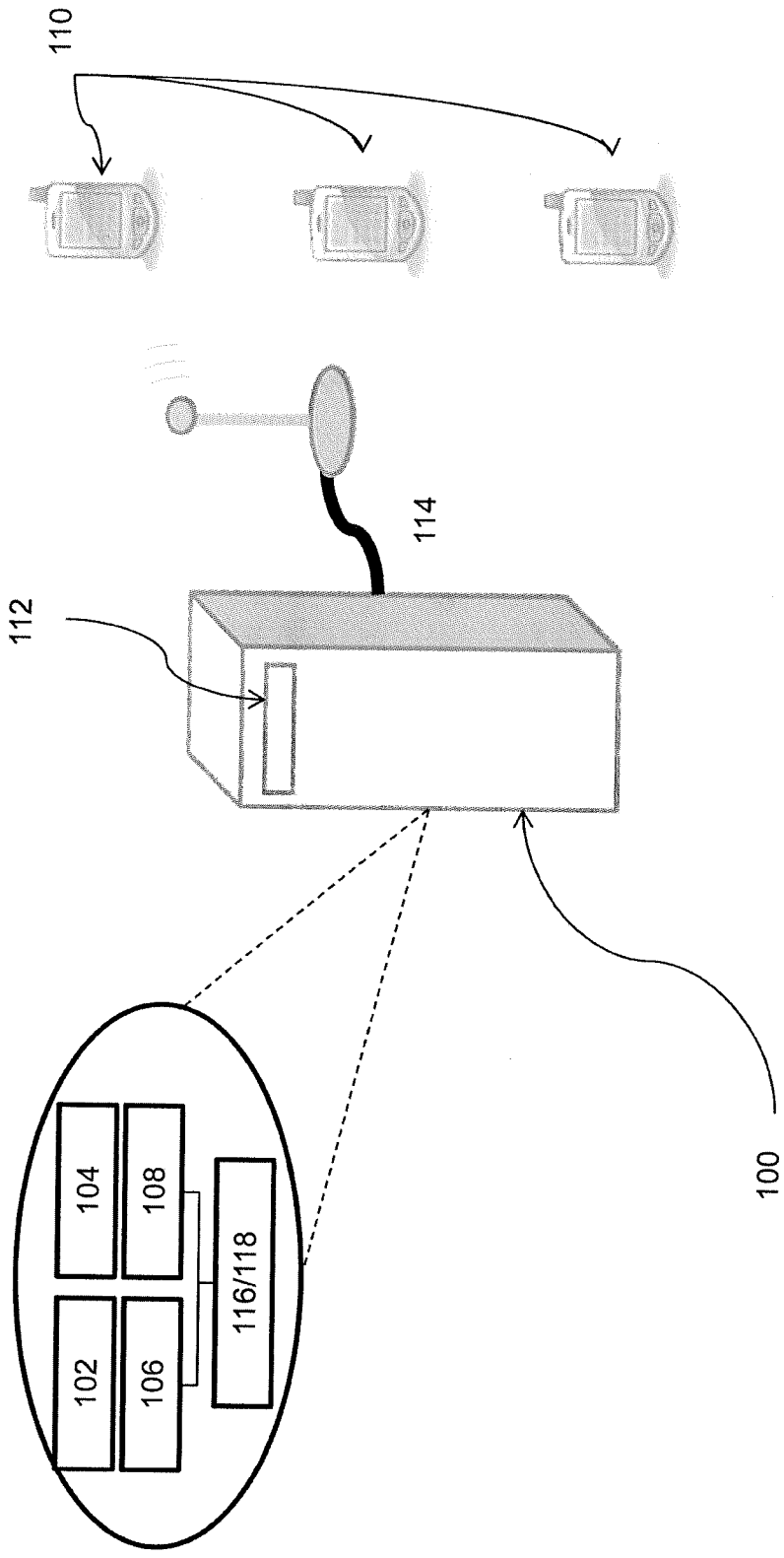


Figure 1

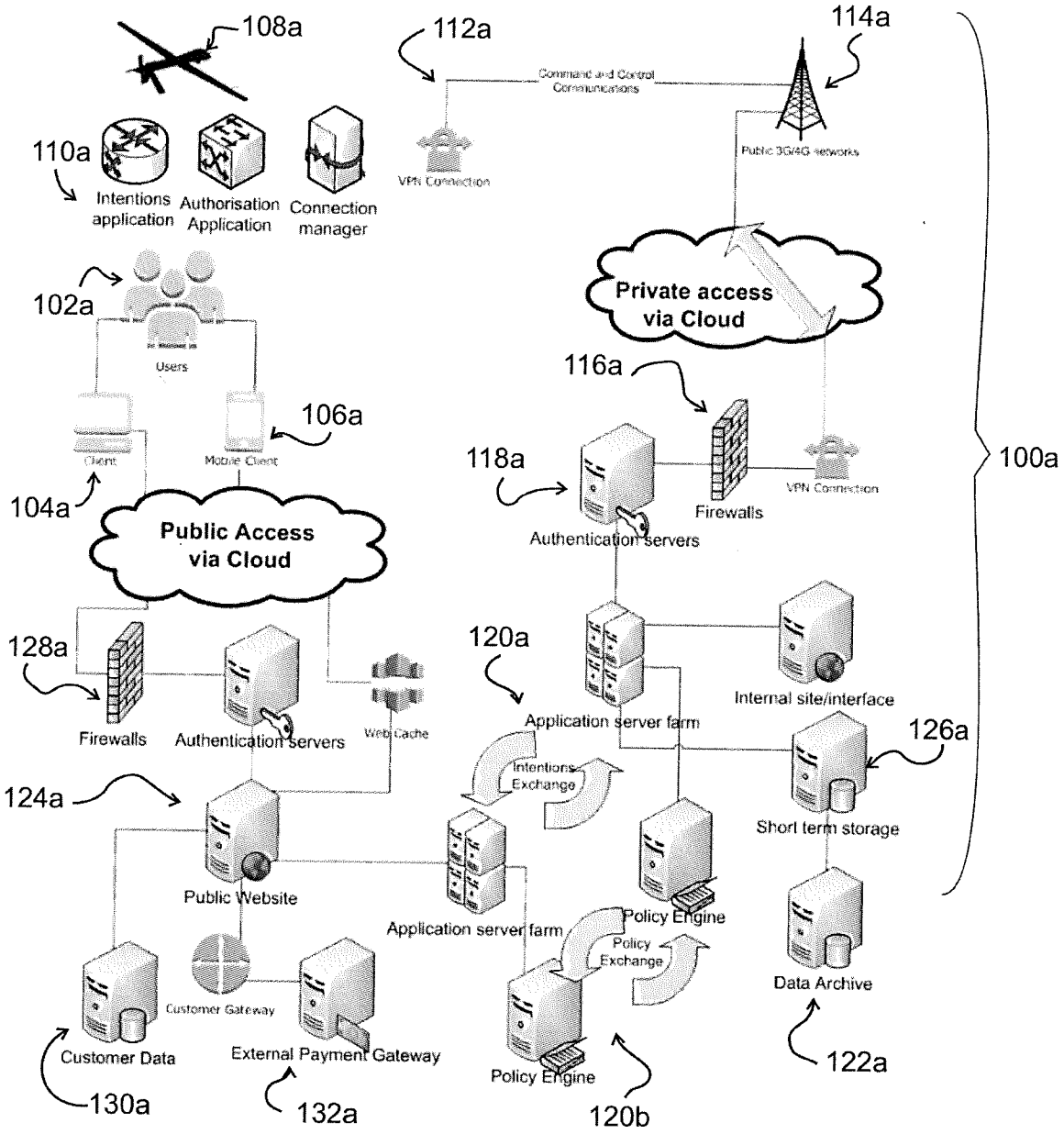

108a
112a
114a
Command and Control Communications
VPN Connection
Public 3G/4G networks
110a
Intentions application
Authorisation Application
Connection manager
Private access via Cloud
102a
Users
116a
106a
Client
Mobile Client
118a
VPN Connection
Firewalls
Authentication servers
100a
104a
Public Access via Cloud
120a
128a
Internal site/interface
Application server farm
Firewalls
Authentication servers
Web Cache
126a
Intentions Exchange
124a
Short term storage
Public Website
Application server farm
Policy Engine
Policy Exchange
Customer Gateway
Data Archive
Customer Data
External Payment Gateway
Policy Engine
122a
130a
132a
120b

Figure 2

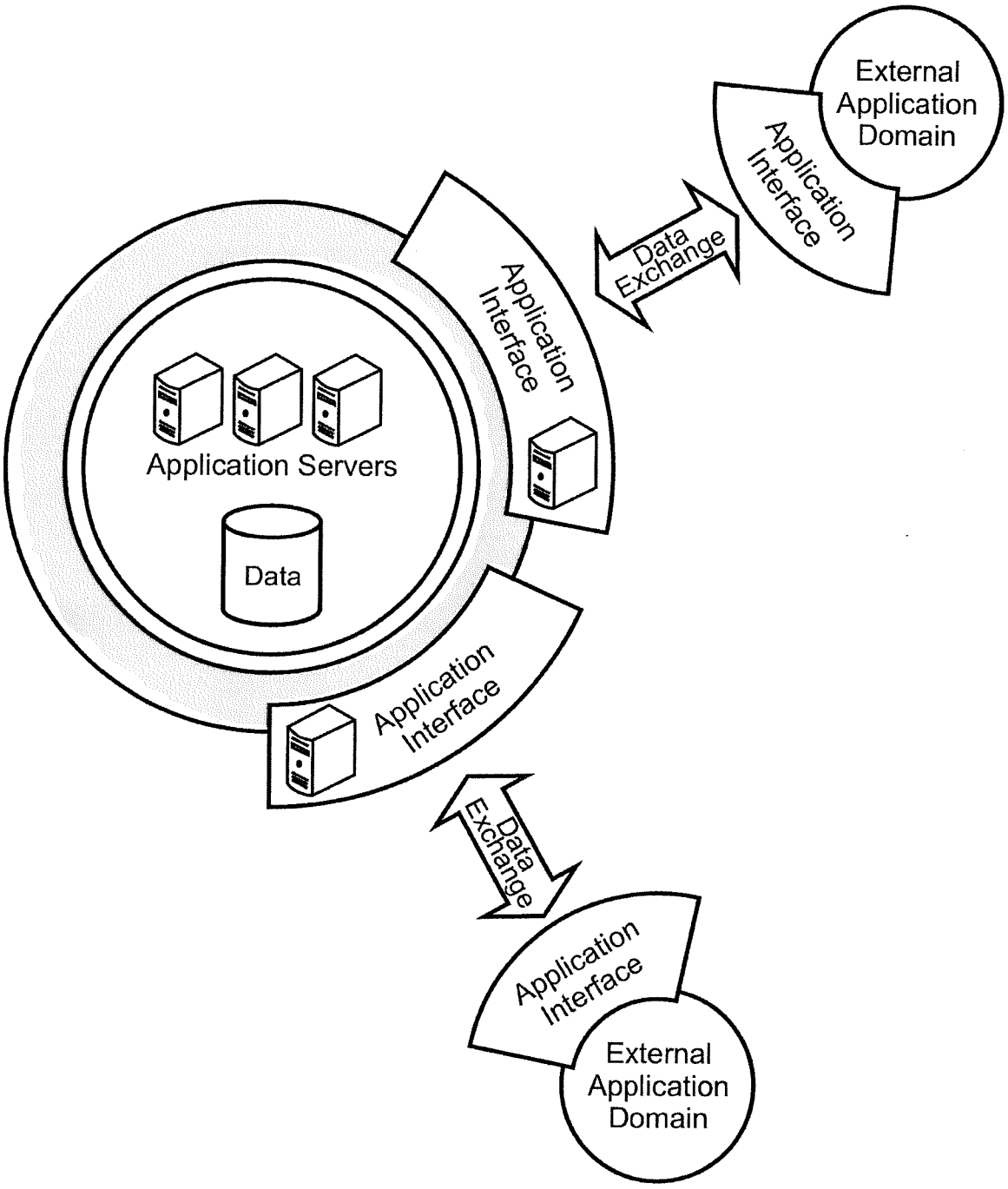

External Application Domain
Application Interface
Data Exchange
Application Interface
Application Servers
Data
Application Interface
Data Exchange
Application Interface
External Application Domain

Figure 2a

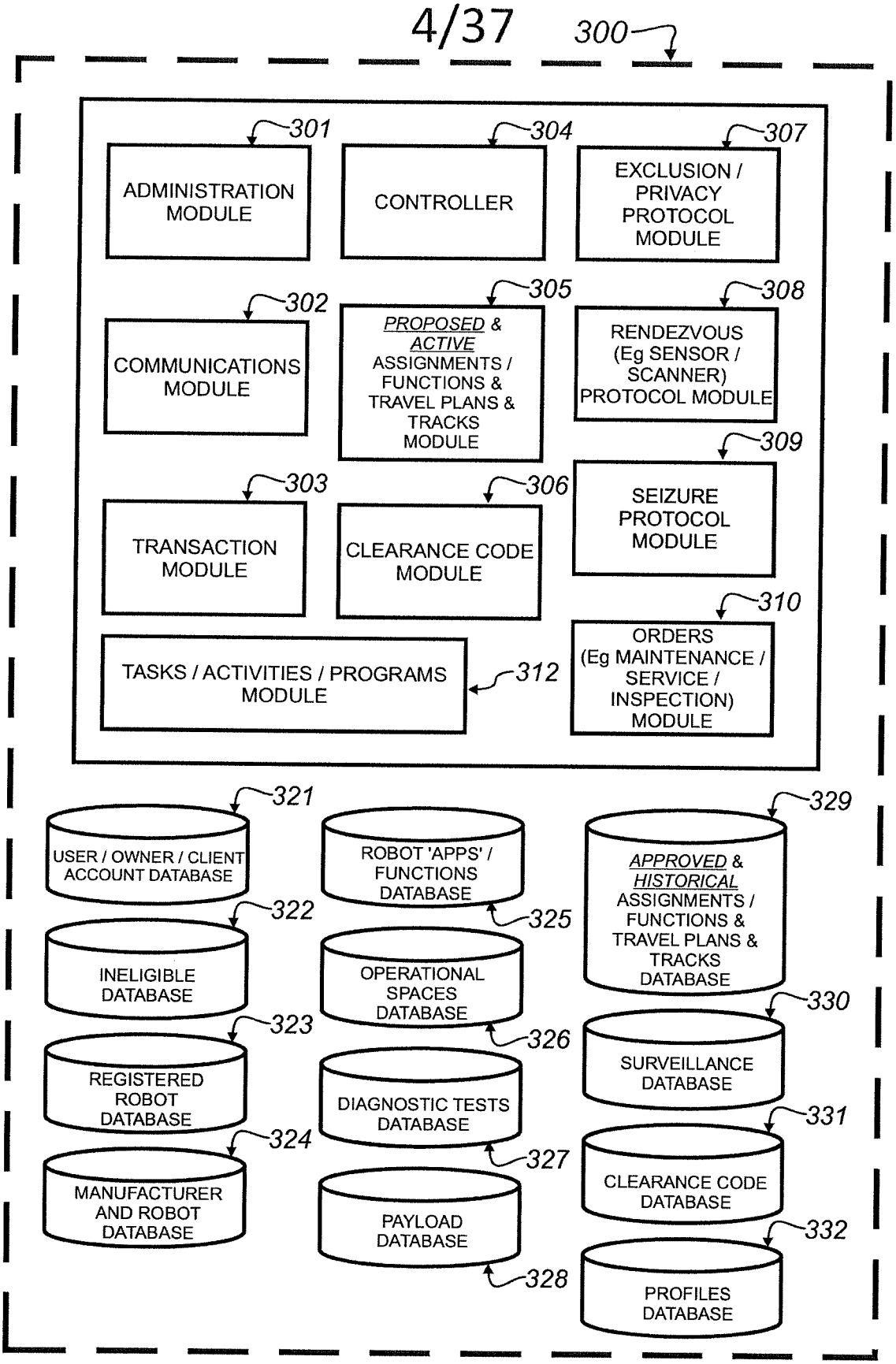

300
301
ADMINISTRATION MODULE
304
CONTROLLER
307
EXCLUSION / PRIVACY PROTOCOL MODULE
302
COMMUNICATIONS MODULE
305
PROPOSED & ACTIVE ASSIGNMENTS / FUNCTIONS & TRAVEL PLANS & TRACKS MODULE
308
RENDEZVOUS (Eg SENSOR / SCANNER) PROTOCOL MODULE
309
SEIZURE PROTOCOL MODULE
303
TRANSACTION MODULE
306
CLEARANCE CODE MODULE
310
ORDERS (Eg MAINTENANCE / SERVICE / INSPECTION) MODULE
TASKS / ACTIVITIES / PROGRAMS MODULE
312
321
USER / OWNER / CLIENT ACCOUNT DATABASE
322
INELIGIBLE DATABASE
323
REGISTERED ROBOT DATABASE
324
MANUFACTURER AND ROBOT DATABASE
ROBOT 'APPS' / FUNCTIONS DATABASE
325
OPERATIONAL SPACES DATABASE
326
DIAGNOSTIC TESTS DATABASE
327
PAYLOAD DATABASE
328
329
APPROVED & HISTORICAL ASSIGNMENTS / FUNCTIONS & TRAVEL PLANS & TRACKS DATABASE
330
SURVEILLANCE DATABASE
331
CLEARANCE CODE DATABASE
332
PROFILES DATABASE

