



# Severe Weather Management eBook

For plant developers, owners and operators



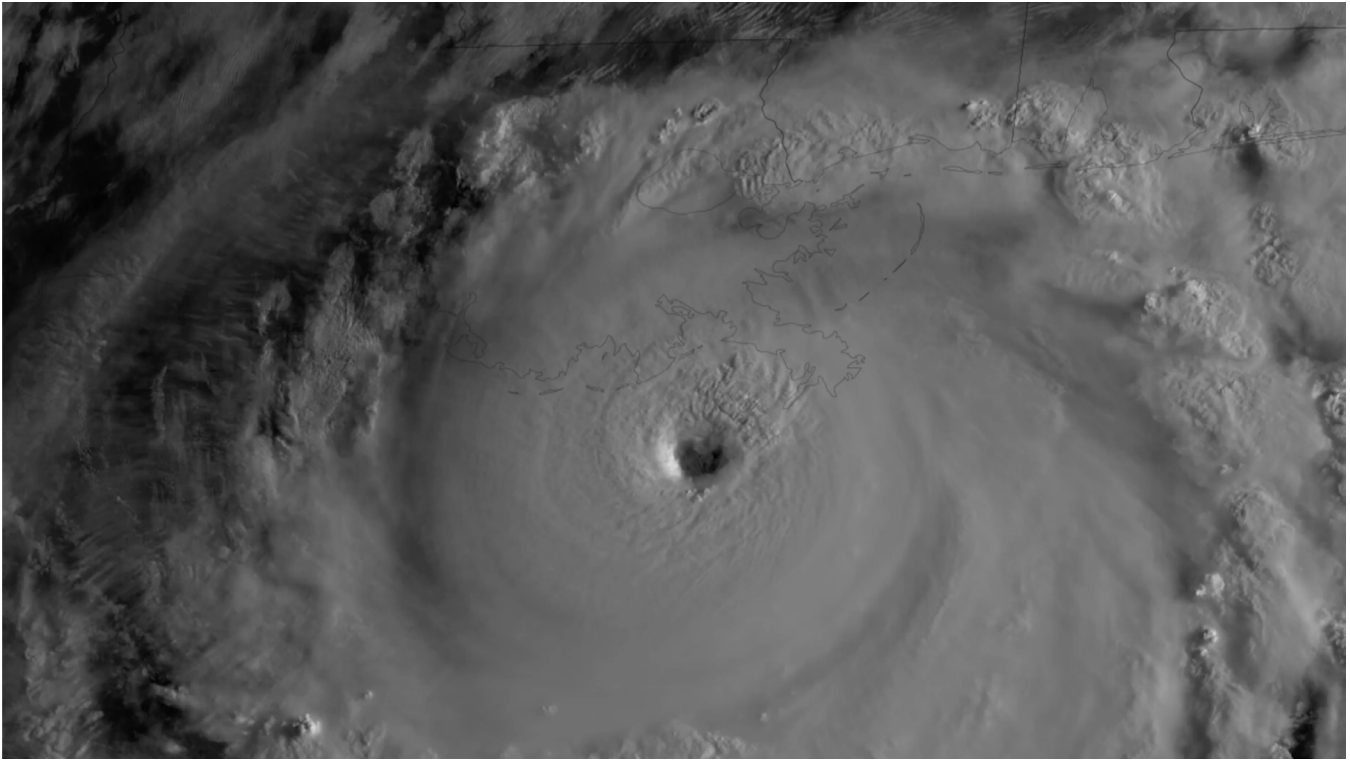




*Storm over Bannerton Solar Farm, Australia*

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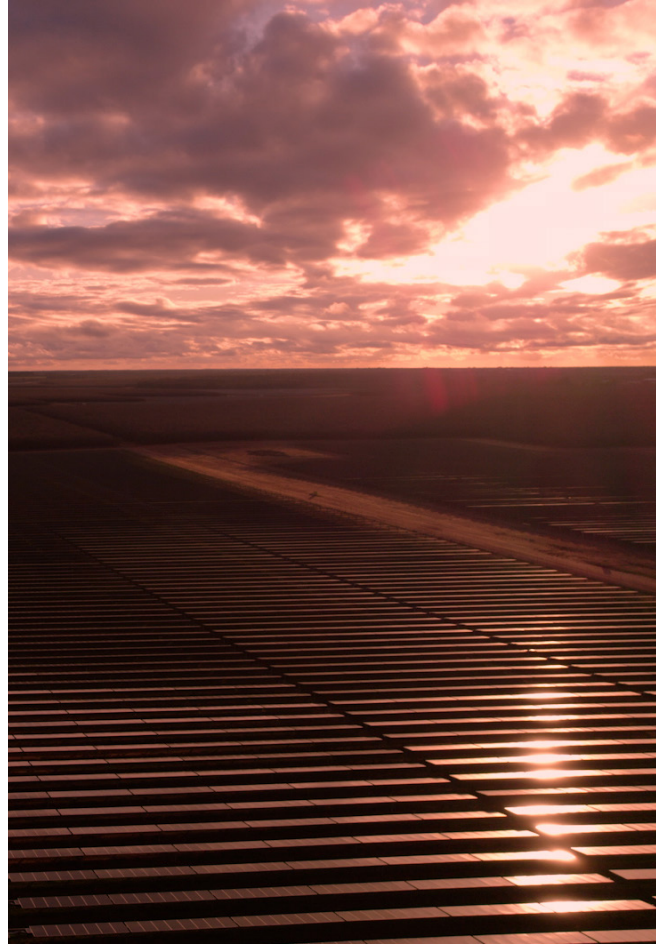


*Hurricane Ida approaching landfall*

## Introduction

Unfortunately, solar Natural Catastrophe (Nat Cat) events have been on the rise over the past several years. Per GCube's Sept 2022 North American Nat Cat report, the dominant share of these damaging events was outside the traditional categories of earthquake, hurricane, and flood. While the industry has been applying standard building code-based engineering and equipment certifications, more must be done to address Nat Cat risk.

Well-engineered tracking systems with intelligent stowing and enhanced weather event management tools will be part of the solution, in combination with appropriate PV panel technology selection and robust operational practices. NX Navigator™ empowers system operators with the industry's most advanced weather event planning & response tools. NX Horizon™ features the most capable and responsive active stowing functionality in the industry, including integrated UPS for backup stowing power as standard. And NX Horizon Hail Pro™ offers additional hardware upgrades, expanded software tools, and support services specifically tailored for hail.

