

Southern California Edison

WSD-001 – Resolution WSD-001 to Establish Procedures for the Wildfire Safety Division's Review of 2020 Wildfire Mitigation Plans Pursuant to PUC Sections 8386 and 8386.3

DATA REQUEST SET Cal Advocates - SCE - 2020 WMP - 02

To: Cal Advocates

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Response Date: 3/16/2020

Question 002:

For SCE's Advanced Unmanned Aerial Systems Study (drone study),³ is the WMP states that "the study was successful in that all planned circuit segments were flown and yielded abundant data."

- a. Did the drone study prove successful in further reducing wildfire risk by detecting equipment risks that are difficult to find by other means?
- b. Did the drone study prove successful in expediting power restoration to minimize the impact of outages on customers?
- c. If the answer to either question (a) or (b) above is no, please state when SCE expects the drone technology to yield these benefits.
- d. What is the timeline for when the drone technology will be in widespread use as part of SCE's operations?
- e. What challenges appeared from the 2019 study, and how is SCE addressing them?

Response to Question 002:

- A. No, SCE is still in the development stage of Beyond Visual Line of Sight (BVLOS) UAS flight with respect to the aerial patrol of circuits impacted by Public Safety Power Shutoff (PSPS). While SCE anticipates (a) further reducing wildfire risk by detecting equipment risks that are difficult to find by other means (as evidenced by our aerial inspection program, conducted *within* line of sight) and (b) expediting power restoration to minimize the impact of outages on customers, SCE is currently focused on the fundamentals associated with BVLOS flight (which SCE hypothesizes will be required to make UAS-based circuit patrols efficient and effective over traditional means). These key fundamentals are:
 - o Developing a strong safety case and concept of operations that will meet Federal Aviation Administration (FAA) requirements
 - o Improving UAS platform and sensor capabilities to better adjust image zoom, perspective, and video streaming capability in a reliable manner that consistently satisfies the quality requirements of the Qualified Electrical Workers (QEW) who are responsible for an 'all-clear' determination to re-energize a circuit
 - o Improving overall flight planning, UAS operation, and sensor operation
 - o Improving mobilization and preparedness to more closely simulate live PSPS events.
- B. Please see response to part (A) above.
- C. With respect to leveraging drone technology specifically to patrol lines using BVLOS (the focus of this study), SCE anticipates operationalizing this capability sometime in 2021-2022, likely in limited areas as defined by a FAA Certificate of Authorization (pending). However, with respect to leveraging drone technology to further reduce wildfire risk by detecting equipment risks that are difficult to find by other means, SCE's aerial inspection program

(focused on detailed structure inspections) is operational and currently yielding these benefits using drones flying *line of sight* missions.

- D. Please see response to part (C) above.
- E. There were several consistent challenges encountered during the first round of demonstration flights in the field. Areas for improvement include failsafe planning, sensor image quality and operation, aircraft visibility, operational range from the pilot-in-command and ground control station, and overall operation flight planning and execution timing. Below is a table that includes a summary of these challenges and recommendations for improvement that SCE is incorporating into the next round of demonstration flights.

Description of Challenges	Recommendation for Improvement
UAS vendor operated UAS at an altitude above 2,000 ft, violating the FAA Certificate of Authorization altitude limit of 1,200 ft.	Improve pre-flight planning and failsafe procedures to account for terrain elevation variation. Improve crew resource management.
UAS sensor provided inadequate quality data for inspection of assets during patrol	Equip UAS with a sensor having adjustable zoom capability and multiple sensors for optionality and redundancy
Live-feed transmission was unreliable and inadequate for inspection of assets during patrol	Improve flight planning to maintain stronger telemetry during flight and improve audit of life-feed video streaming system to determine points of failure
UAS did not achieve objective of 3-mile distance from pilot in command, as required in the statement of work	Improve flight planning, UAS platform battery supply, and flight efficiency to safely increase distance capabilities; explore other UAS platforms