Figure 3

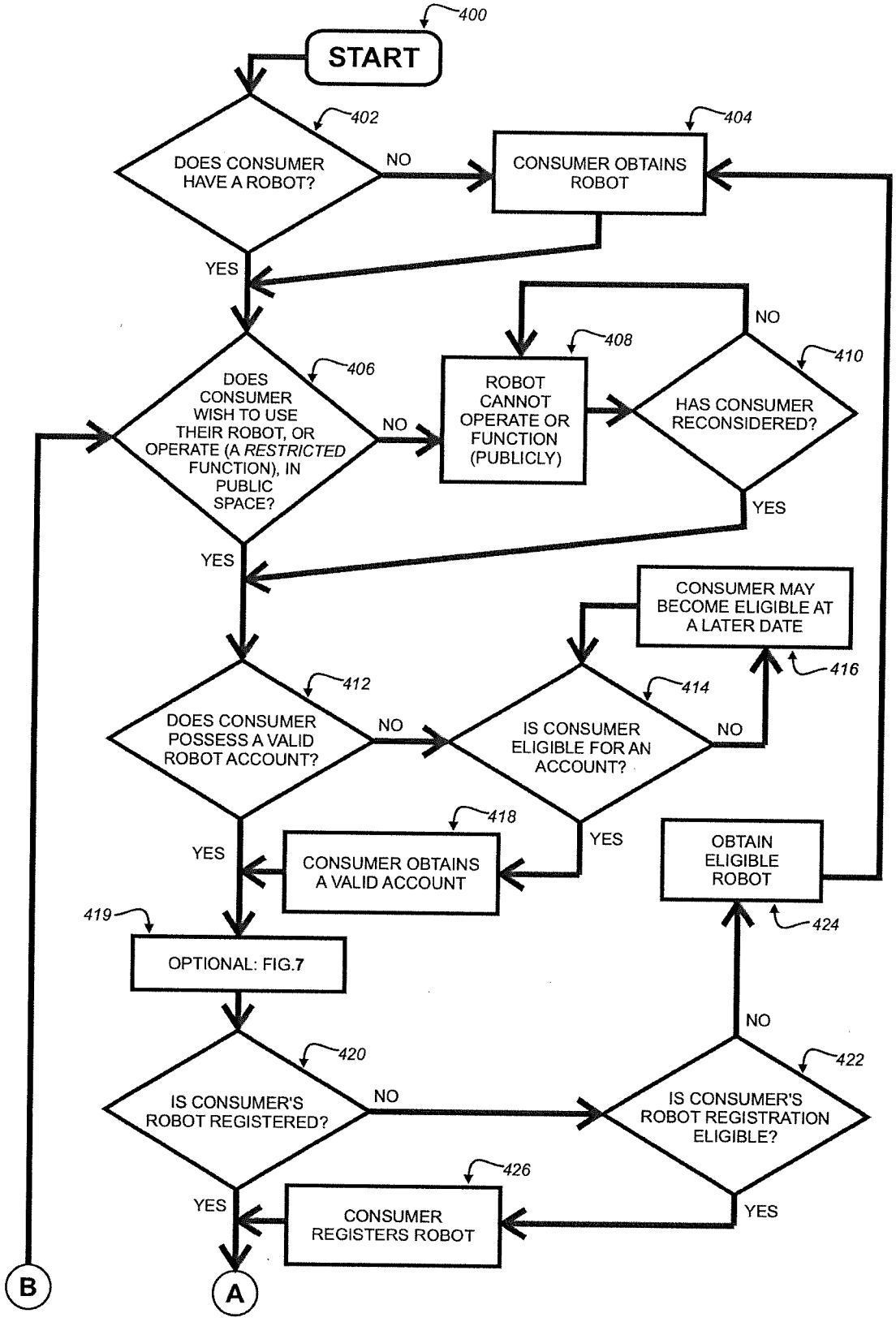

400
START
402
DOES CONSUMER HAVE A ROBOT?
NO
404
CONSUMER OBTAINS ROBOT
YES
406
DOES CONSUMER WISH TO USE THEIR ROBOT, OR OPERATE (A RESTRICTED FUNCTION), IN PUBLIC SPACE?
NO
408
ROBOT CANNOT OPERATE OR FUNCTION (PUBLICLY)
410
HAS CONSUMER RECONSIDERED?
NO
YES
YES
CONSUMER MAY BECOME ELIGIBLE AT A LATER DATE
416
412
DOES CONSUMER POSSESS A VALID ROBOT ACCOUNT?
NO
414
IS CONSUMER ELIGIBLE FOR AN ACCOUNT?
NO
YES
418
CONSUMER OBTAINS A VALID ACCOUNT
YES
OBTAIN ELIGIBLE ROBOT
424
419
OPTIONAL: FIG.7
NO
420
IS CONSUMER'S ROBOT REGISTERED?
NO
422
IS CONSUMER'S ROBOT REGISTRATION ELIGIBLE?
426
YES
CONSUMER REGISTERS ROBOT
YES
B
A

Figure 4

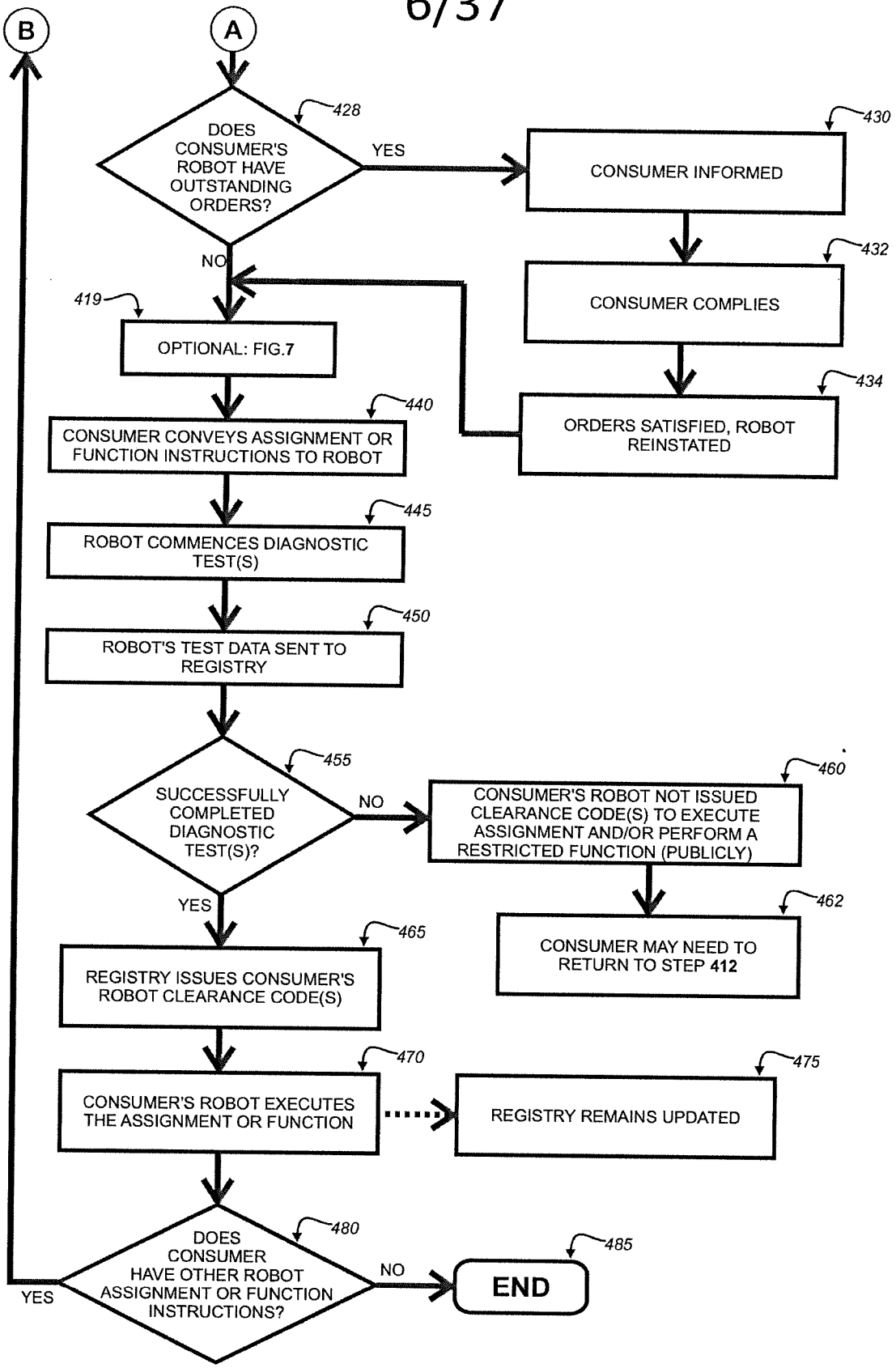

B
A
428
DOES CONSUMER'S ROBOT HAVE OUTSTANDING ORDERS?
YES
430
CONSUMER INFORMED
NO
432
CONSUMER COMPLIES
419
OPTIONAL: FIG.7
434
ORDERS SATISFIED, ROBOT REINSTATED
440
CONSUMER CONVEYS ASSIGNMENT OR FUNCTION INSTRUCTIONS TO ROBOT
445
ROBOT COMMENCES DIAGNOSTIC TEST(S)
450
ROBOT'S TEST DATA SENT TO REGISTRY
455
SUCCESSFULLY COMPLETED DIAGNOSTIC TEST(S)?
NO
460
CONSUMER'S ROBOT NOT ISSUED CLEARANCE CODE(S) TO EXECUTE ASSIGNMENT AND/OR PERFORM A RESTRICTED FUNCTION (PUBLICLY)
YES
462
CONSUMER MAY NEED TO RETURN TO STEP 412
465
REGISTRY ISSUES CONSUMER'S ROBOT CLEARANCE CODE(S)
470
CONSUMER'S ROBOT EXECUTES THE ASSIGNMENT OR FUNCTION
475
REGISTRY REMAINS UPDATED
480
DOES CONSUMER HAVE OTHER ROBOT ASSIGNMENT OR FUNCTION INSTRUCTIONS?
NO
485
END
YES

Figure 5

Scenarios of facilitating robot commands or requests

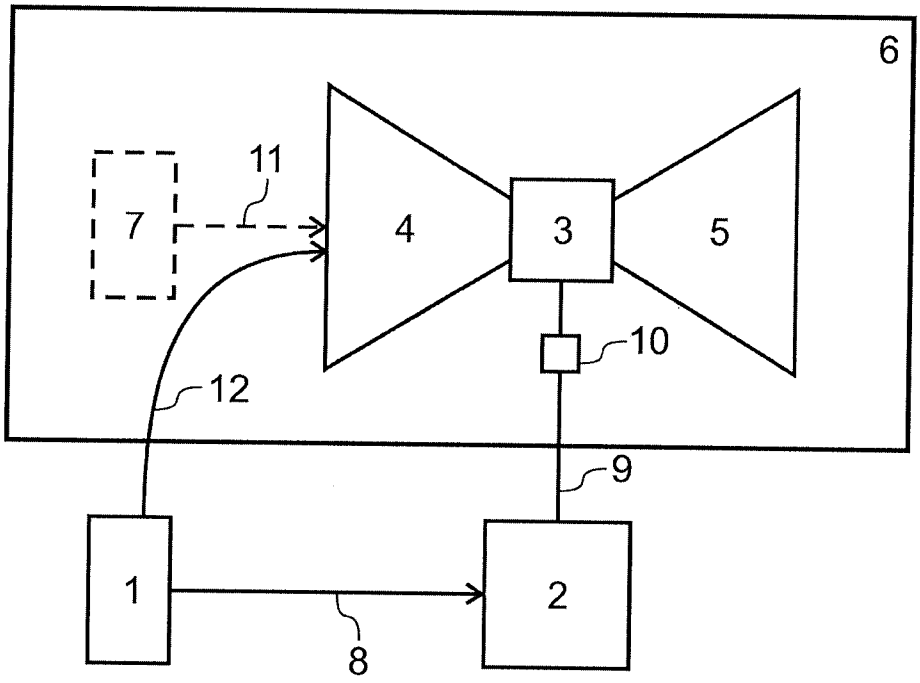


Figure 5a

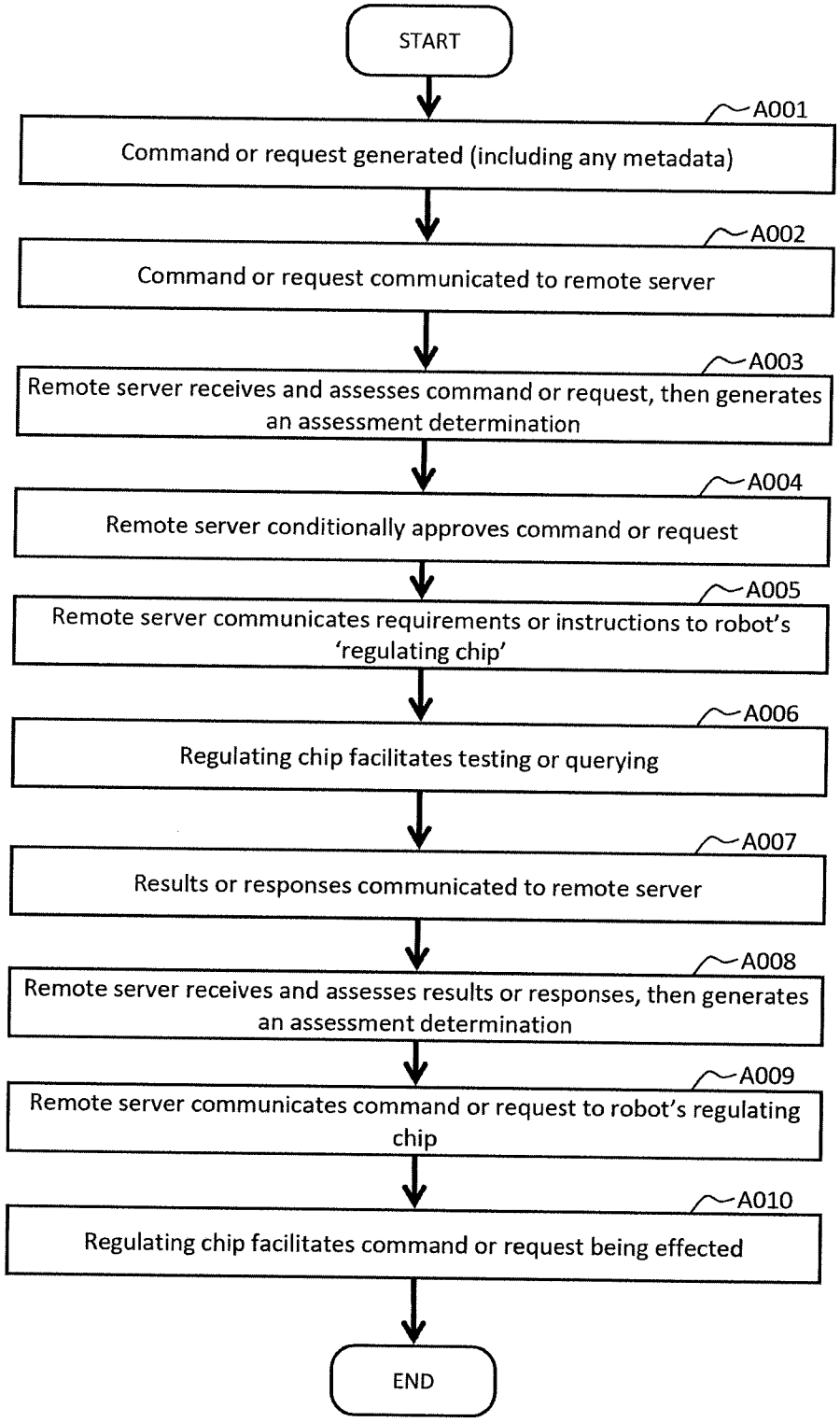

START
A001
Command or request generated (including any metadata)
A002
Command or request communicated to remote server
A003
Remote server receives and assesses command or request, then generates an assessment determination
A004
Remote server conditionally approves command or request
A005
Remote server communicates requirements or instructions to robot's 'regulating chip'
A006
Regulating chip facilitates testing or querying
A007
Results or responses communicated to remote server
A008
Remote server receives and assesses results or responses, then generates an assessment determination
A009
Remote server communicates command or request to robot's regulating chip
A010
Regulating chip facilitates command or request being effected
END

Figure 5b

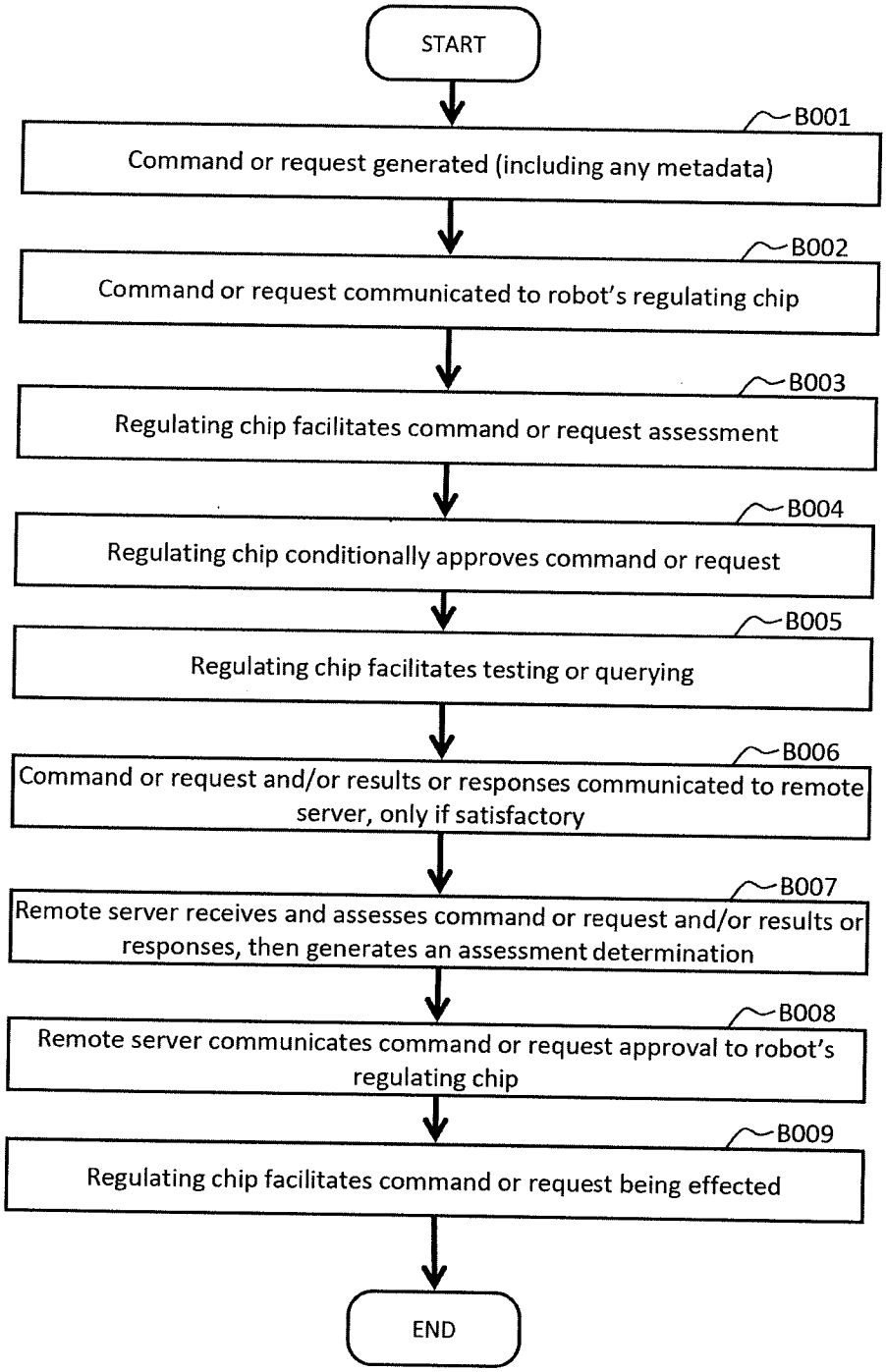

START
B001
Command or request generated (including any metadata)
B002
Command or request communicated to robot's regulating chip
B003
Regulating chip facilitates command or request assessment
B004
Regulating chip conditionally approves command or request
B005
Regulating chip facilitates testing or querying
B006
Command or request and/or results or responses communicated to remote server, only if satisfactory
B007
Remote server receives and assesses command or request and/or results or responses, then generates an assessment determination
B008
Remote server communicates command or request approval to robot's regulating chip
B009
Regulating chip facilitates command or request being effected
END

