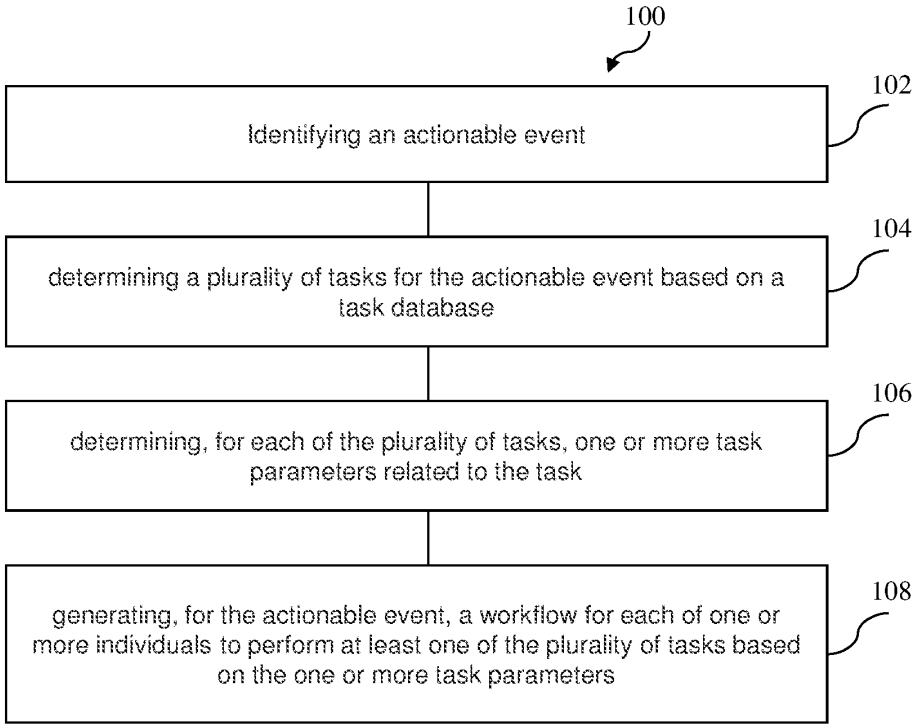

100
Identifying an actionable event
102
determining a plurality of tasks for the actionable event based on a task database
104
determining, for each of the plurality of tasks, one or more task parameters related to the task
106
generating, for the actionable event, a workflow for each of one or more individuals to perform at least one of the plurality of tasks based on the one or more task parameters
108

