

CASE STUDY

Solar EPC/O&M Provider Improves Site Performance with Advanced Drone Technologies

Introduction

DEPCOM is a Solar PV Power EPC/O&M services provider that serves a portfolio of large-scale solar farms distributed across the United States. DEPCOM prides itself in adopting new technologies that best serve solar farm owners in their efforts to improve the performance, efficiencies, and overall advancement of their solar energy assets. They were recently listed as a [Top 10 Most Inspiring Company](#) from Inc magazine.

DEPCOM has been an early adopter of drone technology to reduce time that managers and crew members are spending in the field, improve overall asset and plant performance, and reduce hazardous and unsafe tasks for crew members.

Measure has been pleased to service DEPCOM's drone needs during construction, commissioning, and for O&M, helping them improve their own management practices while benefitting the end client - solar farm owners.

Drones Improve Manager Efficiency

Lucas Geismar is an Operations Maintenance Manager for DEPCOM. Lucas manages four

power plants in four different states – from Connecticut to Texas - and relays that one of the biggest challenges of his job is needing to be in several places at once.

1,863 - The miles between Texas and Connecticut - the locations of two sites Lucas manages.

"Crews are pretty small and efficient, but that means that some skills are not present everywhere," Lucas explains. "Any time a high level of experience is needed, I have to be there."



Aerial imagery of one of the sites DEPCOM manages.

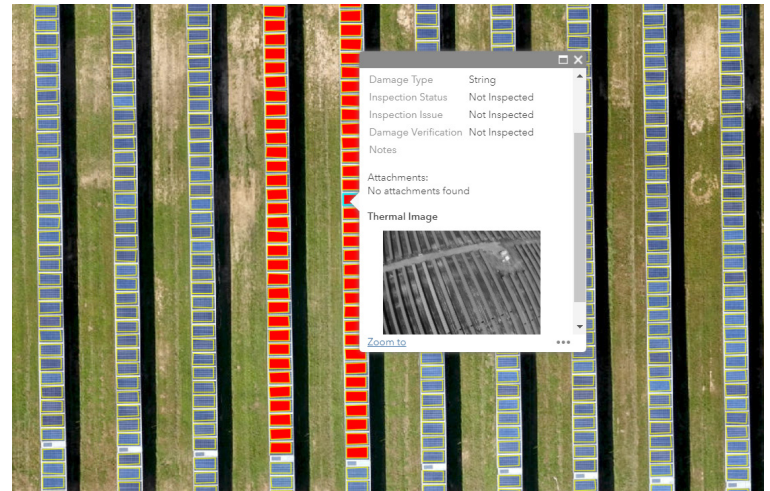
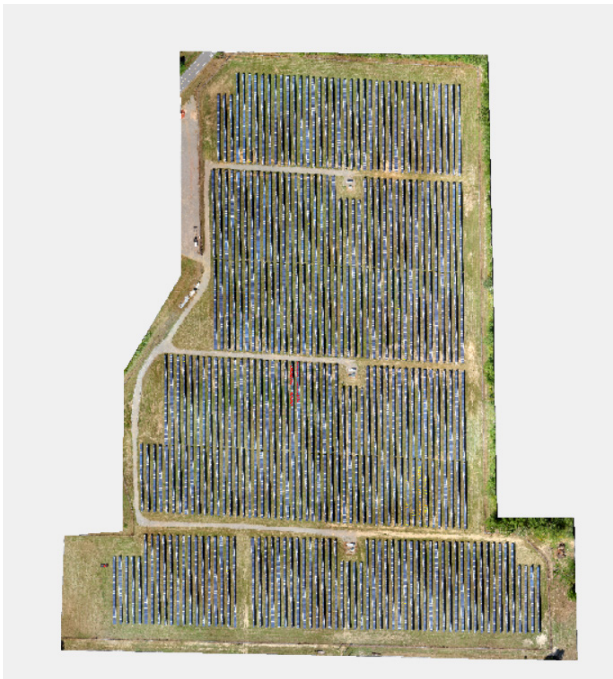
Unlike a traditional power plant where you have crews on 24/7 rotating shifts, solar farms require less daily attention, but when attention is needed, it comes in spurts. In other words, if something goes wrong, it's all hands on deck. But if something goes wrong in more than one plant at the same time, crews and managers are spread thin.

"It's important for me to be available in the event something goes wrong," Lucas explains.

