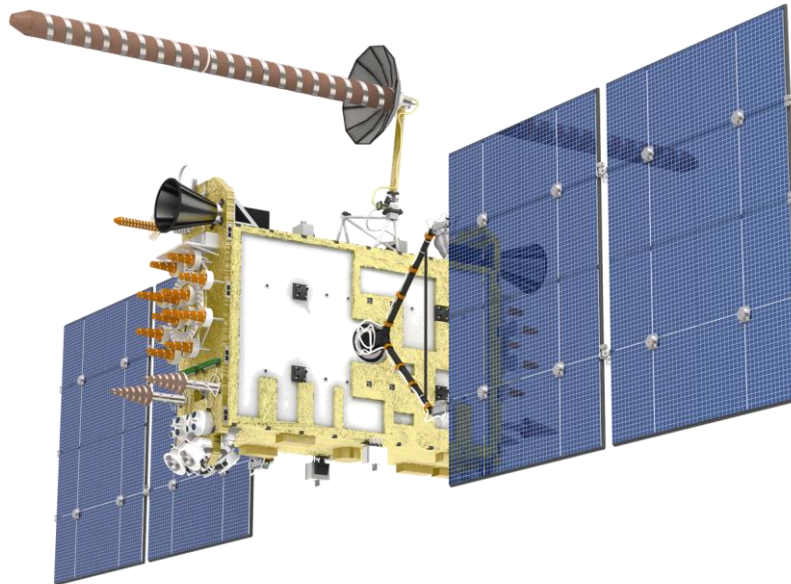
Installation Errors



Solar Activity



Urban Canyon

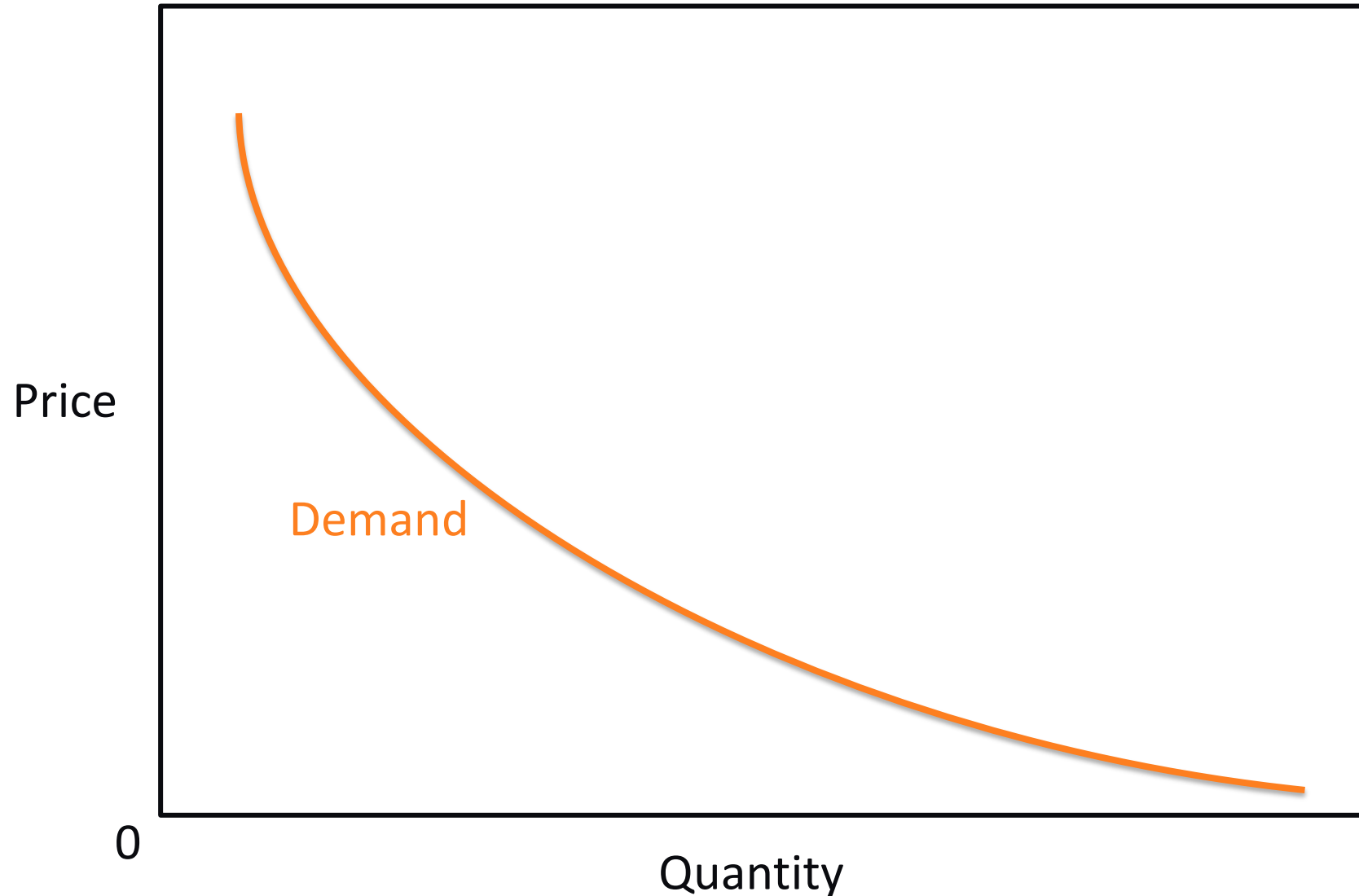


Kessler Syndrome



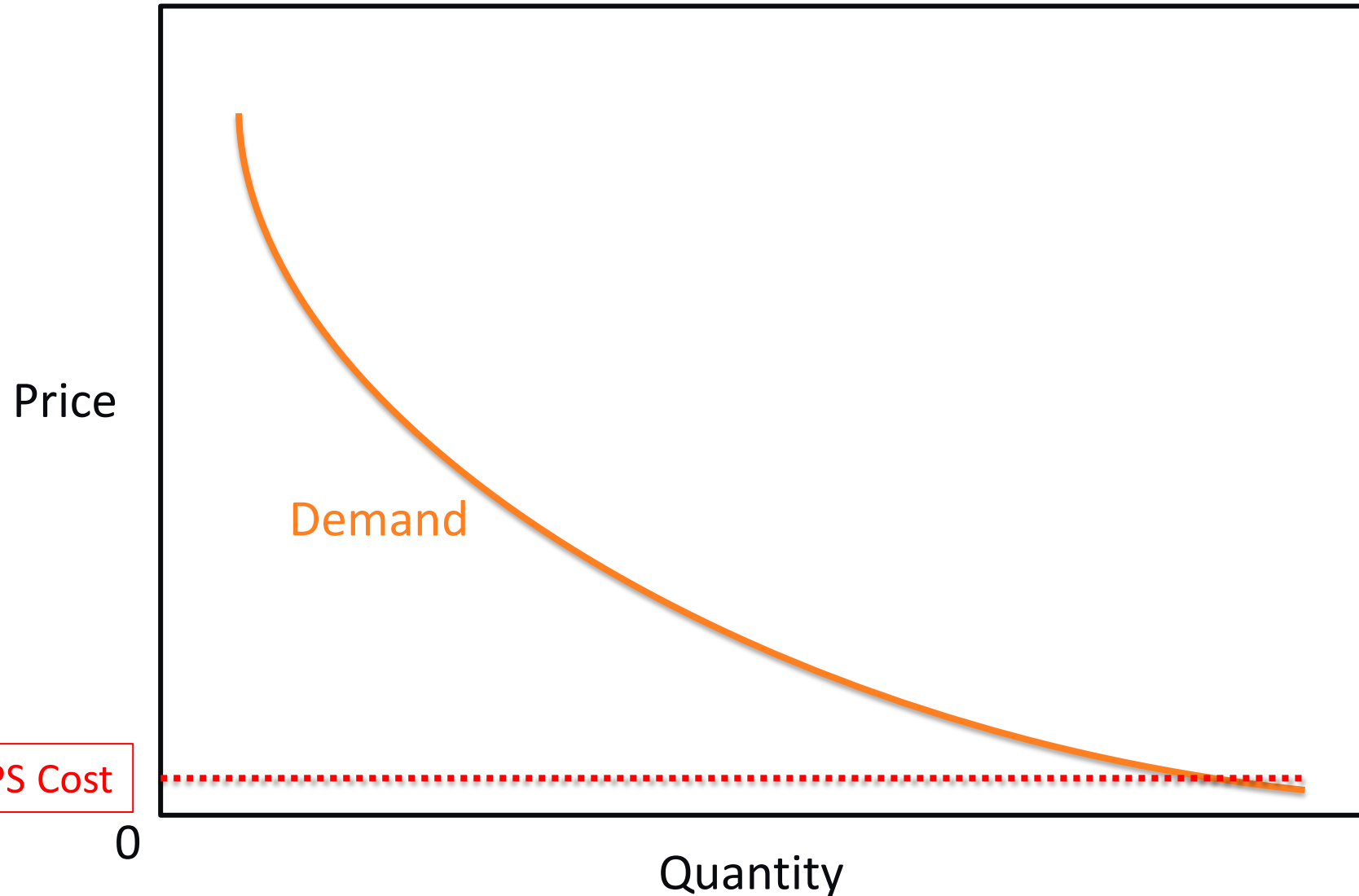
# Theoretical Supply – Demand Model

## PNT