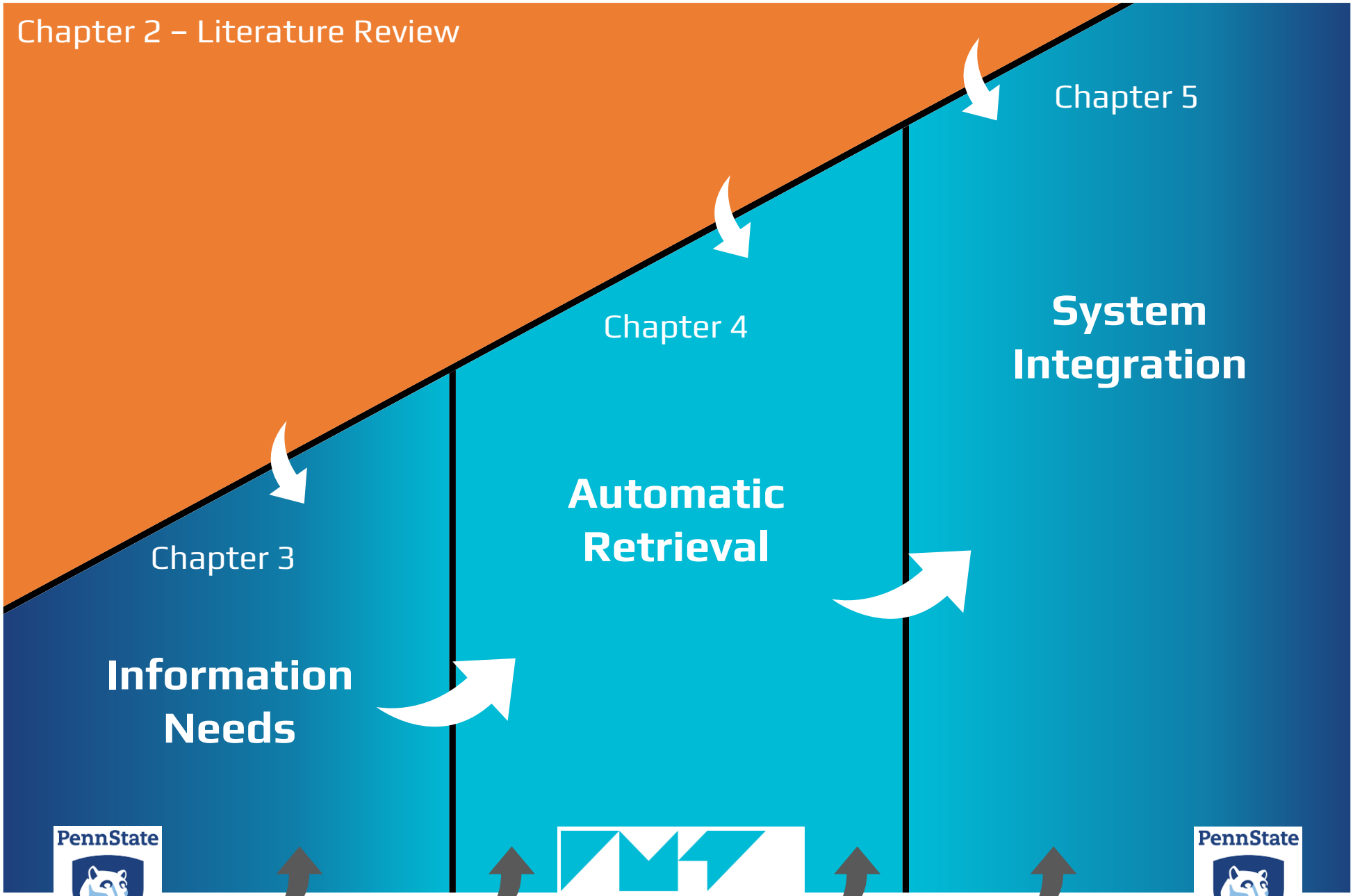
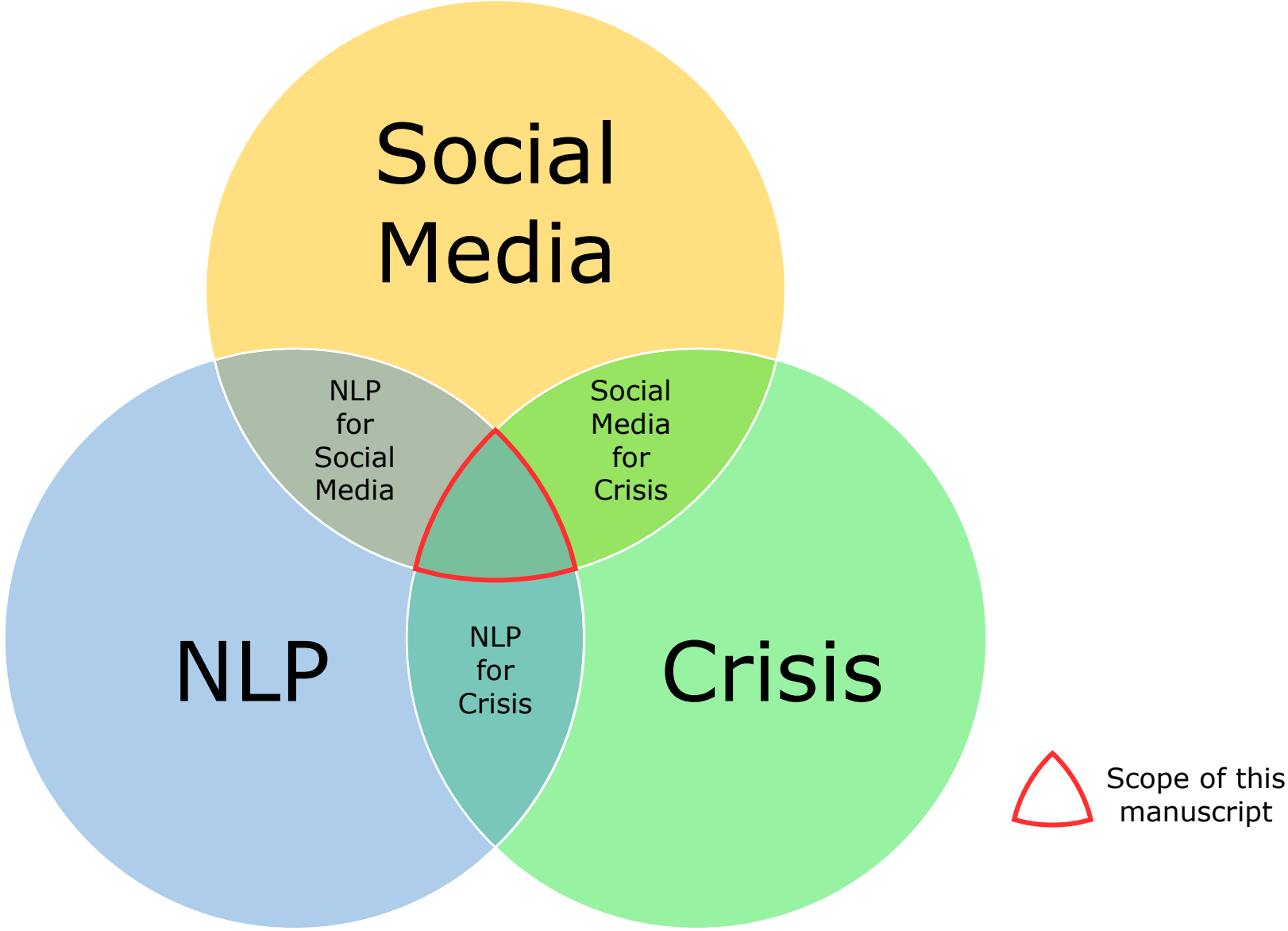
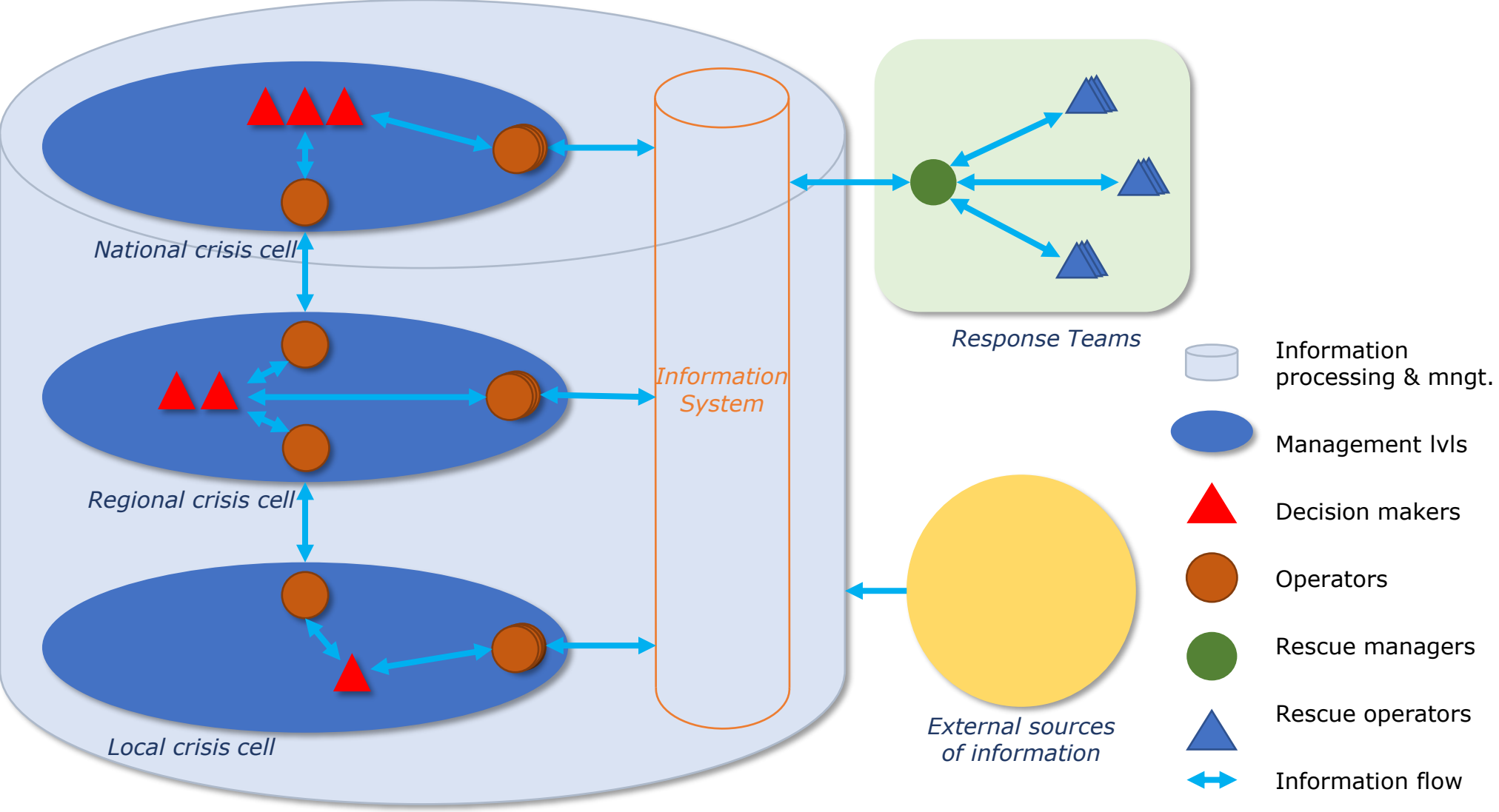
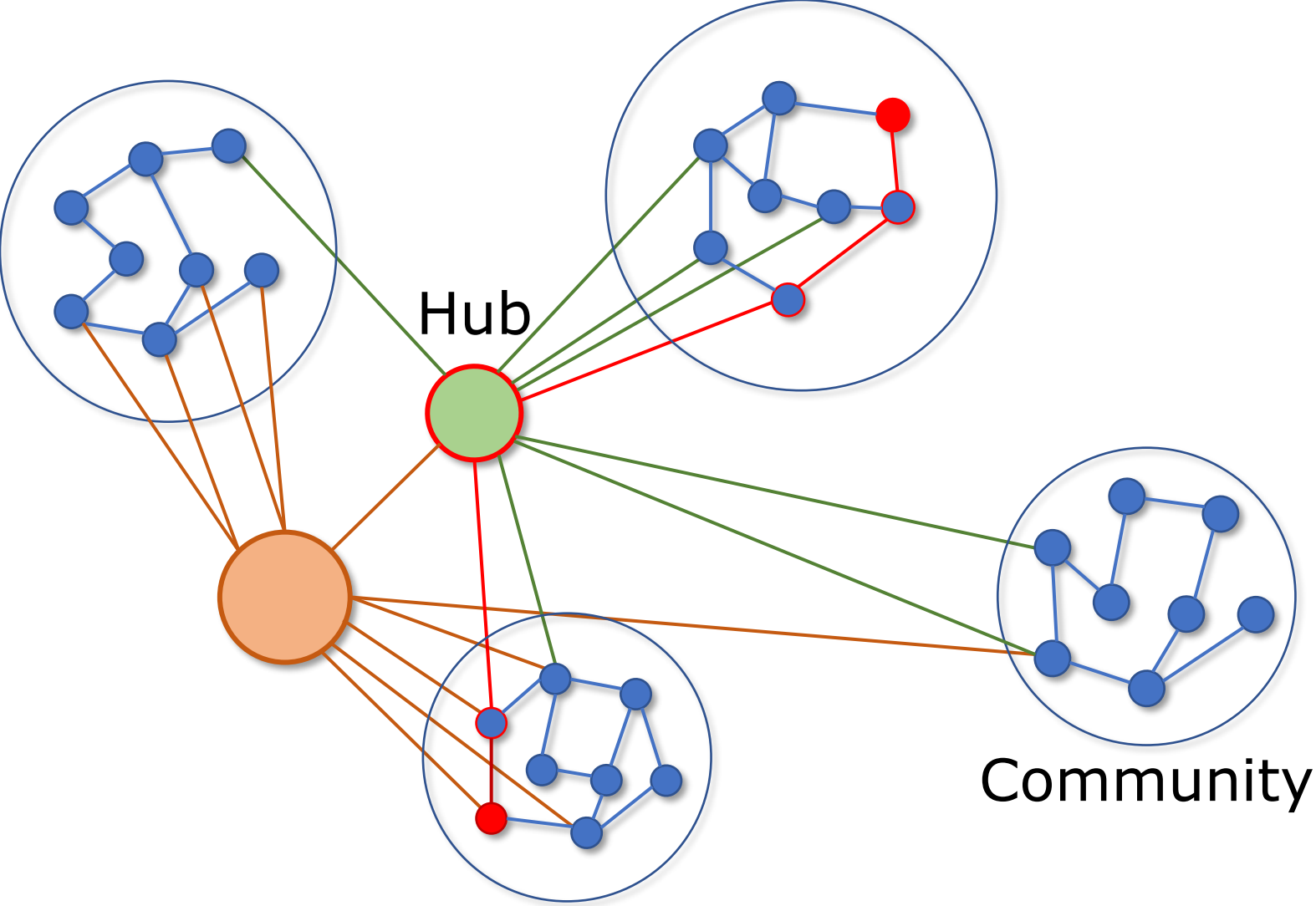
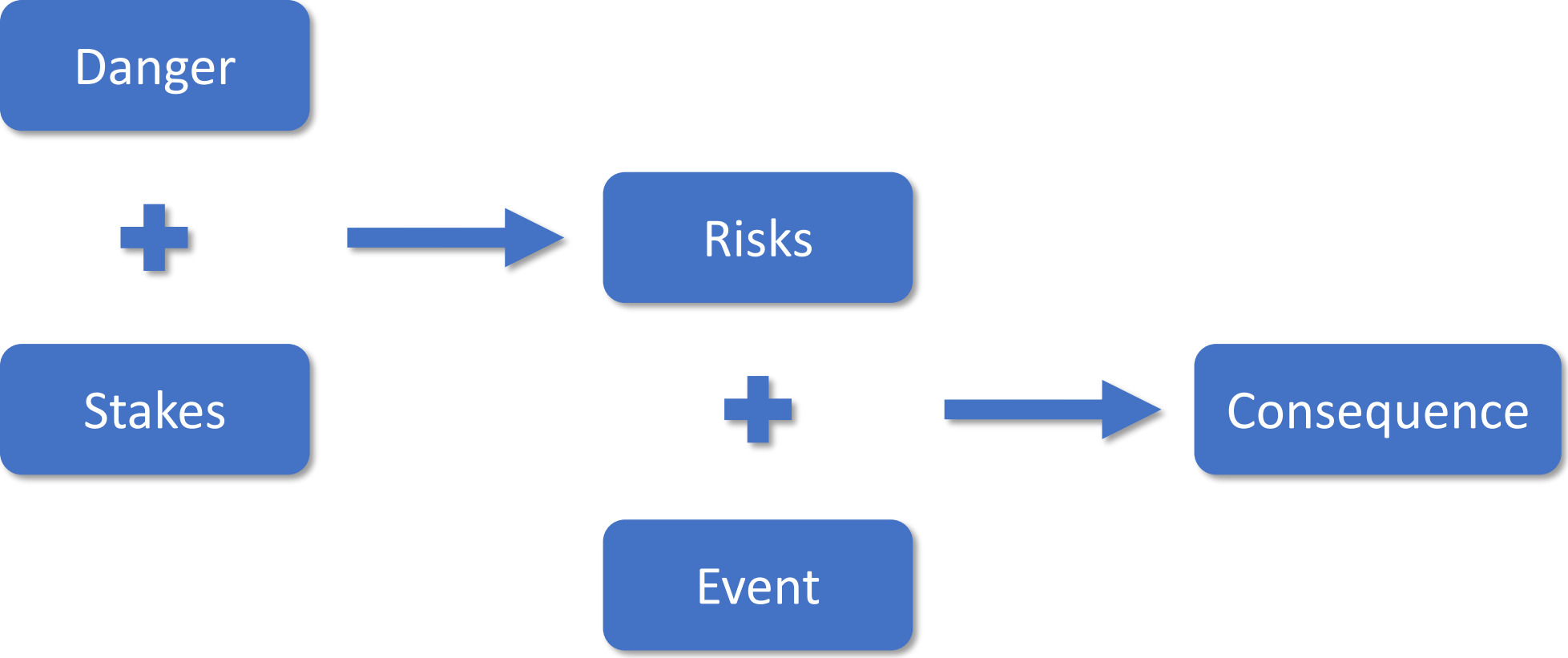
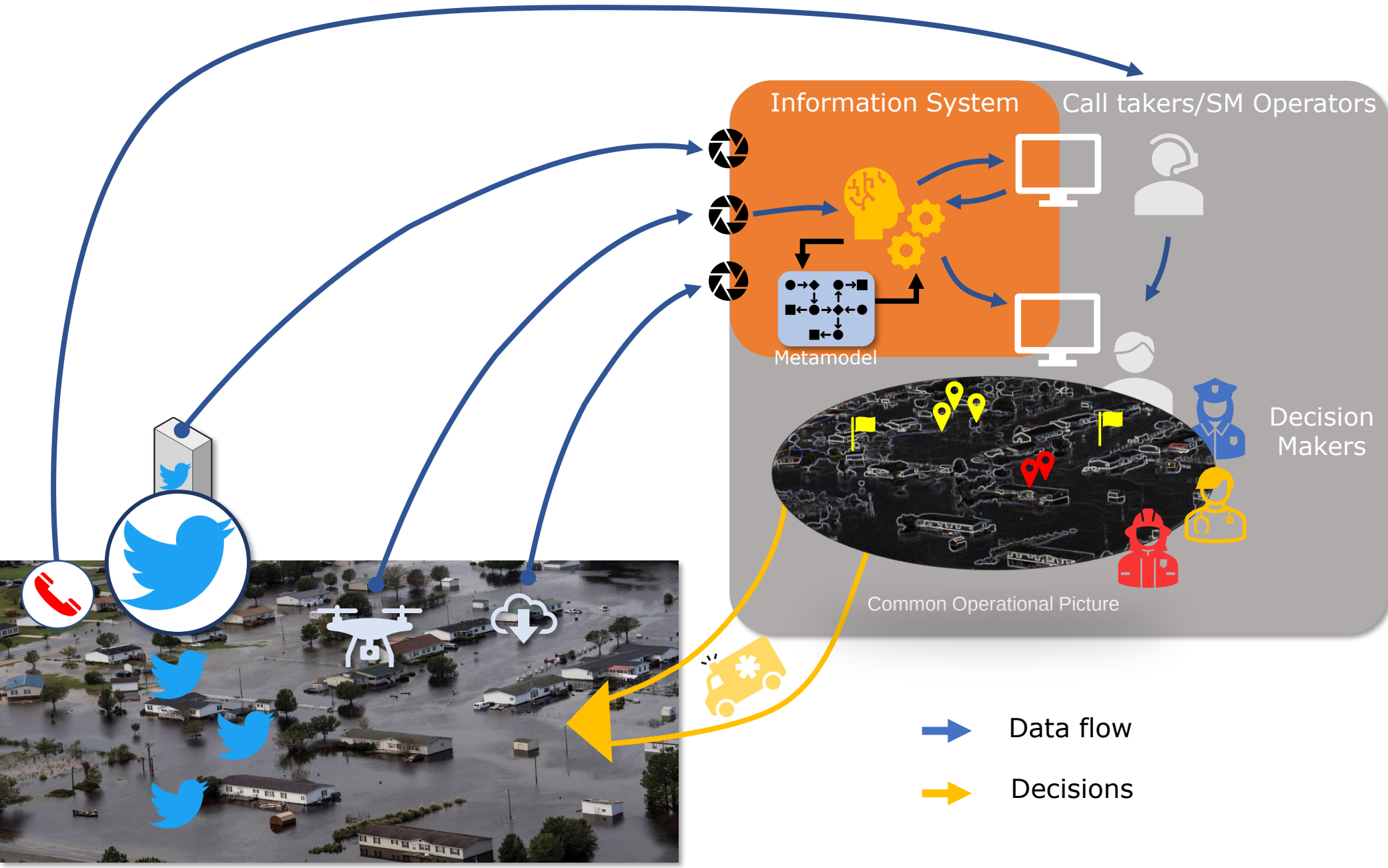