FIG. 1

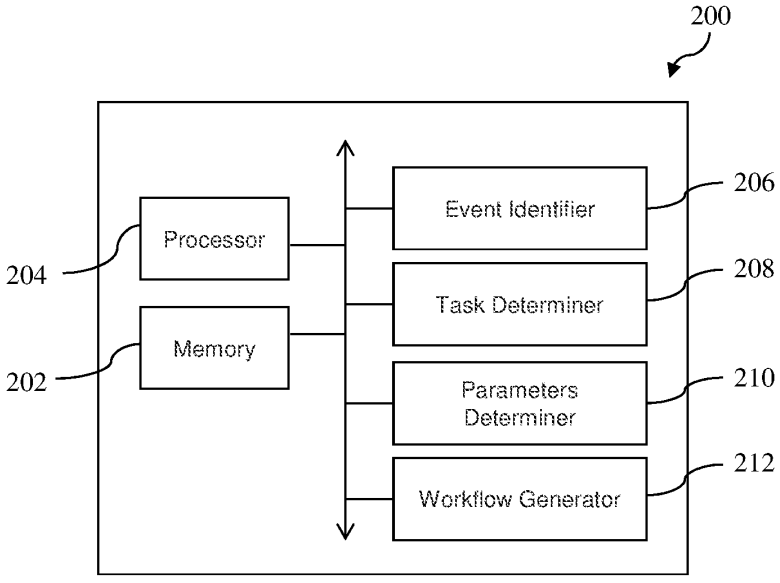

200
Processor
204
Memory
202
Event Identifier
206
Task Determiner
208
Parameters Determiner
210
Workflow Generator
212

FIG. 2

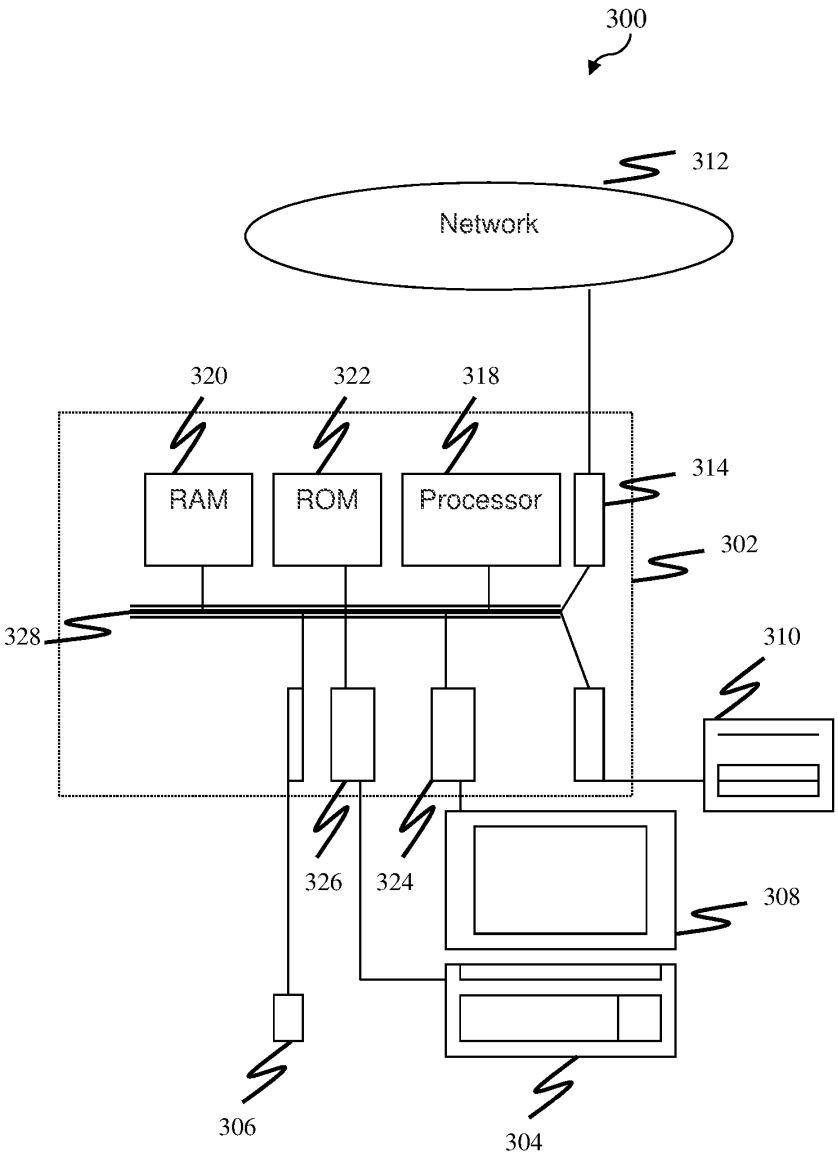

300
312
Network
320
322
318
RAM
ROM
Processor
314
302
328
310
326
324
308
306
304

FIG. 3

	Category	Challenge
1	**Event Complexity**	**Diverse Events** Diverse kind of events that require diverse kinds of responses, actions, services by diverse kinds of human resources
2		**Unpredictability and Location Complexity** Diverse kind of events that require diverse kinds of responses, actions, services may arise at any time at any location that is difficult to predict exactly
3		**Complexity in demand** Each event may demand attention or need for action with different levels of priorities where high priority events may be resolved earlier and lower priority events may be resolved later or postponed. Furthermore, demand may be changing over time (within same day, weekly, monthly or suddenly)
4		**High Critical Events** In rare cases, highly critical events such as fire, earth quake, terrorist activity ..etc may occur. Whole response or actions or services have to changed to ensure safety of human resources or general public and also to make mitigate risks effectively.
5	**Command Control and Monitoring Complexity**	**Complexity Decision making process** While large number of diverse events take place at different locations, managing or handling events is extremely complex, time consuming and may costly due to increased human resources requirements.
6		**Complexity in assigning tasks and monitoring progress** Communicating the tasks associated with each type of ground staff may require significant communication effort may causes delays and may be more costly.
7	**Resource utilization complexity** (Human Response, Service, Action, Tasks related)	• **Each human may have it's own abilities or weaknesses and different performance levels at certain tasks.** • **Such ability may also be depending on task or location where the task have to be carried out.** • **Human resources may be distributed across different geo-graphical locations at a certain time**

