



# **DISASTER MONITORING & MANAGEMENT WITH Unmanned Aerial System UTILIZING GNSS**

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# Presentation Flow



- Background
- Need Analysis
- UAS – A Viable Solution
- Role of GNSS Technology
- Summary

# Background



- Pakistan is a country that has experienced various disasters and lost resources over the past
  - Flood
  - Earthquake
  - Landslides
  - Disease breakout
- Monitoring and more importantly relief management in case of a disaster becomes of utmost importance

# Background



# Need Analysis

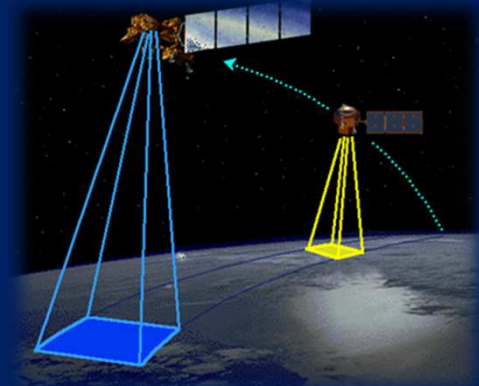
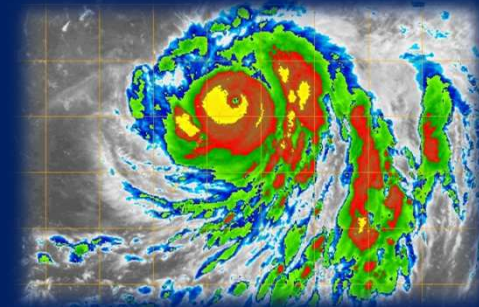
- The data for these disasters need to be gathered and analyzed for:
  - Verifying disaster modeling
  - Broadcasting alert messages
  - Damage assessment
  - Coordinating rescue efforts



# Satellite Imagery

## A Possible Solution?

- Weather Coverage
- Receiving & Distributing Distress Signals
- Real Time Data on Climate Change
- Spatial Coverage of Disaster Events through Remote Sensing



# Satellite Imagery

## A Possible Solution?

- Many satellite images are readily available
    - » Low resolution
    - » High cost
  - Some data is not available (e.g. optical)
  - Frequent updates are required using satellite imagery
  - In the future, satellite image collection
- Although Satellite Imagery provides invaluable data, there still remains room for improvement that requires a dexterous platform



# Unmanned Aerial System

## A viable solution

- This presentation aims to discuss:
  - GNSS aided Unmanned Aerial Systems (UAS) utilization for Disaster Monitoring & Relief Management





# Unmanned Aerial Systems

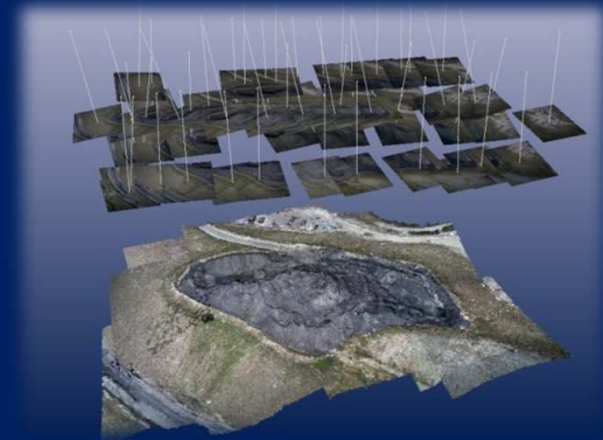
A technology to go beyond Sat Imagery Limitations



UAS Aerial Imagery fills the data gap b/w Satellites and Manned Imagery

## UAS vs. Satellites:

- » High Resolution Spatial Coverage
- » Images can be obtained as and when required
- » Cloud Impact avoided by flying at Low altitudes
- » Footage for scenes which are inaccessible with satellite



# Unmanned Aerial Systems

A technology to go beyond Sat Imagery Limitations



UAS Aerial Imagery fills the data gap b/w Satellites and Manned Imagery

## UAS vs. Manned Aerial System:

- » UAS can fly in riskier and more treacherous areas such as: hurricanes, Volcanic eruptions and Nuclear Disasters
- » Manned Aerial Systems are quite expensive than UAS



# Role of UAS

## Disaster Monitoring & Relief Management



# Role of GNSS Technology

- GNSS is the standard generic term used for satellite navigation systems.
  - It provide autonomous geo-spatial positioning with global coverage.
  - GNSS based receivers can provide the location (latitude, longitude and altitude) within few meters.