Chapter 1 - Context
Chapter 2 – Literature Review
Chapter 5
Chapter 4
System Integration
Automatic Retrieval
Chapter 3
Information Needs
PennState
IMT Mines Albi-Carmaux
École Mines-Télécom
PennState

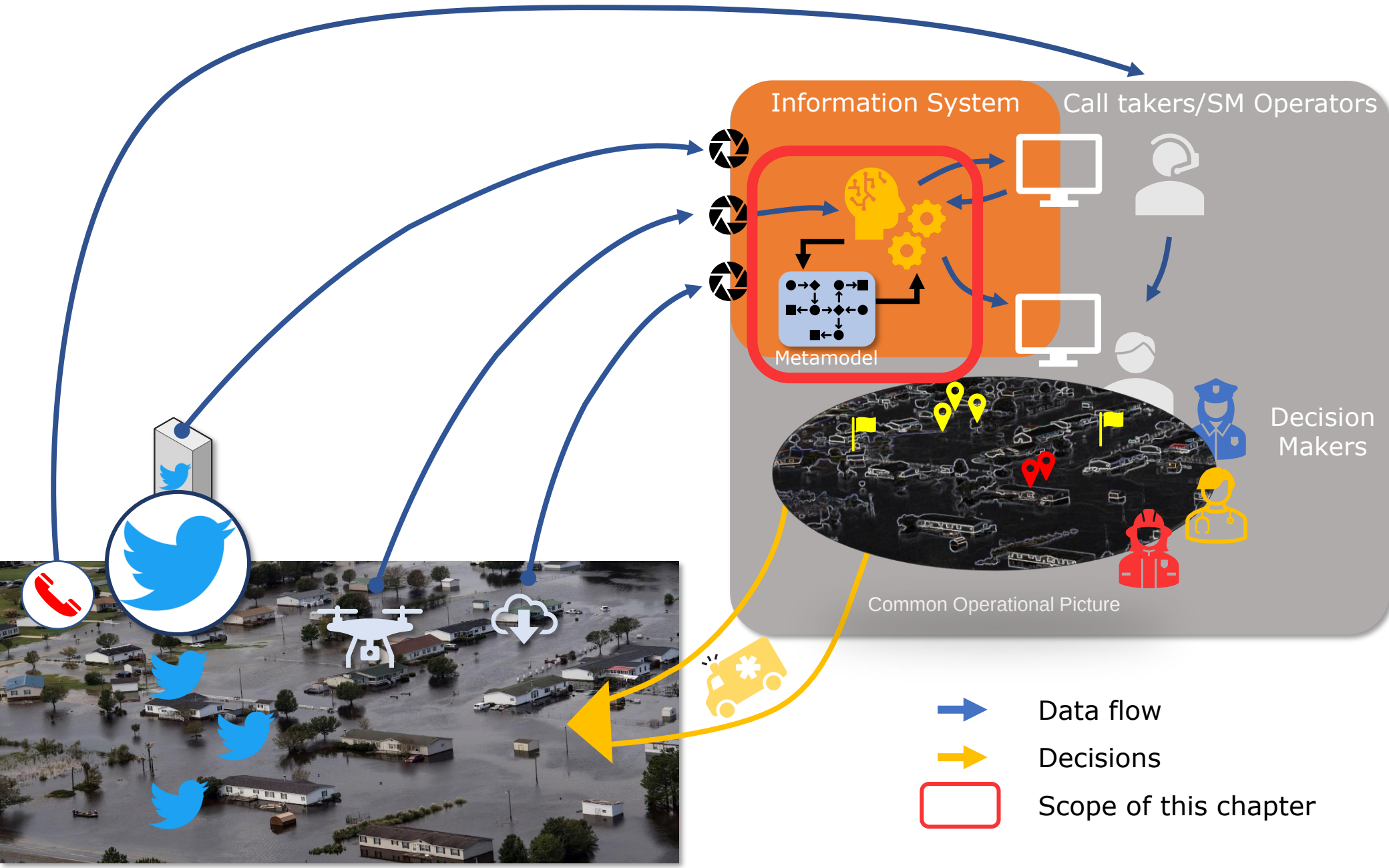

Social Media
NLP for Social Media
Social Media for Crisis
NLP
NLP for Crisis
Crisis
Scope of this manuscript

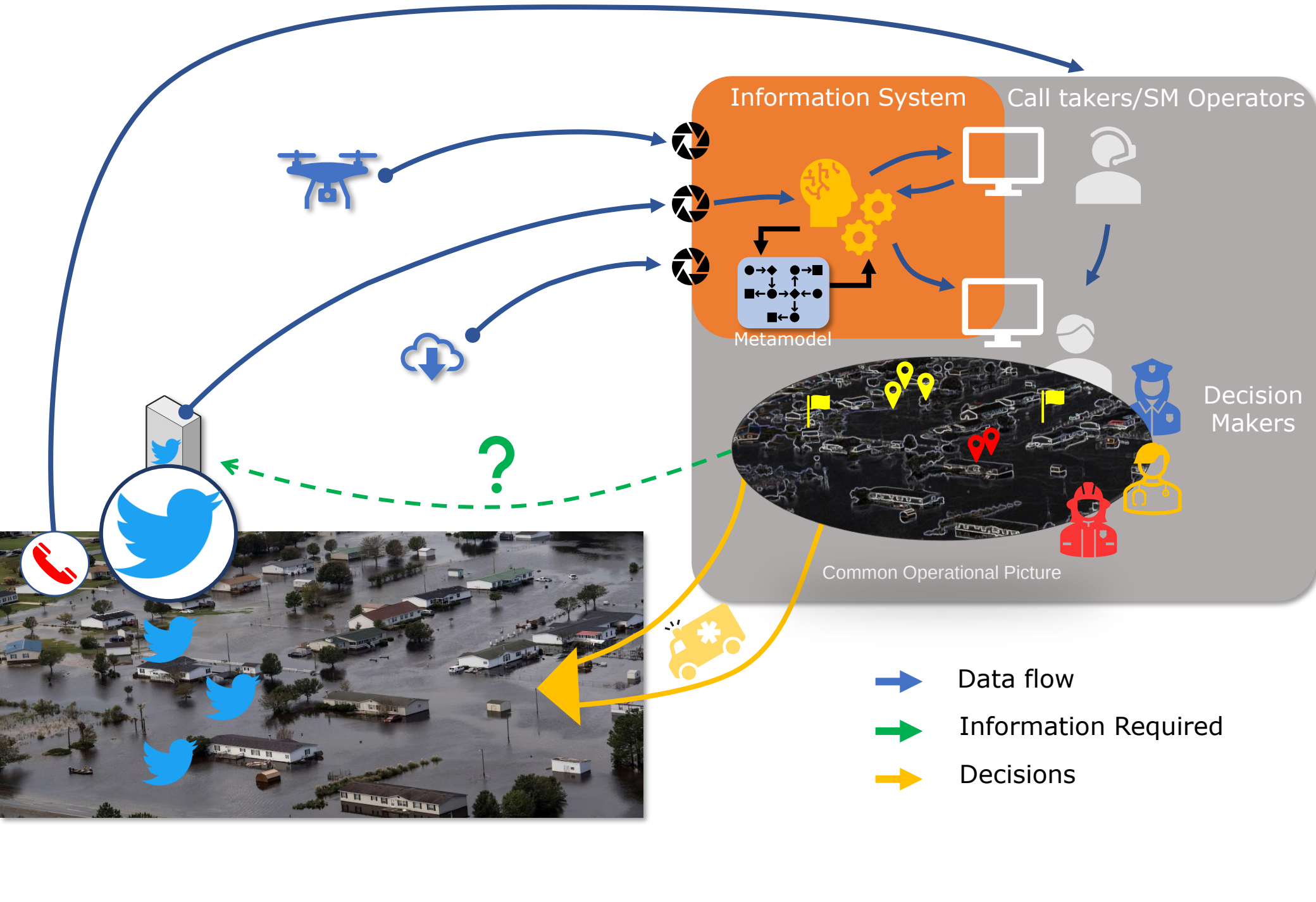

National crisis cell
Regional crisis cell
Local crisis cell
Information System
Response Teams
External sources of information
Information processing & mngt.
Management lvls
Decision makers
Operators
Rescue managers
Rescue operators
Information flow