FIG. 4

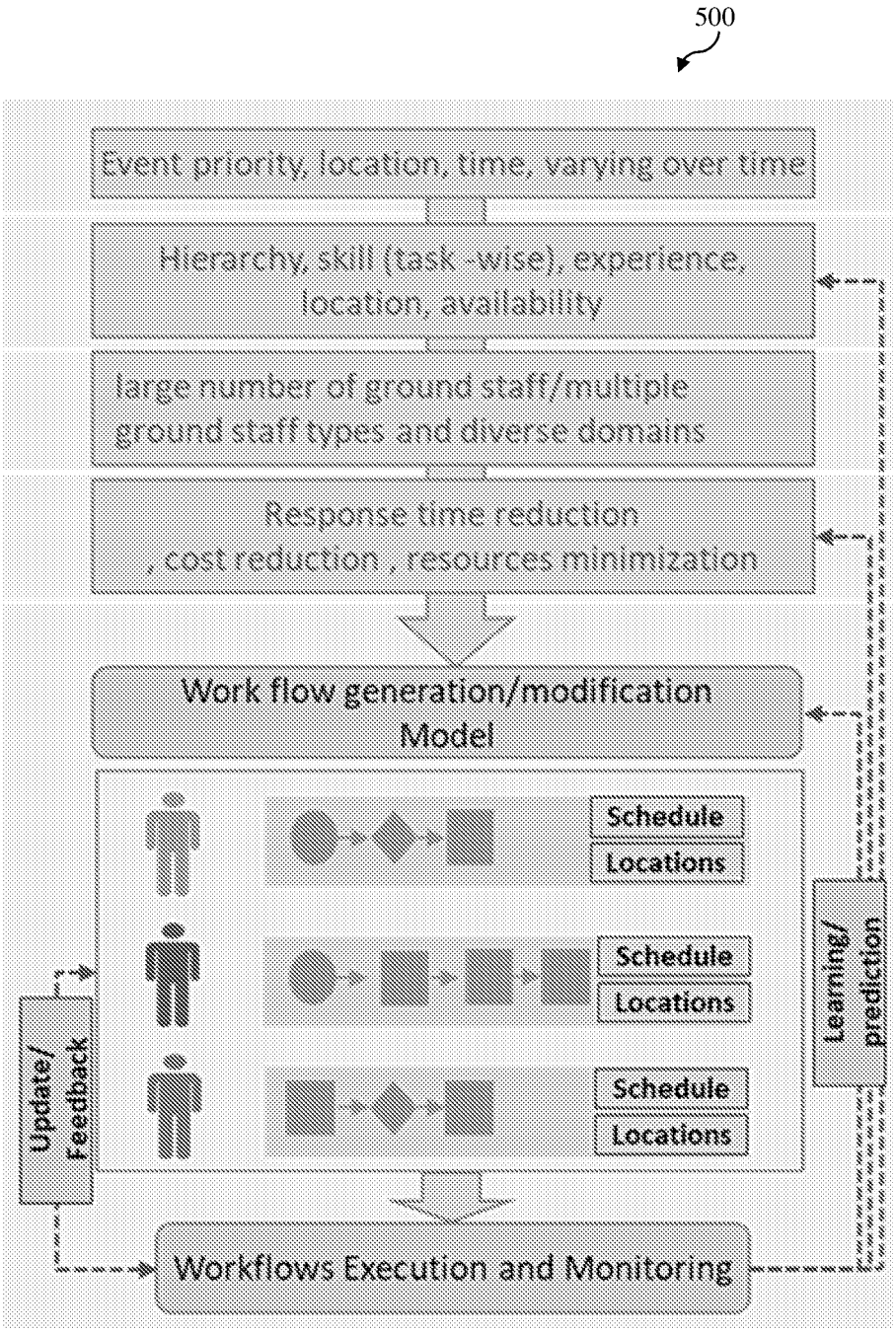

500
Event priority, location, time, varying over time
Hierarchy, skill (task -wise), experience, location, availability
large number of ground staff/multiple ground staff types and diverse domains
Response time reduction , cost reduction , resources minimization
Work flow generation/modification Model
Schedule
Locations
Schedule
Locations
Schedule
Locations
Update/ Feedback
Learning/ prediction
Workflows Execution and Monitoring

