



Severe Weather Management eBook

For plant developers, owners and operators





Storm over Bannerton Solar Farm, Australia

Table of Contents

Introduction 3

NX Horizon + NX Navigator 4

NX Navigator 4

 Weather Event Response Planning 5

 Real-Time Control and Monitoring 5

NX Horizon Intelligent Stowing with Integrated UPS 6

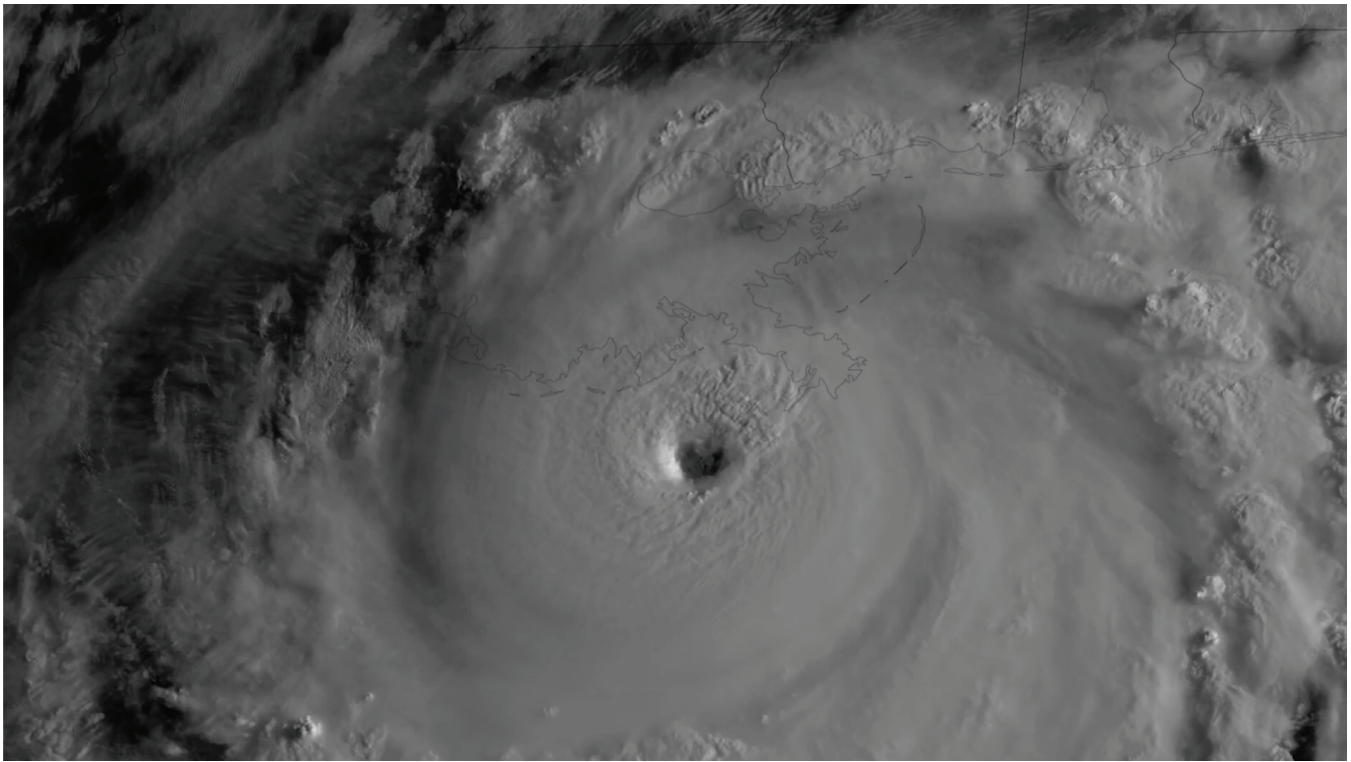
 Severe Weather Event Scenarios 7

Nextracker versus Traditional Tracking Systems 7

 Limitations of traditional tracking systems in severe weather 8

How Can We Help? 9