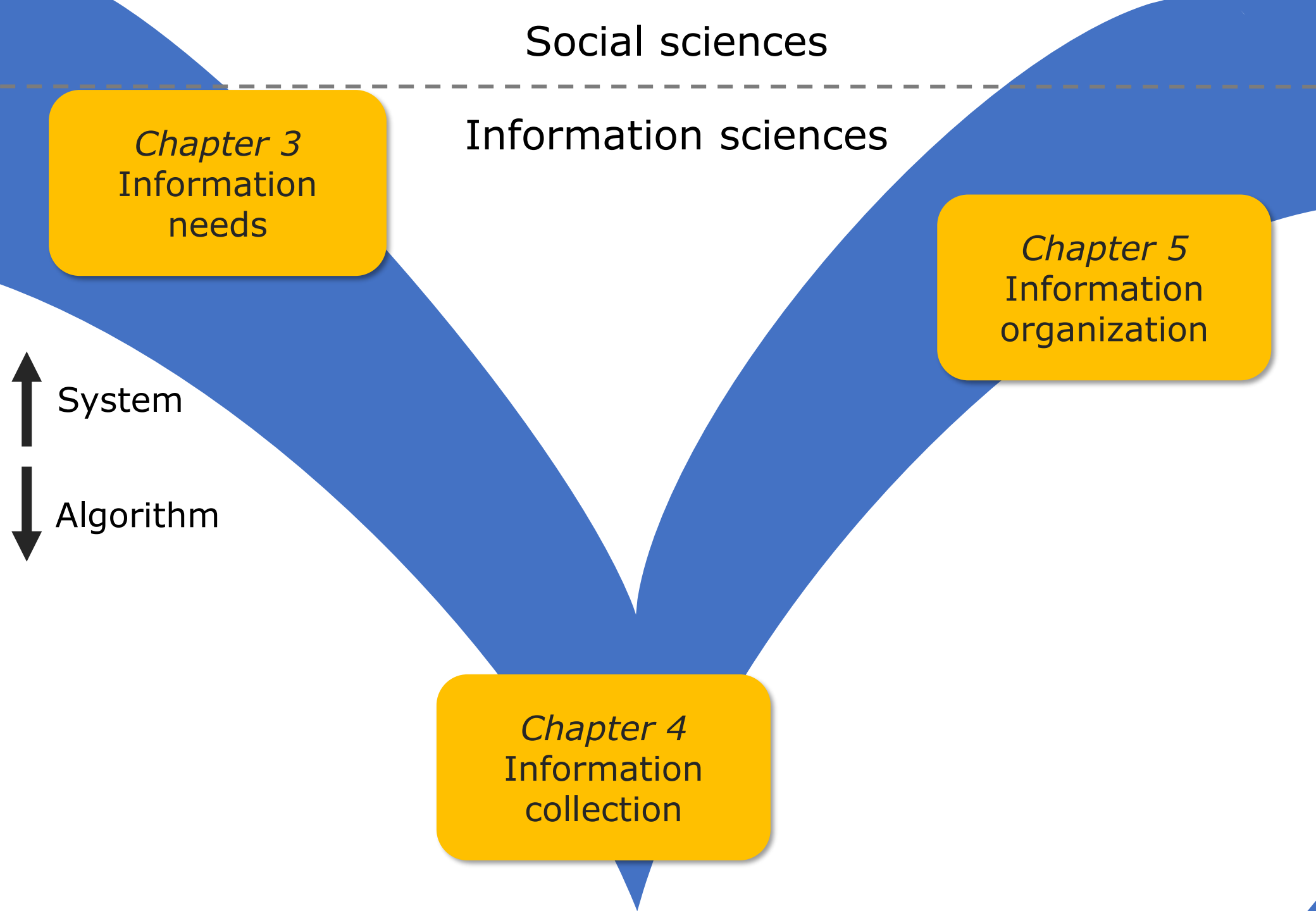

Hub
Community

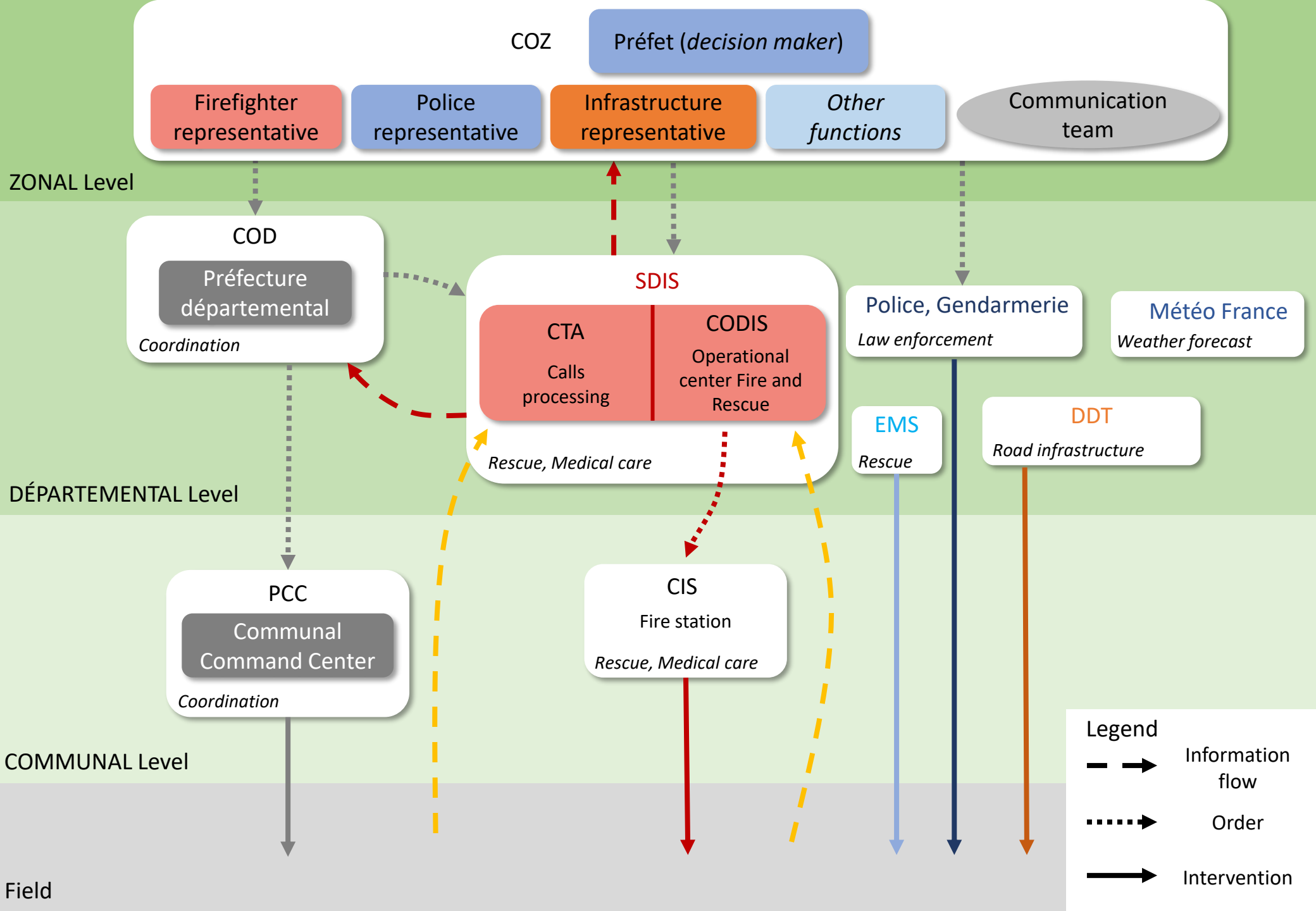

Danger
Stakes
Risks
Event
Consequence

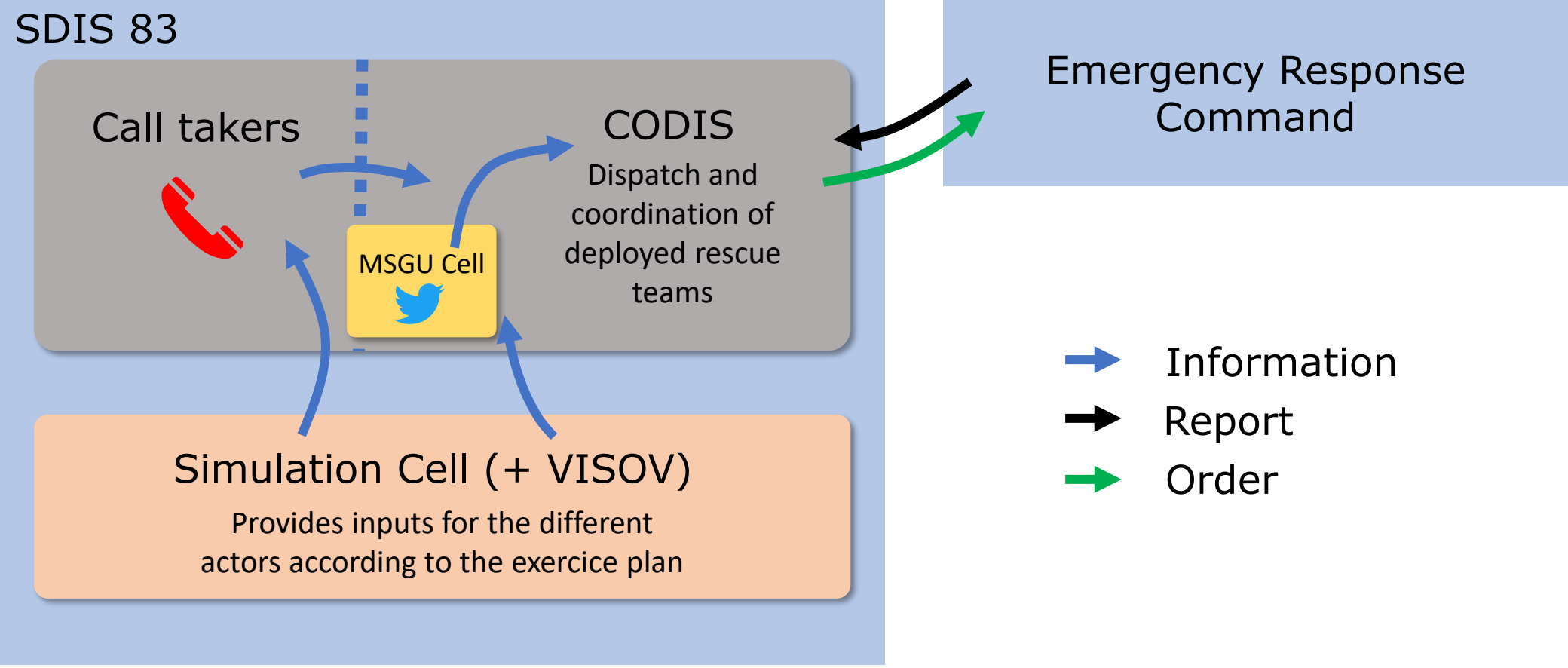

Information System
Call takers/SM Operators
Metamodel
Decision Makers
Common Operational Picture
Data flow
Decisions

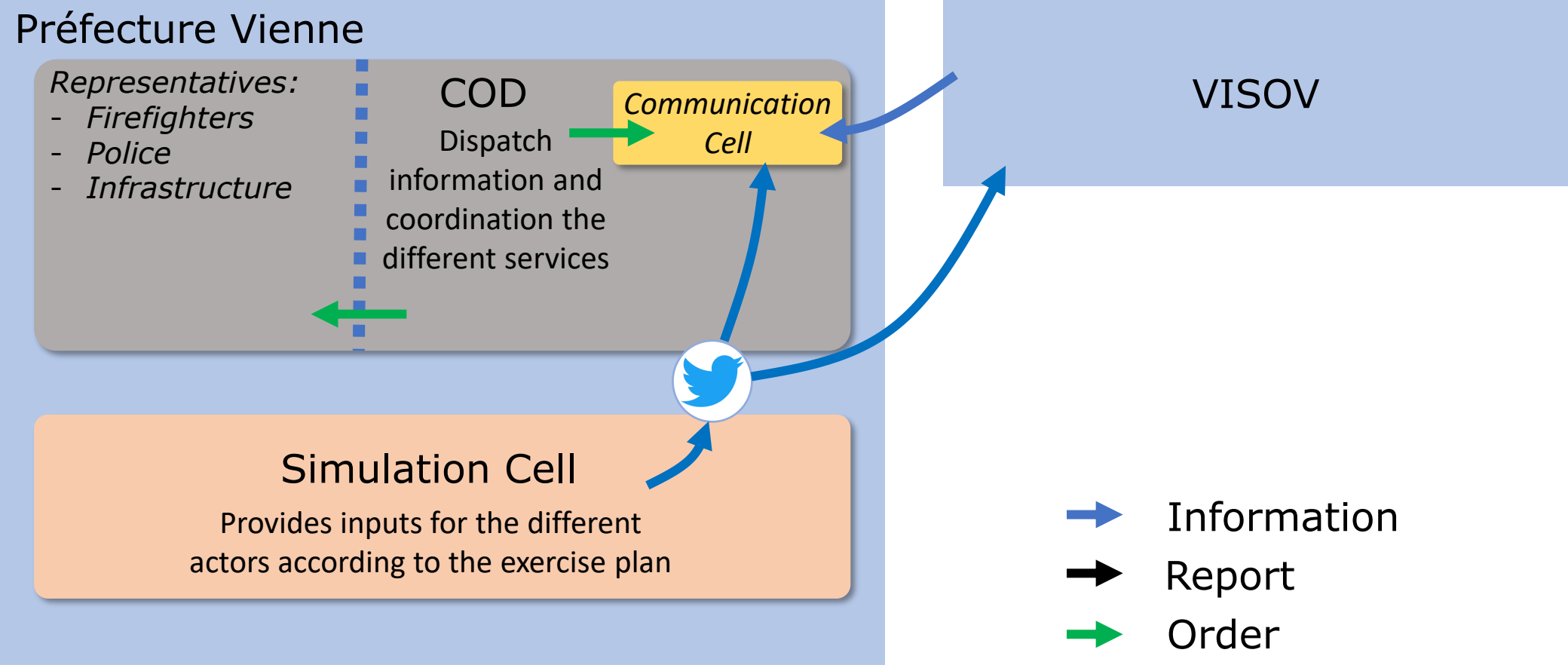

Information System
Call takers/SM Operators
Metamodel
Decision Makers
Common Operational Picture
Data flow
Decisions
Scope of this chapter