Figure 5c

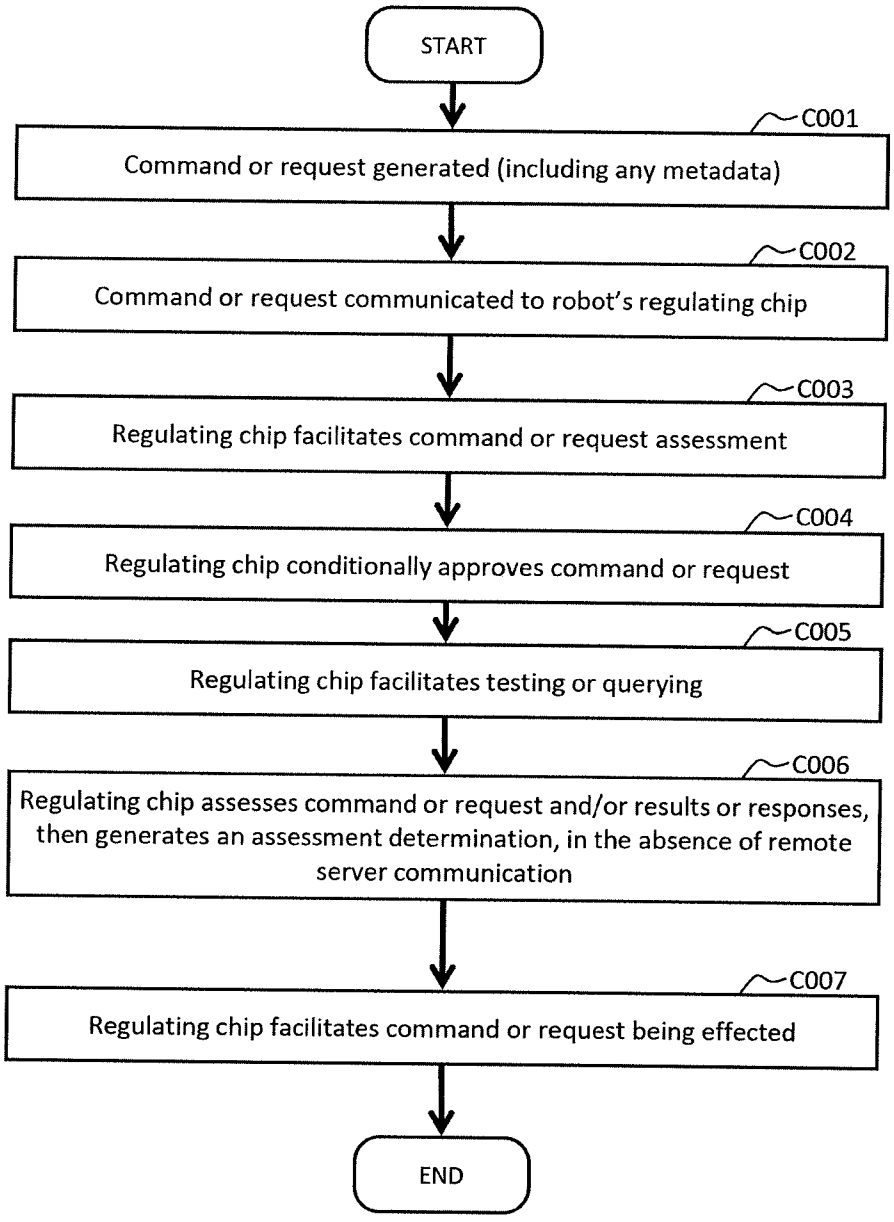

START
C001
Command or request generated (including any metadata)
C002
Command or request communicated to robot's regulating chip
C003
Regulating chip facilitates command or request assessment
C004
Regulating chip conditionally approves command or request
C005
Regulating chip facilitates testing or querying
C006
Regulating chip assesses command or request and/or results or responses, then generates an assessment determination, in the absence of remote server communication
C007
Regulating chip facilitates command or request being effected
END

Figure 5d

PROFILE UPDATE

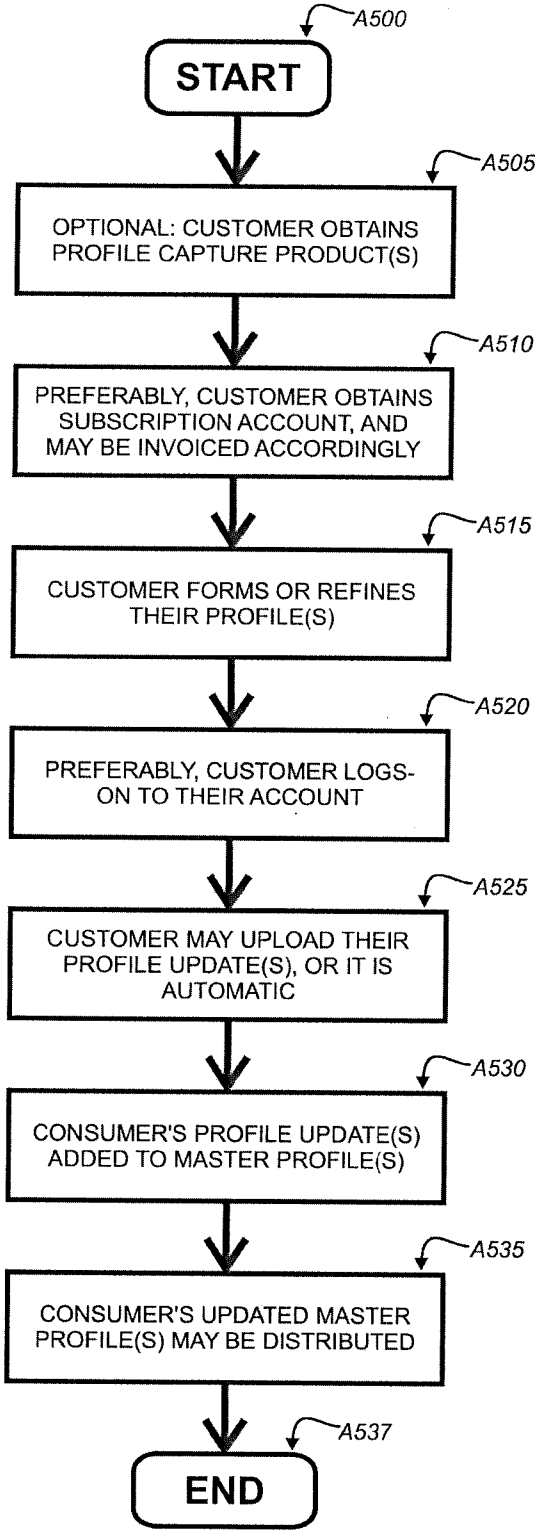


Figure 6

PROFILE UPDATE

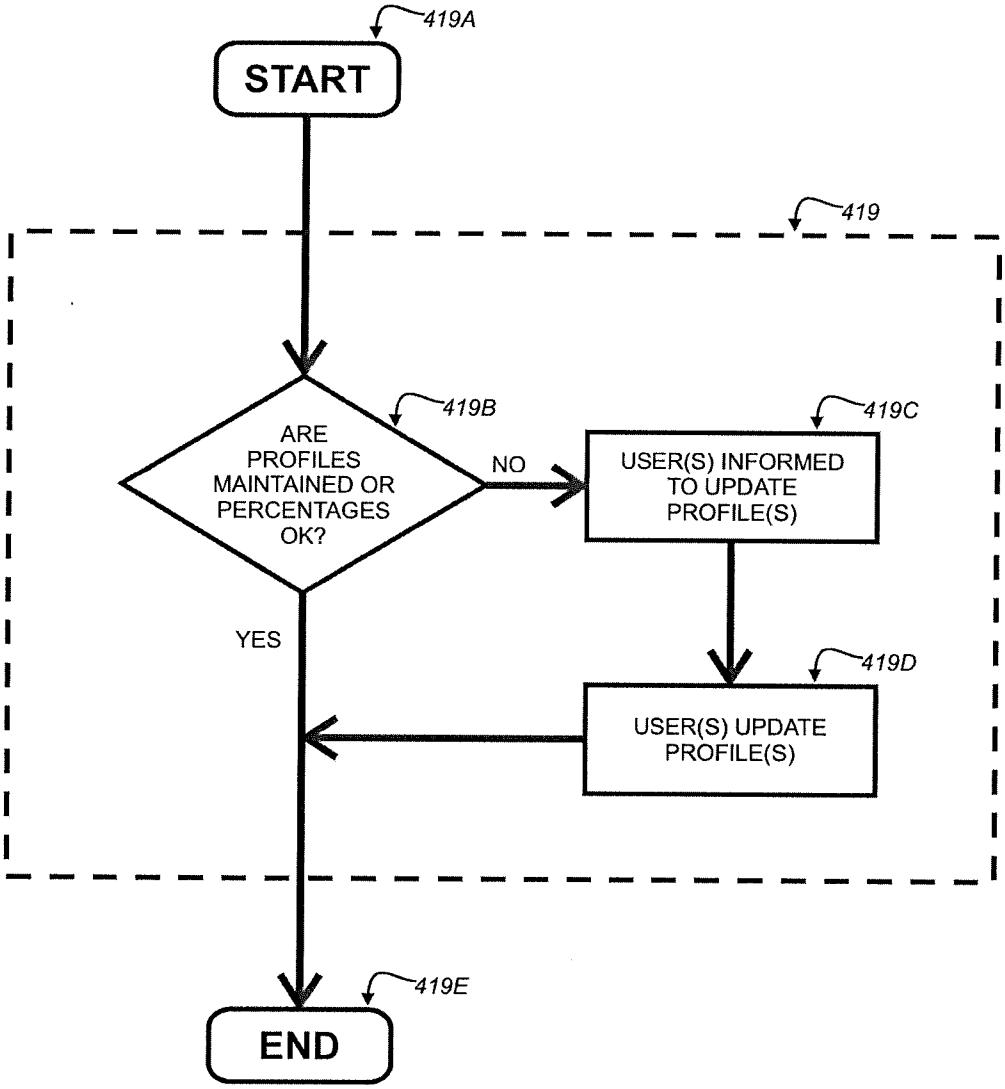


Figure 7

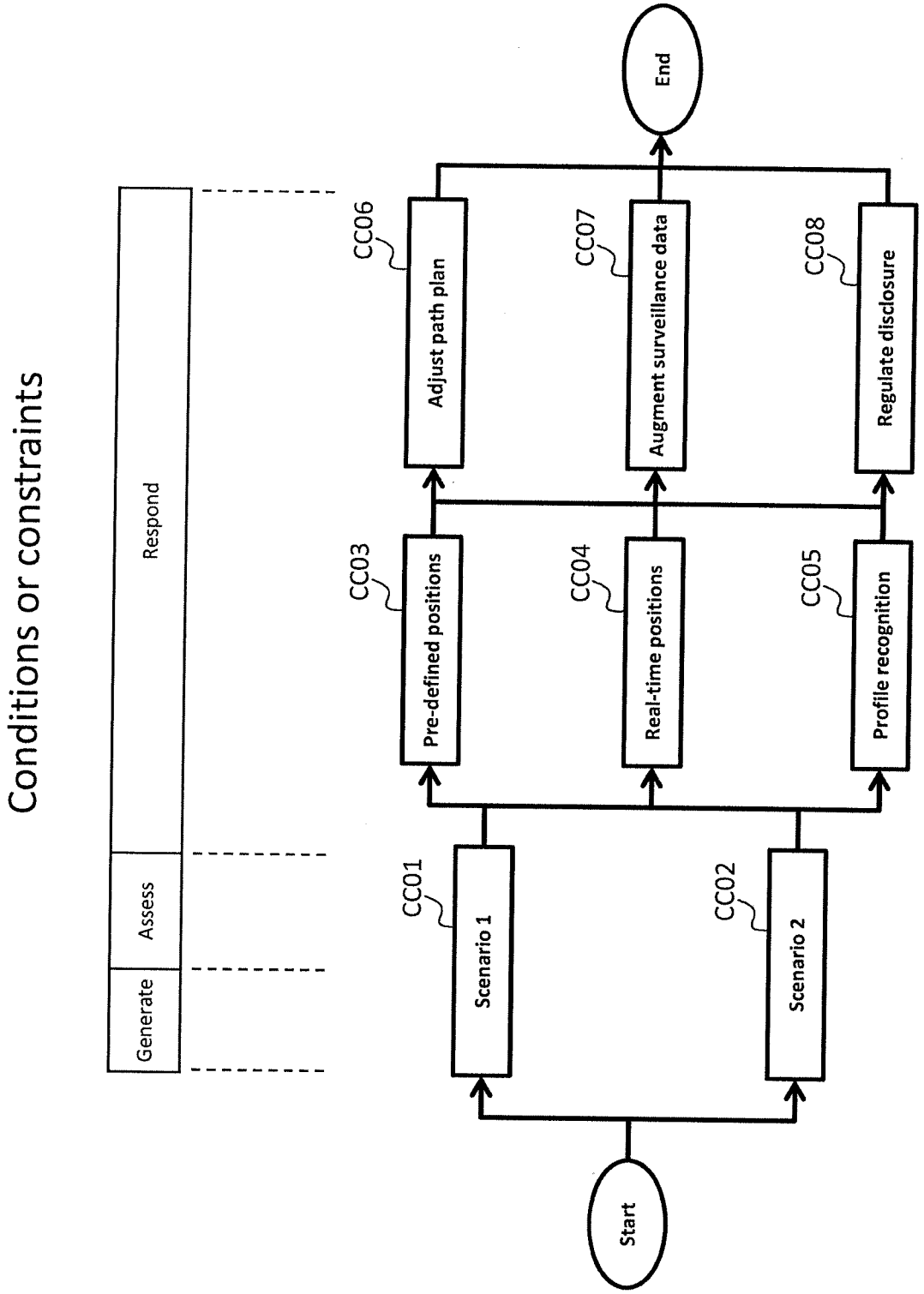

Conditions or constraints
Generate
Assess
Respond
Start
Scenario 1
Scenario 2
Pre-defined positions
Real-time positions
Profile recognition
Adjust path plan
Augment surveillance data
Regulate disclosure
End
CC01
CC02
CC03
CC04
CC05
CC06
CC07
CC08

Figure 7a

Scenario 1 and 2

Broad	Scenario 1	Scenario 2
(1) Generate	D01 Condition or constraint generated (including any metadata)	E01 Condition or constraint generated (including any metadata)
	D02 Condition or constraint communicated to remote server	E02 Condition or constraint communicated to robot's regulating chip
(2) Assess (optional)	D03 Remote server receives and assesses condition or constraint, then generates an assessment determination	E03 Regulating chip receives and facilitates condition or constraint assessment
	D04 Remote server approves condition or constraint	E04 Regulating chip approves condition or constraint
	D05 Remote sever communicates condition or constraint to robot's 'regulating chip'	
(3) Respond	D06 Regulating chip facilitates condition or constraint being imposed	E05 Regulating chip facilitates condition or constraint being imposed
(4) Amend (optional)	D07 Condition or constraint amended or revoked	E06 Condition or constraint amended or revoked