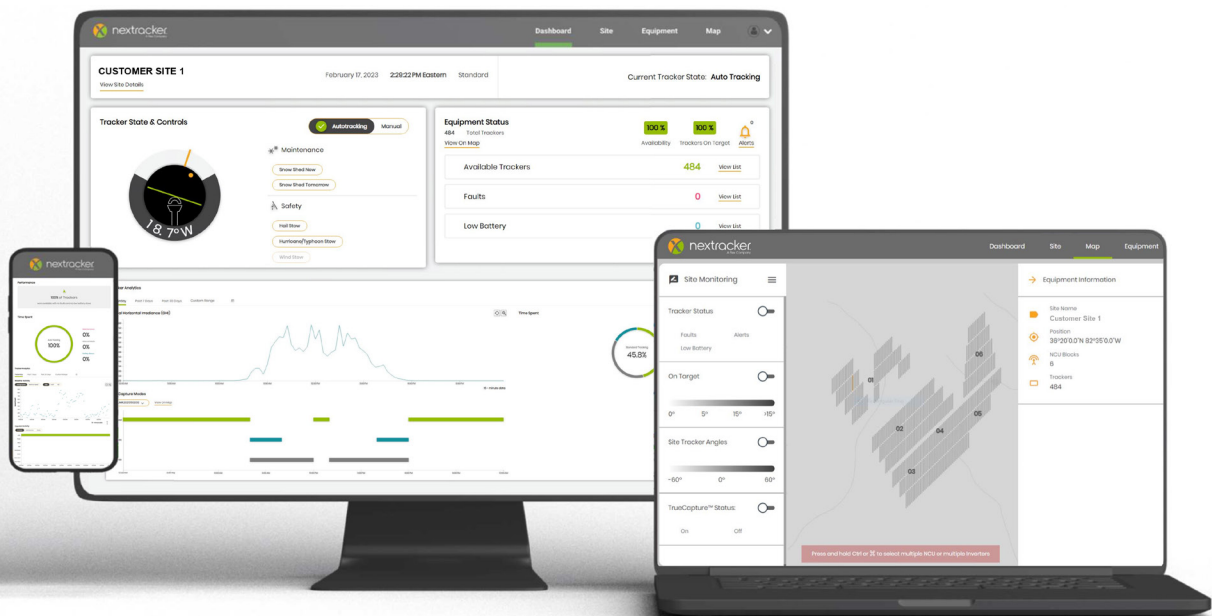


## NX Horizon + NX Navigator

*A comprehensive solution for severe weather event management*

For any given severe weather event, the best array position depends on the event itself, solar panel technology, and other site-specific factors. To tailor safety stowing protocols to each situation, tracking systems must offer active control and a multitude of stow control options.

The combination of NX Horizon with NX Navigator Premium arms plant operators with