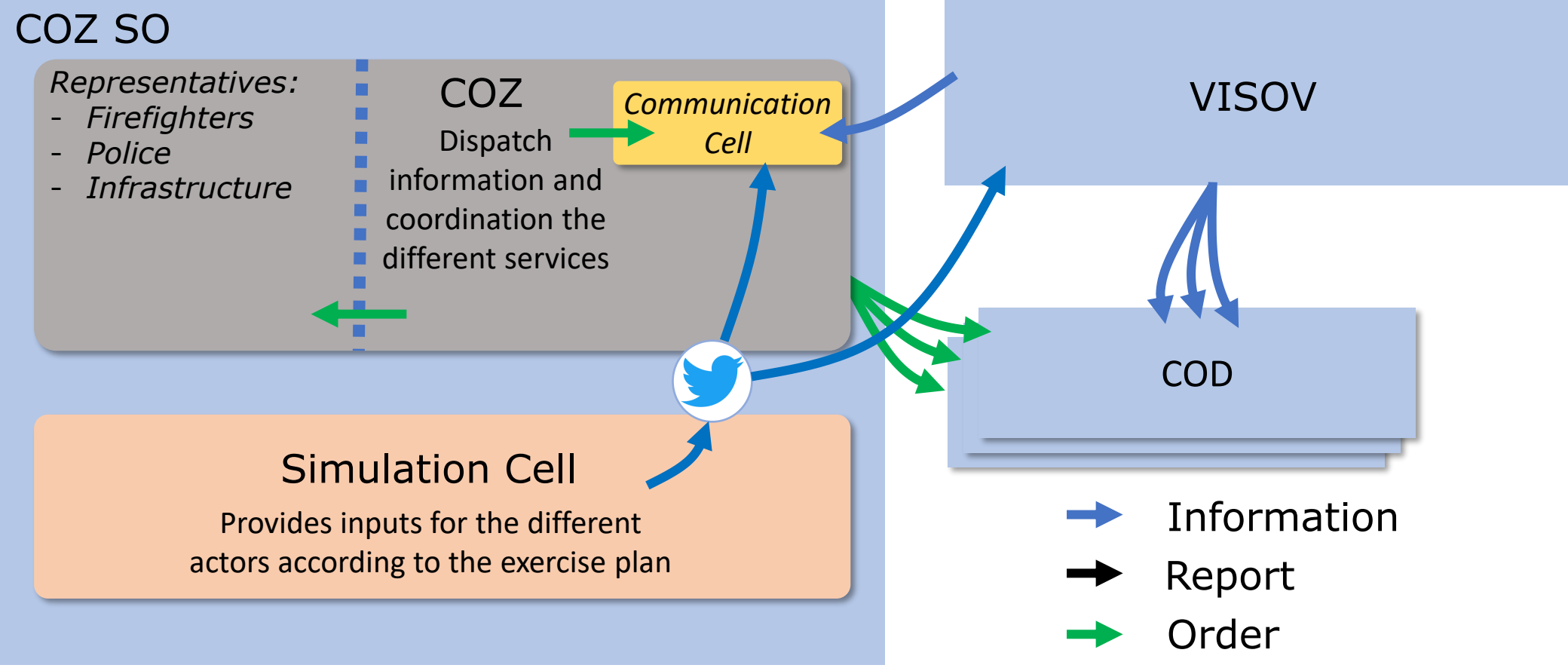

Information System
Call takers/SM Operators
Metamodel
Decision Makers
Common Operational Picture
?
Data flow
Information Required
Decisions

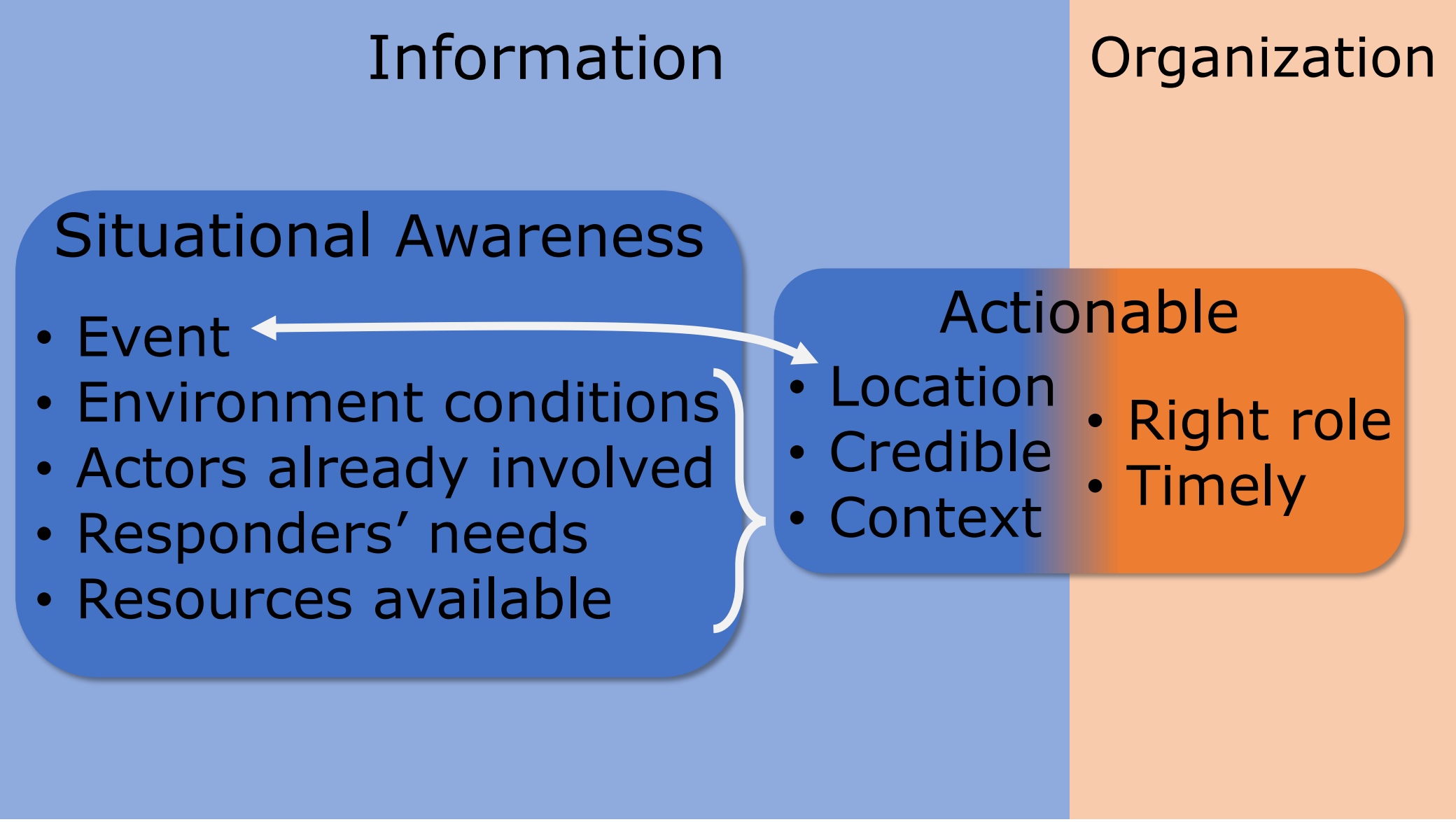

Social sciences
Information sciences
Chapter 3
Information needs
Chapter 5
Information organization
System
Algorithm
Chapter 4
Information collection

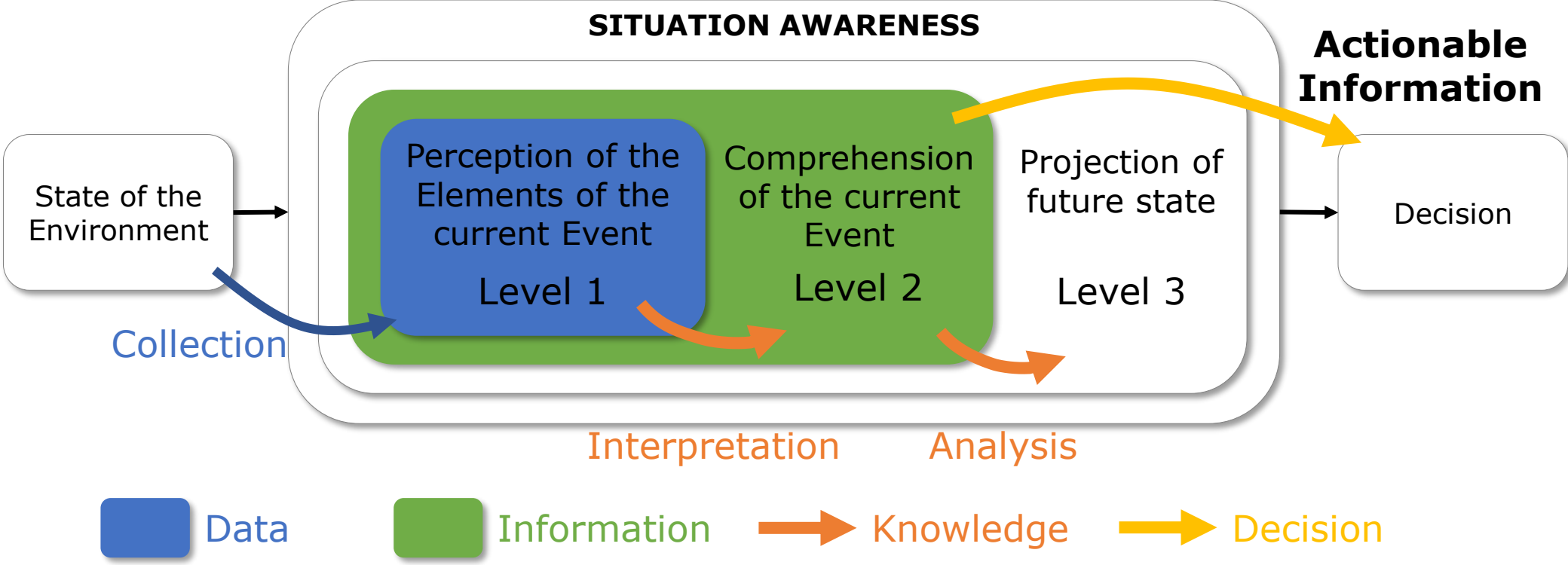

COZ
Préfet (*decision maker*)
Firefighter representative
Police representative
Infrastructure representative
Other functions
Communication team
ZONAL Level
COD
Préfecture départemental
Coordination
SDIS
CTA
Calls processing
CODIS
Operational center Fire and Rescue
Rescue, Medical care
Police, Gendarmerie
Law enforcement
Météo France
Weather forecast
EMS
Rescue
DDT
Road infrastructure
DÉPARTEMENTAL Level
PCC
Communal Command Center
Coordination
CIS
Fire station
Rescue, Medical care
COMMUNAL Level
Field
Legend
Information flow
Order
Intervention


SDIS 83
Call takers
CODIS
Dispatch and coordination of deployed rescue teams
MSGU Cell
Simulation Cell (+ VISOV)
Provides inputs for the different actors according to the exercice plan
Emergency Response Command
Information
Report
Order


Préfecture Vienne
Representatives:
- Firefighters
- Police
- Infrastructure
COD
Dispatch information and coordination the different services
Communication Cell
VISOV
Simulation Cell
Provides inputs for the different actors according to the exercise plan
Information
Report
Order


COZ SO
Representatives:
- Firefighters
- Police
- Infrastructure
COZ
Dispatch information and coordination the different services
Communication Cell
VISOV
COD
Simulation Cell
Provides inputs for the different actors according to the exercise plan
Information
Report
Order


Information
Organization
Situational Awareness
• Event
• Environment conditions
• Actors already involved
• Responders' needs
• Resources available
Actionable
• Location
• Credible
• Context
• Right role
• Timely


SITUATION AWARENESS
Actionable Information
State of the Environment
Perception of the Elements of the current Event
Level 1
Comprehension of the current Event
Level 2
Projection of future state
Level 3
Decision
Collection
Interpretation
Analysis
Data
Information
Knowledge
Decision