Figure 7b

Graphical

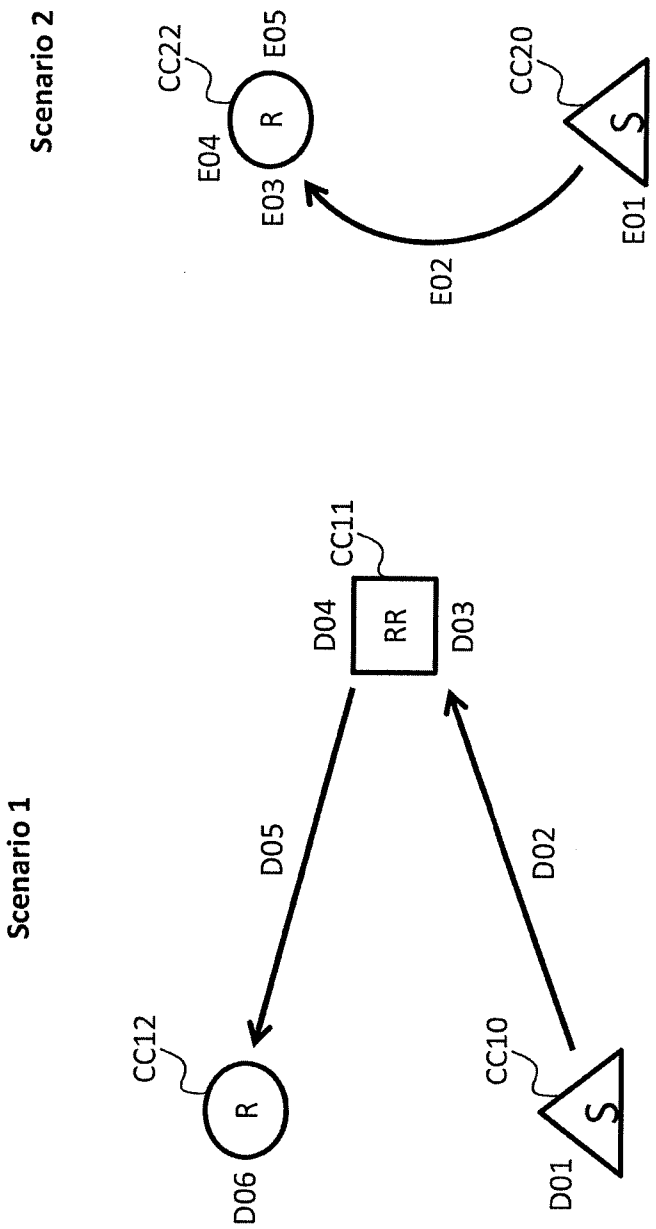


Figure 7c

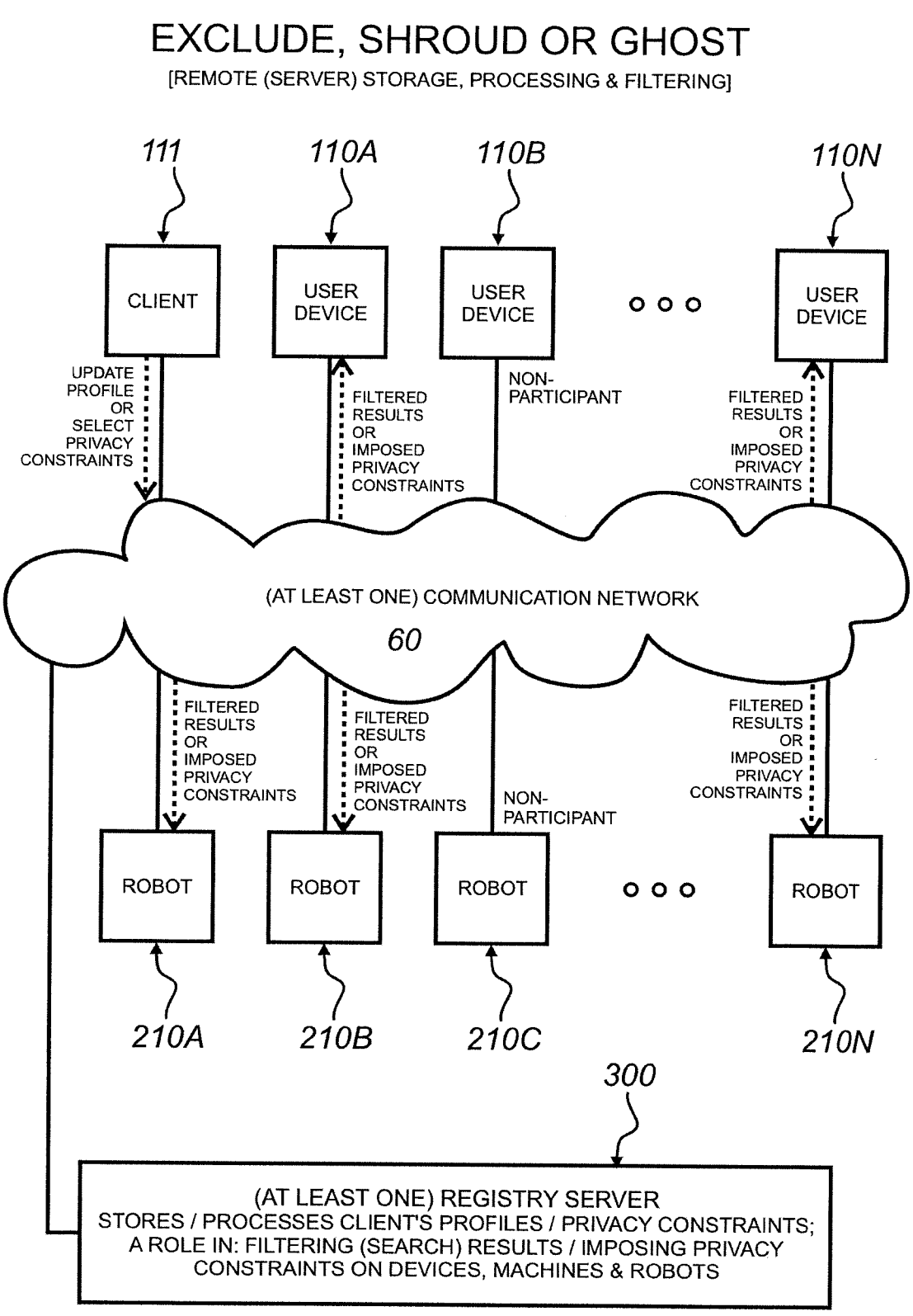

EXCLUDE, SHROUD OR GHOST
[REMOTE (SERVER) STORAGE, PROCESSING & FILTERING]
111
110A
110B
110N
CLIENT
USER DEVICE
USER DEVICE
USER DEVICE
UPDATE PROFILE OR SELECT PRIVACY CONSTRAINTS
FILTERED RESULTS OR IMPOSED PRIVACY CONSTRAINTS
NON-PARTICIPANT
FILTERED RESULTS OR IMPOSED PRIVACY CONSTRAINTS
(AT LEAST ONE) COMMUNICATION NETWORK
60
FILTERED RESULTS OR IMPOSED PRIVACY CONSTRAINTS
FILTERED RESULTS OR IMPOSED PRIVACY CONSTRAINTS
NON-PARTICIPANT
FILTERED RESULTS OR IMPOSED PRIVACY CONSTRAINTS
ROBOT
ROBOT
ROBOT
ROBOT
210A
210B
210C
210N
300
(AT LEAST ONE) REGISTRY SERVER
STORES / PROCESSES CLIENT'S PROFILES / PRIVACY CONSTRAINTS;
A ROLE IN: FILTERING (SEARCH) RESULTS / IMPOSING PRIVACY CONSTRAINTS ON DEVICES, MACHINES & ROBOTS

Figure 8

EXCLUDE, SHROUD OR GHOST

[REMOTE (SERVER) STORAGE, PROCESSING & FILTERING]

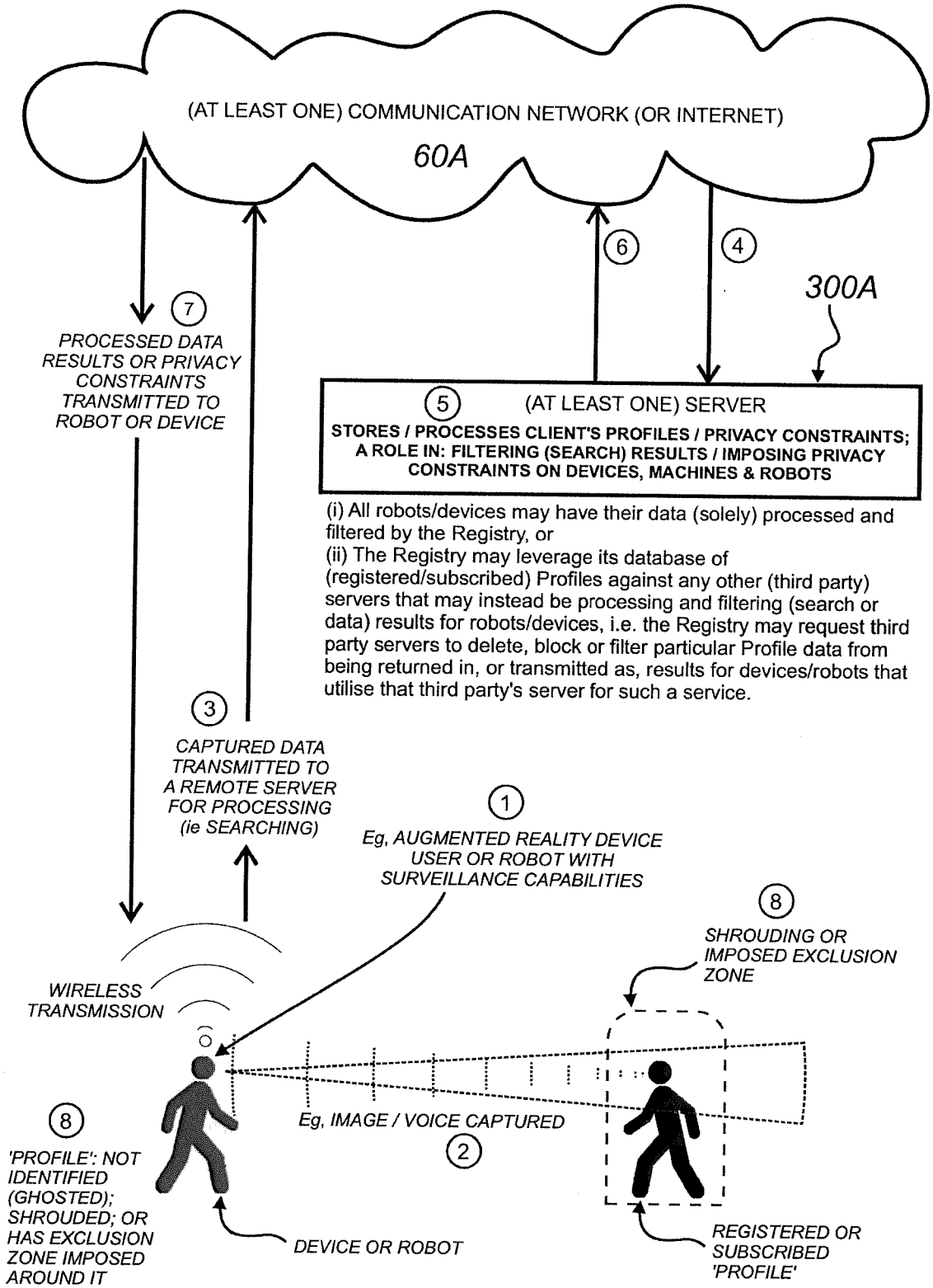


Figure 9

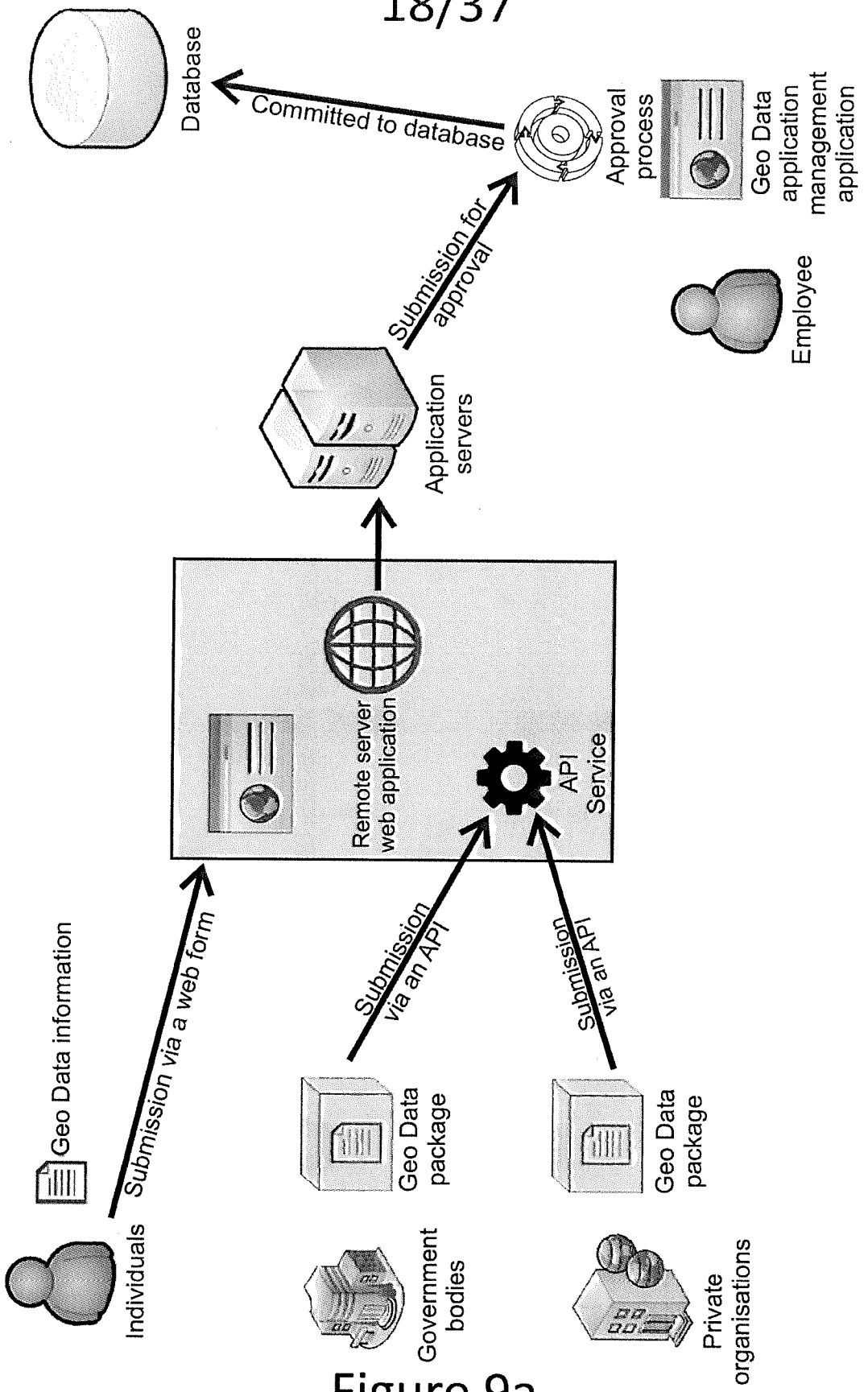

Database
Committed to database
Approval process
Geo Data application management application
Employee
Submission for approval
Application servers
Remote server web application
API Service
Geo Data information
Submission via a web form
Submission via an API
Submission via an API
Geo Data package
Geo Data package
Individuals
Government bodies
Private organisations

Figure 9a

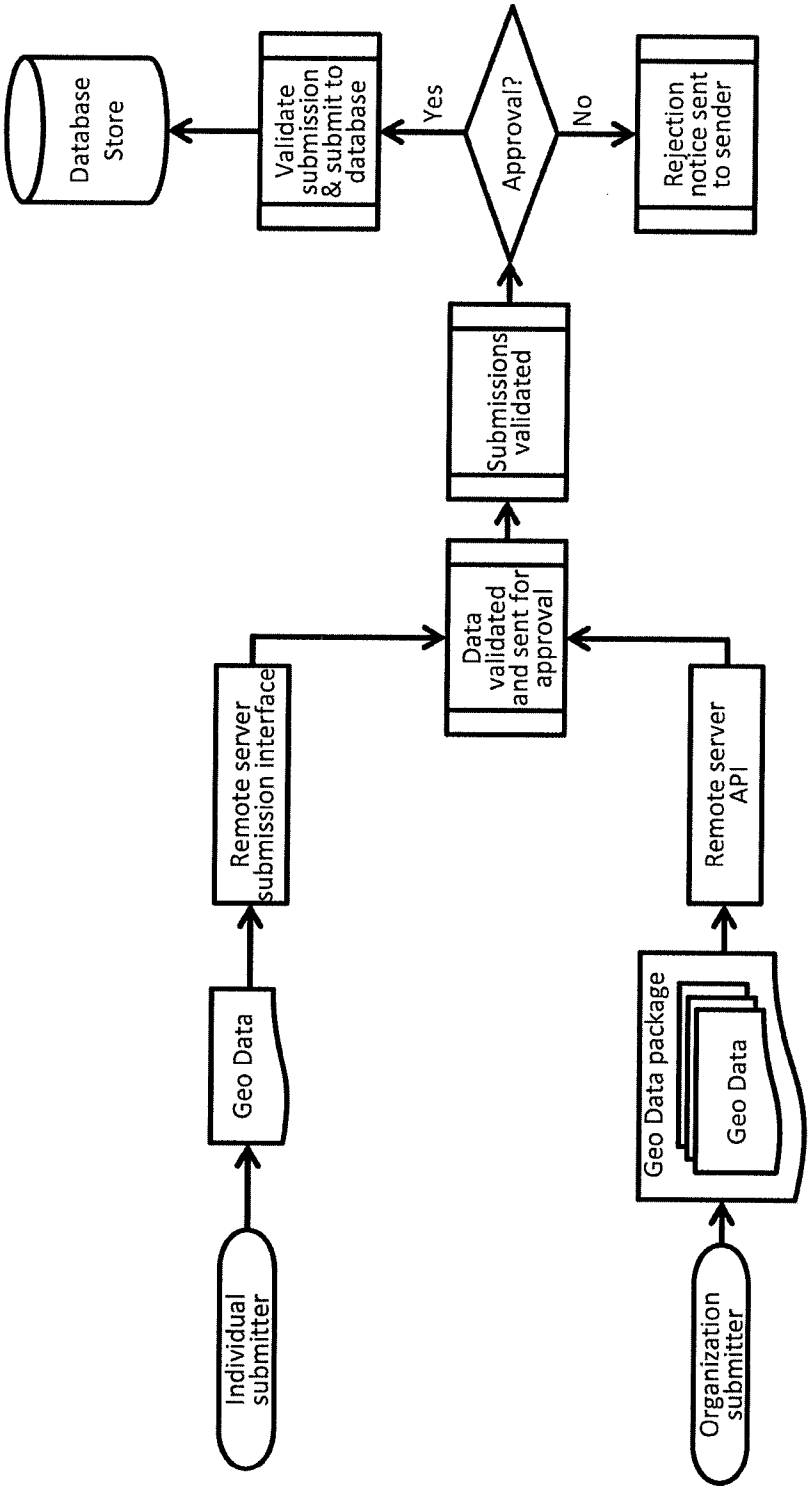

Database Store
Validate submission & submit to database
Yes
Approval?
No
Rejection notice sent to sender
Submissions validated
Data validated and sent for approval
Remote server submission interface
Remote server API
Geo Data
Geo Data package
Geo Data
Individual submitter
Organization submitter