 References 9

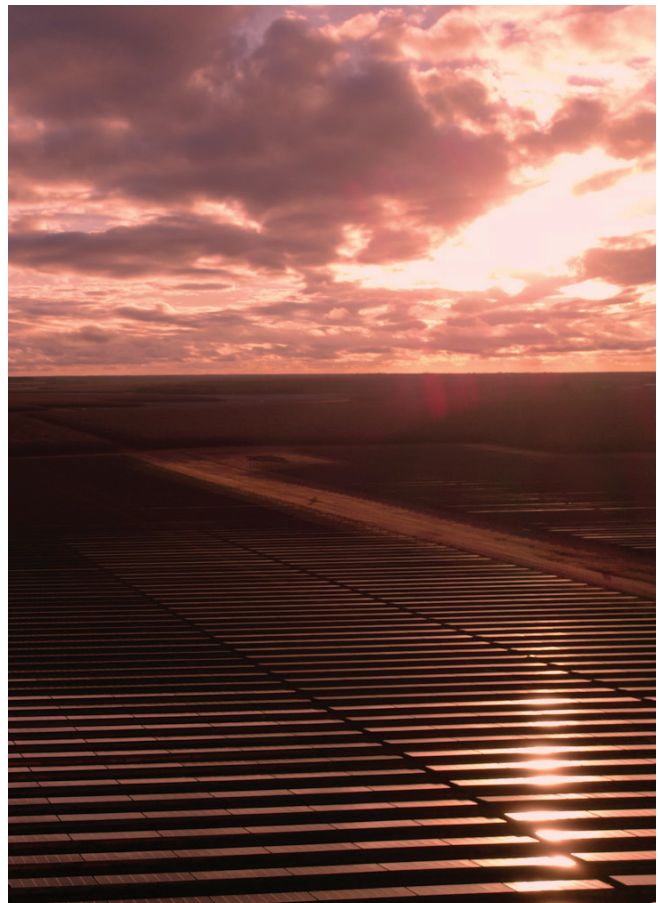


Hurricane Ida approaching landfall

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 Horizon™ features the most capable and responsive active stowing functionality in the industry, including integrated UPS for backup stowing power as standard. NX Navigator™ empowers system operators with the industry's most advanced weather event planning & response tools.

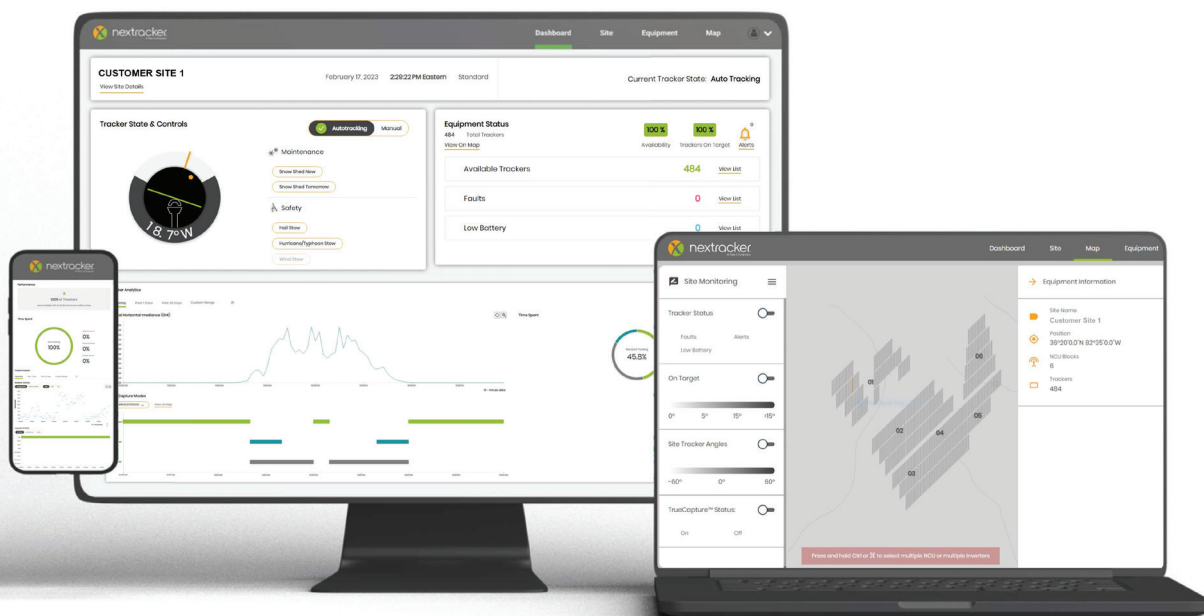


NX Horizon + NX Navigator

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.