Alternative to GPS



# Theoretical Supply – Demand Model

## PNT Alternative to GPS



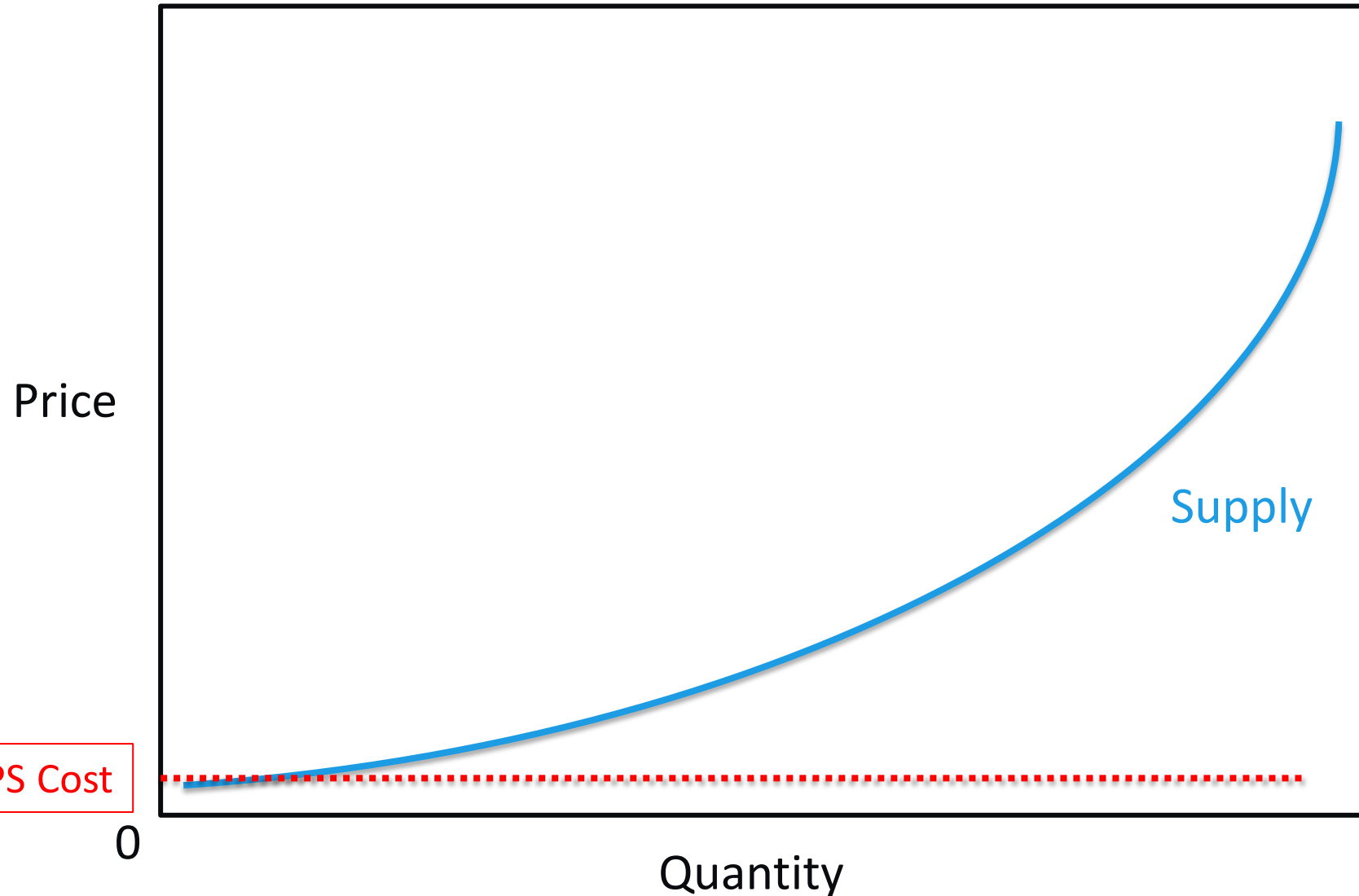
Perceived GPS Cost

0

Quantity

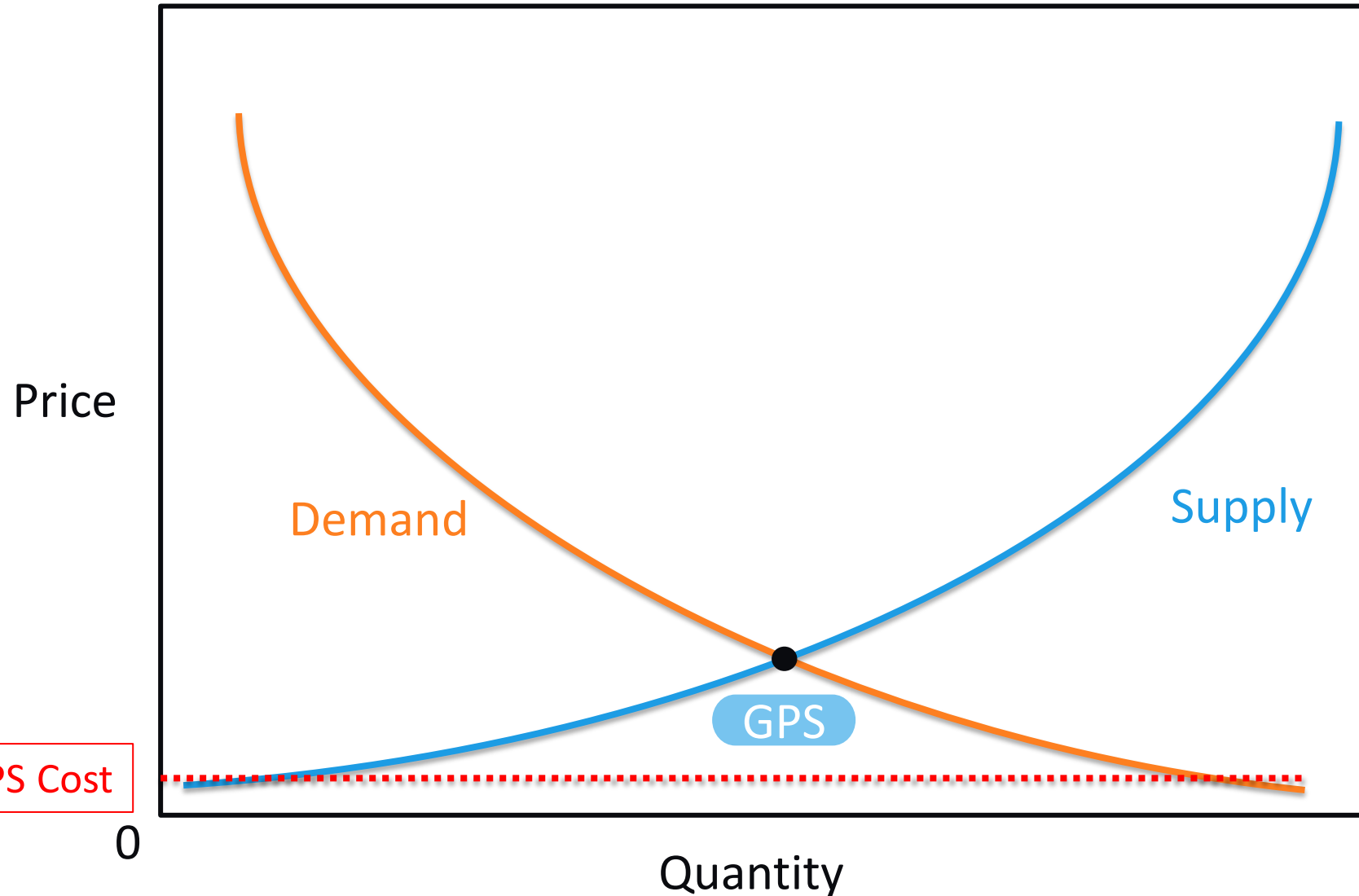
# Theoretical Supply – Demand Model