Legend

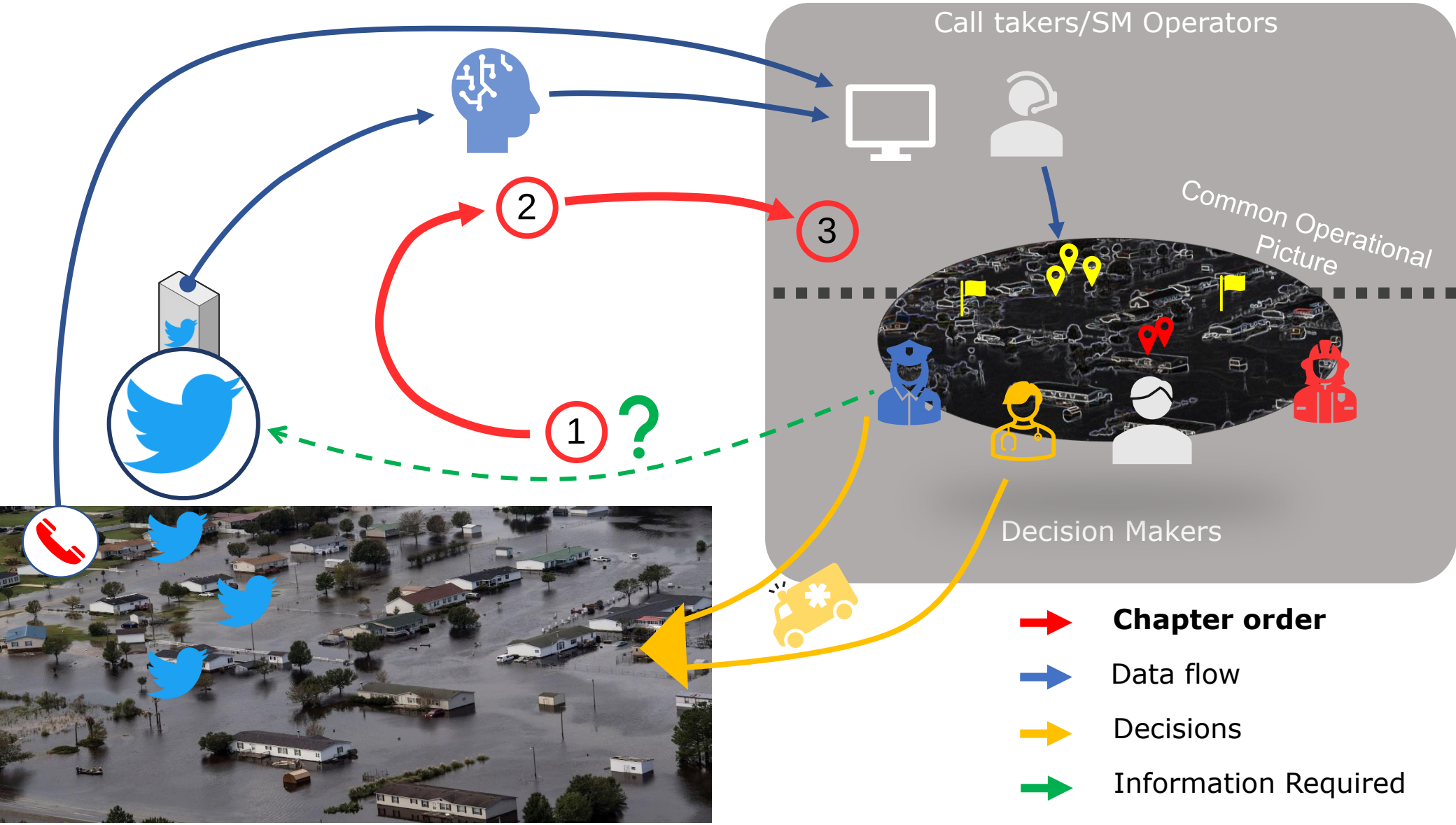
EMS

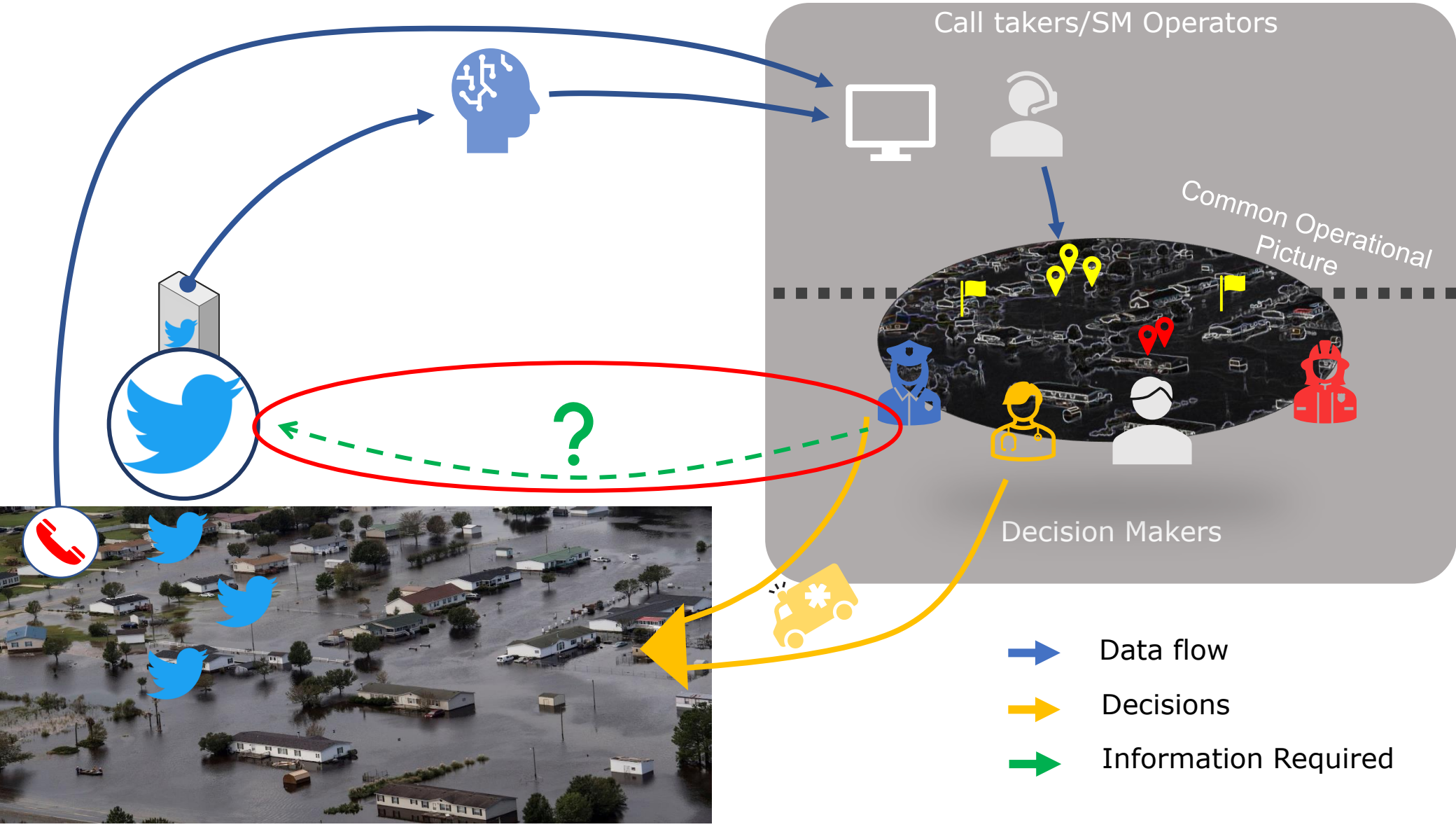
Police

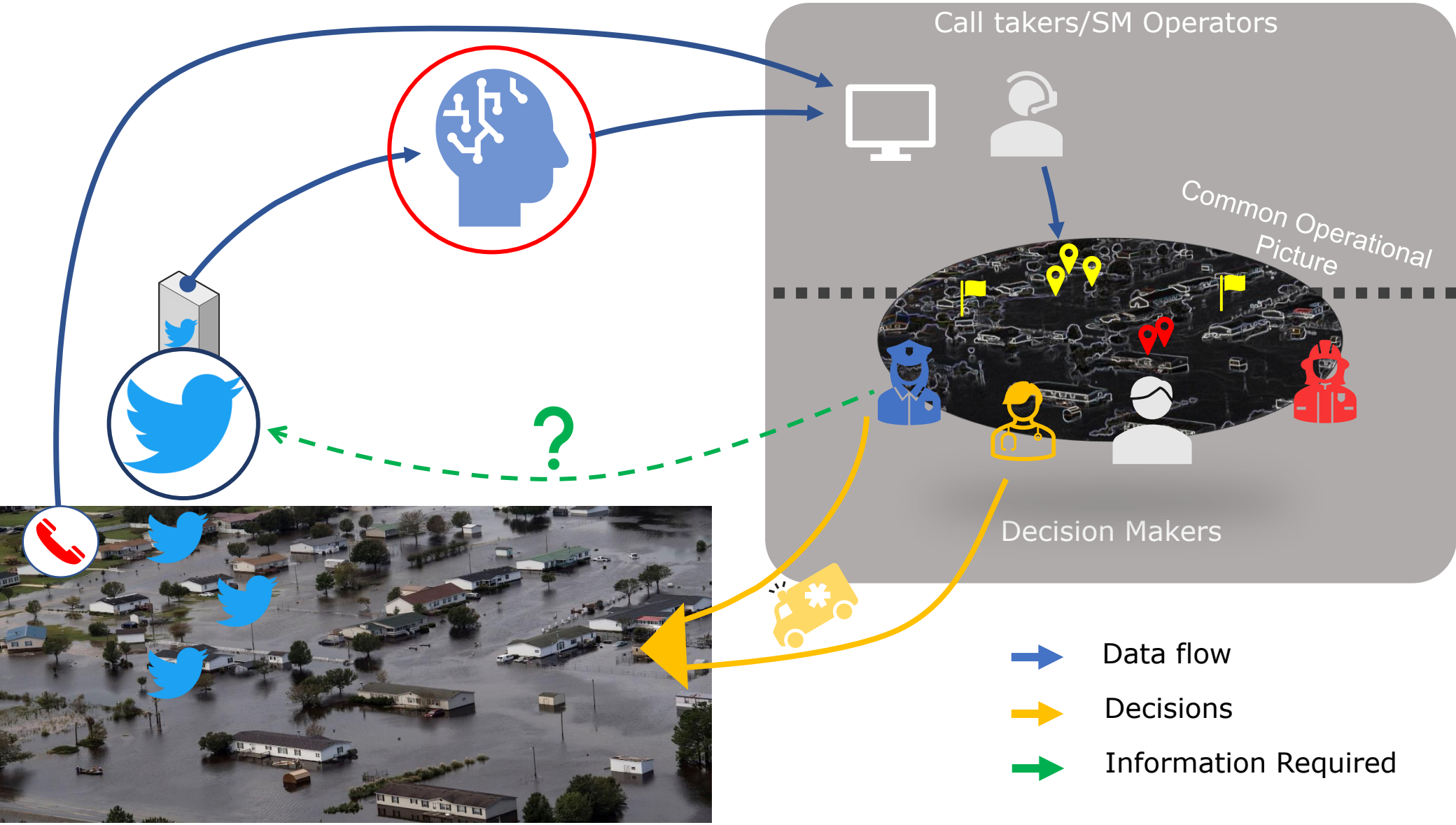
Firefighters

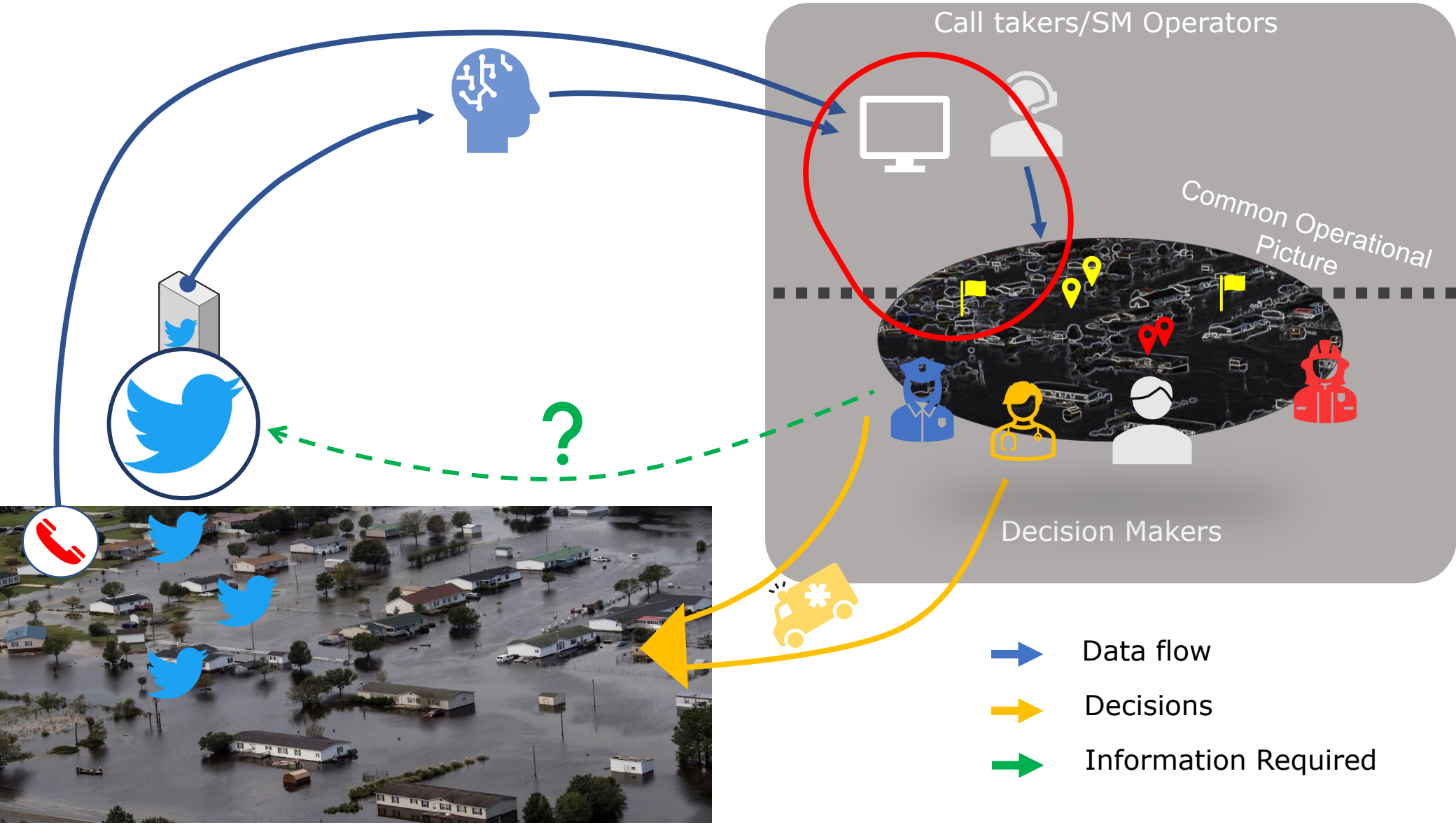
Event

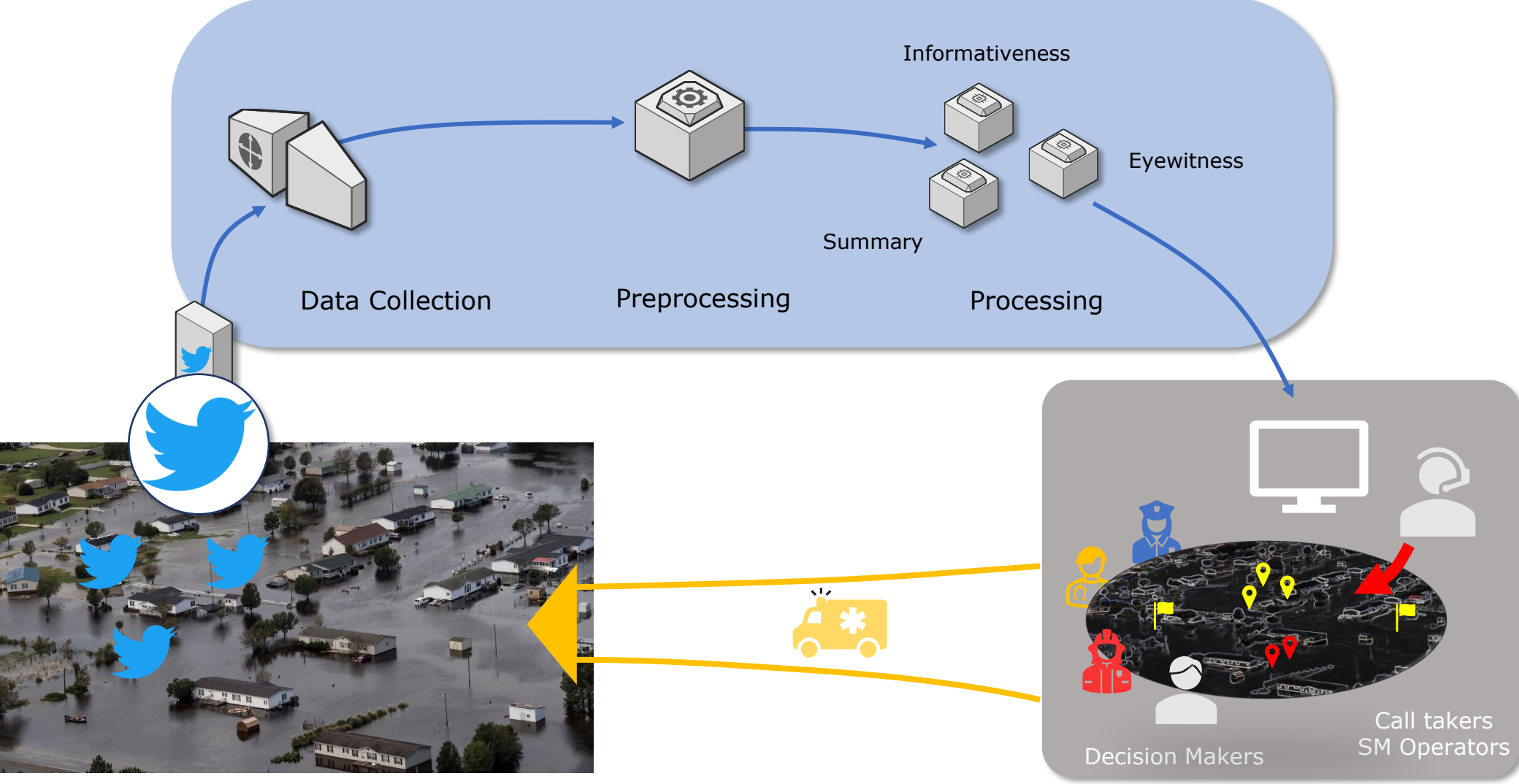
Time	t1	t1	t1	t1	
Event Location					
Event Context					
Environ.					
Respon. Needs					
Resources					

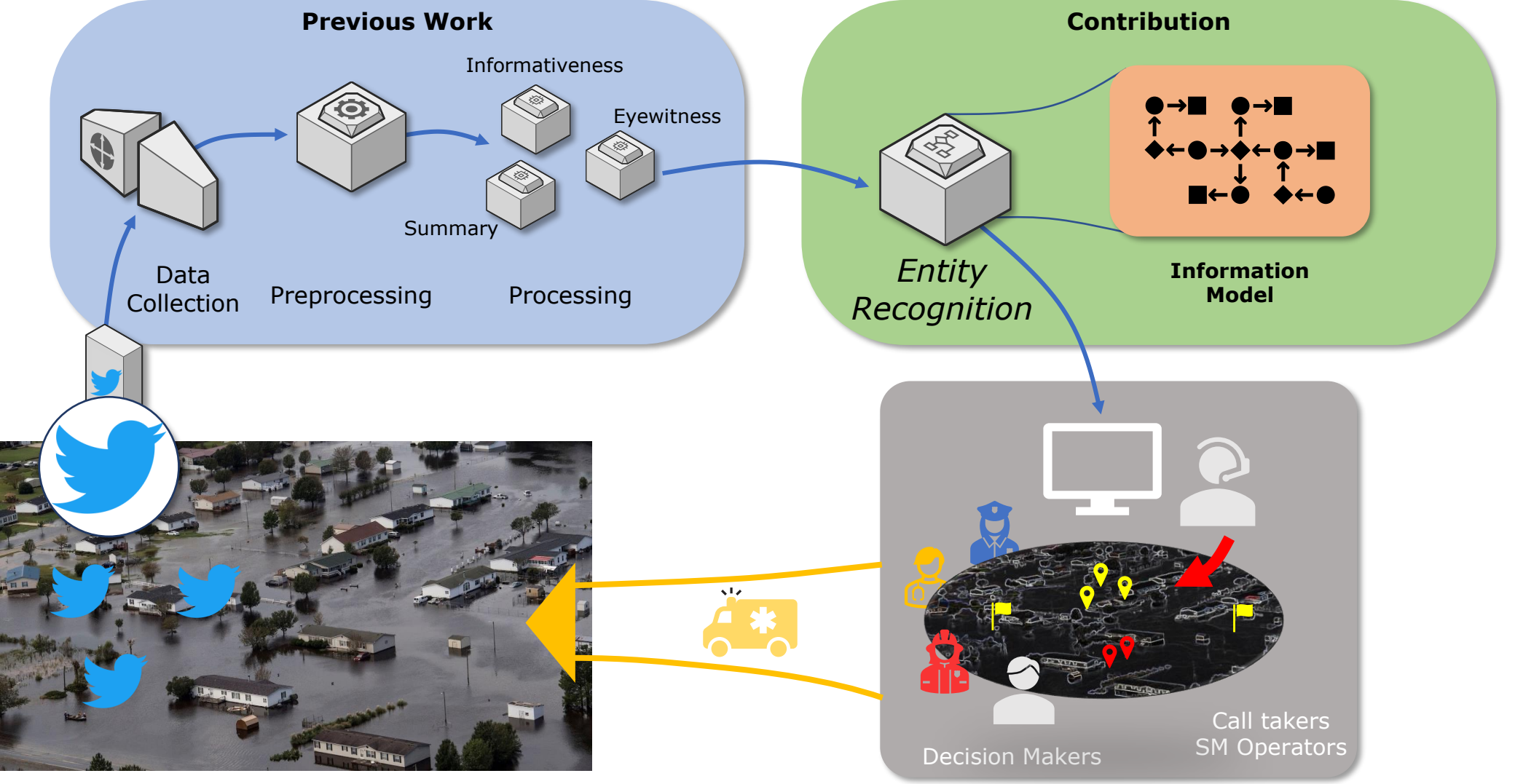

Call takers/SM Operators