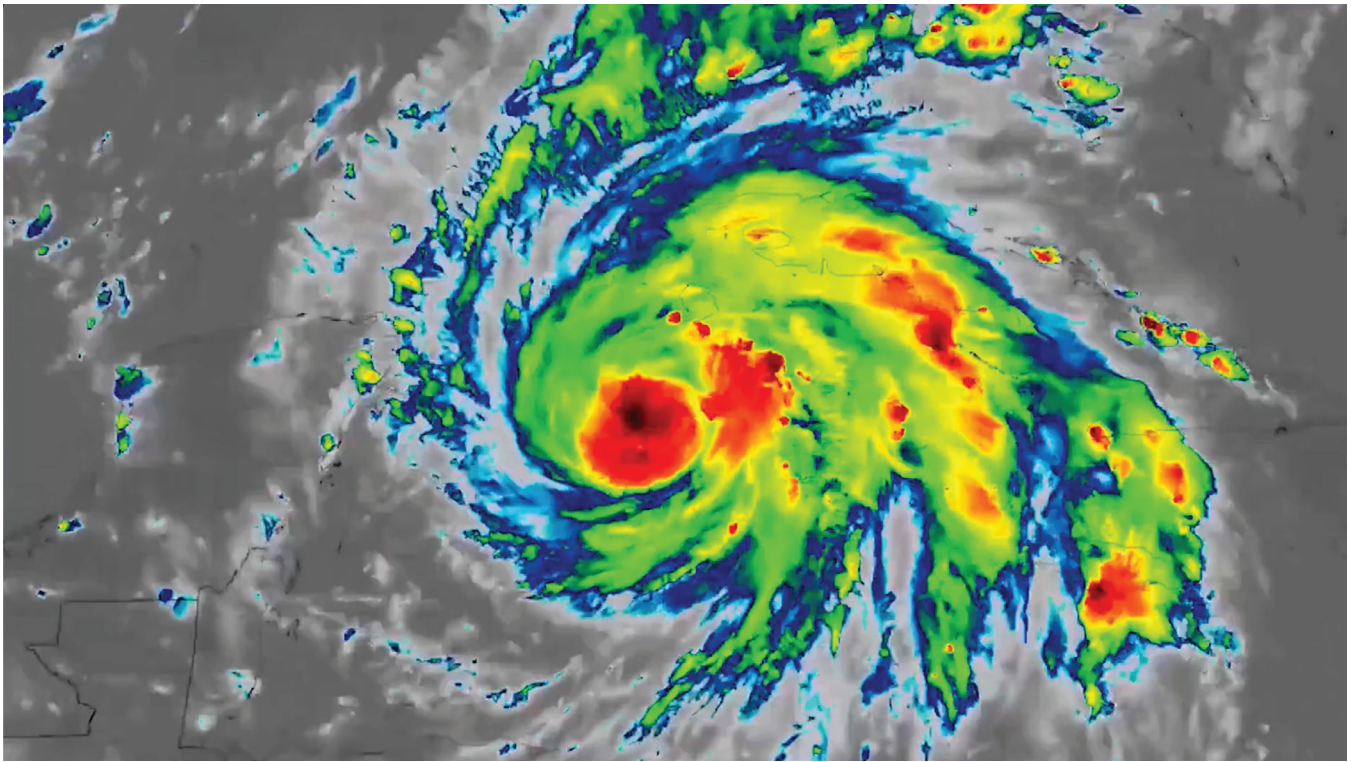
The combination of NX Horizon with NX Navigator Premium arms plant operators with advanced operational tools and stowing capabilities to manage their solar assets before, during and after severe weather events, without reliance on grid power. Operators of Nextracker systems enjoy greater control and 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.