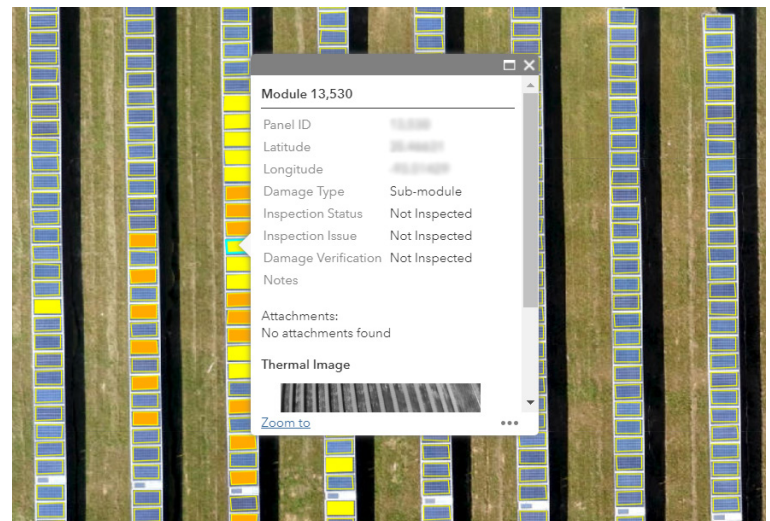
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Example of Data Results

Solar Inspection



Solar inspection results are presented through an interactive web portal that displays the entire farm (above). Users can zoom in and view individual panel information (right) and update the data in real-time either through the portal or via the in-field repair app (see page 5).



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A traditional solar farm inspection for one of Lucas's sites would take several weeks to perform at a size of 74 MW. And that is with Lucas being solely focused on that one task and relying on good weather for the duration of that time frame.

DEPCOM turned to a drone services provider to perform scheduled inspections via aerial thermal imagery, which has helped to reduce the amount of time personnel spend on a single inspection - and away from other duties.

DEPCOM - true to their commitment to develop deep technical knowledge and relationships with Tier 1 suppliers - formed a partnership with [Measure](#), a top international provider of drone inspection and data services. Measure performs all drone work for DEPCOM sites, including transmission line inspections, ensuring a consistent quality of work and data.

"The drone has done everything we have wanted it to do - and done it well," Lucas says. **"The issues are immediately identified and fixed so much faster than would ever be possible trying to perform this in-house."**

Drones Improve Solar Plant Performance

The primary job of the solar O&M provider is ensuring the plant is performing at its optimal level. Performance and minimum output

levels must be met - and exceeded - at every opportunity.

One way that output is affected is through necessary plant downtime. The drone inspections reduce the costly consequences of shutting plants down when an isolated issue occurs. Incidents such as blown overhead fuses in a transmission line can be inspected by drones while keeping the plant running.

There are also scheduled inspections that can require scheduled downtime. In the case of an annual substation inspection, the drone is able to perform the inspection without the need to shut it down.


Aerial thermography results have previously been validated by DEPCOM to result in a >98% reporting accuracy.

DEPCOM has also found aerial thermography inspections to both meet and enhance the functionality of Imp testing. Measure employs a high imagery overlap for all thermal data collection, resulting in less than 20% new data being collected per image. Thermal images are compiled into orthomosaics that remove damage artifacts, such as solar flares, prior to final analysis. All damages flagged are verified manually through a review of several individual thermal images of the damage location. By mitigating for potential false positive identification via extensive thermal data capture, aerial thermography results have previously been validated by DEPCOM to result in a >98%

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Example of Data Results

Transmission Inspection



Transmission Structure Inspection Report

Customer Name: DEPCOM
Site Name: 74 MW Solar Generation
Contact Name and Number: [Redacted] and [Redacted]
Date of Service: [Redacted]
Inspection Personnel: Gunner Goldie, Anthony Zimlich, Andy Justicia, and Burton Putrah

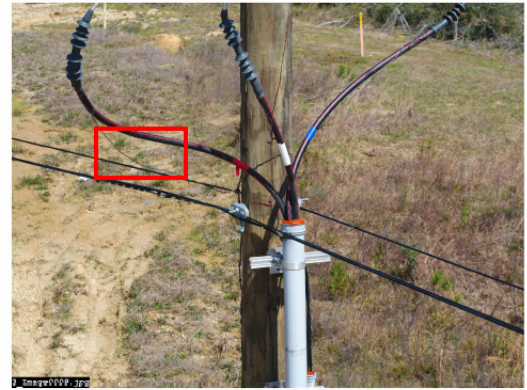
Structure Inspection Punch List

Inspection Service	Equipment Inspection	Notes
RGB Scan		
Visual inspection of structures from varying height on either side of the structure.	Wood structures along 34.5kV line.	Damage was identified according to classification scale provided by Measure.
Thermal Scan		
Visual inspection of structures from varying height on either side of the structure.	Wood structures along 34.5kV line.	Damage was identified according to classification provided by Measure.