advanced operational tools and stowing capabilities to manage their solar assets before, during and after severe weather events, without reliance on grid power. Operators of Nextracker systems enjoy greater control and faster active stowing capability as compared to other tracking systems, especially those which are passively stowed, or AC powered.

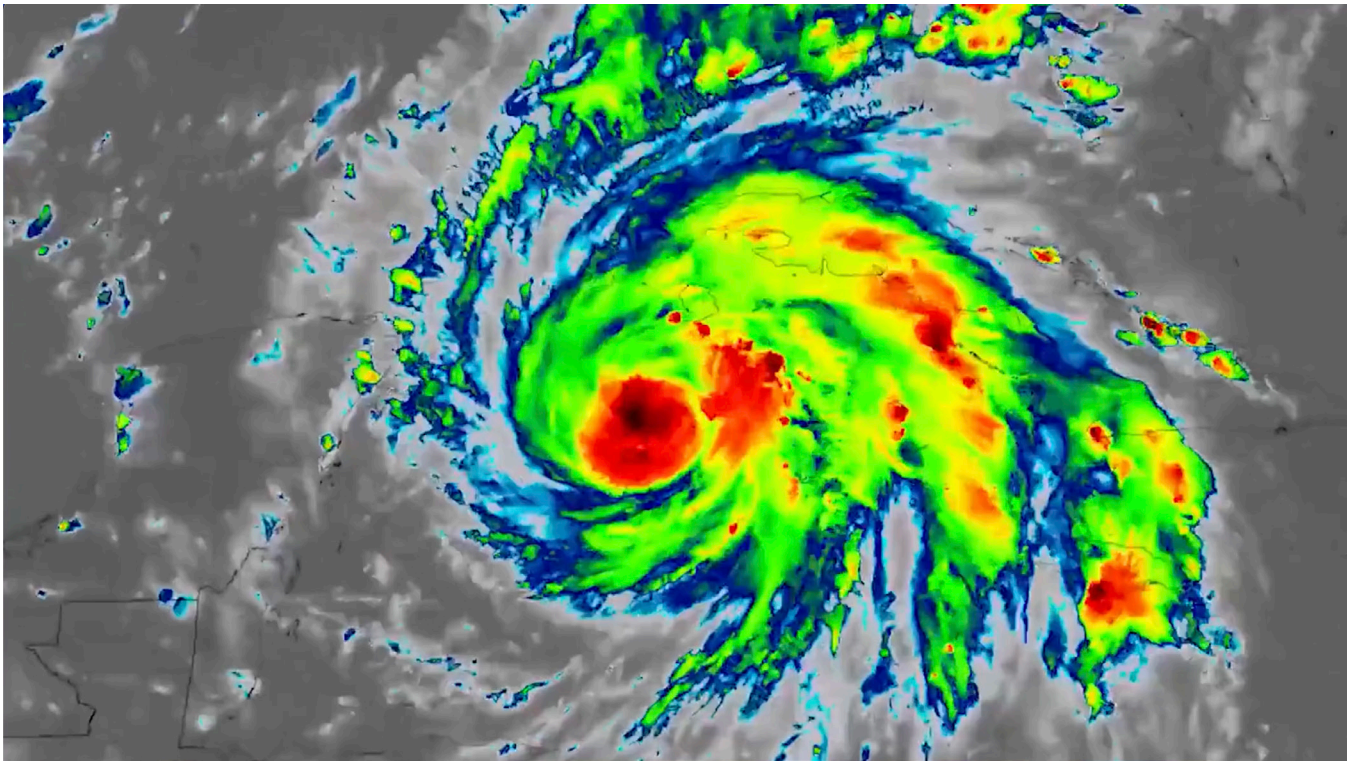


## NX Navigator

*Empowering system operators with greater operational control and response capability*