FIG. 5

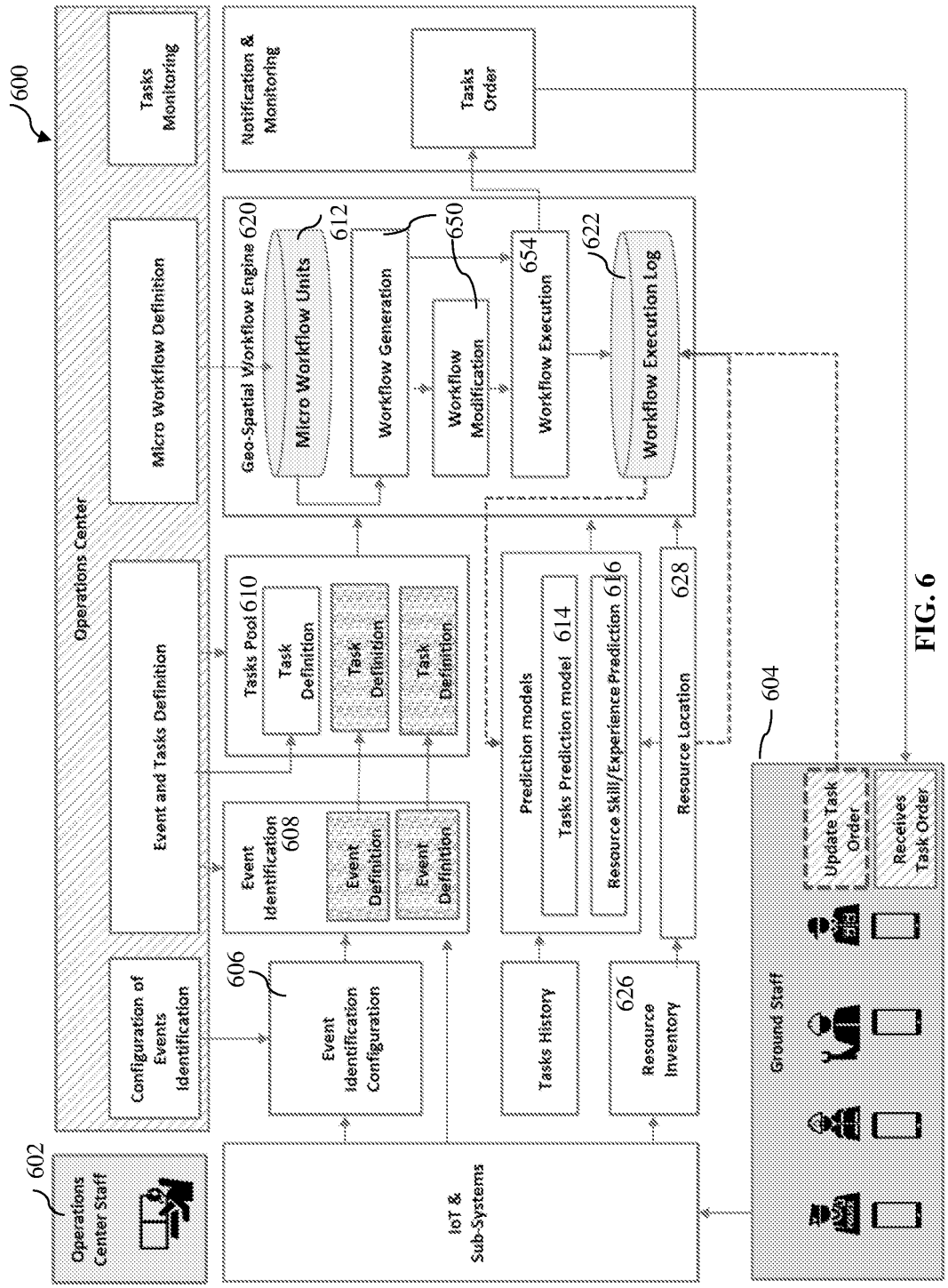

600
Operations Center
Tasks Monitoring
Micro Workflow Definition
Event and Tasks Definition
Configuration of Events Identification
Notification & Monitoring
Tasks Order
Geo-Spatial Workflow Engine 620
Micro Workflow Units
612
Workflow Generation
650
Workflow Modification
654
Workflow Execution
622
Workflow Execution Log
Tasks Pool 610
Task Definition
Task Definition
Task Definition
Event Identification 608
Event Definition
Event Definition
Prediction models
Tasks Prediction model 614
Resource Skill/Experience Prediction 616
628
Resource Location
606
Event Identification Configuration
Tasks History
626
Resource Inventory
602
Operations Center Staff
IoT & Sub-Systems
604
Ground Staff
Update Task Order
Receives Task Order