Figure 9b

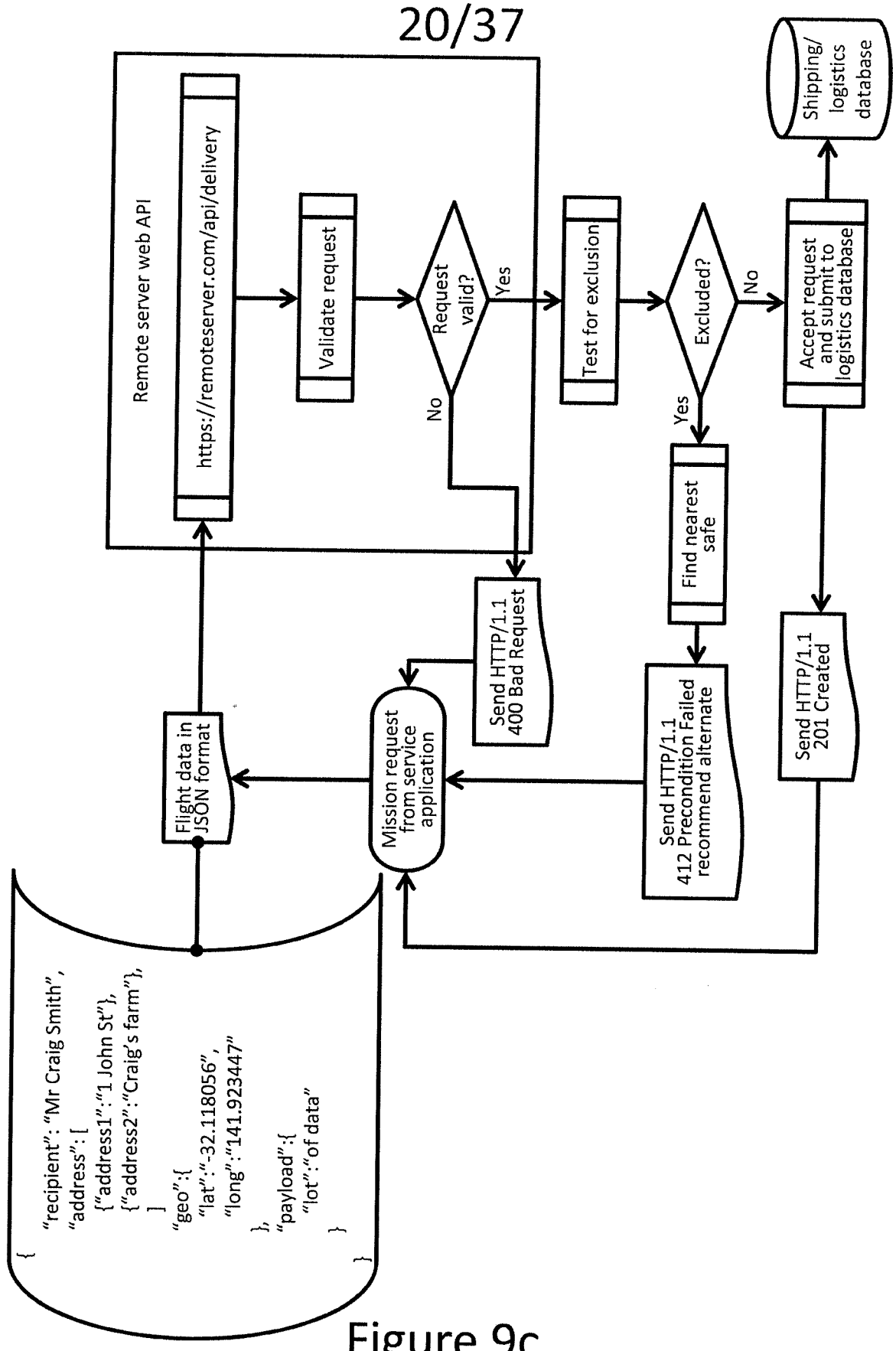

Remote server web API
https://remoteserver.com/api/delivery
Validate request
Request valid?
Yes
No
Test for exclusion
Excluded?
Yes
No
Accept request and submit to logistics database
Shipping/ logistics database
Find nearest safe
Send HTTP/1.1 400 Bad Request
Send HTTP/1.1 412 Precondition Failed recommend alternate
Send HTTP/1.1 201 Created
Flight data in JSON format
Mission request from service application
{
"recipient": "Mr Craig Smith",
"address": [
{"address1":"1 John St"},
{"address2":"Craig's farm"},
]
"geo":{
"lat":"-32.118056",
"long":"141.923447"
},
"payload":{
"lot":"of data"
}
}

Figure 9c

EXCLUDE, SHROUD OR GHOST

[CLIENT APPLIES FOR PRIVACY: MAP SELECTION; POSITION TRACKER; PROFILE PROTECTION]

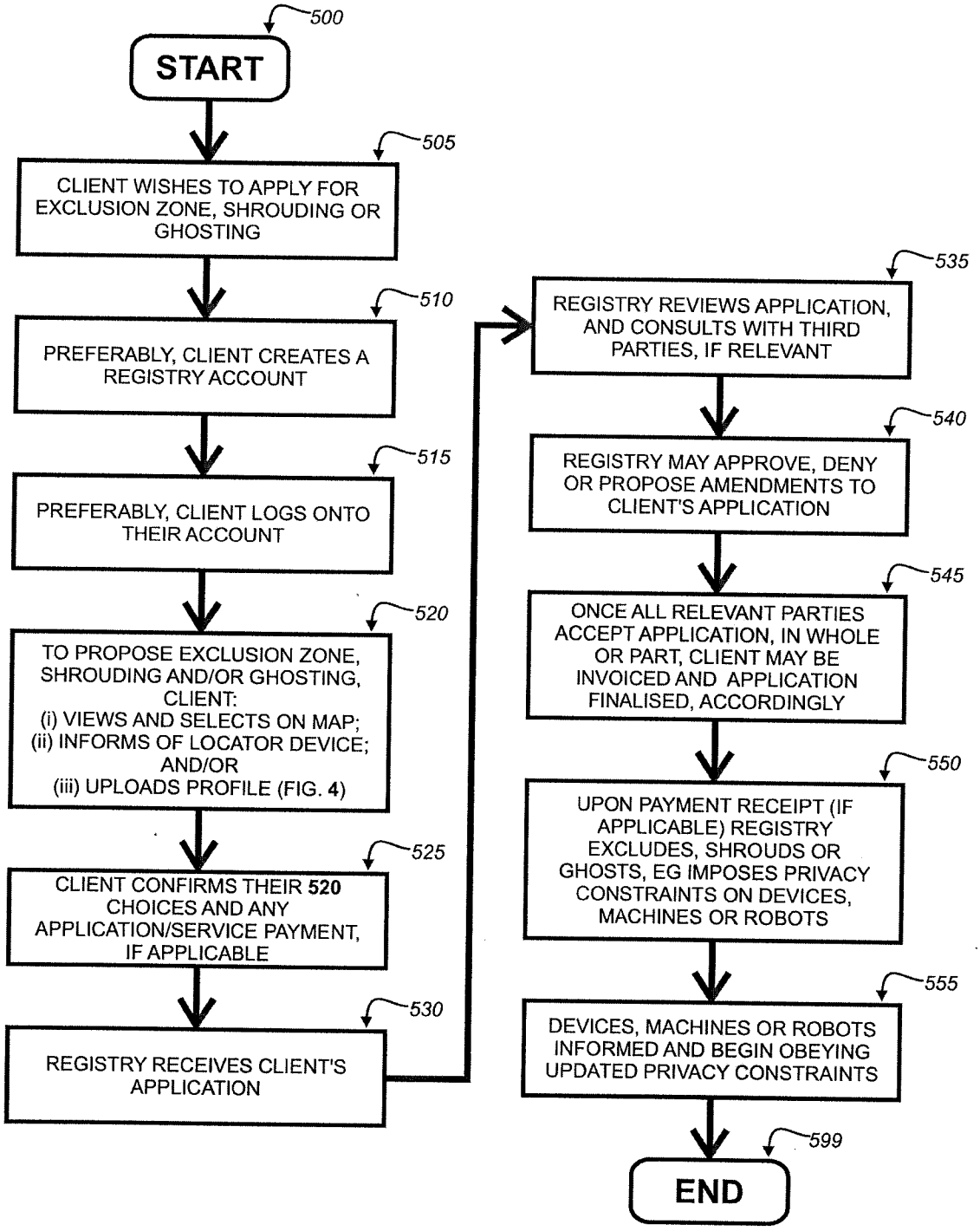


Figure 10

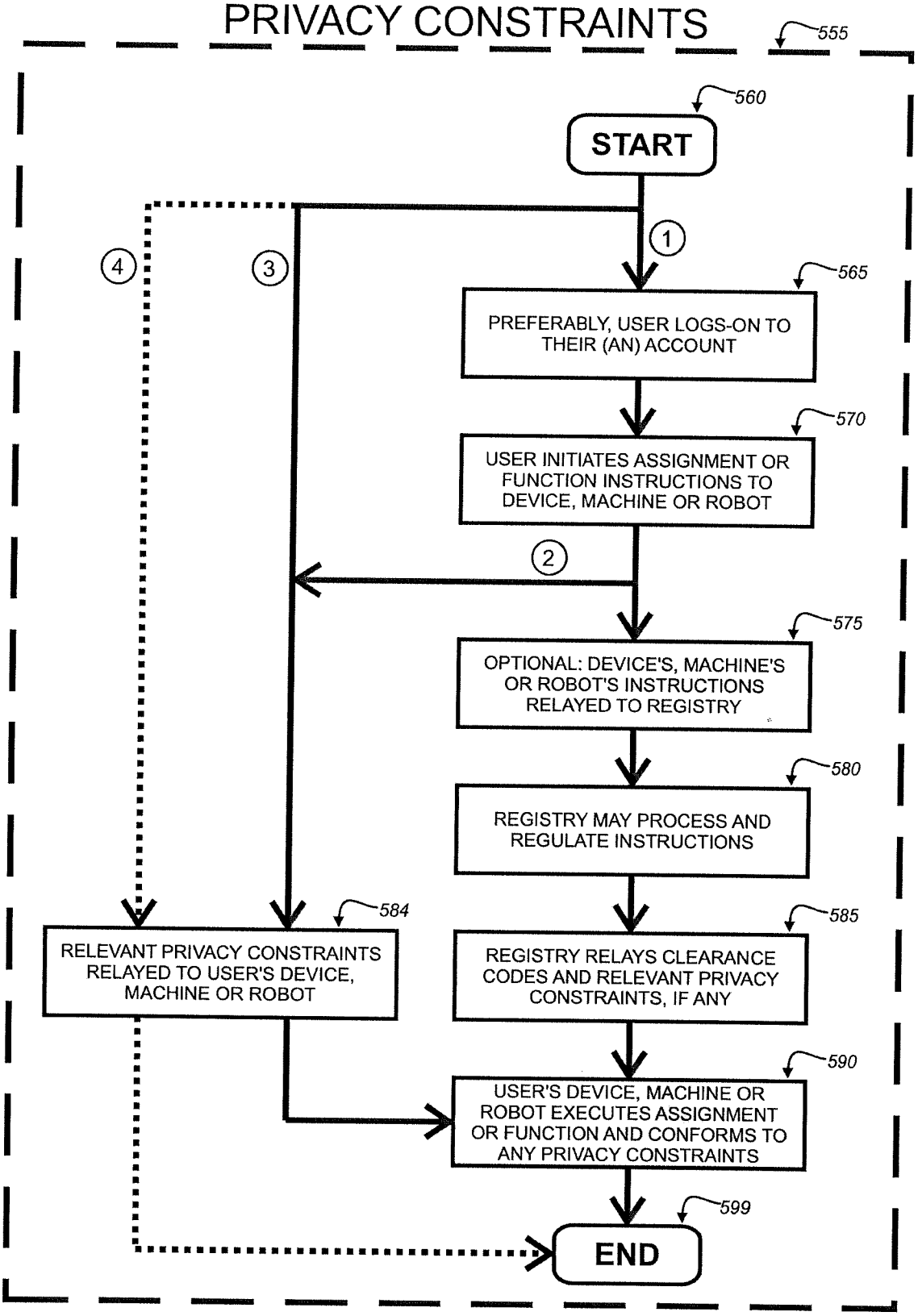

PRIVACY CONSTRAINTS
555
560
START
1
2
3
4
565
PREFERABLY, USER LOGS-ON TO THEIR (AN) ACCOUNT
570
USER INITIATES ASSIGNMENT OR FUNCTION INSTRUCTIONS TO DEVICE, MACHINE OR ROBOT
575
OPTIONAL: DEVICE'S, MACHINE'S OR ROBOT'S INSTRUCTIONS RELAYED TO REGISTRY
580
REGISTRY MAY PROCESS AND REGULATE INSTRUCTIONS
584
RELEVANT PRIVACY CONSTRAINTS RELAYED TO USER'S DEVICE, MACHINE OR ROBOT
585
REGISTRY RELAYS CLEARANCE CODES AND RELEVANT PRIVACY CONSTRAINTS, IF ANY
590
USER'S DEVICE, MACHINE OR ROBOT EXECUTES ASSIGNMENT OR FUNCTION AND CONFORMS TO ANY PRIVACY CONSTRAINTS
599
END

Figure 11

Broad	Policing	Conditions	Intentions
(1) Generate	(1) Generate policing initiative	(1) Generate condition/constraint	(1) Generate Intention
(2) Assess (optional)	(2) Assess sample of situation	(2) Assess generated condition/constraint	(2) Assess generated Intention
(3) Respond	(3) Respond with enforcement &/or notify	(3) Respond by imposing condition/constraint	(3) Respond by effecting or executing Intention
(4) Amend (optional)	(4) Amend or revoke enforcement	(4) Amend or revoke condition constraint	(4) Amend or revoke Intention

Figure 11a

(1) Designed, developed, manufactured	E.g. 'Approved Design Organisations' or 'Production Approval'
(2) Certified (enrolled)	2.1 Robot's parties and particulars determined (Fig. 11c)
	2.2 Robot's specifications determined (Fig. 11d)
	2.3 Robot's protocols (& compatibility with) determined: Type 1-3 (Fig. 11e-h)
	2.4 Robot's operations (Intentions) determined (Fig. 11i)
	2.5 Robot's diagnostic/health tests determined (Fig. 11j)
	2.6 Robot's baseline, tolerance, threshold & template values determined
(3) Registered (installed)	3.1 Prospective registrant assessed for registration (Fig. 11k)
	3.2 Specified robot customised or appropriated to registrant (Fig. 11k)
	3.3 Parties and particulars are registered
	3.4 Initial protocols installed
	3.5 Robot activated for use (service)
(4) Used (in-service)	Use standard robot
	Change of registered parties &/or particulars
	Updates created, communicated, received, installed & imposed
	Modifications (design changes)
	Use modified robot
(5) Decommissioned	E.g. deregistered, uninstalled, unenrolled.

Figure 11b

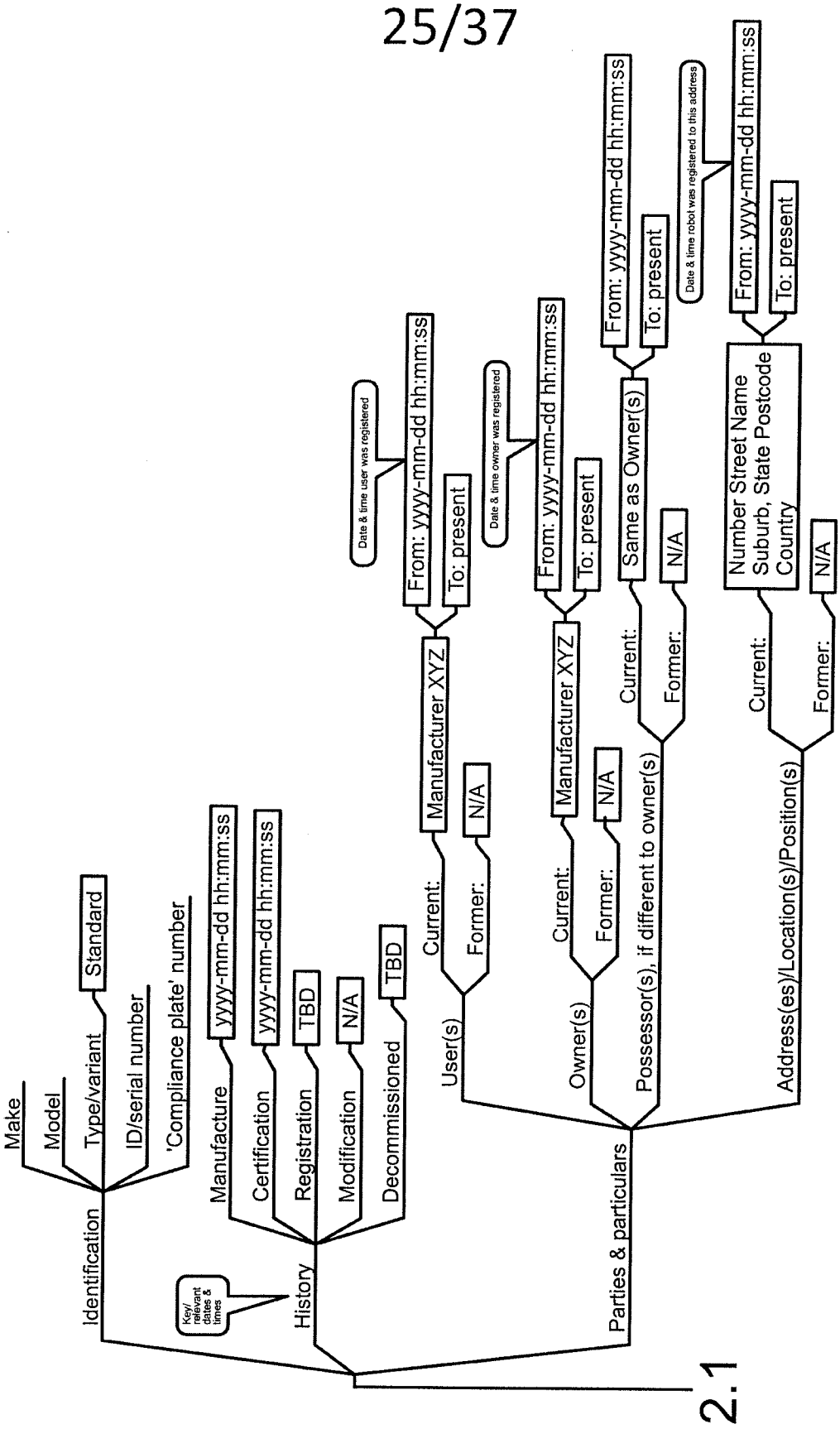

2.1
Identification
Make
Model
Type/variant
Standard
ID/serial number
'Compliance plate' number
History
Key/ relevant dates & times
Manufacture
yyyy-mm-dd hh:mm:ss
Certification
yyyy-mm-dd hh:mm:ss
Registration
TBD
Modification
N/A
Decommissioned
TBD
Parties & particulars
User(s)
Current:
Manufacturer XYZ
From: yyyy-mm-dd hh:mm:ss
To: present
Date & time user was registered
Former:
N/A
Owner(s)
Current:
Manufacturer XYZ
From: yyyy-mm-dd hh:mm:ss
To: present
Date & time owner was registered
Former:
N/A
Possessor(s), if different to owner(s)
Current:
Same as Owner(s)
From: yyyy-mm-dd hh:mm:ss
To: present
Former:
N/A
Address(es)/Location(s)/Position(s)
Current:
Number Street Name
Suburb, State Postcode
Country
From: yyyy-mm-dd hh:mm:ss
To: present
Date & time robot was registered to this address
Former:
N/A