Common Operational Picture
Decision Makers
2
3
1
?
Chapter order
Data flow
Decisions
Information Required

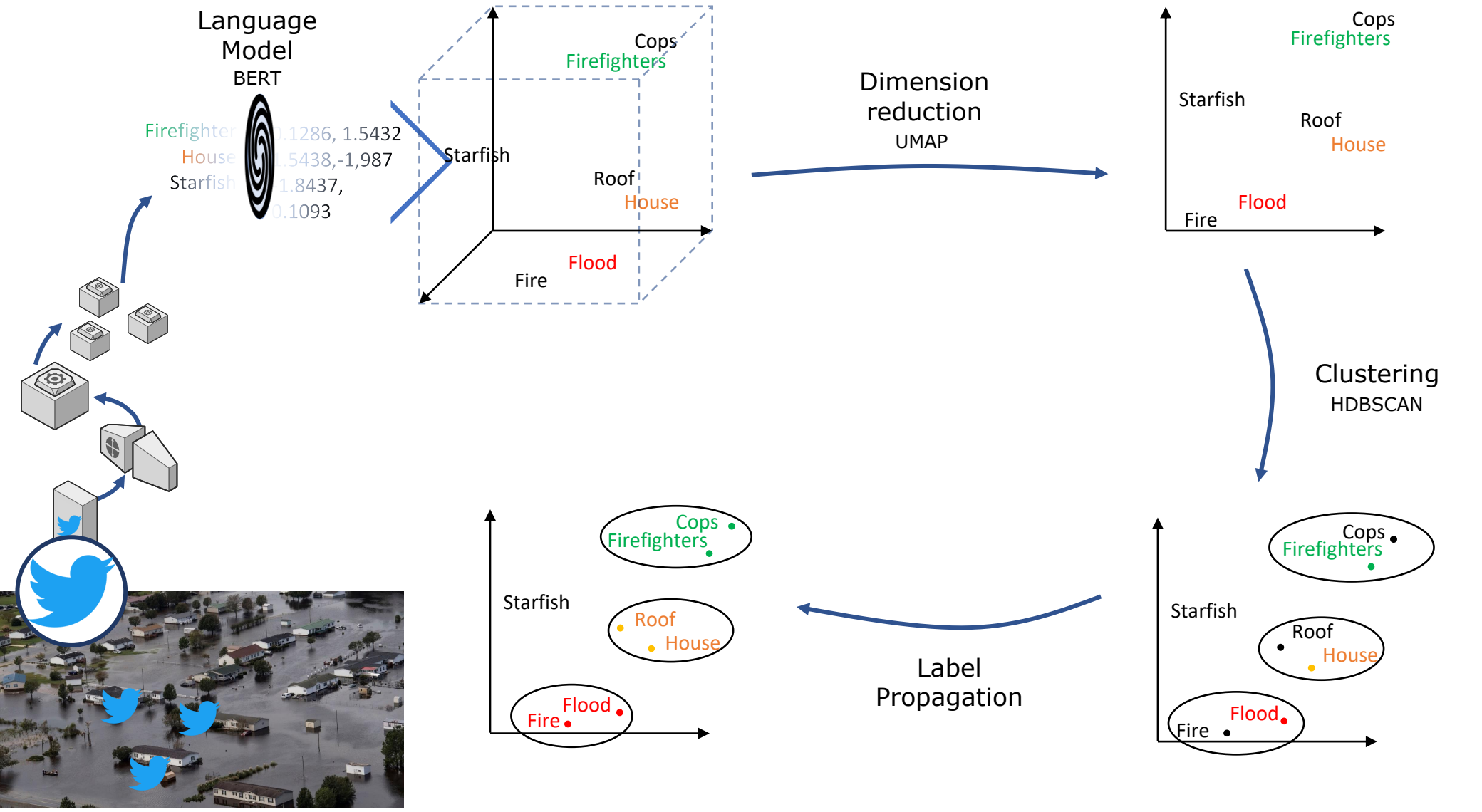

Call takers/SM Operators
Common Operational Picture
?
Decision Makers
Data flow
Decisions
Information Required

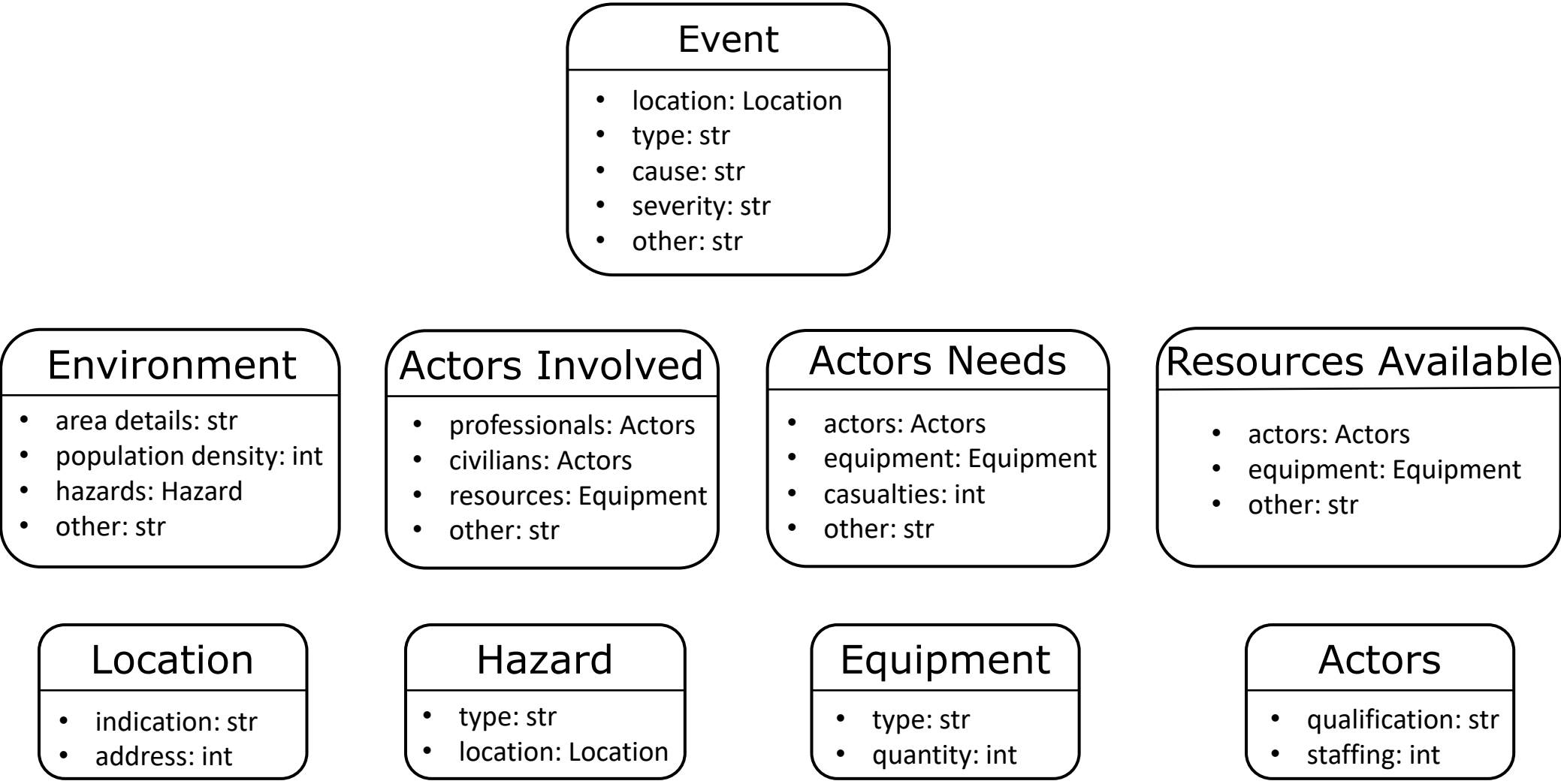

Call takers/SM Operators
Common Operational Picture
Decision Makers
?
Data flow
Decisions
Information Required