FIG. 6

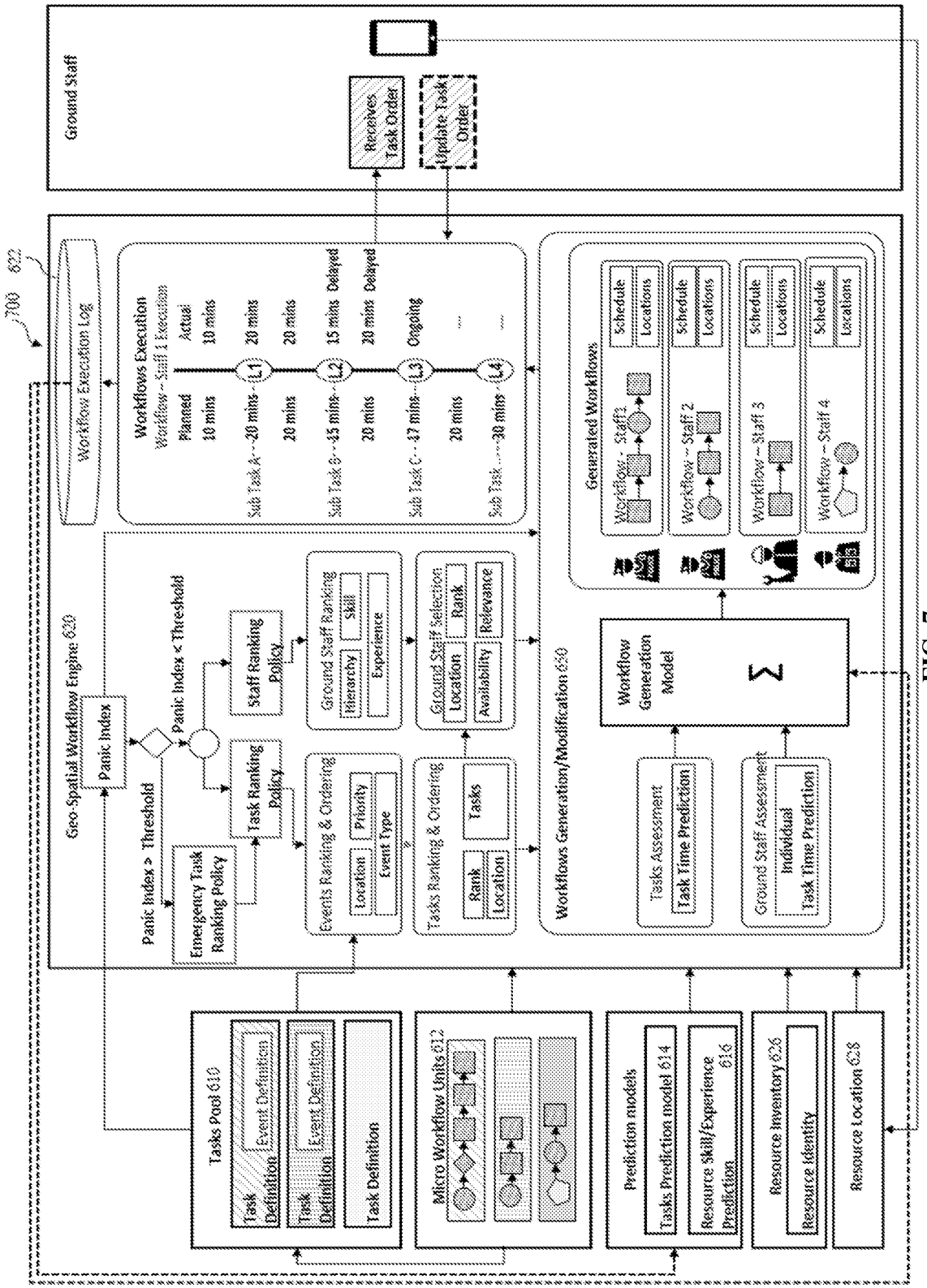

Ground Staff
Receives Task Order
Update Task Order
700
622
Workflow Execution Log
Workflows Execution
Workflow – Staff 1 Execution
Planned
Actual
10 mins
10 mins
Sub Task A
20 mins
20 mins
L1
20 mins
20 mins
Sub Task B
15 mins Delayed
20 mins Delayed
L2
20 mins
20 mins
Sub Task C
Ongoing
L3
20 mins
...
Sub Task ...
...
L4
Geo-Spatial Workflow Engine 620
Panic Index
Panic Index > Threshold
Panic Index < Threshold
Emergency Task Ranking Policy
Staff Ranking Policy
Task Ranking Policy
Events Ranking & Ordering
Location
Priority
Event Type
Ground Staff Ranking
Hierarchy
Skill
Experience
Tasks Ranking & Ordering
Rank
Location
Tasks
Ground Staff Selection
Location
Rank
Availability
Relevance
Workflows Generation/Modification 630
Tasks Assessment
Task Time Prediction
Workflow Generation Model
Σ
Ground Staff Assessment
Individual
Task Time Prediction
Generated Workflows
Workflow – Staff1
Workflow – Staff 2
Workflow – Staff 3
Workflow – Staff 4
Schedule
Locations
Tasks Pool 610
Task Definition
Event Definition
Task Definition
Event Definition
Task Definition
Micro Workflow Units 612
Prediction models
Tasks Prediction model 614
Resource Skill/Experience Prediction 616
Resource Inventory 626
Resource Identity
Resource Location 628

