## Structured Field Testing Framework - Feedback Survey

**Nr.** _____ **Date** _____ **Interviewee** _____

**Experience in Testing/Field Testing:** (field test creation, test conduct, data analysis)

**Part 1: Introduction, General questions about as-is-situation (~10 min)**

| | |
|---|---|
| **1** | **How are you currently preparing for Field Tests?**<br>(What tools, strategies, and processes are you using for preparation) |

| | |
|---|---|
| **2** | **Based on your experiences in Field Testing - What is currently working well and where would you need additional support?** |

| | |
|---|---|
| **3** | **What features/functionality are currently challenging?**<br>Have you experienced any concrete problems, issues, etc., e.g., due to the lack of tooling, processes… (loss of information after a test at the field …) |

| Part 2: Description of envisioned approach (~5 min) | |
|---|---|
| | |
| **Part 3: Perceived Usefulness of our approach and its Features (~10 min)** | |
| | |
| **4** | **To what extent could a structured test description help to better prepare for Field Tests?** (Why/Why Not / How) |
| | |
| | |
| **5a** | **Are the presented concepts and requirements (roles/tasks/conditions) sufficient to describe realistic tests?**<br>(Consider features/functionality to add for describing a test scenario?) |
| | |
| | |
| **5b** | **Which language constructs/expressions are required/desirable to represent field test scenarios for multi-drone missions?** (task description, conditions) |
| | |
| | |
| **6** | **What advantages/disadvantages do you see when using a structured field testing approach?**<br>**Which of the features presented could be the most useful/helpful?** |
| | |

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| | |
| **7** | **Where would you be using a structured field testing approach if available?**<br>**(**Are you aware of anyone else (any other application area) where such an approach could be helpful/beneficial)<br>*(Recommend persons who could be interested)* |
| | |

| **Part 4: Test specification and data collection concerns (~10 min)** |
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| **8** | **Which elements/features should a *task history timeline* represent (i) to orient a field tester, (ii) a test manager, or (iii) a test data analyst?**<br>(data collection, representation, e.g., similar to a social media or Jira timeline)<br>**Which of them would be most useful?** |
| | |

# Part 2: Description of the proposed approach

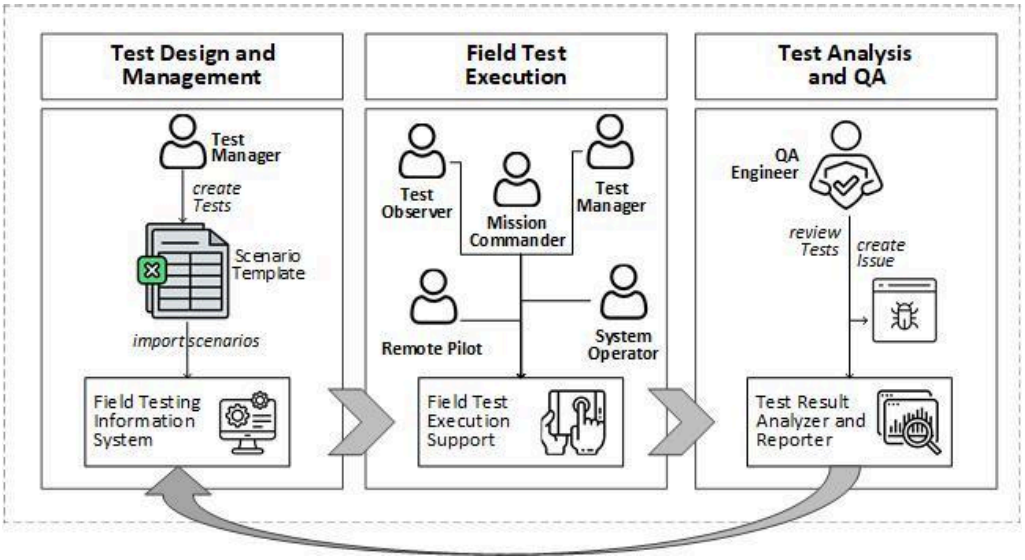
Setting up and executing a field test is commonly a rather time- and resource-intensive task.
Field testing requires preparing physical hardware, deriving test scenarios, and setting up equipment as a basis to execute tests in the field.
A field test needs to be thoroughly planned and validated as the test poses a significant risk to the involved humans in case something goes wrong.
Field test results need to be properly documented, and once the field test is completed, results need to be analyzed to improve detected bugs.