Figure 11c

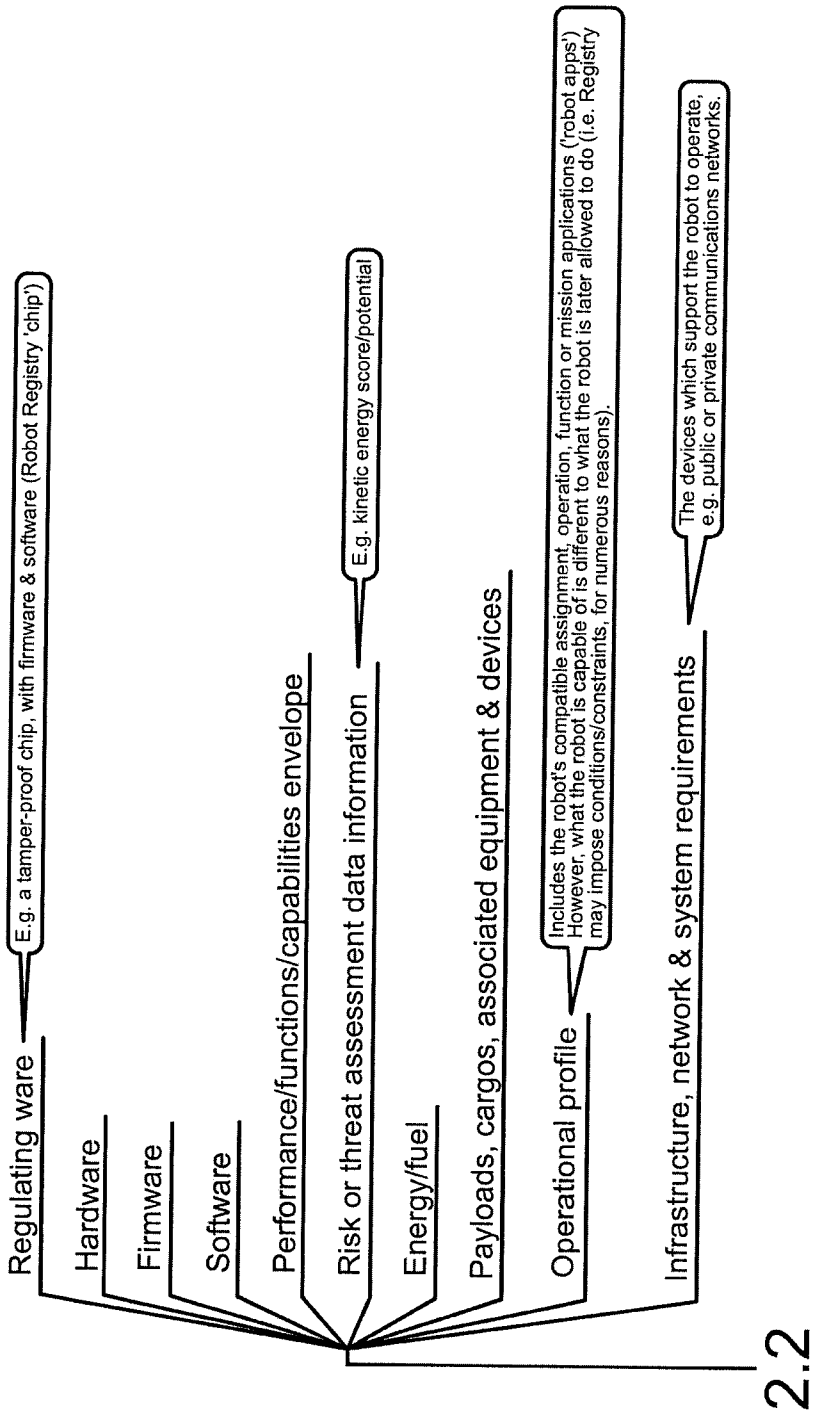

Regulating ware
E.g. a tamper-proof chip, with firmware & software (Robot Registry 'chip')
Hardware
Firmware
Software
Performance/functions/capabilities envelope
Risk or threat assessment data information
E.g. kinetic energy score/potential
Energy/fuel
Payloads, cargos, associated equipment & devices
Operational profile
Includes the robot's compatible assignment, operation, function or mission applications ('robot apps') However, what the robot is capable of is different to what the robot is later allowed to do (i.e. Registry may impose conditions/constraints, for numerous reasons).
Infrastructure, network & system requirements
The devices which support the robot to operate, e.g. public or private communications networks.
2.2

Figure 11d

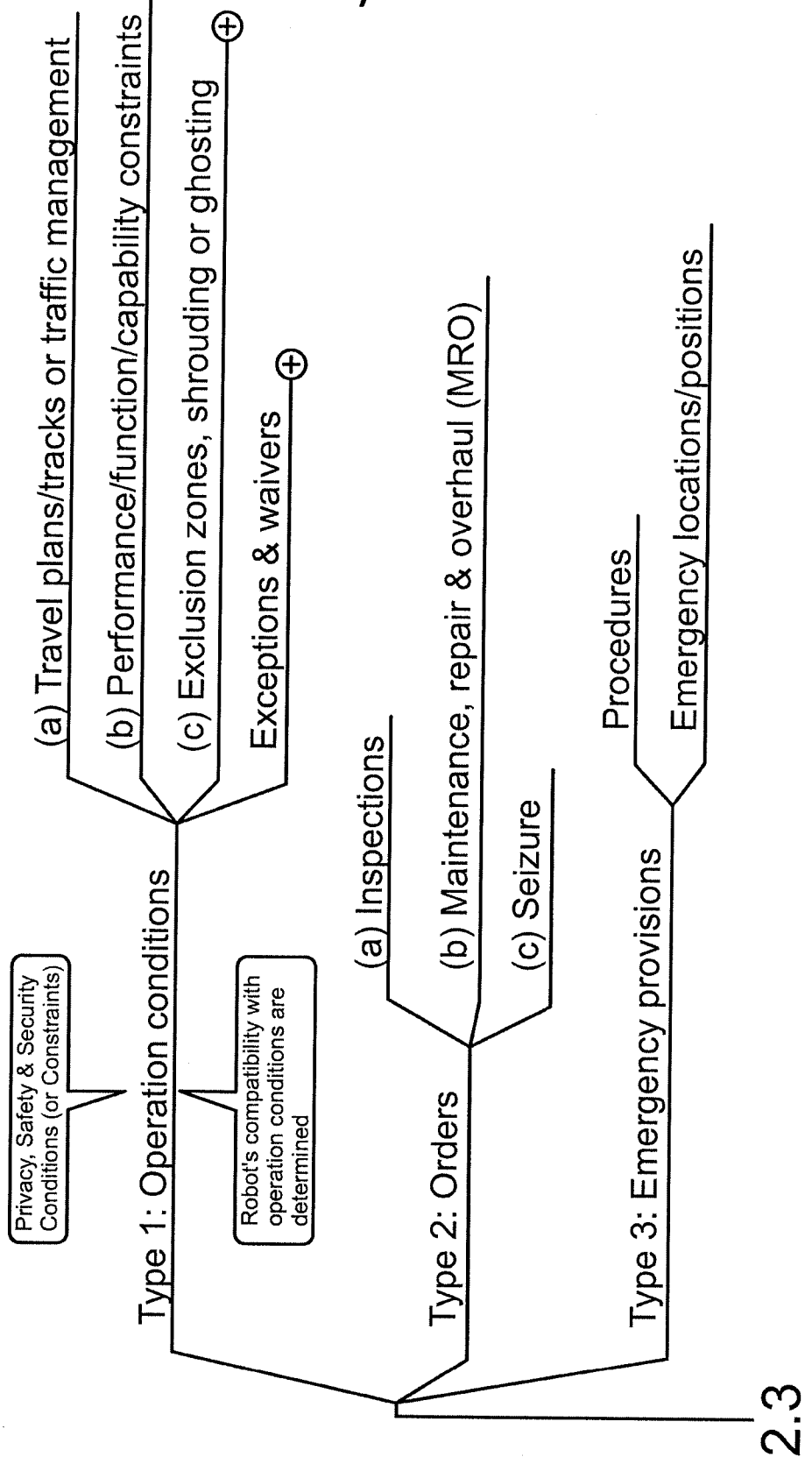

2.3
Type 1: Operation conditions
Privacy, Safety & Security Conditions (or Constraints)
Robot's compatibility with operation conditions are determined
(a) Travel plans/tracks or traffic management
(b) Performance/function/capability constraints
(c) Exclusion zones, shrouding or ghosting
Exceptions & waivers
Type 2: Orders
(a) Inspections
(b) Maintenance, repair & overhaul (MRO)
(c) Seizure
Type 3: Emergency provisions
Procedures
Emergency locations/positions

Figure 11e

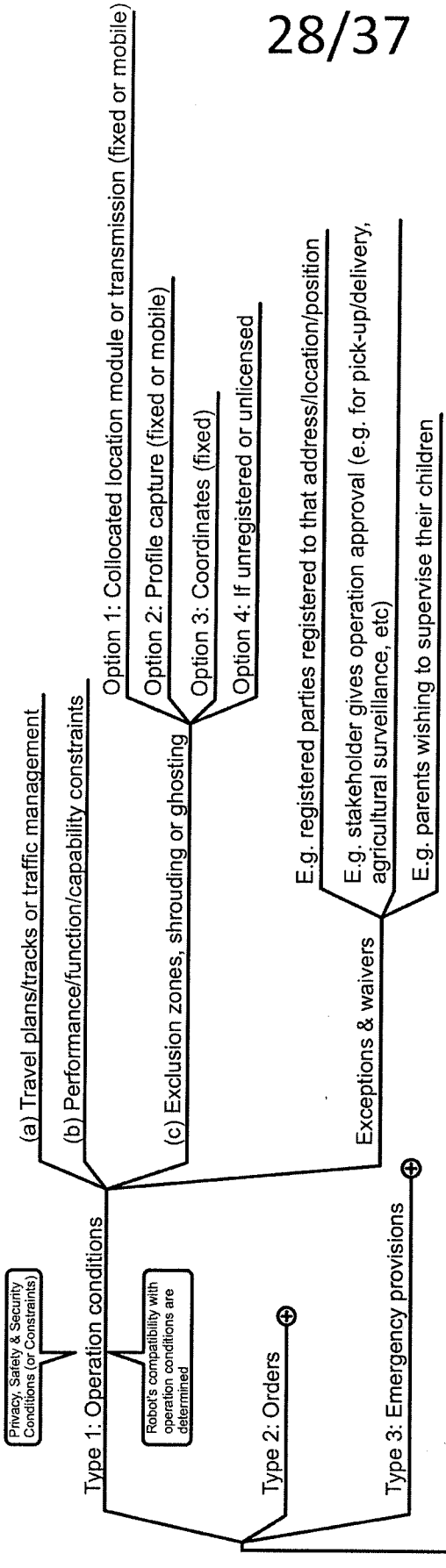

Privacy, Safety & Security Conditions (or Constraints)
Robot's compatibility with operation conditions are determined
Type 1: Operation conditions
(a) Travel plans/tracks or traffic management
(b) Performance/function/capability constraints
(c) Exclusion zones, shrouding or ghosting
Option 1: Collocated location module or transmission (fixed or mobile)
Option 2: Profile capture (fixed or mobile)
Option 3: Coordinates (fixed)
Option 4: If unregistered or unlicensed
Exceptions & waivers
E.g. registered parties registered to that address/location/position
E.g. stakeholder gives operation approval (e.g. for pick-up/delivery, agricultural surveillance, etc)
E.g. parents wishing to supervise their children
Type 2: Orders
Type 3: Emergency provisions
2.3

Figure 11f

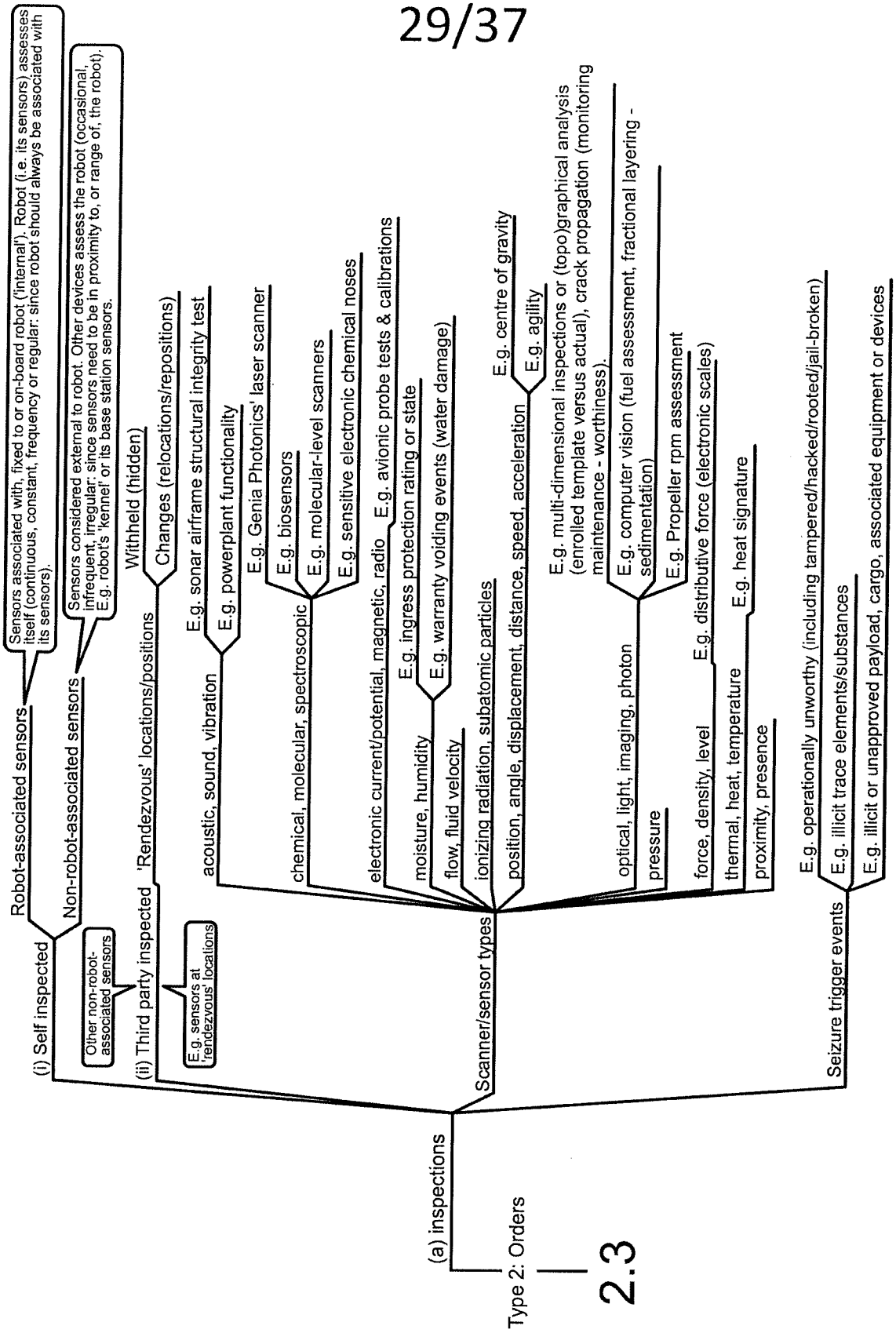

Type 2: Orders
2.3
(a) inspections
Scanner/sensor types
(i) Self inspected
Robot-associated sensors
Sensors associated with, fixed to or on-board robot ('internal'). Robot (i.e. its sensors) assesses itself (continuous, constant, frequency or regular: since robot should always be associated with its sensors).
Non-robot-associated sensors
Sensors considered external to robot. Other devices assess the robot (occasional, infrequent, irregular: since sensors need to be in proximity to, or range of, the robot).
E.g. robot's 'kennel' or its base station sensors.
Other non-robot-associated sensors
(ii) Third party inspected
'Rendezvous' locations/positions
Withheld (hidden)
Changes (relocations/repositions)
E.g. sensors at 'rendezvous' locations
acoustic, sound, vibration
E.g. sonar airframe structural integrity test
E.g. powerplant functionality
chemical, molecular, spectroscopic
E.g. Genia Photonics' laser scanner
E.g. biosensors
E.g. molecular-level scanners
E.g. sensitive electronic chemical noses
electronic current/potential, magnetic, radio
E.g. avionic probe tests & calibrations
moisture, humidity
E.g. ingress protection rating or state
flow, fluid velocity
E.g. warranty voiding events (water damage)
ionizing radiation, subatomic particles
position, angle, displacement, distance, speed, acceleration
E.g. centre of gravity
E.g. agility
optical, light, imaging, photon
E.g. multi-dimensional inspections or (topo)graphical analysis (enrolled template versus actual), crack propagation (monitoring maintenance - worthiness).
E.g. computer vision (fuel assessment, fractional layering - sedimentation)
pressure
E.g. Propeller rpm assessment
force, density, level
E.g. distributive force (electronic scales)
thermal, heat, temperature
E.g. heat signature
proximity, presence
Seizure trigger events
E.g. operationally unworthy (including tampered/hacked/rooted/jail-broken)
E.g. illicit trace elements/substances
E.g. illicit or unapproved payload, cargo, associated equipment or devices

