



**Asia-Pacific
Economic Cooperation**

2025/SOM3/EPWG/SDMOF/013

Agenda Item: S5.1.1

**Healing the “Common Operational Picture (COP)”:
Artificial Intelligence (AI) and Application
Programming Interfaces (APIs) Reform Disaster and
Public Safety Leadership in the Asia-Pacific Region**

Purpose: Information

Submitted by: Korea



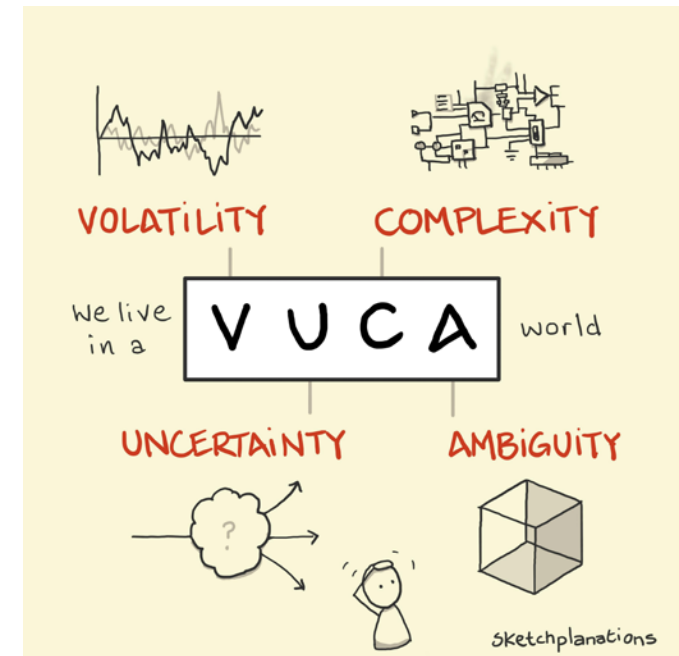
**18th Senior Disaster Management
Officials' Forum
Incheon, Korea
31 July 2025**

Healing the “COP”: AI and APIs Reform Disaster and Public Safety Leadership in the Asia-Pacific Region

Anthony J. Pennings, PhD
with Saebom Jin, PhD

I. From Chaos to Command: Reframing Crisis Leadership in the Age of VUCA

- Unpredictable climate disasters
- Increasingly complex types and sources of disaster data
- Disaster leadership often situated outside the domain of DRR



Background (1): Rise of unpredictable climate disasters

The odds of odd things happening are increasing..!

28 June 2022 Author: Jessica Bridger

The Texas coldwave disaster – How cascading risks took out an entire power grid

Source(s): United Nations Office for Disaster Risk Reduction

Background (2): The Explosion of Data Types

The challenge is NOT scarcity.



Image from the CCTV will be updated at an interval of 5 minutes
Source: <https://images.app.goo.gl/8exRdMDxYbGpaSdu5>

- Proliferation of sensors, satellite feeds, social media, and climate analytics
- Challenge: From raw data → meaningful action

What kind of leadership do we need?