NX Navigator Premium provides system operators an easy-to-use, comprehensive suite of severe weather management tools. Using Navigator operators can optimize strategies for hail, hurricane, snow and flood events on top of automated wind-stowing functions. NX Navigator Premium includes features to pre-configure severe weather responses, and control functions for real-time, direct operator commands.





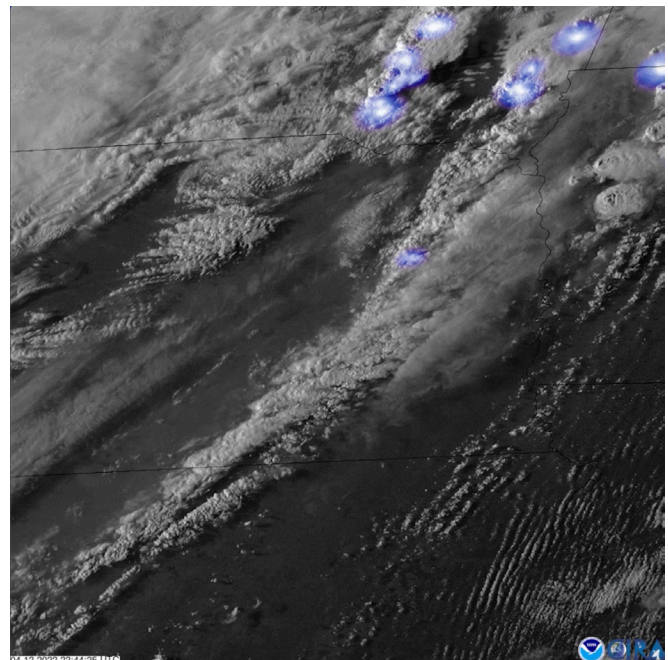
Satellite view of Hurricane Ian

## Weather Event Response Planning

- Pre-configure defensive stowing strategies for a wide range of scenarios
- Tailor system response to site-specific conditions
- Automated control of stow priority for different event types

## Real-Time Control and Monitoring

- Fast response to emerging or changing conditions via an intuitive interface
- One-click commands for hail, hurricane, flood and snow
- View tracker status throughout severe weather events



Midwest Derecho sends thunderstorms, hail, and floods across the region.



Flooding at Jemalong Solar Farm

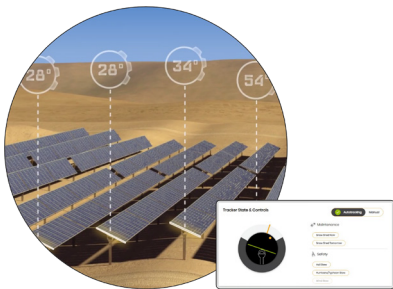


Flood Avoidance

## NX Horizon Intelligent Stowing with Integrated UPS

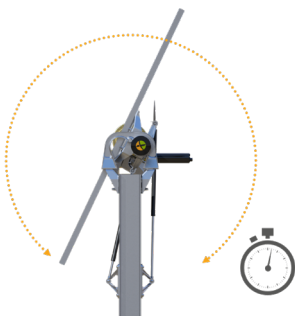
*The industry's most capable and responsive tracker for severe weather*

With its independent row & mechanically balanced architecture, advanced wind engineering, rapid rotation capability, and proven self-powered control and communications, NX Horizon has better severe weather response capabilities built-in by design. With an integrated UPS on every tracker row as standard, stowing capability remains available even in the event of a grid power outage.