Figure 11g

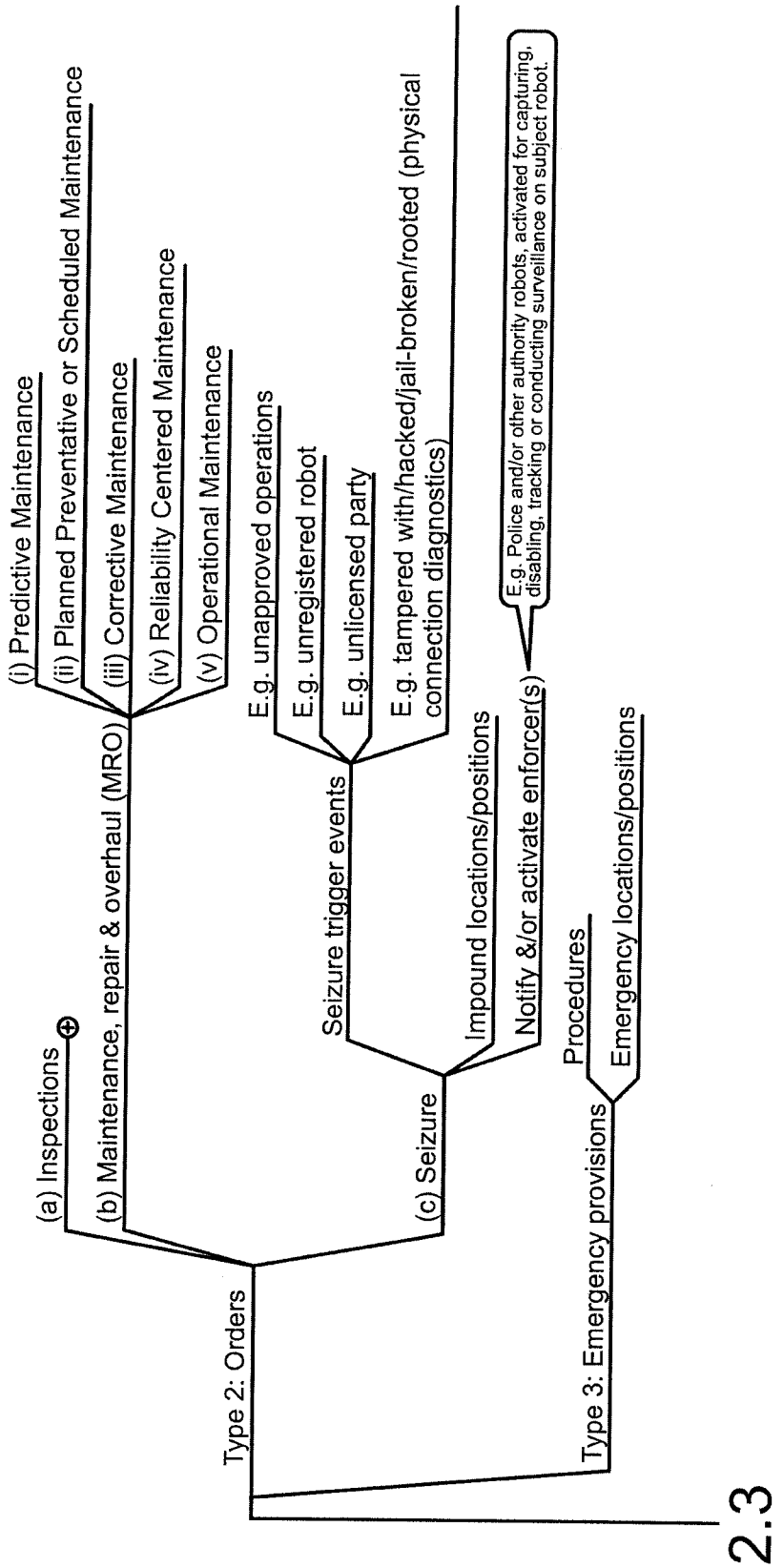

Type 2: Orders
(a) Inspections
(b) Maintenance, repair & overhaul (MRO)
(i) Predictive Maintenance
(ii) Planned Preventative or Scheduled Maintenance
(iii) Corrective Maintenance
(iv) Reliability Centered Maintenance
(v) Operational Maintenance
(c) Seizure
Seizure trigger events
E.g. unapproved operations
E.g. unregistered robot
E.g. unlicensed party
E.g. tampered with/hacked/jail-broken/rooted (physical connection diagnostics)
Impound locations/positions
Notify &/or activate enforcer(s)
E.g. Police and/or other authority robots, activated for capturing, disabling, tracking or conducting surveillance on subject robot.
Type 3: Emergency provisions
Procedures
Emergency locations/positions
2.3

Figure 11h

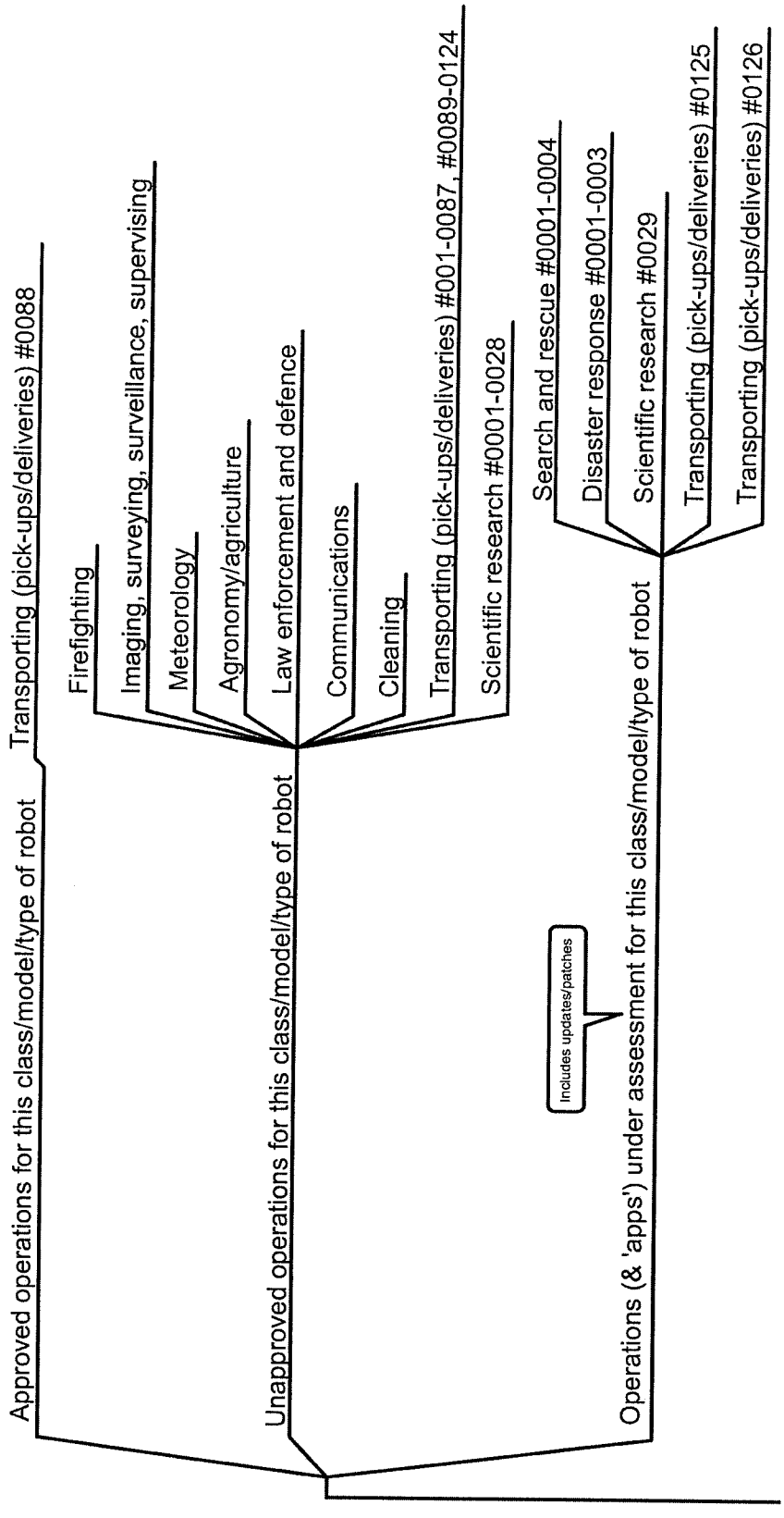

Approved operations for this class/model/type of robot
Transporting (pick-ups/deliveries) #0088
Unapproved operations for this class/model/type of robot
Firefighting
Imaging, surveying, surveillance, supervising
Meteorology
Agronomy/agriculture
Law enforcement and defence
Communications
Cleaning
Transporting (pick-ups/deliveries) #001-0087, #0089-0124
Scientific research #0001-0028
Operations (& 'apps') under assessment for this class/model/type of robot
Includes updates/patches
Search and rescue #0001-0004
Disaster response #0001-0003
Scientific research #0029
Transporting (pick-ups/deliveries) #0125
Transporting (pick-ups/deliveries) #0126
2.4

Figure 11i

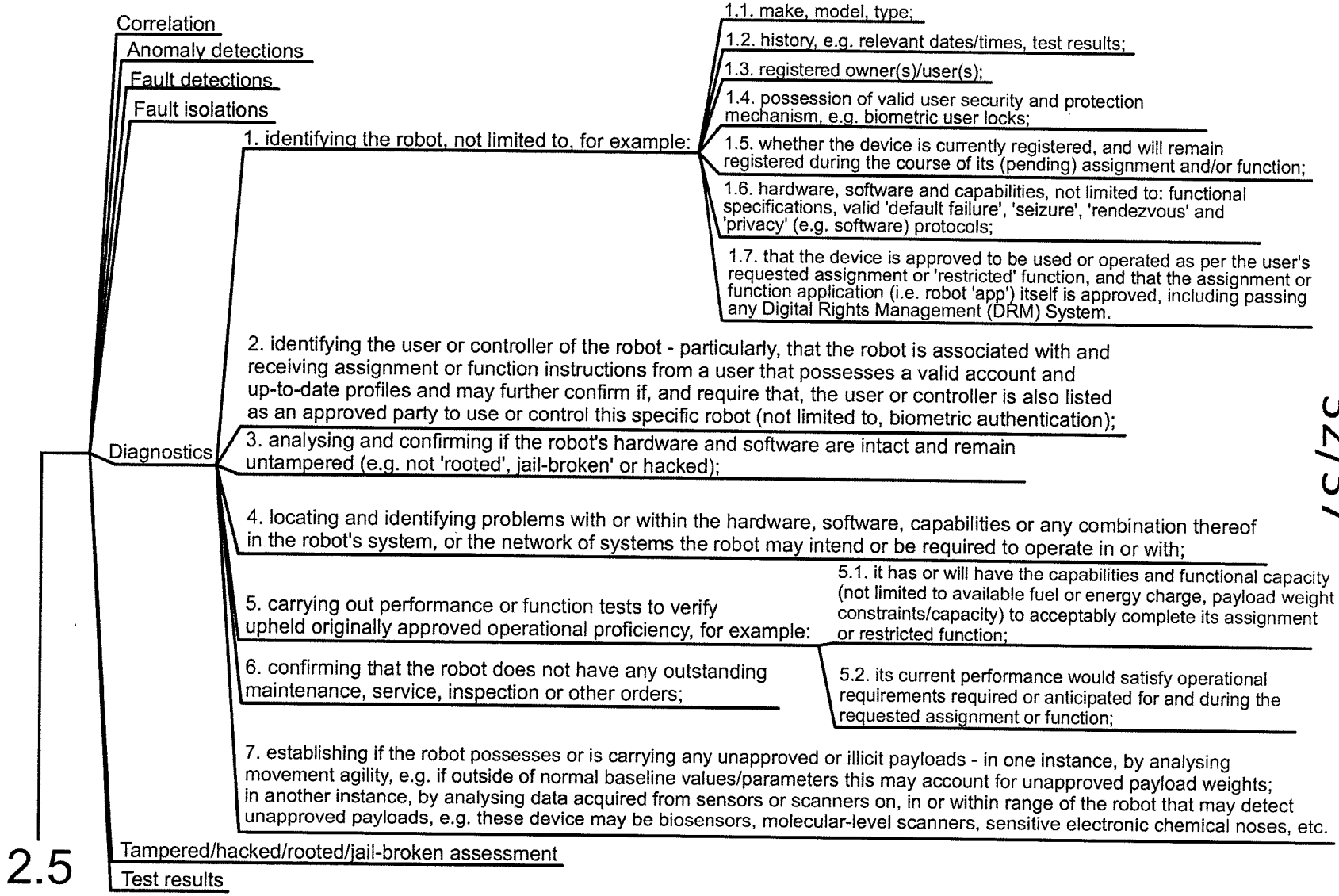
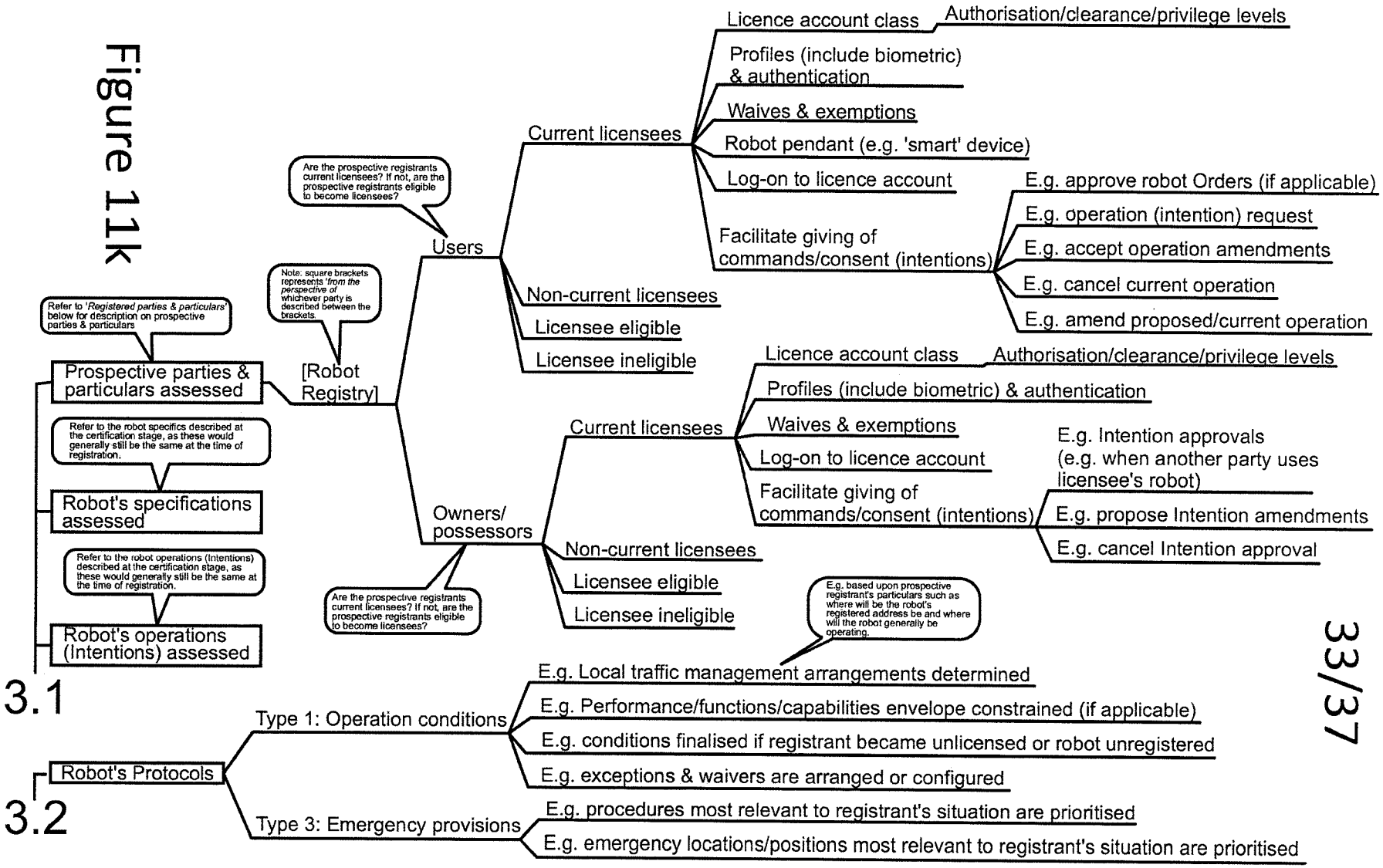

2.5
Correlation
Anomaly detections
Fault detections
Fault isolations
Diagnostics
Tampered/hacked/rooted/jail-broken assessment
Test results
1. identifying the robot, not limited to, for example:
1.1. make, model, type;
1.2. history, e.g. relevant dates/times, test results;
1.3. registered owner(s)/user(s);
1.4. possession of valid user security and protection mechanism, e.g. biometric user locks;
1.5. whether the device is currently registered, and will remain registered during the course of its (pending) assignment and/or function;
1.6. hardware, software and capabilities, not limited to: functional specifications, valid 'default failure', 'seizure', 'rendezvous' and 'privacy' (e.g. software) protocols;
1.7. that the device is approved to be used or operated as per the user's requested assignment or 'restricted' function, and that the assignment or function application (i.e. robot 'app') itself is approved, including passing any Digital Rights Management (DRM) System.
2. identifying the user or controller of the robot - particularly, that the robot is associated with and receiving assignment or function instructions from a user that possesses a valid account and up-to-date profiles and may further confirm if, and require that, the user or controller is also listed as an approved party to use or control this specific robot (not limited to, biometric authentication);
3. analysing and confirming if the robot's hardware and software are intact and remain untampered (e.g. not 'rooted', jail-broken' or hacked);
4. locating and identifying problems with or within the hardware, software, capabilities or any combination thereof in the robot's system, or the network of systems the robot may intend or be required to operate in or with;
5. carrying out performance or function tests to verify upheld originally approved operational proficiency, for example:
5.1. it has or will have the capabilities and functional capacity (not limited to available fuel or energy charge, payload weight constraints/capacity) to acceptably complete its assignment or restricted function;
5.2. its current performance would satisfy operational requirements required or anticipated for and during the requested assignment or function;
6. confirming that the robot does not have any outstanding maintenance, service, inspection or other orders;
7. establishing if the robot possesses or is carrying any unapproved or illicit payloads - in one instance, by analysing movement agility, e.g. if outside of normal baseline values/parameters this may account for unapproved payload weights; in another instance, by analysing data acquired from sensors or scanners on, in or within range of the robot that may detect unapproved payloads, e.g. these device may be biosensors, molecular-level scanners, sensitive electronic chemical noses, etc.