Data-driven Decision Making



Anticipatory Response

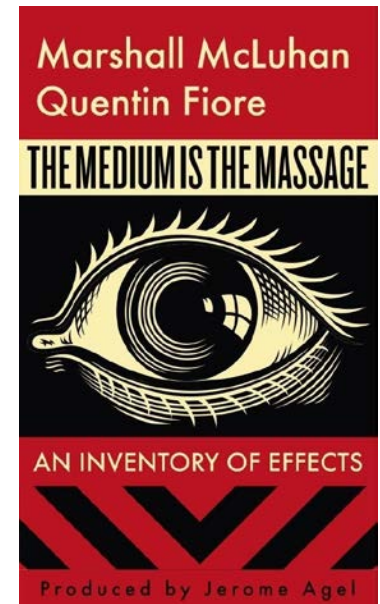


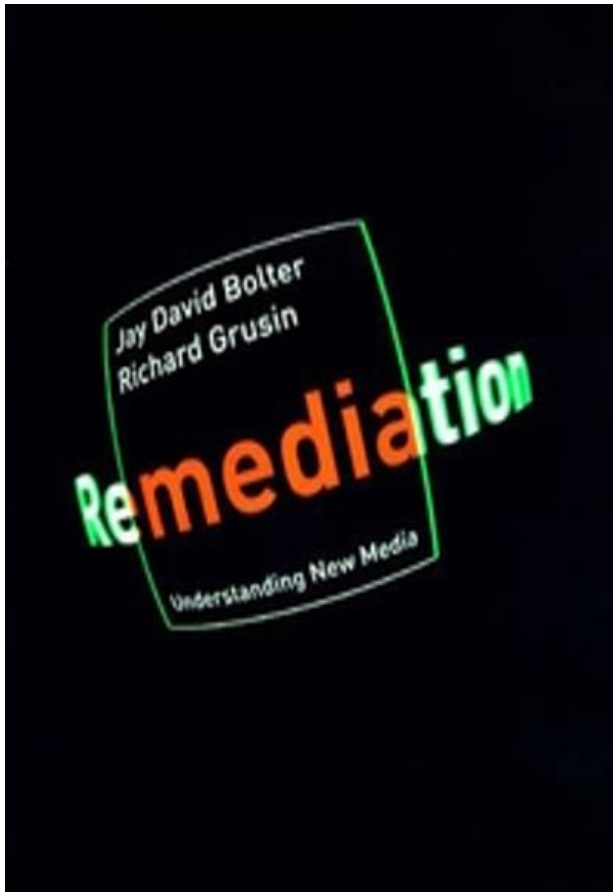
Adaptive Systems



II. “COP” in the Age of AI-Assisted Remediation

- *"The 'content' of any medium is always another medium"* (Marshall McLuhan).
- This isn't about simple replacement but about **transformation** and **improvement**.
- **Remediation**, as defined by Bolter and Grusin (1999), is the idea that new media refashion and incorporate older media forms.





Ultimately from the Italian word *remederi* - "to heal, to re-store to health,"

Remediation was adopted to express **the way in which one medium is seen as reforming or improving upon another.**

New media technologies are designed to improve upon or “**remedy**” **prior technologies** in an attempt to capture or mediate a more “**authentic**” **sense of reality.**

Two logics – **Transparent Immediacy** and **Hypermediacy**

New technologies “remediate” the old

Remediation is the process by which new media adopt and adapt the forms and functions of older media."— Bolter & Grusin, *Remediation: Understanding New Media* (1999)

<u>Principle</u>	<u>Description</u>	<u>Disaster Leadership Context</u>
Immediacy	Desire for seamless, transparent experience (e.g., live data feeds)	Real-time dashboards, alerts, live video connections, situational awareness
Hypermediacy	Layered, visible interfaces augmented with maps and indexical graphics	GIS systems, satellite overlays, multi-channel communications
Remediation	Integration and transformation of prior media into a new framework	AI and digital tools transforming legacy disaster response methods

New technologies don’t replace the old — they remediate them.

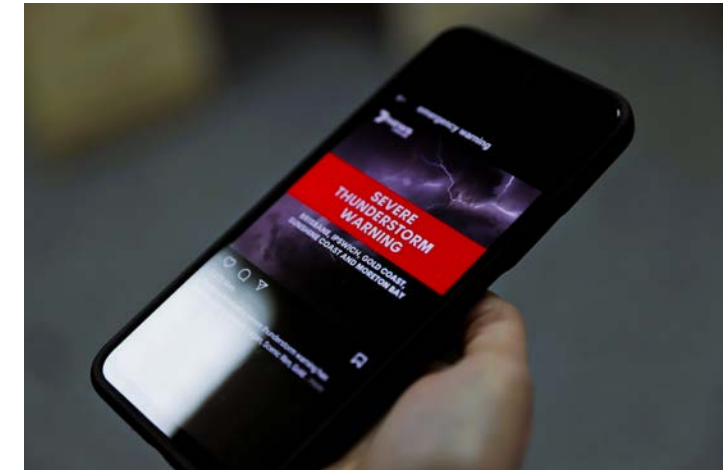
👉 **Reframe: How leadership, communication, and decisions happen in crisis situations**