To provide holistic support for all three parts, we envision a *structured field test framework* that consists of
(1) *Test Design and Management.* An information system shall facilitate the definition and management of structured, flexible, and reusable test scenarios.

(2) *Field Test Execution.* A field-test information system shall provide role-specific task guidance for test scenarios to collect field data by human and machine actors.

(3) *Test Analysis and QA.* Test data analysis shall process, aggregate, and visualize the field test data in an analysis component.

All three parts shall work together, facilitating end-to-end field test definition, execution, and analysis, with information being fed back into, for example, an issue-tracking system for iterative improvement of the system under test, the structured field test specification, and field test support.




The focus of the current work: Part 1 - Test Scenario Management

**Requirements / Capabilities:**

- **(C1) Formal test description:** tests shall be defined in a testable, reusable, and concise manner that captures relevant preconditions, tester actions, and expected outcomes.

- **(C2) Actor roles:** Each test and constituent step requires roles associated with them - Responsibilities are clearly defined, and each participant is aware of his duties, and events to be aware of.

- **(C3) Role-specific tasks in field test state:** Each role shall receive a list of relevant next tasks, which consider the operational context conditions.

- **(C4) Link test activity to resources:** A test activity shall be connected via a task description to the relevant resources, e.g., which button to press, or which switch on a handheld to flip), to provide visual cues.

- **(C5) Feedback of field test issues:** Testers shall receive tool support to report deviations from expected behavior, or issues with conducting the test due to a mismatch between assumptions in the test specification and the operation resources and/or conditions.

- **(C6) Validated field test data collection:** Test execution information shall be related with diverse other sources such as flight controller logs, or system outputs for validating collected data.

- **(C7) Test data analysis support:** After finishing the field test, analysis support shall provide the data analyst, developer, or quality engineer, with information on which parts of a test for example have been completed successfully, and where issues have been reported, as a foundation for focusing on the most relevant parts of the test data and reduce analysis complexity.

**Concern candidates**

**(1) base case function:** tasks to cook the soft-boiled egg

**(2) collect data for test/experiment analysis, and compliance (**Data collection, e.g., read wind speed from an external device display.)

**(3) validation with observer (4 eyes), compliance**

**(4) coordination with parallel tasks (**task dependencies, attention cycle time, signals)

**(5) validate the feasibility of conducting the tasks with available resources** (cognitive load, trade-offs, degraded performance)

**(6) further systems engineering concerns (**e.g., safety, IT security)

| Process Setup | |
|---|---|
| **ID** | UC1 |
| **Name** | Test Case-01: Single UAV Takeoff-Waypoints-Land |
| **Description** | A simple Test Case where a single UAV takes off, flies to a series of waypoints, and returns to launch. |
| **Primary Actor** | mission_commander, UAV (controller ?) |
| **Supporting Actors** | pilot_1 |
| **Variable Imports** | waypoints: List<Waypoint> |
| **Condition Imports** | |