Figure 11j

Figure 11k


3.1
Prospective parties & particulars assessed
Refer to 'Registered parties & particulars' below for description on prospective parties & particulars
Robot's specifications assessed
Refer to the robot specifics described at the certification stage, as these would generally still be the same at the time of registration.
Robot's operations (Intentions) assessed
Refer to the robot operations (Intentions) described at the certification stage, as these would generally still be the same at the time of registration.
[Robot Registry]
Note: square brackets represents 'from the perspective of' whichever party is described between the brackets.
Users
Are the prospective registrants current licensees? If not, are the prospective registrants eligible to become licensees?
Current licensees
Licence account class
Authorisation/clearance/privilege levels
Profiles (include biometric) & authentication
Waives & exemptions
Robot pendant (e.g. 'smart' device)
Log-on to licence account
Facilitate giving of commands/consent (intentions)
E.g. approve robot Orders (if applicable)
E.g. operation (intention) request
E.g. accept operation amendments
E.g. cancel current operation
E.g. amend proposed/current operation
Non-current licensees
Licensee eligible
Licensee ineligible
Owners/ possessors
Are the prospective registrants current licensees? If not, are the prospective registrants eligible to become licensees?
Current licensees
Licence account class
Authorisation/clearance/privilege levels
Profiles (include biometric) & authentication
Waives & exemptions
Log-on to licence account
Facilitate giving of commands/consent (intentions)
E.g. Intention approvals (e.g. when another party uses licensee's robot)
E.g. propose Intention amendments
E.g. cancel Intention approval
Non-current licensees
Licensee eligible
Licensee ineligible
E.g. based upon prospective registrant's particulars such as where will be the robot's registered address be and where will the robot generally be operating.
E.g. Local traffic management arrangements determined
3.2
Robot's Protocols
Type 1: Operation conditions
E.g. Performance/functions/capabilities envelope constrained (if applicable)
E.g. conditions finalised if registrant became unlicensed or robot unregistered
E.g. exceptions & waivers are arranged or configured
Type 3: Emergency provisions
E.g. procedures most relevant to registrant's situation are prioritised
E.g. emergency locations/positions most relevant to registrant's situation are prioritised

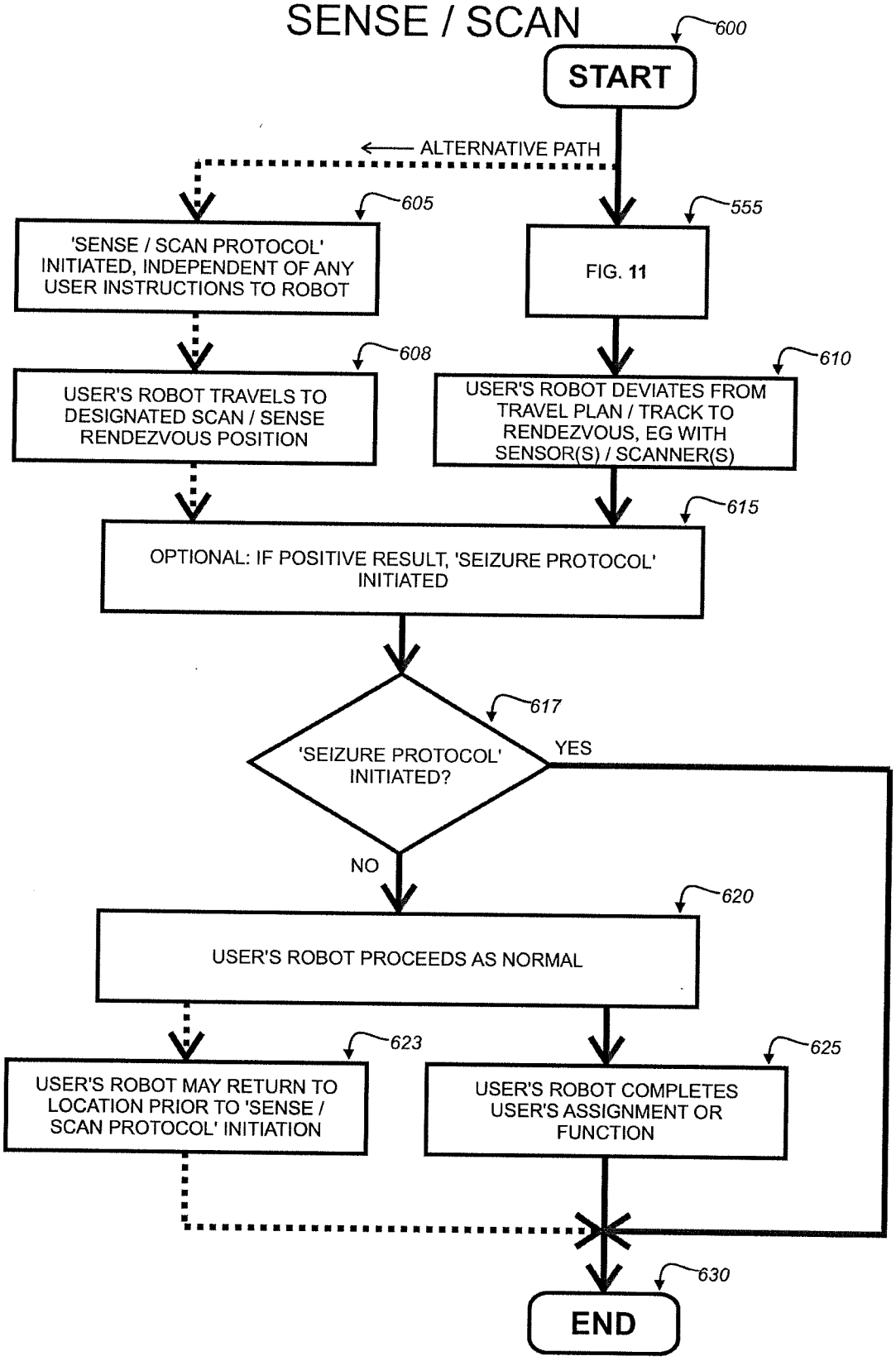

SENSE / SCAN
600
START
ALTERNATIVE PATH
605
'SENSE / SCAN PROTOCOL' INITIATED, INDEPENDENT OF ANY USER INSTRUCTIONS TO ROBOT
555
FIG. 11
608
USER'S ROBOT TRAVELS TO DESIGNATED SCAN / SENSE RENDEZVOUS POSITION
610
USER'S ROBOT DEVIATES FROM TRAVEL PLAN / TRACK TO RENDEZVOUS, EG WITH SENSOR(S) / SCANNER(S)
615
OPTIONAL: IF POSITIVE RESULT, 'SEIZURE PROTOCOL' INITIATED
617
'SEIZURE PROTOCOL' INITIATED?
YES
NO
620
USER'S ROBOT PROCEEDS AS NORMAL
623
USER'S ROBOT MAY RETURN TO LOCATION PRIOR TO 'SENSE / SCAN PROTOCOL' INITIATION
625
USER'S ROBOT COMPLETES USER'S ASSIGNMENT OR FUNCTION
630
END

Figure 12

SEIZURE PROTOCOL

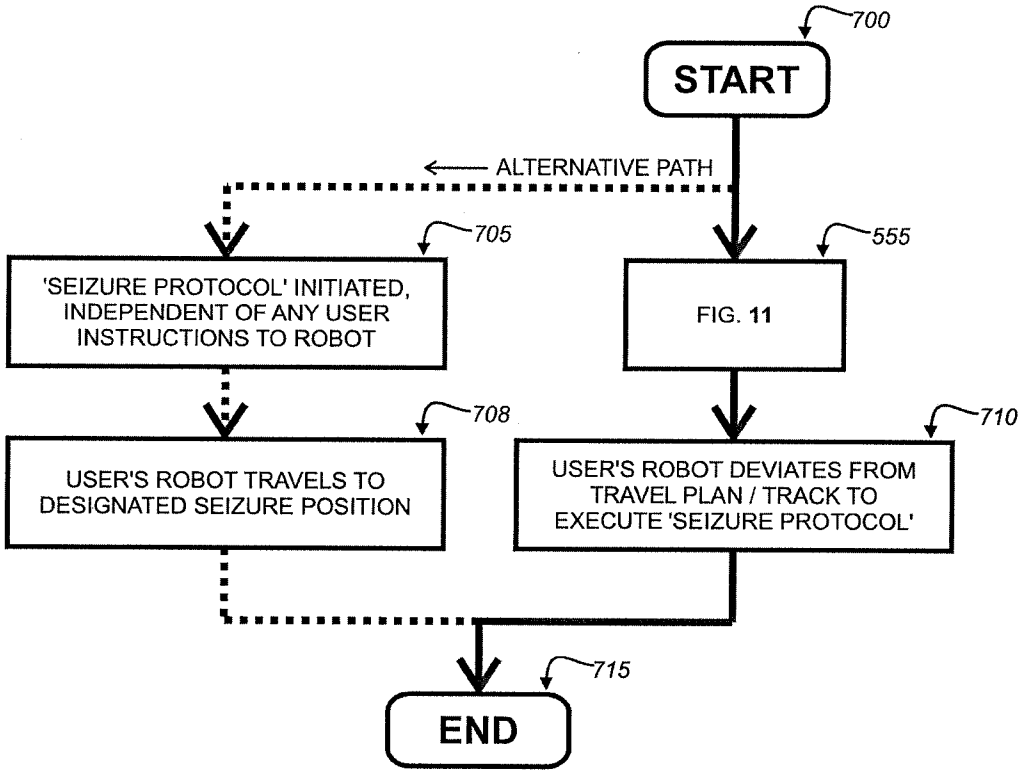


Figure 13

IDENTIFYING NON-PARTICIPANTS

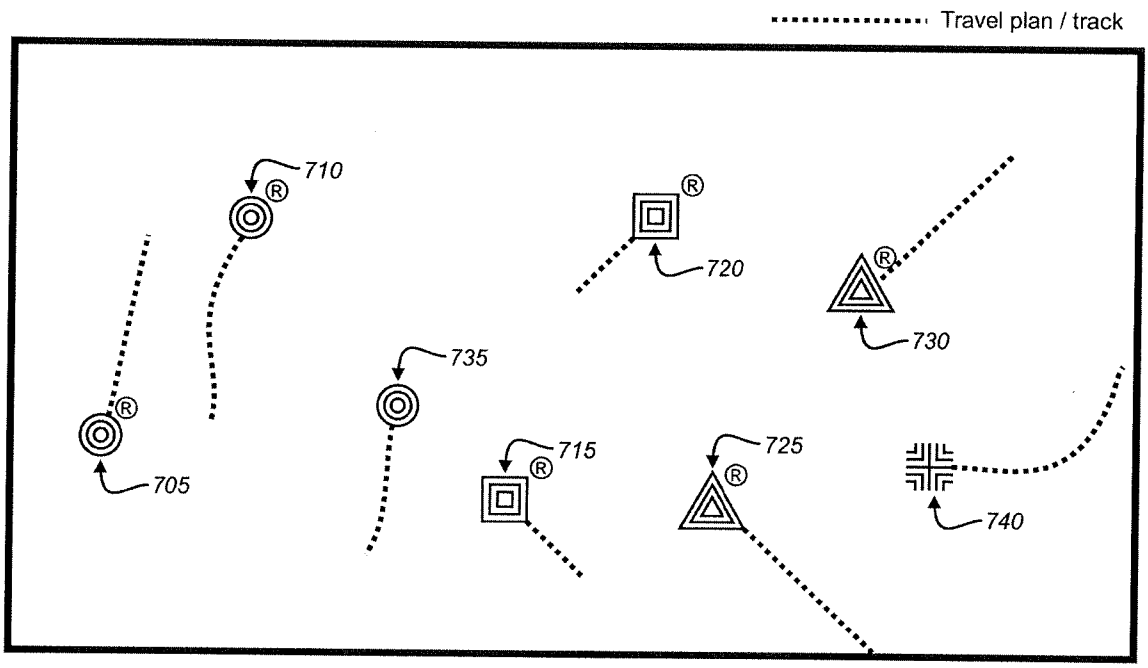


Figure 14

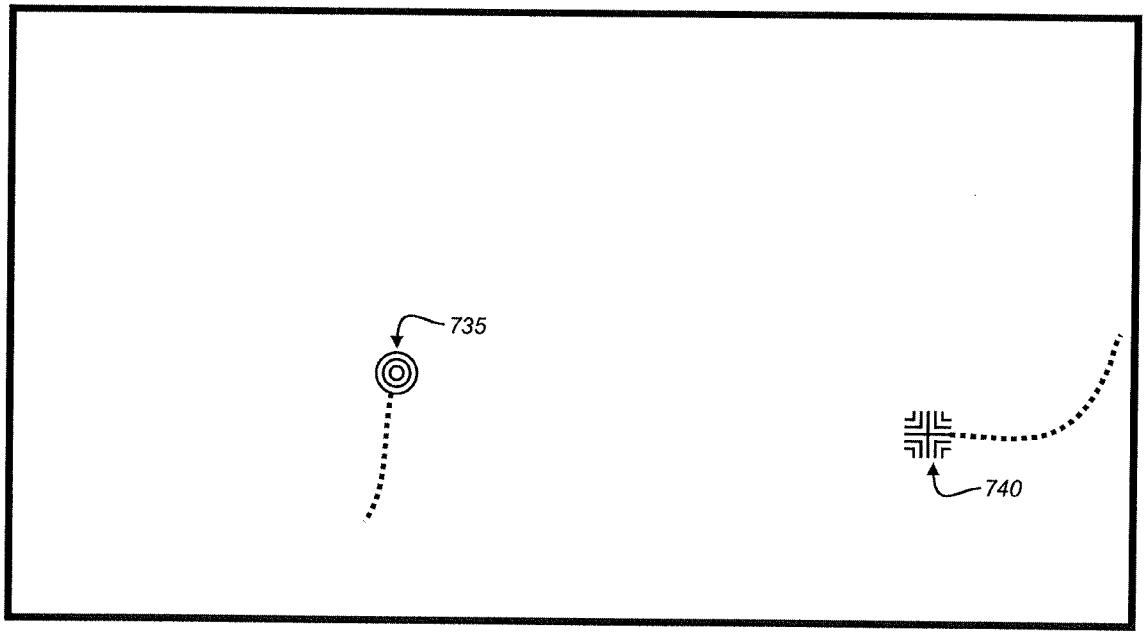


Figure 15

DEALING WITH NON-PARTICIPANTS

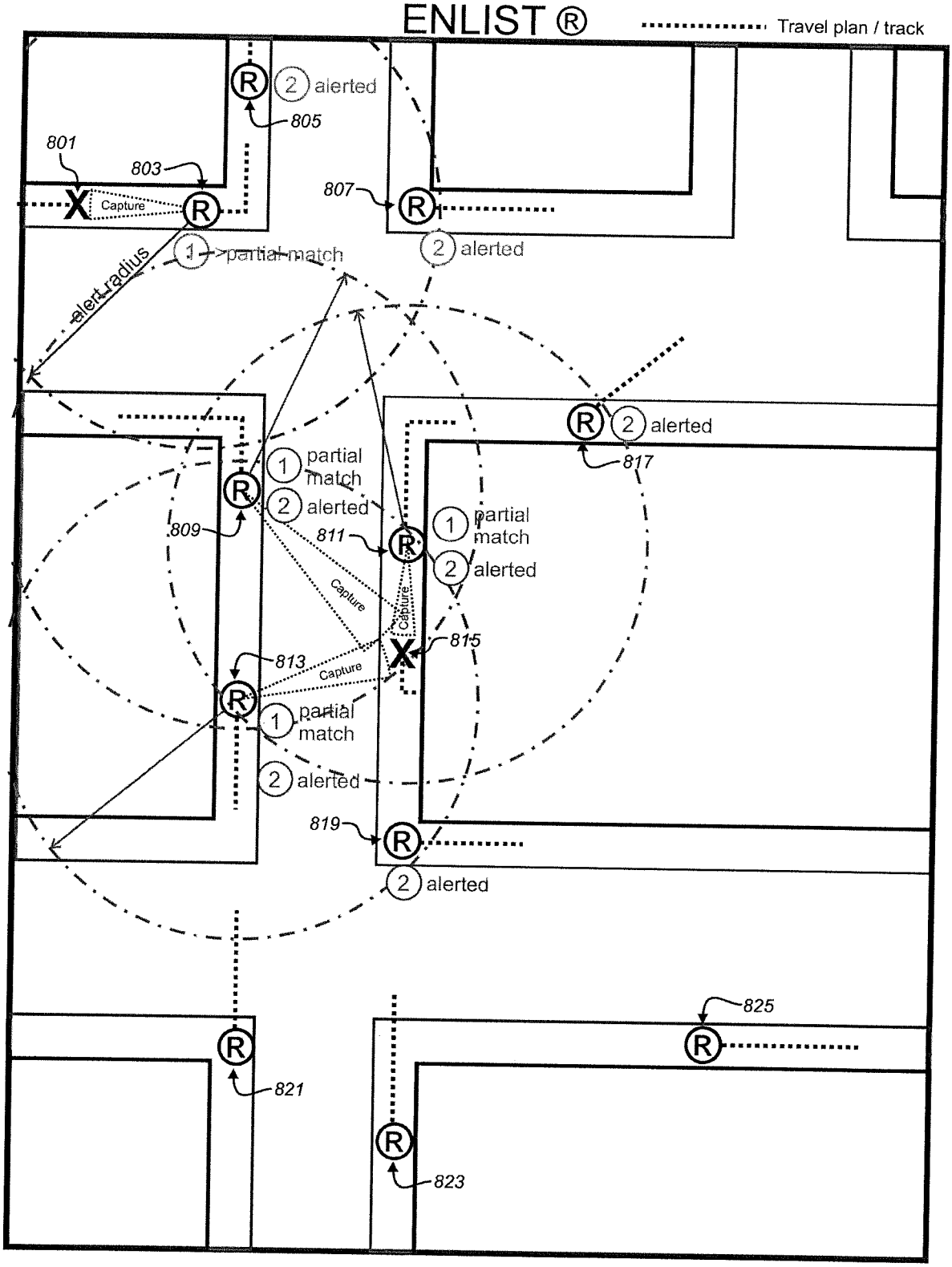


Figure 16