From Traditional Media to Leadership Interfaces

Transition from

- Historically, writing remediated the voice, print remediated writing, television remediated film and radio.
- Spreadsheets as remediated bureaucratic tools such as lists, writing, tables, formulas → now real-time decision layers
- “Show-Biz” financial news remediates ticker tapes and economic statistics while interviewing experts → now social media updates
- Satellite and AI systems mediate disaster information to leaders in actionable formats

👉 Leadership now involves **navigating digital interfaces** rather than issuing directives alone



“COP” as a necessary mediation tool

The Common Operational Picture (COP) is not just a dashboard — it’s a dynamic media environment.



Source: <https://www.magaero.com/unlocking-the-benefits-of-a-common-operating-picture/>

Remediating Crisis Interfaces: What is COP?

The “**Common Operational Picture**” (COP) is a **shared visualization of operational information** that provides **real-time situational awareness** to decision-makers, teams, and systems involved in complex, often multi-agency operations—such as military missions, emergency response, critical infrastructure management, or smart city monitoring.

- Regularly used in control rooms but increasing mobile and personal (POP)
- Intelligence centers and networks of response that helps leaders view the same up-to-date information.

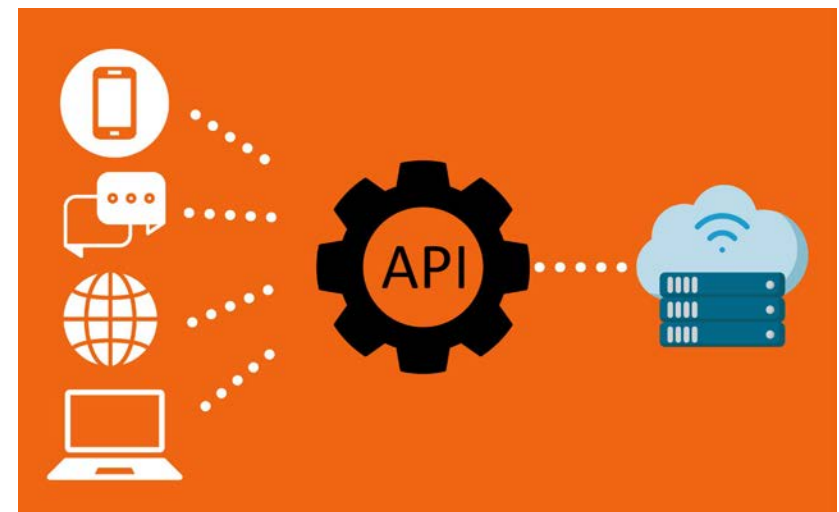
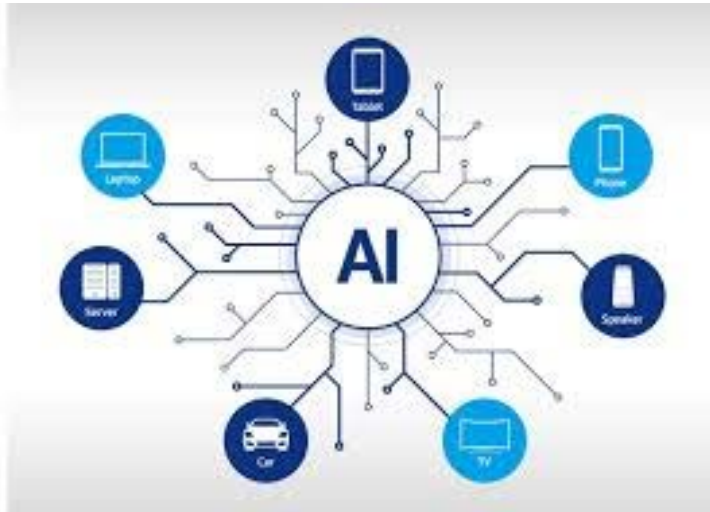