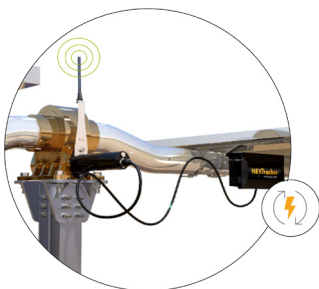
### Smart, Active Row Control

- Nextracker's intelligent, closed-loop control system quickly repositions tracker rows from normal tracking to a desired stow position when required. Depending on the event type and configuration selections in NX Navigator, this active stowing capability may be called upon via automated or operator commands.



### Rapid Stowing & $\pm 60^\circ$ Range of Motion

- NX Horizon is capable of repositioning to most defensive stow positions in 2 minutes or less. A  $\pm 60^\circ$  range of motion with built-in hard stops provides the industry's best stowing positions for hail and snow. Nextracker's advanced plant-level communications architecture ensures all tracker rows receive stowing push commands in near real-time.



### Integrated UPS

- According to DOE reliability studies, weather is responsible for all large-scale and more than 50% of all 2015 electrical outage events in the United States<sup>1</sup>. NX Horizon trackers and their supporting communications network are self-powered via dedicated solar panels and include onboard backup batteries, ensuring no external power is required to stow the system.

# Upgrade Hail Protection with NX Horizon Hail Pro

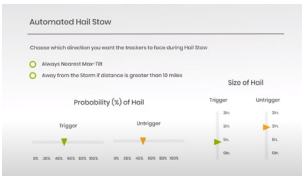
*The industry's new gold standard for hail risk mitigation*

NX Horizon Hail Pro leverages the NX Horizon platform's inherent severe weather performance strengths – including rapid stowing capability, high stow angles, and integrated UPS – and adds hardware upgrades, expanded software tools, and support services specifically tailored for hail. Building on Nextracker's extensive experience in hail-prone regions, NX Horizon Hail Pro allows solar developers to pursue projects in hail regions with the confidence that they are prepared with the best mitigation tools available.



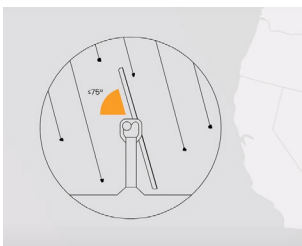
## 360° Wind Structural Design

- Hail-forming thunderstorms can feature unpredictable, shifting winds, and in some cases stowing “away from the storm” can reduce hail risk to panels. Hail Pro's upgraded wind engineering allows system operators to focus on the best possible hail stowing strategy without needing to consider wind loading.



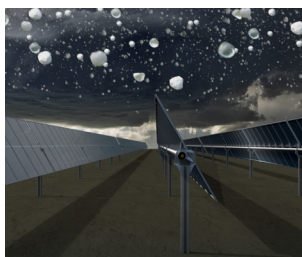
## Automated Hail Stowing

- In addition to single-click manual stowing options, operators can set up automated stowing protocols for predicted hail events, based on third-party weather forecasting data and user-defined triggering criteria such as hail location, size, and probability.



## Hail Pro-75

- For projects in severe hail regions, the optional Hail Pro-75 package offers added protection by increasing the maximum stow angle from 60° to 75° – an industry first. In lab tests, 75° stowing achieved >90% panel glass survivability against 3" ice balls, while also increasing tolerance against front-winded hail scenarios. power is required to stow the system.





























## Hail Readiness Support

- To ensure Hail Pro systems are ready to perform when they're needed most, Nextracker offers seasonal hail-stow functional testing support, training, and troubleshooting. Our team can also provide ongoing system monitoring, including actionable checklists and reports on hail preparation that can offer peace of mind for owners, operators, and insurers alike.the system.