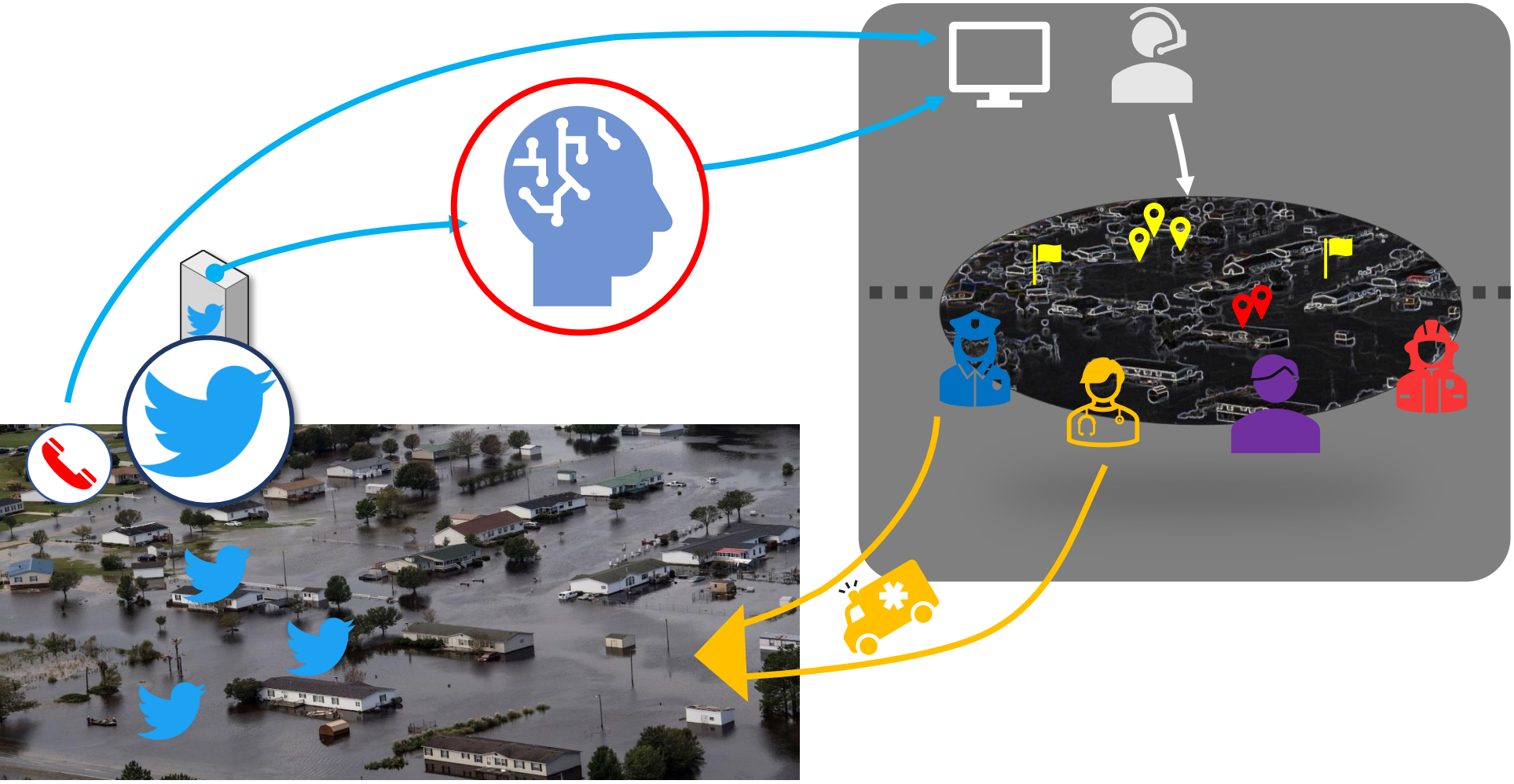

Call takers/SM Operators
Common Operational Picture
Decision Makers
?
Data flow
Decisions
Information Required

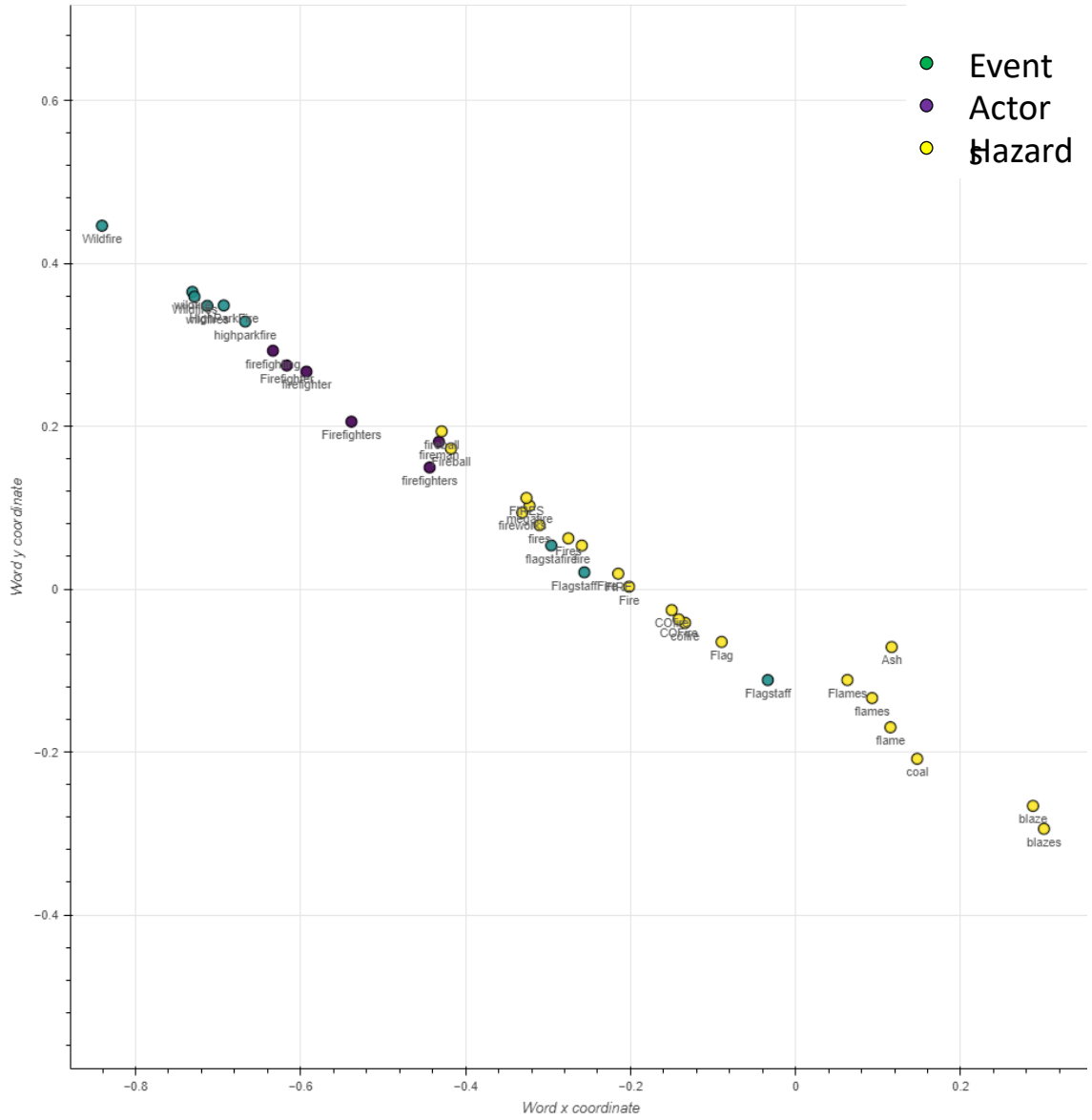

Informativeness
Eyewitness
Summary
Data Collection
Preprocessing
Processing
Call takers
SM Operators
Decision Makers

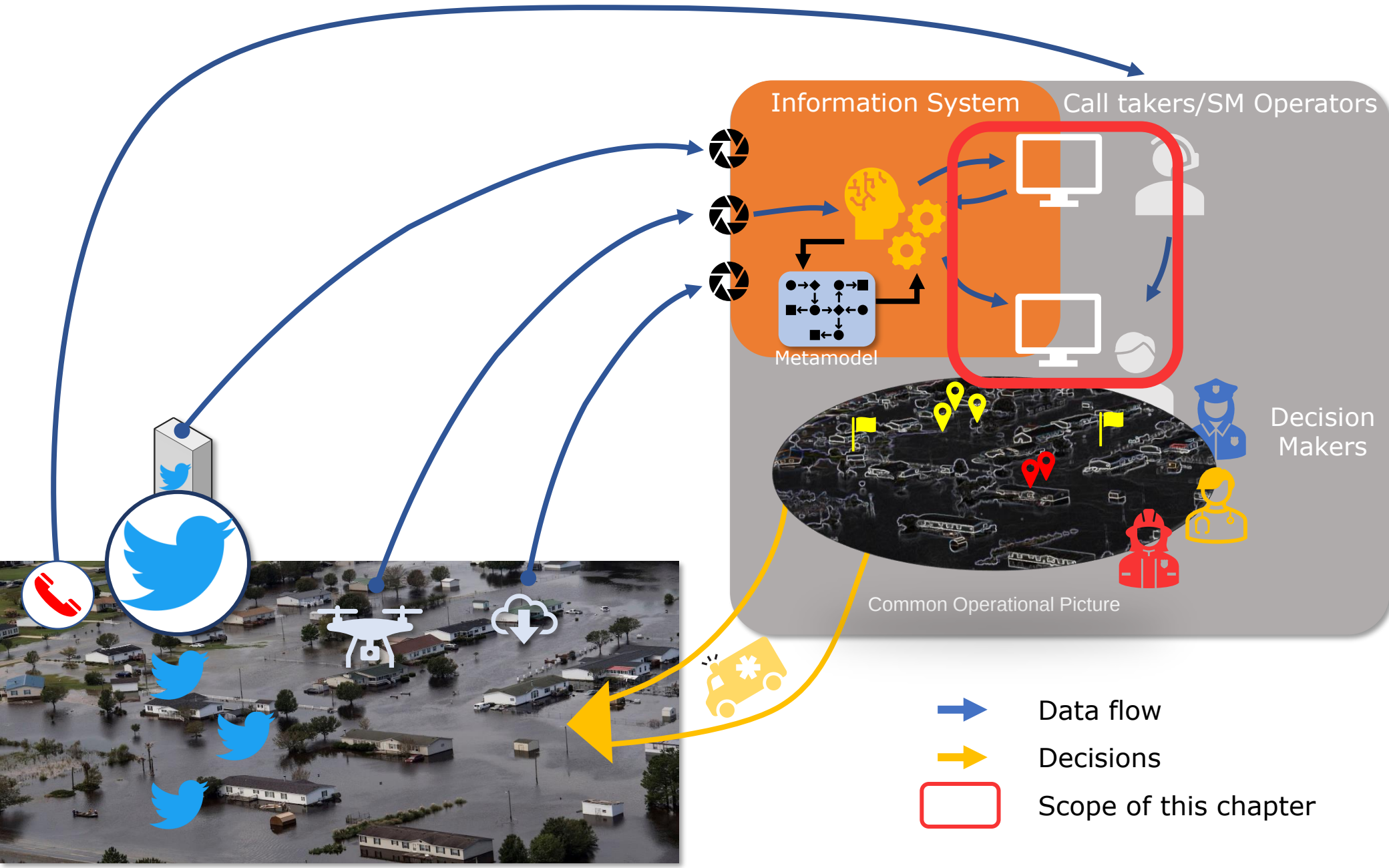

Previous Work
Informativeness
Eyewitness
Summary
Data Collection
Preprocessing
Processing
Contribution
Entity Recognition
Information Model
Decision Makers
Call takers
SM Operators

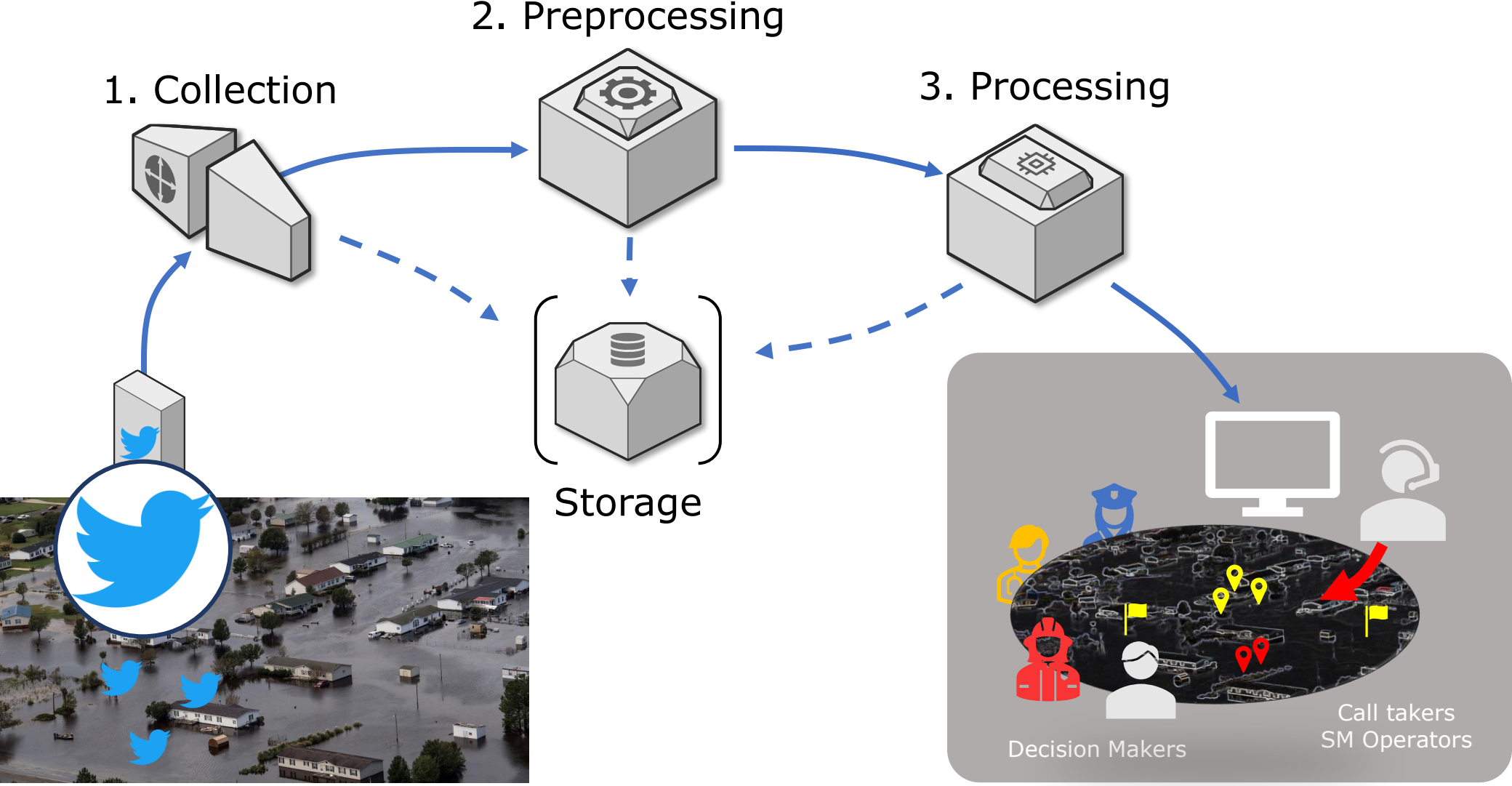

Language Model
BERT
Firefighter
House
Starfish
1.1286, 1.5432
.5438,-1,987
1.8437,
0.1093
Cops
Firefighters
Starfish
Roof
House
Flood
Fire
Dimension reduction
UMAP
Cops
Firefighters
Starfish
Roof
House
Flood
Fire
Clustering
HDBSCAN
Cops
Firefighters
Starfish
Roof
House
Flood
Fire
Label Propagation
Cops
Firefighters
Starfish
Roof
House
Flood
Fire