- Key features:
dashboards, alerts, decision support
- Key benefits in:
 - ✓ Situational awareness
 - ✓ Collaboration across units/agencies
 - ✓ Decision speed
 - ✓ Operational efficiency

Source: <https://www.linkedin.com/pulse/common-operational-picture-its-leo-van-den-berg>

AI, APIs, and the COP as a Dynamic Interface

- **APIs** allow COPs to connect and normalize diverse media streams.
- **AI** turns COPs from static monitors into dynamic intelligence platforms.
- By applying *Remediation theory*, disaster leaders can continue to design these systems not just to inform, but **to shape perception, action, and trust during crises.**



Application Programming Interfaces (**APIs**) as bridges to connect, integrate, and synchronize data and video streams from diverse systems, platforms, and sensors.

APIs allow a COP to consume, fuse, and display media and **data from both structured and unstructured sources in real time.**

- **Data Collection** - APIs fetch data from surveillance cameras, drones, weather feeds, and more.
- **Normalization** - APIs convert varied data formats (video, JSON, CSV, XML) into standardized inputs.
- **Synchronization** - APIs coordinate time-stamping and geolocation across systems
- **Visualization** - APIs push processed data to front-end displays like dashboards or mobile apps
- **Interactivity** - APIs enable real-time updates, alerts, map overlays, and drill-down actions

Artificial Intelligence (AI)'s capacity to ingest, process, and fuse massive, disparate datasets with APIs fundamentally transforms how information is integrated and represented within COPs.

- **AI as an operating system** using APIs to enable the COP to dynamically integrate **disparate sources into a unified operational perspective, facilitating interpretation and prediction.**
- Uses NLP, Computer Vision, Predictive Analytics, Speech-to-Text
- Creates a remediated interface for:
 - ✓ Transparent Immediacy (real-time clarity)
 - ✓ Hypermediacy (layered complexity & insight)

👉 AI empowers the COP to **transition from a static display to a dynamic interface**, continuously developing entity capable of adapting to the fluid information demands of a crisis.