### Example: Severe Weather Event Scenarios

EVENT	SYSTEM RESPONSE	AVAILABLE STOW TYPES		DIRECTIONAL CONTROL
		AUTOMATED	OPERATOR	
 <b>Hail</b>	One-click, site-level stow in advance of hail event			
 <b>Hurricane</b>	One-click, site-level stow in advance of hurricane event			
 <b>Flooding</b>	Stowing to prevent panel immersion. Drive and control components protected at torque tube elevation			
 <b>High wind</b>	Automated response to site wind conditions			
 <b>Heavy snow</b>	Prevent snow accumulation on panels, or shed snow			
 <b>Sandstorms</b>	Support robotic cleaning integration			
 <b>Loss of site power</b>	Automated defensive stowing upon loss of grid power			
 <b>Overnight</b>	A Nighttime position configurable to project-specific factors			

## Nexttracker versus Traditional Tracking Systems

NX Horizon with NX Navigator Premium help better address severe weather events when combined with appropriate operational planning & response protocols by the system operator. NX Horizon Hail Pro offers additional protection with upgraded engineering and advanced software specifically designed to mitigate the unique dangers of hail. This combination of technologies is the industry’s most advanced tracker solution for severe weather management, with capabilities well beyond those available with traditional tracking systems.



*Nexttracker operating in extreme site conditions*





Above: Full Scale Wind Testing at NREL Flat Irons Campus

Limitations of traditional tracking systems in severe weather may include:

- Passively stowed trackers which use wind forces to reposition rows lack complete operator control and may experience poor stow timing and direction when wind conditions change.
- Hail stowing is less effective on systems with a smaller range of motion. A vertically falling hailstone will impart approximately 65% more impact energy on panels stowed at 50° versus 60°.
- Tracker systems using AC power are at risk of losing stowing capability in the event of a power outage
- Longer wait times to achieve safety stow. AC powered or unbalanced systems may take 5-10 minutes to reposition
- Less-advanced actively stowed trackers are unlikely to deliver comparable stow reliability, communications, and sensor integration as the 75GW proven NX Horizon system.

	NX HORIZON + NX NAVIGATOR	TRADITIONAL TRACKERS
Integrated UPS	✓	✗
+/- 60° range of motion	✓	✗
2-minute stow capability	✓	✗
Smart, active row control	✓	✗
Weather event response planning	✓	✗

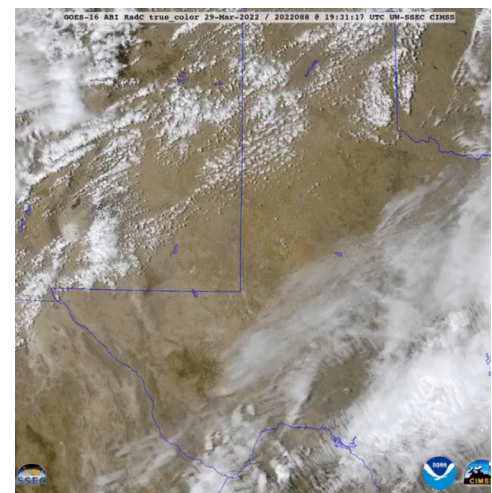
FEATURES	NX HORIZON + NX NAVIGATOR	NX HORIZON HAIL PRO	CONVENTIONAL TRACKERS
Self-powered with integrated UPS	✓	✓	✗
Up to 40°/minute rotation speed	✓	✓	✗
60° stow angle	✓	✓	✗
360° wind structural design		✓	✗
Rapid stowing broadcast		✓	✗
Single-click manual stowing		✓	✗
User-configured automated stowing		✓	✗
75° stow angle		Available	✗

## How Can We Help?

Nextracker takes great pride in strong, ongoing partnership with powerplant developers, owners, and operators. It is through supporting the success of your projects that we fulfill our mission as a leading energy solutions company.

In this e-book we've highlighted the role tracking systems play with respect to severe weather events, and how Nextracker products and technology enable operators to better address risk across a wide variety of event types. Severe weather and Nat Cat risk is an important topic for the industry, and together we will rise to these challenges by building, operating and supporting high-quality, weather resilient powerplants.

We are committed to the continued development of severe weather solutions and welcome the opportunity to meet with your team to discuss in more detail. To schedule a follow-up meeting, please contact your Nextracker representative and reference this e-book, which we sincerely hope you found valuable.



## References

1: <https://www.energy.gov/sites/prod/files/2017/02/f34/Chapter%20IV--Ensuring%20Electricity%20System%20Reliability%2C%20Security%2C%20and%20Resilience.pdf>

Above: Satellite view of a dust storm  
Below: A dust storm