**Process Definition**

| # | Phase | Given | When | Then | Responsible | Priority | Duration | Subprocess | Subprocess Para |
|---|---|---|---|---|---|---|---|---|---|
| 1 | preflight-check | UAV <uav_1> is available at test site. | RPIC <pilot_1> shall place UAV | UAV <uav_1> is placed in its launch | pilot_1 | 50 | | | |
| 2 | preflight-check | UAV <uav_1> is disabled. | RPIC <pilot_1> shall activate a | UAV <uav_1> is activated and arme | pilot_1 | 50 | | ActivateAndArm | {"drone": "uav_1" |
| 3 | mission-planning | | MCOM <mission_commander> | The waypoints are marked comple | mission_co... | 50 | | | |
| 4 | mission-planning | UAV <uav_1> is activated and armed. | MCOM <mission_commander> | UAV <uav_1> hovers over the launc | mission_co... | 70 | | | |
| 5 | takeoff | | UAV <uav_1> shall take off to i | UAV <uav_1> has reached takeoff a | | 50 | | | |
| 6 | mission-execution | UAV <uav_1> has reached takeoff altitude. | UAV <uav_1> shall switch to in | UAV <uav_1> is in-flight mode. | | 10 | | | |
| 7 | mission-execution | | {{ foreach waypoint in waypoints }} | | | 10 | | | |
| 7.1 | mission-execution | | UAV <uav_1> shall cruise to th | UAV <uav_1> has reached {{waypoi | | 50 | | | |
| 8 | mission-execution | UAV <uav_1> has reached the last waypoint. | UAV <uav_1> shall switch to h | UAV is at the last {{waypoint}}. | | 10 | | | |
| 9 | RTL | | MCOM <mission_commander> shall issue a command to return to | | mission_co... | 70 | | | |
| 10 | RTL | | UAV <uav_1> shall switch to RTL mode, shall ascend to its predefi | | | 10 | | | |
| 11 | land | UAV <uav_1> has reached the start location.. | UAV <uav_1> shall switch to landing mode. | | | 50 | | | |
| 12 | land | UAV <uav_1> has landed | UAV <uav_1> shall switch to on-ground mode. | | | 50 | | | |
| 13 | post-flight | UAV <uav_1> is disarmed. | | | | 10 | | | |
| 14 | post-flight | UAV <uav_1> is disarmed. | RPIC <pilot_1> for UAV <uav_1 | UAV <uav_1> is disabled. | pilot_1 | 10 | | | |
| 15 | post-flight | | | UAV <uav_1> has landed at the orig | | 10 | | | |
| | | | TOBS <test observer> shall measure/validate time of takeoff. | | | | | | |
| | | | TOBS <test observer> shall measure/validate time of landing. | | | | | | |
| | | | TOBS <test observer> shall report an issue if a UAV <x> does not a | | | | | | |
| | | | TOBS <test observer> shall report an issue if a process or resource | | | | | | |

## QUESTION 5

**5A)**

| | |
|---|---|
| 1- Role | pilot, test observer, others |
| 2- Pre-condition | Has to be true to start a task, e.g., mission is in progress, UAV in state in-flight. |
| 3- Post-condition | task success condition that a human or machine actor can evaluate, post-condition may activate next phase |
| 4-Phase | Preflight-check, mission planning, etc. to group tasks for activation. |
| 5-Priority | A number to rank available tasks, based on design and run-time knowledge. |
| 6-Time window/Duration | A task may have a time window for completion, e.g., 10 minutes,to trigger a time out if not finished in time. |
| 7-Fallback scen. | tasks to conduct if mission deviates from normal scenario, e.g., loss of a drone. |
| 8 - *Troubleshooting* | tasks to conduct in case of a disturbance that requires swift, targeted action for risk mitigation, e.g., checking likely |
| other? | |

**5B)**

**1- Task Constructs:**

| | |
|---|---|
| *<Role/actor> shall <conduct task>* | MCOM <mc> shall mark UAVs in mission with "Mission A". |
| *Role/Actor with parameters/mapping* | RPIC {{ uav.pilot }} shall arm UAV {{ uav }}. |
| *Sub-process with parameters* | RPIC {{ uav.pilot }} shall perform a *post-flight{uav.pilot,uav}* inspection of UAV {{ uav }}. |
| *Tasks for a set of actors/object* | For each <object> in <set of objects>: for each UAV in (UAVs marked with "Mission A") |
| *List of tasks* | RPIC {{ uav.pilot }} shall check UAV {{ uav }}, shall perform a post-flight inspection of UAV {{ uav }}, and shall disable UAV {{ uav }} |
| ***OTHER?*** | |

***2- Task Expressions:***

| | |
|---|---|
| *Role/actor:* | *RPIC {{ uav.pilot }} shall activate and arm UAV {{ uav }}. Variable UAV related to Pilot.* |
| *Set of roles/actors:* | *TOBS <test observer> can be assigned to one or more persons.* |
| *Recurring task:* | *Test observer shall record every 30 seconds the energy level of the UAV battery.* |
| *Task object for a human or machine to interpret:* | *.. shall order UAV {{ uav }} to take off to their takeoff altitude.* |
| *Task object for a human to interpret:* | *shall report whether UAV {{ uav }} has taken off to its takeoff altitude.*<br>*shall report an issue if a UAV {{ uav }} does not achieve its mission contribution.* |
| *Placeholder that may require clarification:* | *TOBS <test observer> shall measure/validate time of achieving test milestone for mission.* |
| ***OTHER?*** | |