AI-Driven Personalized Operational Pictures (POPs): Focused, Role-Based Views

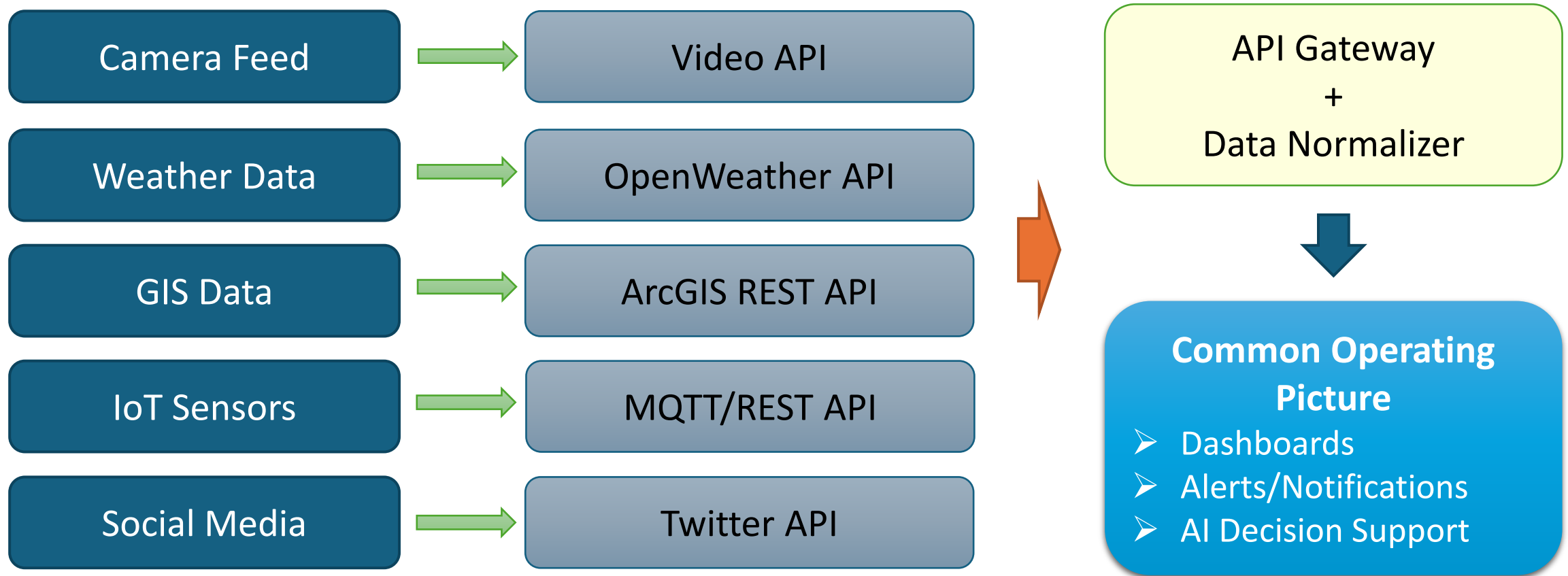
- Customized displays for each responder based on their specific workflow responsibilities and preferences
- Filters out noise, highlights key data (not extraneous data) – crucial in complex environments
- Boosts **clarity**, **efficiency**, and **real-time action**

By prioritizing specific data feeds, applications, and analytical tools, POPs enhance an operator's ability to detect trends or anomalies that may require immediate action, thereby improving efficiency and responsiveness.



AI generated image

Data Flow in a COP with AI and APIs



III. Remediated Decision-Making with the AI-Assisted COP and Dashboard

- Applying theory to practice: How to design AI-assisted COP to support real-time decision-making

1) Contextualized and Curated Data to Build Trust

- Information overload in crisis: more data $\neq$ better decisions.
- **Remediated Visuals:** help leaders acknowledge the complexity of a disaster and the multi-faceted nature of the response, thereby **building credibility by showing they grasp the full picture** (e.g., "We are tracking X, Y, and Z data points, and here's how they interrelate").
- **Contextualization and Curation:** Leaders should shape technologies to include strong curation and contextualization features, **helping users make sense of the data rather than just being exposed to it** (e.g., AI used to help summarize trends from multiple data streams).

 **Trust begins with a transparent explanation of complexity.**

2) Hypermediated Platforms for Communication

- Use **official channels** (web/app) to verify and contextualize multi-source information.
- Leverage hypermediated platforms to **segment and target specific messages** to different audiences based on their needs, location, or preferred channels.
- Design communication technologies for **two-way interaction** (e.g., interactive maps where users can report needs, Q&A features on dashboards).
- Use technologies like **advanced dashboards or "story map" platforms** to construct a **coherent and evolving narrative out of diverse and complex data streams**. This involves skillfully curating and presenting hypermediated information **to tell a clear story of the situation, the response, and the path forward**.

3) Orchestrating Complexity via Interface Design

Design systems where users can navigate through layers of information seamlessly.

- For Emergency Operations Centers (EOCs) or public-facing information portals, design **hypermediated interfaces** (like dashboards) with extreme care.
- How: apply user-centered design, clear visual hierarchies, customizable views, and drill-down navigation
- **Hypermediacy** should reveal, not confuse:
 - ✓ Tailored views (e.g., public info officer ≠ operations chief)
 - ✓ Information synthesized into coherent, actionable insights
 - ✓ Interface as narrative space, not just a data wall

👉 The goal is to turn complex data into **actionable intelligence**.