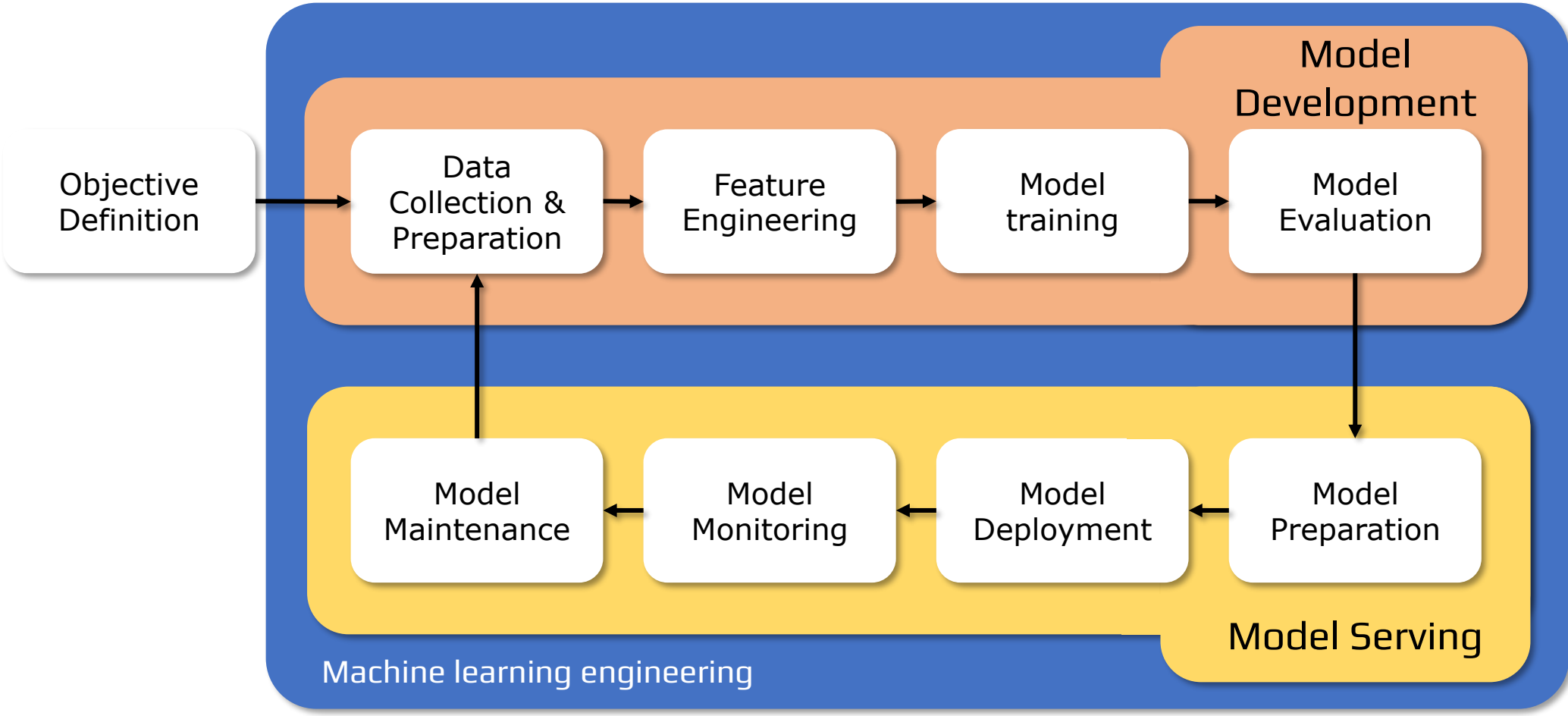

Event
location: Location
type: str
cause: str
severity: str
other: str
Environment
area details: str
population density: int
hazards: Hazard
other: str
Actors Involved
professionals: Actors
civilians: Actors
resources: Equipment
other: str
Actors Needs
actors: Actors
equipment: Equipment
casualties: int
other: str
Resources Available
actors: Actors
equipment: Equipment
other: str
Location
indication: str
address: int
Hazard
type: str
location: Location
Equipment
type: str
quantity: int
Actors
qualification: str
staffing: int

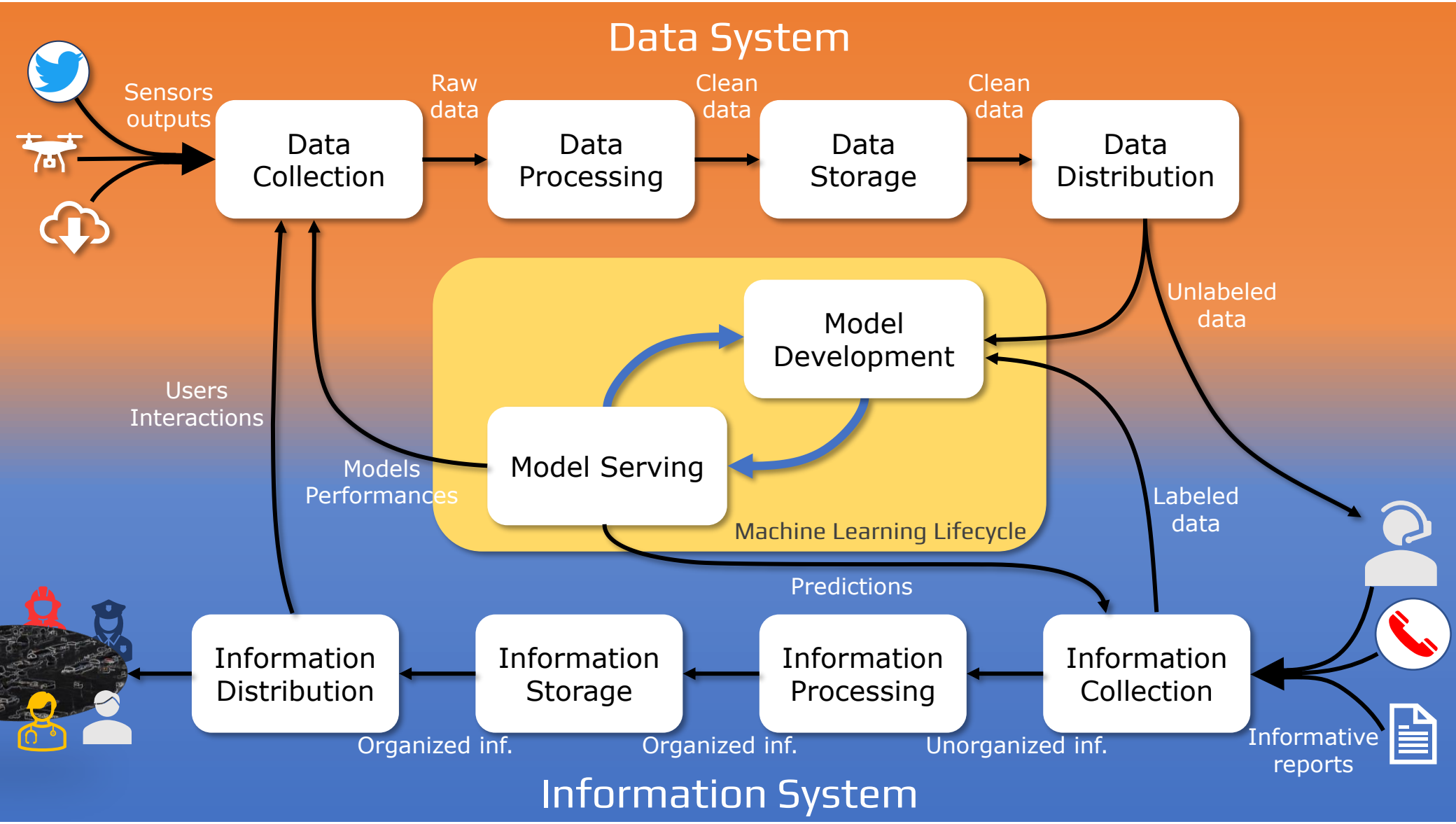


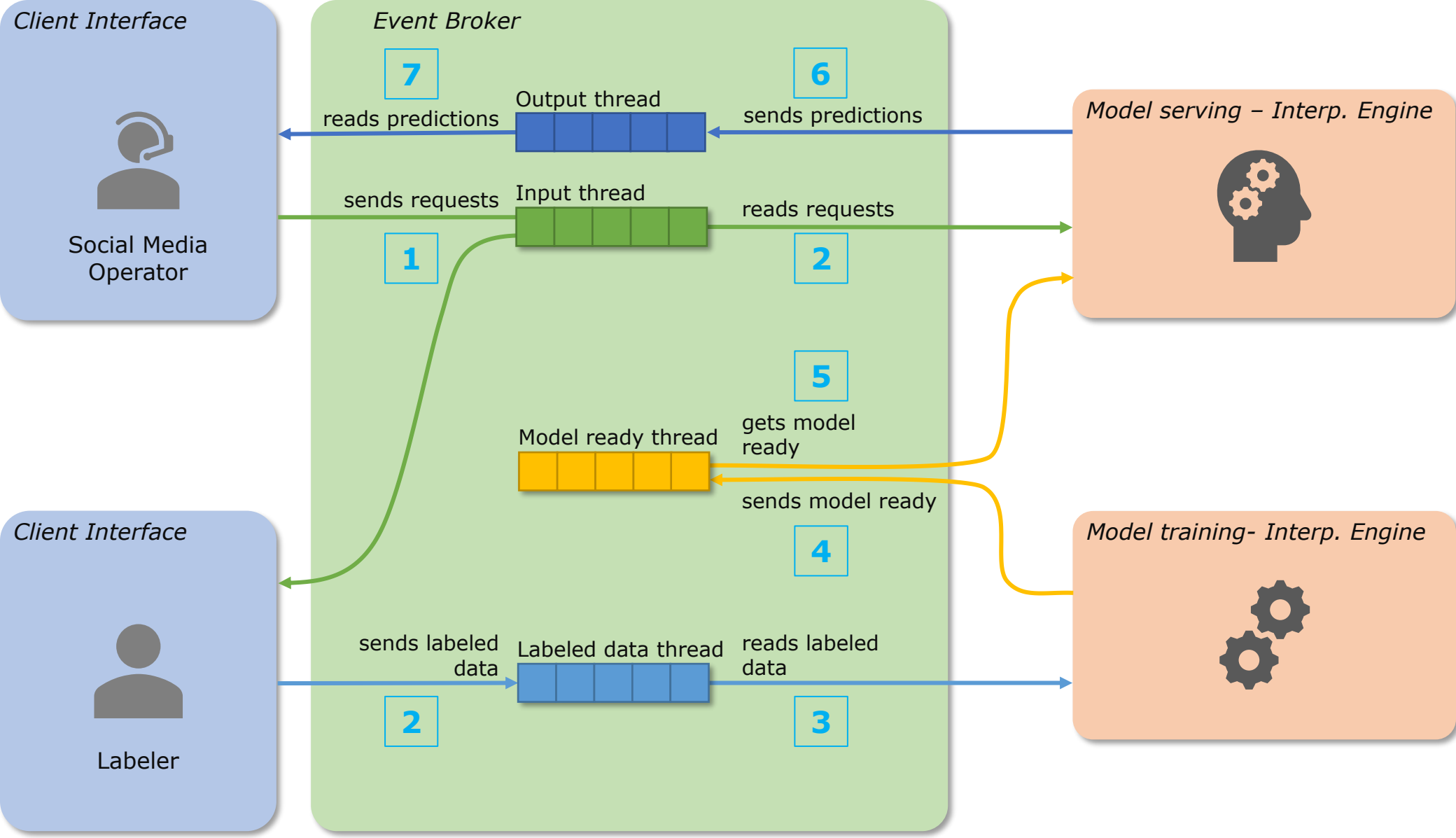

Event
Actor
Hazard
Word y coordinate
Word x coordinate
0.6
0.4
0.2
0
−0.2
−0.4
−0.8
−0.6
−0.4
−0.2
0
0.2
Wildfire
highparkfire
Firefighters
firefighters
Fire
Flag
Flagstaff
Ash
Flames
flames
flame
coal
blaze
blazes


Information System
Call takers/SM Operators
Metamodel
Decision Makers
Common Operational Picture
Data flow
Decisions
Scope of this chapter


2. Preprocessing
1. Collection
3. Processing
Storage
Decision Makers
Call takers
SM Operators


Model Development
Objective Definition
Data Collection & Preparation
Feature Engineering
Model training
Model Evaluation
Model Maintenance
Model Monitoring
Model Deployment
Model Preparation
Model Serving
Machine learning engineering


Data System
Sensors outputs
Data Collection
Raw data
Data Processing
Clean data
Data Storage
Clean data
Data Distribution
Unlabeled data
Model Development
Users Interactions
Model Serving
Models Performances
Machine Learning Lifecycle
Labeled data
Predictions
Information Distribution
Information Storage
Information Processing
Information Collection
Organized inf.
Organized inf.
Unorganized inf.
Informative reports
Information System


Client Interface
Social Media Operator
Event Broker
7
reads predictions
Output thread
6
sends predictions
Model serving – Interp. Engine
sends requests
Input thread
reads requests
1
2
5
Model ready thread
gets model ready
sends model ready
4
Client Interface
Labeler
sends labeled data
Labeled data thread
reads labeled data
2
3
Model training- Interp. Engine