FIG. 7

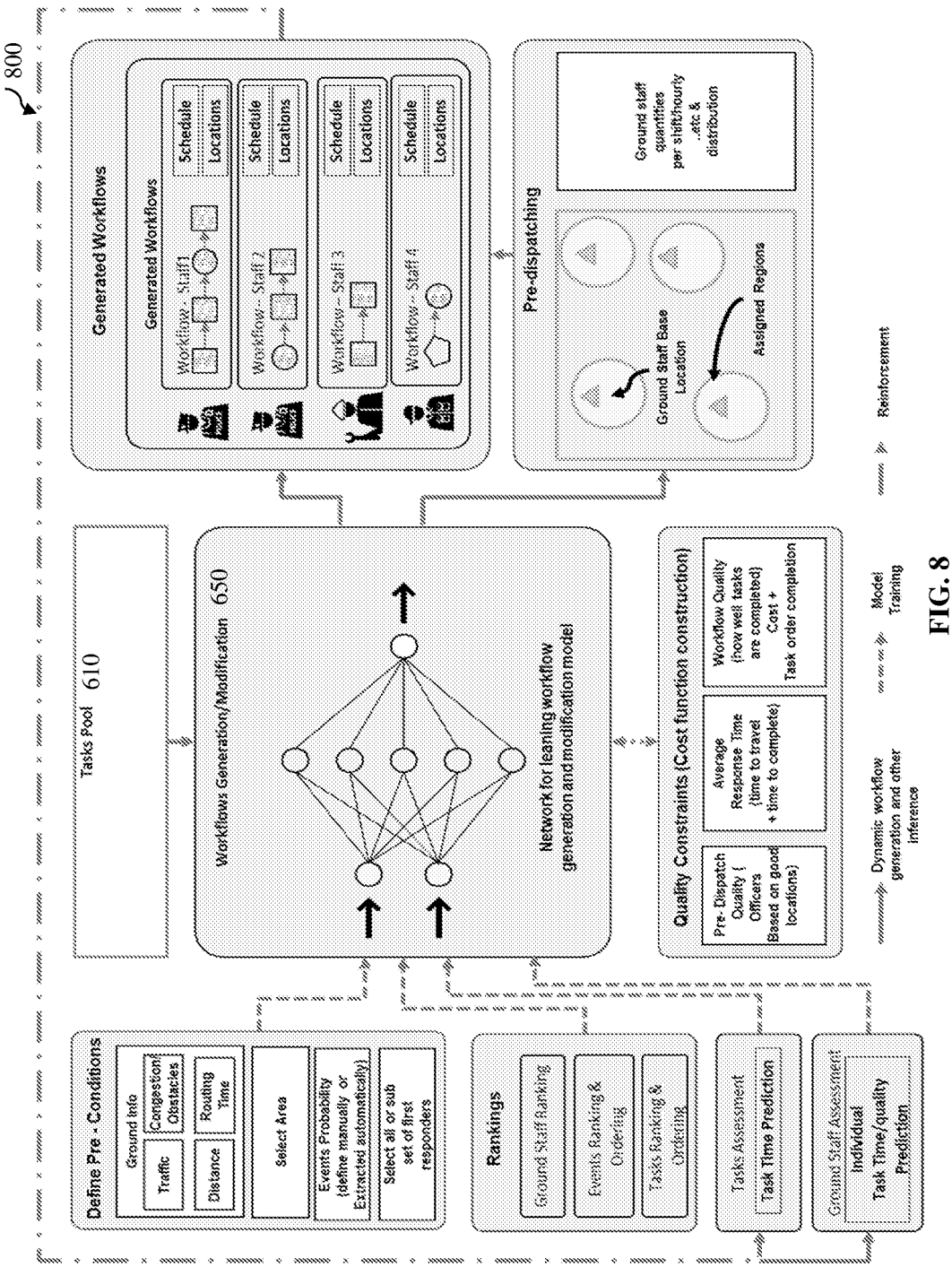

800
Generated Workflows
Generated Workflows
Workflow - Staff1
Workflow - Staff 2
Workflow - Staff 3
Workflow - Staff 4
Schedule
Locations
Pre-dispatching
Ground staff quantities per shift/hourly ..etc & distribution
Ground Staff Base Location
Assigned Regions
Tasks Pool 610
Workflows Generation/Modification 650
Network for learning workflow generation and modification model
Quality Constraints (Cost function construction)
Pre- Dispatch Quality (Officers Based on good locations)
Average Response Time (time to travel + time to complete)
Workflow Quality (how well tasks are completed) Cost + Task order completion
Dynamic workflow generation and other inference
Model Training
Reinforcement
Define Pre - Conditions
Ground Info
Traffic
Congestion/ Obstacles
Distance
Routing Time
Select Area
Events Probability (define manually or Extracted automatically)
Select all or sub set of first responders
Rankings
Ground Staff Ranking
Events Ranking & Ordering
Tasks Ranking & Ordering
Tasks Assessment
Task Time Prediction
Ground Staff Assessment
Individual
Task Time/quality Prediction