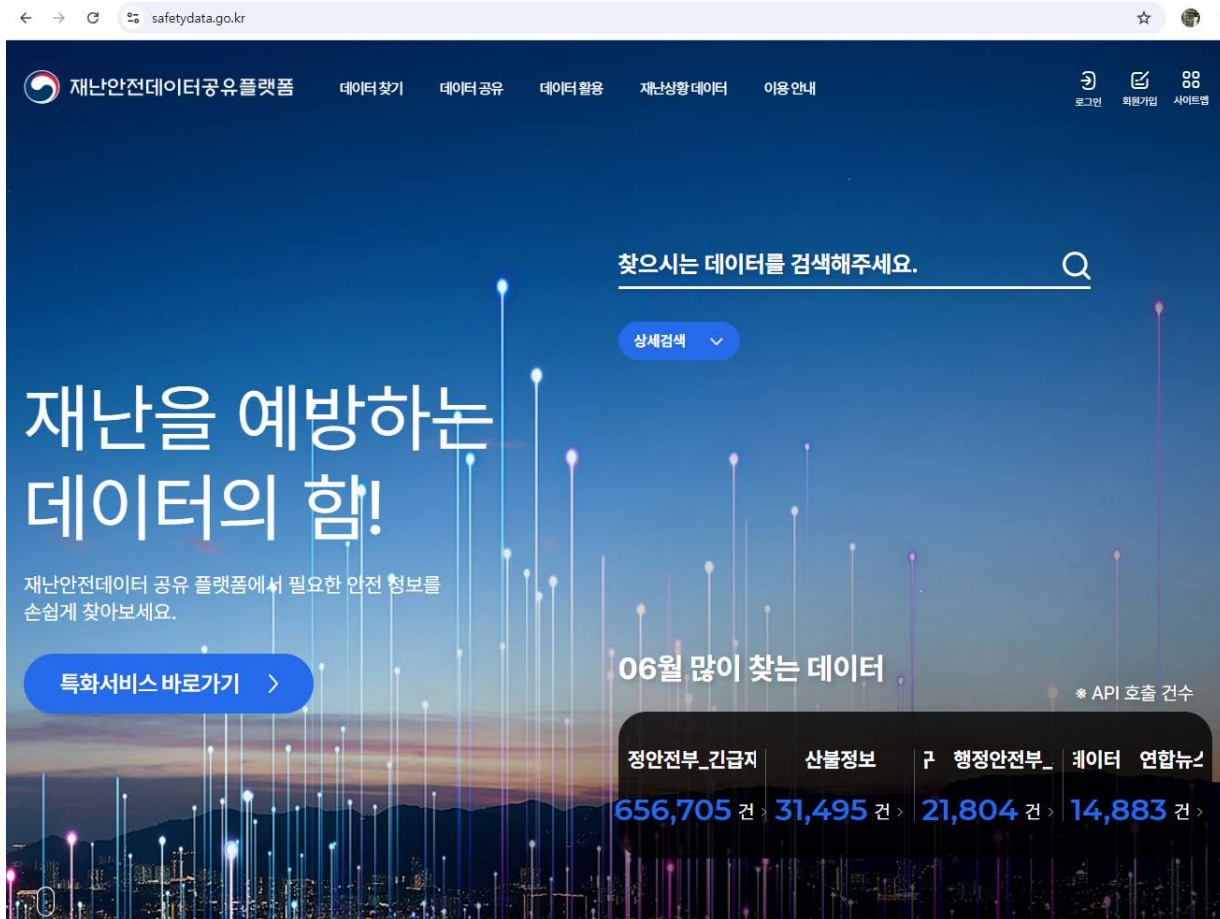
4) Transparent Immediacy for Situational Awareness

Shaping COPs/Dashboards for urgency and engagement:

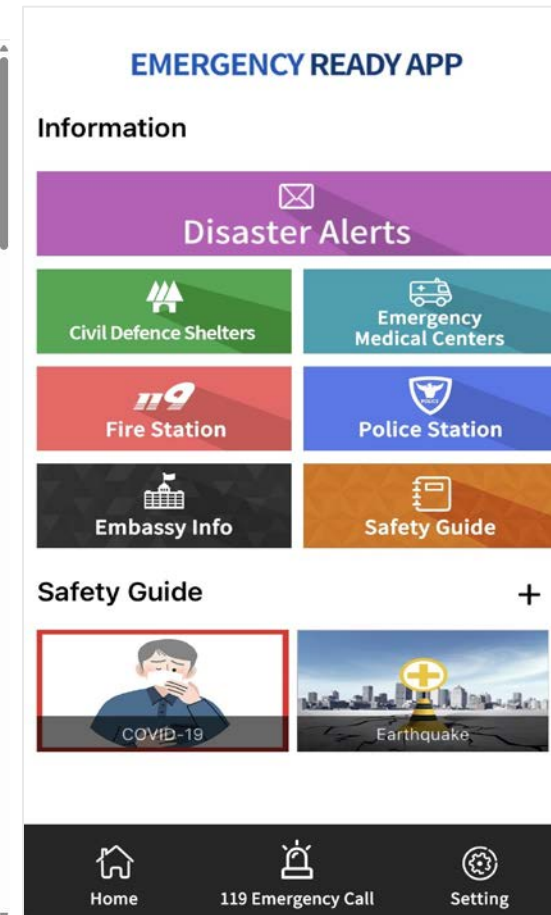
- **Prioritize real-time, visible information:** live field reports, sensor data (e.g., water levels, air quality), GPS tracking of assets, and even (carefully vetted) social media updates concerning on-the-ground conditions.
 This fosters a sense of immediate shared awareness.
- **Design highly-intuitive** COPs/dashboard and **Reduce cognitive load:** minimal clicks, flat navigation
 Information feels directly accessible rather than hidden behind a cumbersome technological interface.

5) Public Data & Dashboards for Transparency

- Public dashboards builds public confidence and **perceived competence of institutions**.
- Enables the public to monitor government responsiveness, not just weather.



Source: <https://www.safetydata.go.kr/>



Source: [Seoul Metropolitan Govt](#)

Hypermediacy, when used well, can **enhance public trust** by revealing the “machinery” behind decisions.

6) Interface Literacy for Leadership

- Leaders should champion the **strategic design of COPs**, informed by these media theories, **rather than just procuring technology**.
- Prioritize user experience (UX) and ensure that COPs are genuinely decision-support tools, not just complex data displays.
- Promote Interoperability and Integration: Ensure data from various remediated sources can flow into and be intelligently displayed within the hypermediated COP environment.
- Train users not just on how to use the COP, but **how to interpret the information** presented, understanding its immediacy, its remediated nature, and how to navigate its hypermediated complexity.

IV. Conclusions: Building Authenticity with AI

AI is not just a processor of information—it is a media theorist in action:

- It chooses when to reveal complexity (hypermediacy) and when to suppress it in favor of immediacy (transparent immediacy).

By acting as an intelligent media system, **AI becomes the operating core of the modern COP.**

This allows public safety systems to deliver:

- Clarity for responders
- Depth for analysts
- Trust for the public

*“**Don’t just display data.** Construct meaning through media-aware interfaces that balance urgency, clarity, and layered complexity.”*

- ▶ Use **remediation** to build user trust through familiarity.
- ▶ Apply **transparent immediacy** to drive quick comprehension and decisive action.
- ▶ Employ **hypermediacy** to manage complexity, ensure accountability, and support verification.
- ▶ Ensure the **balance between immediacy and accuracy**, and **between simplicity and integrity**.

When guided by these principles, AI-enabled COPs and dashboards become more than tools—they become **the interface of leadership itself**.

They empower responders, inform the public, and bring order to chaos through clarity, structure, and meaning.

“Our culture wants both to multiply its media
and to erase all traces of mediation.”

— Bolter & Grusin, *Remediation* (1999)