Structure Damage Summary

Maintenance Items	Count of Deficiencies Found
1 – Any Safety Concern (missing warning sign)	1
1 – Broken/Missing Insulator	1
1 – Missing Bolt	1
1 – Broken Wire (long enough to cause outage)	2
1 – Worn Insulator Anchor Eye on Metal tower	1
2 – Flashed Insulator	2
2 – Damaged Bolts	1
3 – Damaged Bolt-to-Component	0

Structure ID	Image Name	Pole Type	Location/Component Type	Damage Type	Damage Class	Notes	Latitude	Longitude
11	1_Image0009.jpg	Wood	Conductor Wire	Loose	2	Wire/Conductor not fully clamped to fuse, beginning to unravel	31.0000	-84.0000
15	3_Image0008.jpg	Wood	Ground Wire	Loose	4	Static wire loose from Riser, could touch cable below	31.0000	-84.0000
17	4_Image0015.jpg	Wood	Other (See Notes)	Worn	4	Surge Arrester Bond Worn/Darkened	31.0000	-84.0000
17	4_Image0018.jpg	Wood	Cotter Key	Loose	3	Cotter Key is beginning to back out	31.0000	-84.0000
20	5_Image0002.jpg	Wood	Insulator	Chipped	1	Insulator is Chipped	31.0000	-84.0000
20	5_Image0005.jpg	Wood	Other (See Notes)	Worn	4	Surge Arrester Bond not completely Bonded	31.0000	-84.0000



Tower 15: Loose static ground wire



Tower 11: Loose conductor strands



Tower 17: Loose cotter key

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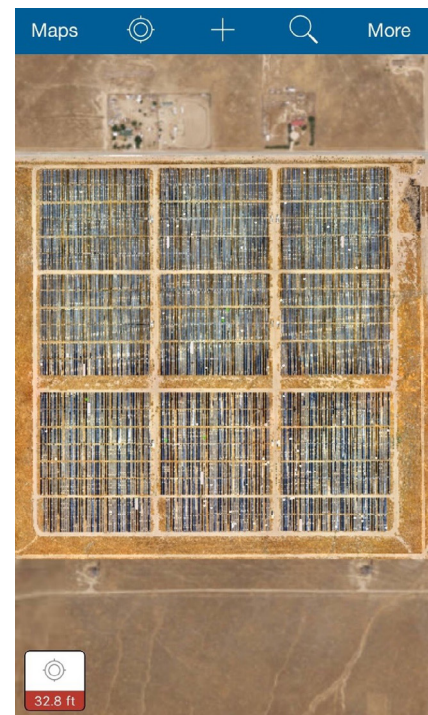
reporting accuracy.

But the drone flight itself is not the only benefit of drone technology provided by Measure. After an inspection is performed, the work of the crew begins as they fix the problems that the drone data captured. Using an in-field repair app that crews can download on their smartphone or tablet, a worker is able to pinpoint exactly where the problem is in the field, reference the issue with that particular panel or string, rectify the issue, and update the data with notes – all while in the field.

“The data we get back from Measure is incredibly usable,” Zachary Nichols, Director of O&M at DEPCOM, reflects. He goes on,

“Using the app, we’re able to eliminate the need to take handwritten notes in order to document everything that was done at the end of the day. The real-time updates are helpful to management and increase the efficiency of those in the field.”

In-Field Repair App



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Drones Reduce Hazardous Work

Safety is a core value at DEPCOM, and traditional solar and substation inspections are dangerous work. A crew member has to suit up in protective clothing, go into the field, and use an amp clamp on each individual circuit.

“Any time we can take people out of the field and defer that risk to technology, we try to do that,” Zachary explains.

The safety benefits of drones in solar and other industries has long been established and experienced.

When detecting a blown fuse in an overhead transmission line, DEPCOM called Measure to do a flyover. This eliminated the need to bring in the bucket truck and send someone up near the power lines.

In just one solar farm inspection, DEPCOM saved 778 manhours, 97% of which were hazardous.

For added context, Measure compared results across four different solar sites (one of which was for DEPCOM). Total hazardous manhours avoided across all four sites were 1,433! Not to mention, efficiencies were increased by 97%.

Measure’s Results: Comparison Across Solar Sites

	Site 1	Site 2	Site 3	Site 4
Size	74MW	30MW	21MW	12.5MW
Drone Inspection Time	24 Hrs	6 Hrs	7 Hrs	4 Hrs
Manual Inspection Time	778 Hrs	293 Hrs	208 Hrs	195 Hrs
Hazardous Manhours Avoided	754 Hrs	287 Hrs	201 Hrs	191 Hrs
Increased Efficiency	97%	98%	97%	98%
Net Cost Savings	\$68,399	\$25,485	\$17,063	\$19,552

Conclusion

Solar farms should seek to use technology to defer risk to people and improve plant performance at every opportunity. When outsourcing O&M, favor organizations like DEPCOM who have a proven track record of using drones to increase manager efficiency, improve overall plant performance, and reduce risks to employees.

You can contact DEPCOM at <https://www.depcompower.com/connect-with-us/>. For more information on drone data and technology, contact Measure at <https://www.measure.com/contact>.