# Role of GNSS Technology

- With the advancements in GNSS technology, precise positioning service can provide surveying grade accuracy.
  - It can provide high accuracy, precision and integrity.
  - It can fulfill the requirements of geodesy and geosciences
  - It can serve the needs of surveying, mapping and navigation users.



# Role of GNSS Technology

GNSS serves as an essential enabling technology for:

- Way point Navigation for autonomous flight
- Geo-referenced incident data and imagery
- Precise location for Search & Rescue

# ROLE OF GNSS TECHNOLOGY

Way point Navigation for autonomous flight

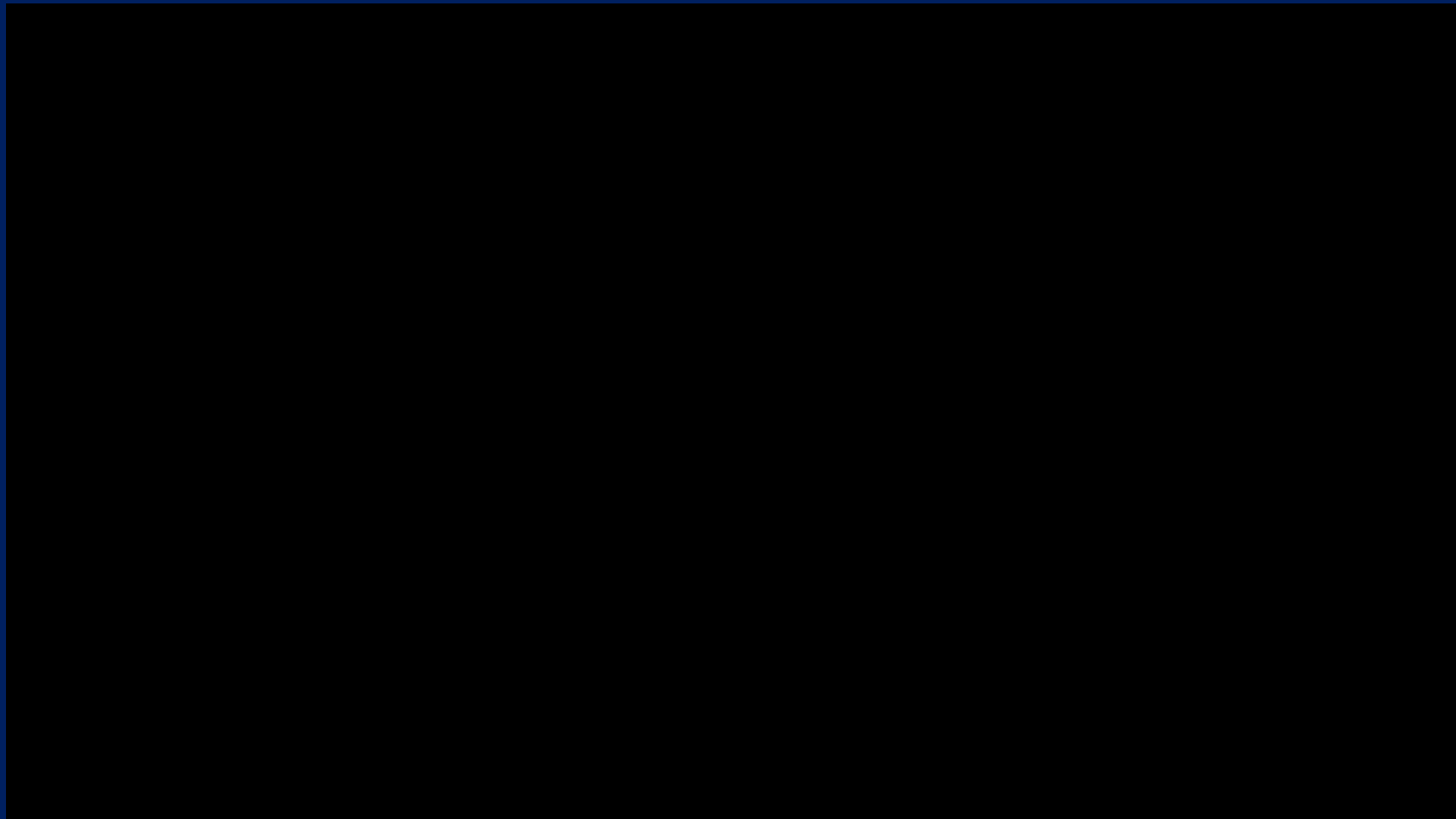




# ROLE OF GNSS TECHNOLOGY

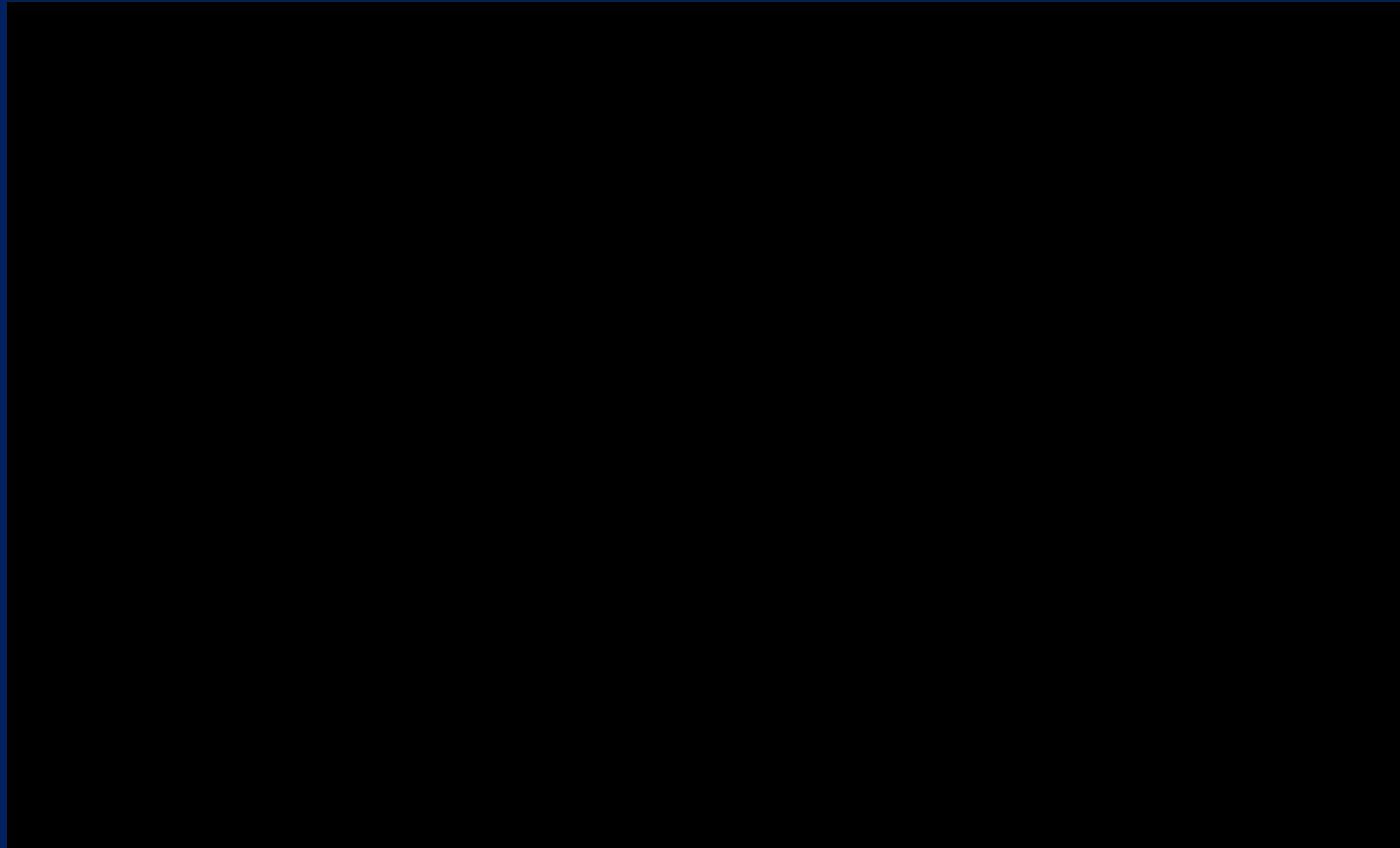


Geo-referenced incident data and imagery



# ROLE OF GNSS TECHNOLOGY

Precise location for Search & Rescue



# SUMMARY

- Efficiency of Disaster Monitoring & Rescue activities can be enhanced by utilizing UAS
- GNSS fulfills the navigation and positioning needs to effectively monitor and manage disasters through UAS

**THANK YOU**