FIG. 8

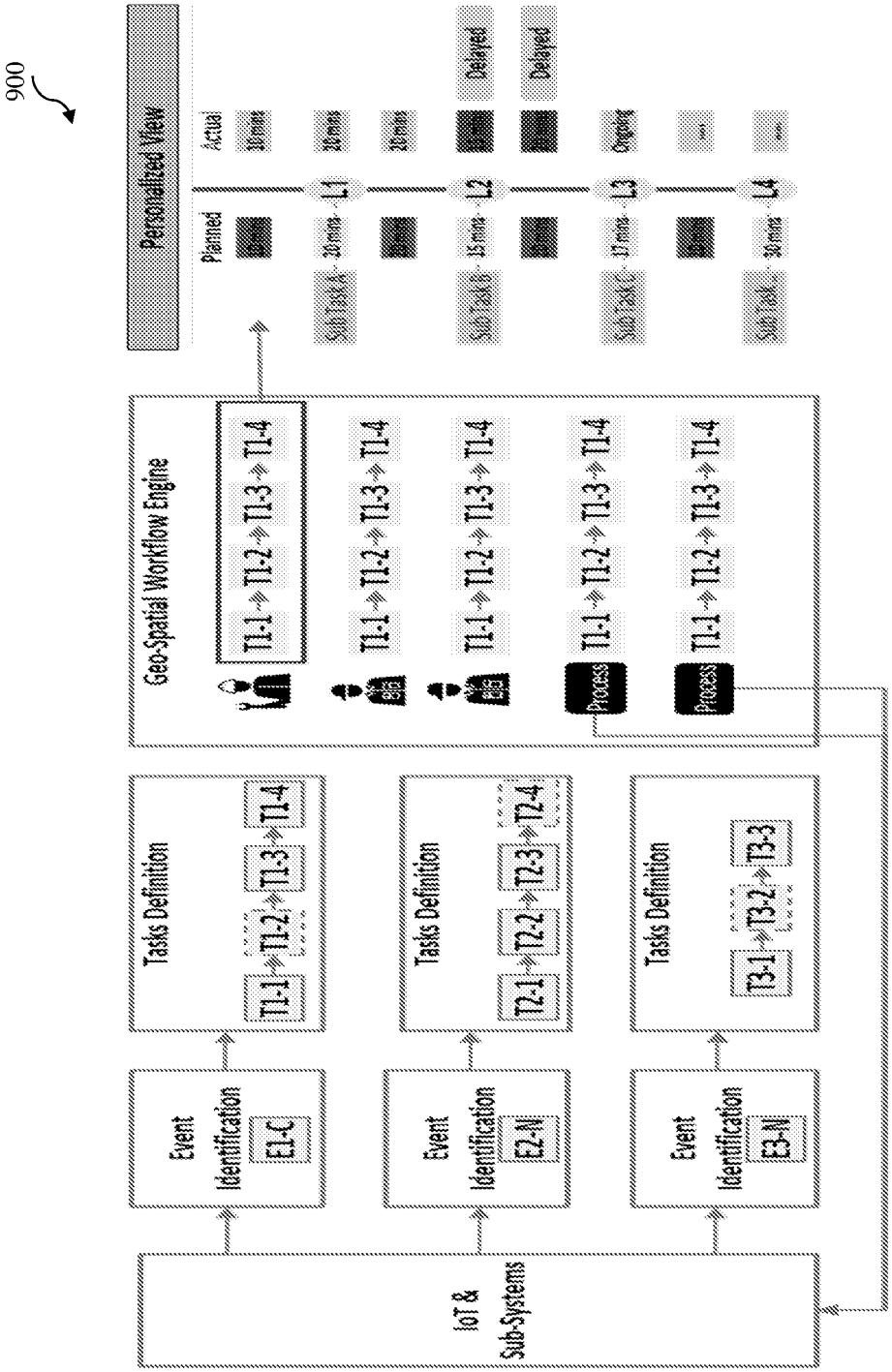

900
Personalized View
Actual
Planned
L1
L2
L3
L4
Delayed
Delayed
Urgent
Geo-Spatial Workflow Engine
T1-1 → T1-2 → T1-3 → T1-4
Tasks Definition
T1-1 → T1-2 → T1-3 → T1-4
T2-1 → T2-2 → T2-3 → T2-4
T3-1 → T3-2 → T3-3
Event Identification
E1-C
E2-N
E3-N
IoT & Sub-Systems

FIG. 9