## PNT Alternative to GPS



# Theoretical Supply – Demand Model

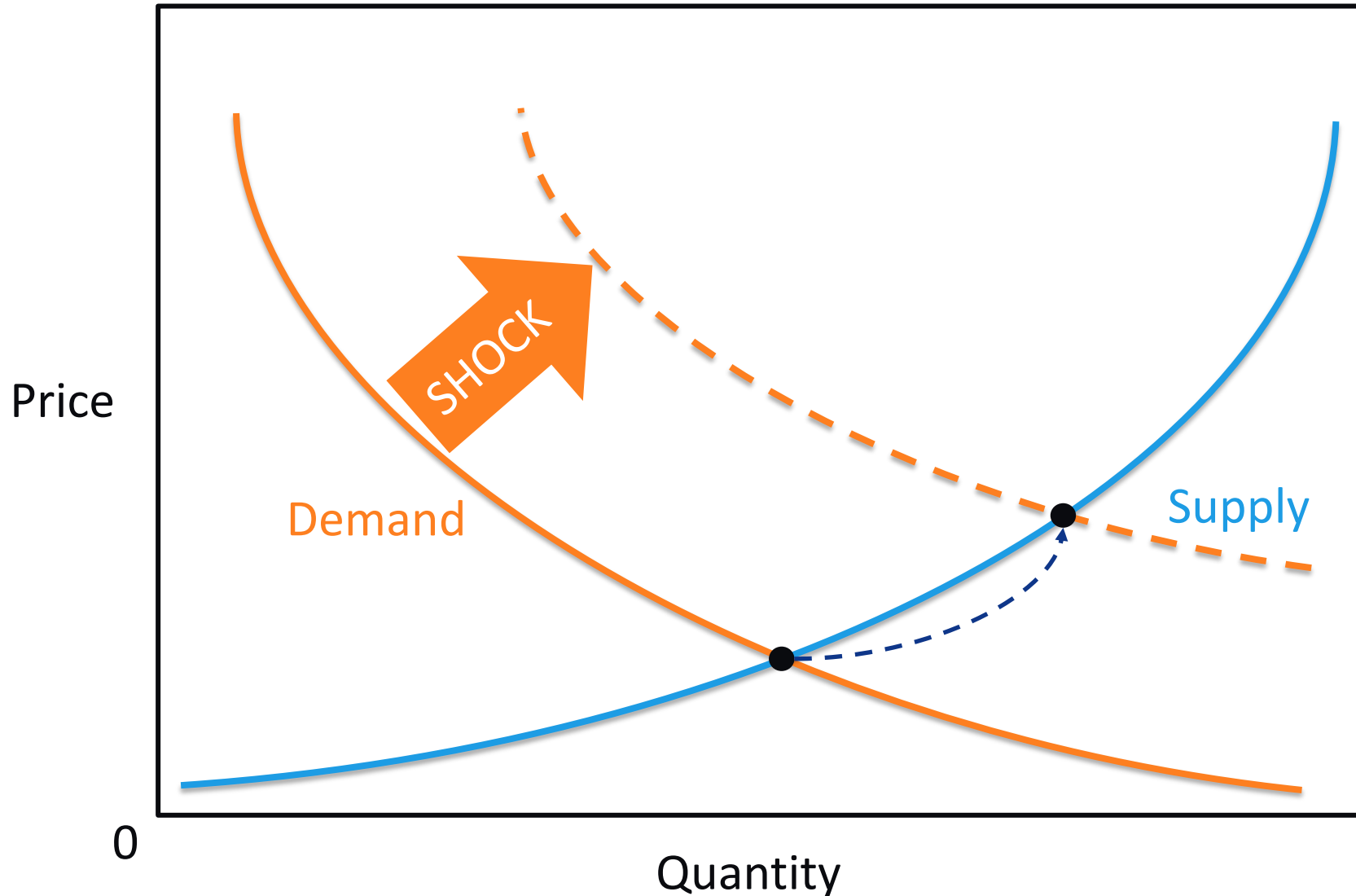
## PNT Alternative to GPS





# Theoretical Supply – Demand Model

## PNT Alternative to GPS



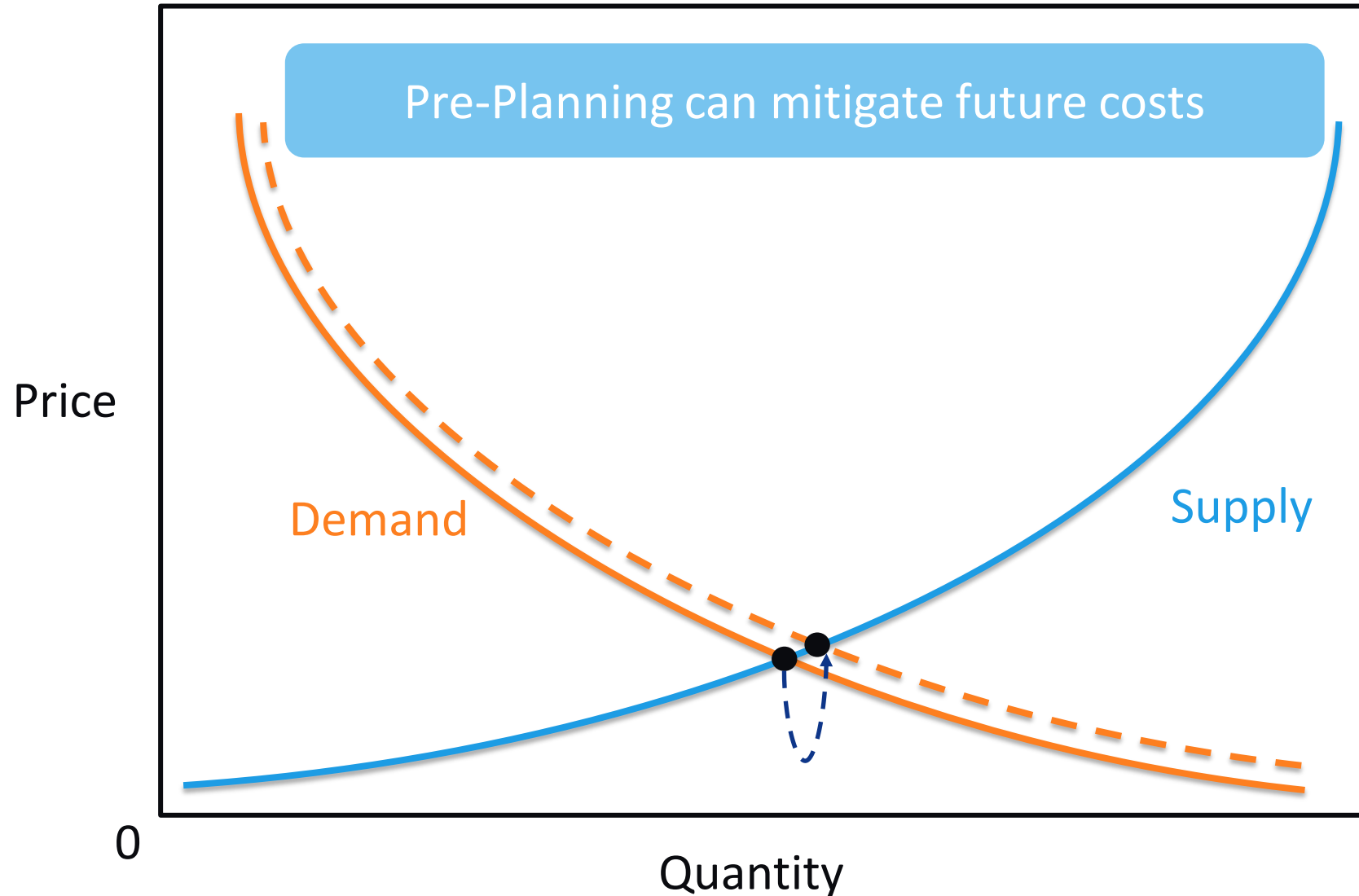
**Shock:** Short Term Market Reaction

Imminent Perceived Risk/Threat

Actual Impact to GPS

# Theoretical Supply – Demand Model

## PNT Alternative to GPS



# Keys to Analysis

- **Risk Tolerance**
  - Loss of revenue
  - Customer satisfaction
  - Preparedness
  - What-if scenarios
- **Current Cost vs Future Value**
- **Does a New PNT Source Add Value?**
  - Marketing advantage
  - Support other critical infrastructure
  - Governmental requirements
- **Survivability**



# What Will Be the Next Compelling Event?





# Thank you!

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**Duke Buckner**

Strategy and Business Development

Frequency and Time Systems

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