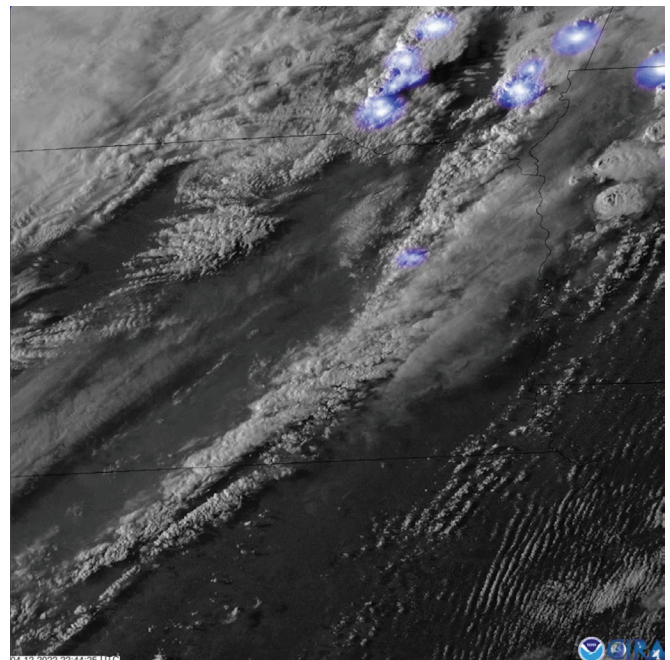
Satellite view of Hurricane Ian

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

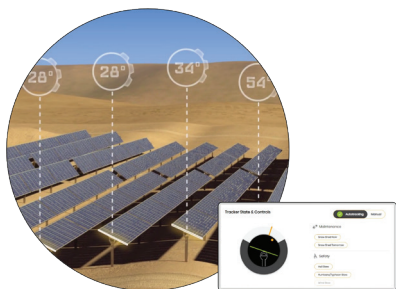


Flood Avoidance

NX Horizon Intelligent Stowing with Integrated UPS

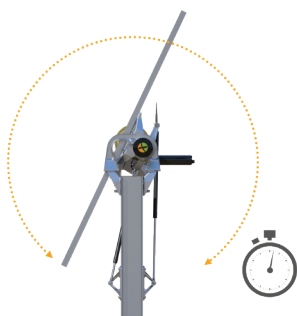
The industry's most capable and responsive tracker for severe weather

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.



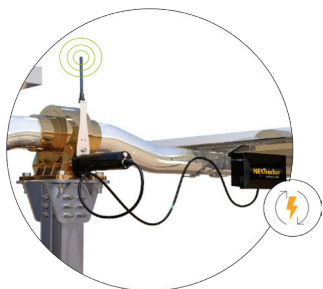
Smart, Active Row Control

- 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 States¹. 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.

Example: Severe Weather Event Scenarios

EVENT	SYSTEM RESPONSE	AVAILABLE STOW TYPES		DIRECTIONAL CONTROL
		AUTOMATED	OPERATOR	
 Hail	One-click, site-level stow in advance of hail event			
 Hurricane	One-click, site-level stow in advance of hurricane event			
 Flooding	Stowing to prevent panel immersion. Drive and control components protected at torque tube elevation			
 High wind	Automated response to site wind conditions			
 Heavy snow	Prevent snow accumulation on panels, or shed snow			
 Sandstorms	Support robotic cleaning integration			
 Loss of site power	Automated defensive stowing upon loss of grid power			
 Overnight	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. This combination of technology 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 70GW proven NX Horizon system.

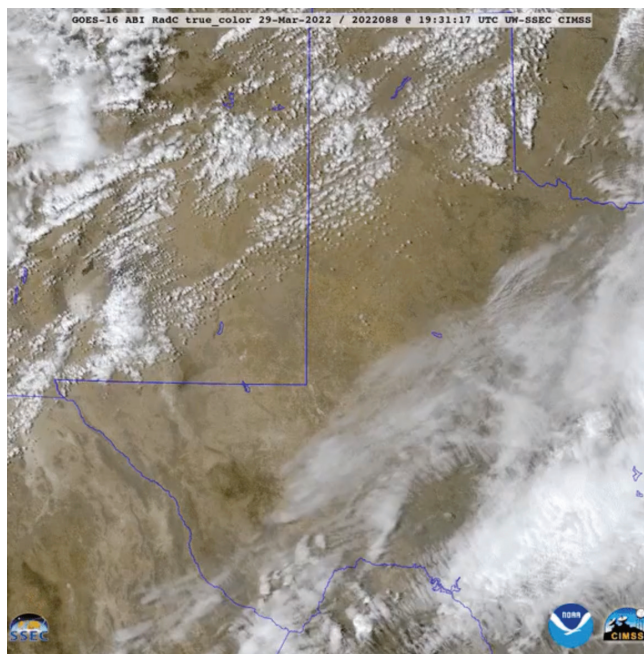
	NX HORIZON + NX NAVIGATOR	TRADITIONAL TRACKERS
Integrated UPS	✓	✗
+/- 60° range of motion	✓	✗
2-minute stow capability	✓	✗
Smart, active row control	✓	✗
Weather event response planning	✓	✗

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.



Above: Satellite view of a dust storm

Below: A dust storm

References

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



