

# Year 4: Earthquake rescue mission

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**Identifier :** UC006

Rescue victims, reconnaissance, safety of structures and people

## Pre Conditions

1. Buildings have collapsed, firemen are at location. The team is equipped with UAV and UGVs.

## Post Conditions

1. Victims have been found.
2. Location has been secured or status is known.

## Action Sequences

1. -----
2. + Initial overview and first dispatch of UAV
3. -----
4. Mission Commander gives command to UAV operator to fly to accident area to provide an overview of the earthquake site
5. UAV goes to the area earthquake site, reports to mission commander by walkie talkie
6. Mission Commander takes snapshots of interesting images provided by UAV to team awareness display (surface table TREX)
7. When the UAV has provided enough information, Mission Commander asks UAV pilot to land
8. Mission Commander analyzes information (Ed data, images and videos) and communicates plan (in-field rescuer to safer area of collapse, UGV to possible risk of collapse area).
9. Mission Commander defines no-go area for in-field rescuer on team awareness display
10. -----
11. Dispatch of in-field rescuer
12. -----
13. Mission Commander defines area where in-field rescuer should start search
14. In-field rescuer goes into field and starts search
15. -----
16. + Dispatch of UGV-1 and UGV-follow
17. -----
18. Mission Commander defines waypoint where UGV should start search
19. UGV-1 draws planned route on 2D map and shows actions and strategy
20. UGV-1 navigates to waypoint and starts measurements and reconnaissance in area around waypoint
21. UGV-1 operator adds photos on TREX
22. -----
23. + UAV, MC and in-field cooperation
24. -----
25. Mission Commander gives UAV operator waypoints where possibly victims could be (this is a collapsed home)
26. UAV-pilot navigates to area and MC analyzes images for victims

27. MC finds victim (victim-1 in drawing) lying on top of debris
28. MC takes snapshot of victim and adds this to OCU and team awareness display
29. MC adds victim to team awareness display and adds smart question to status of victim
30. The in-field rescuer is nearby and has the right capabilities, so he is notified by the team awareness display to go to the victim
31. -----
32. + UGV 1 and follow cooperation
33. -----
34. UGV-1 detects a car (car-1): OCU shows car and notifies UGV operator by speech
35. UGV-1 operator adds smart question for UGV-follow to look inside car for victim with arm
36. UGV-1 proceeds the search
37. UGV-follow operator sends UGV-follow to look inside car with arm
38. UGV-follow goes to car and looks inside
39. UGV-follow operator: no victims inside car can be seen. Fill in smart question in TREX
40. -----
41. -----
42. + UGV and in-field rescuer cooperation
43. -----
44. UGV-1 operator hears a victim (victim-3, partially hidden by debris)
45. UGV-1 detects a victim with thermal cam: OCU shows victim and notifies UGV operator by speech
46. UGV-1 operator takes a screenshot in the OCU (this is sent to TREX)
47. UGV-1 operator adds smart question for in-field rescuer to triage victim
48. In-field rescuer proceeds to victim and enters information to smart question (immediate)
49. -----
50. + In-field rescuer and UGV cooperation
51. -----
52. In-field rescuer hears victim scream, it appears to come from no-go area
53. In-field rescuer adds victim to team awareness display and adds smart question
54. UGV-operator is notified of smart question concerning victim in no-go area
55. UGV-operator indicates waypoint and UGV-1 proceeds to area
56. -----
57. -----
58. + Search for source of hazard within the debris
59. -----
60. MC receives information about a building that there are possibly dangerous chemicals (see chemical sign on drawing) stored
61. MC adds possible dangerous chemicals to team awareness display and adds smart question
62. UGV-1 is notified of smart question by pop-up on team awareness display
63. UGV-1 proceeds to area and searches for chemicals

## Actors

- **In-field rescuer** : Fireman in the field
- **Mission Commander** : Commander that is in charge of the mission
- **UAV** : Unmanned Aerial Vehicle
- **UAV-operator** : Operator for the Unmanned aerial Vehicle
- **UGV-1** : Unmanned Ground Vehicle
- **UGV-follow** : UGV that follows the first UGV in the field in order to give an overview of the situation
- **UGV-1 operator** : Person who operates an Unmanned Ground Vehicle
- **UGV-follow operator**: Person who operates an Unmanned Ground Vehicle