***5b.3 Condition construct***

*(1) Boolean state: Phase.inprogress, UAV_at_site, UAV_mission_in-flight*

*(2) Marker: UAVs marked with "Mission A"*

*(x) Further condition constructs?*

***5b.4 Condition expression***

*(1) Simple condition: Phase.inprogress = True, number > 3*

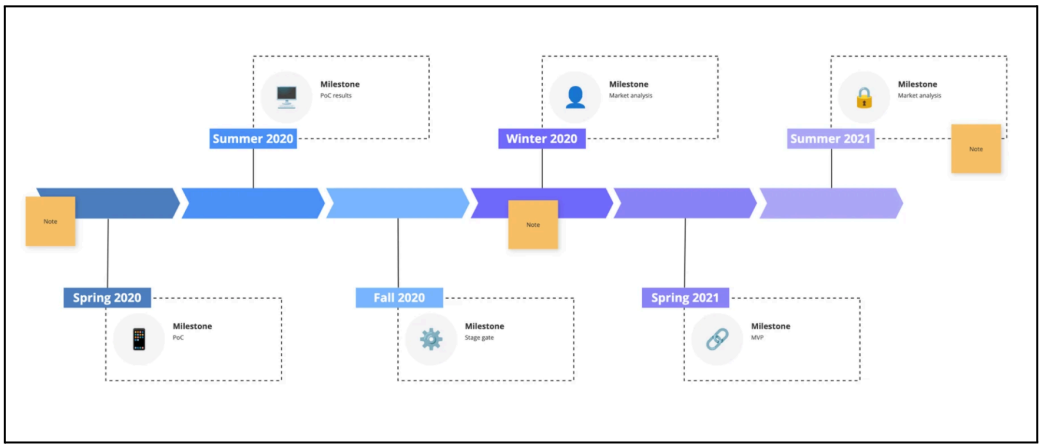
*(2) Short name for condition; P03: Phase.inprogress = True*

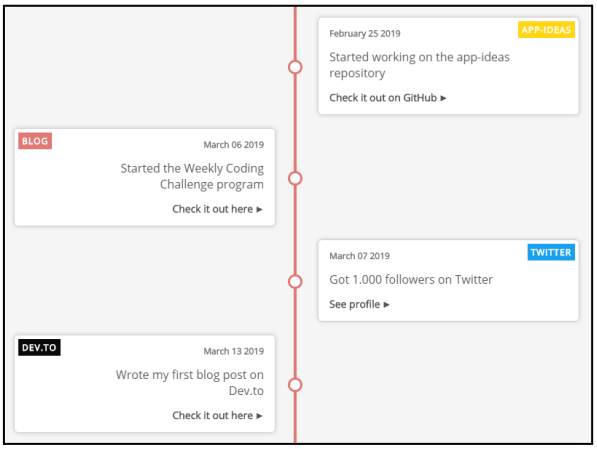
*(3) Logical combination of conditions: P03 AND (UAV_at_site = True)*

*(x) Further condition expressions?*

# QUESTION 8


facebook
Home
Profile
Friends
Inbox
News Feed
Comments
Similar Posts
Pages
Status Updates
Facebook
Penn State
College
Coworkers
Fencing
Photos
Notes
Links
Video
Live Feed
View News Feed
What's on your mind?
Carrie Peterson is excited for Caiden to be
Kim Garrett became a fan of Yoplait Delight
Kim Garrett became a fan of EQUINOX.
Anoop Nagwani is now friends with Prafful Anand.
Myles Uyema This is a work of fiction. Bori
suspense didn't kill me. The paranormal acti
ordinary, and the guy was a douche.


Milestone
PoC results
Summer 2020
Milestone
Market analysis
Winter 2020
Milestone
Market analysis
Summer 2021
Note
Note
Note
Spring 2020
Milestone
PoC
Fall 2020
Milestone
Stage gate
Spring 2021
Milestone
MVP


February 25 2019
APP-IDEAS
Started working on the app-ideas repository
Check it out on GitHub ►
BLOG
March 06 2019
Started the Weekly Coding Challenge program
Check it out here ►
March 07 2019
TWITTER
Got 1.000 followers on Twitter
See profile ►
DEV.TO
March 13 2019
Wrote my first blog post on Dev.to
Check it out here ►