Tempest news

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Posted by **Weatherflow** • **December, 2021**

TEMPEST NEWS | DECEMBER 2021

NEARLY 100 YEARS AGO THE DEADLIEST TORNADO IN U.S. HISTORY STRUCK THE MIDWEST

Unseasonable and **devastating tornadoes ripped through portions of the Midw** earlier this month, resulting in the loss of at least 80 lives and leaving many more injured. Nearly a century ago, a similar outbreak of deadly tornadoes tore through almost the exact same region. The Tri-State Tornado was almost a mile wide at times, with winds reaching 300 mph, killing almost 700 people across Missouri, Indiana, and Illinois.

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CLIMATE CHANGE INCREASINGLY THREATENS THE U.S. ELECTRICITY GRID

The United States power grid is already facing a growing number of challenges. Struggles to meet current demand coupled with aging infrastructure and a future with only higher demand doesn't paint a promising picture. Now, experts are calling for climate change to be considered as future infrastructure planning begins.

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FUTURE HURRICANE SEASONS COULD BE EVEN MORE DAMAGING

It's no secret that the 2021 hurricane season was a bad one. Over 20 storms counted throughout the season caused NOAA to move to a backup list of official storm names for the second year in a row, and US coastlines racked up $480 billion in damages from hurricanes and tropical storms. Research shows that damage in future seasons could be exacerbated by storms surging towards the coast but then slowing down once they arrive, a characteristic amplified by warmer climates.

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INNOVATOR OF THE MONTH

Since childhood weather geek Vincent Toupet has been captivated by weather data, collecting measurements daily for things like temperature and precipitation on just a sheet of paper in his home. Fast forward to adulthood and Vincent is still obsessed with weather data, but collects his measurements with a more sophisticated personal weather station, enjoying the perks of being able to view his weather data even while out on the go. But Vincent became frustrated with the lack of data analytics in the user interface of many stations and decided to find a solution. He started a side project to create an application that would allow him to manipulate his weather data to create reports, compare weather with the previous day or year, and more. Thus, his app **SmartMixin** was born!

For the future, Vincent plans on building a configurable widget for Android and iOS, extending the app's alert system with more complex scenarios, and adding more reports. On the weather forecast side, he would like to extend the way we can compare forecasts coming from different models (GFS, HRRR, Arome, Arpege, ICON...). Tempest is supported by SmartMixin through our open API and can be downloaded for iOS and Android.

let's talk about the weather

...with our very own co-founder and CEO here at WeatherFlow-Tempest, Buck Lyons! We caught up with Buck this month to talk more about the importance of neighborhood-level weather data, the company's recent success on StartEngine, and more.

Q: TELL US ABOUT YOUR WORK IN WEATHER. WHERE DID YOUR BELIEF THAT A HYPERLOCAL WEATHER STATION WOULD BE A GOOD BUSINESS COME FROM?

A: I realized that for many of the things I liked to do, (fishing, scuba diving, skiing, kiteboarding), having better, more localized weather information would be a game-

changer. Although I wasn't much of a surfer, I knew that what Surfline was doing f surfing was incredibly innovative and could be the genesis of a business. So I star WeatherFlow at the beginning of 2000, with an emphasis on outdoor sports at the time. Because it was a tumultuous time in valuations of businesses and we were kind of out of sight, we lost out on early acquisitions we wanted to make. So, we decided to start doing it ourselves and started the company. When the .com crash came shortly after, because we were focusing on providing real, valuable information unlike most companies that went out of business, but were able to stay in business providing a subscription product to windsurfers and sailors. From there we migrated our business applications to other industries and government groups, and have continued to grow. But we never forgot our roots, providing weather information to sailors and windsurfers!

Q: WHEN DID YOU LAUNCH THE TEMPEST? CAN YOU TELL ME ABOUT IT?

A: Our effort was only launched in May of 2020. We introduced an earlier version as a test system a few years before. Advances in technology allowed us to build this elegant system with no moving parts. It's incredibly reliable, can send data to central servers, and provides better data to help inform many products. The IoT really allowed it to explode, as it integrates various types of technology, including sensors, enabling data to be centrally collected, analyzed, and processed in a way to be most useful.

Q: JUST READ IN BLOOMBERG THAT VOLATILE WEATHER IS FORCING CITIES TO SEEK 'ADDITIONAL' WEATHER INSIGHTS. HOW HAS CLIMATE CHANGE IMPACTED DEMAND FOR WEATHER DATA?

A: Absolutely. We provide weather insights to businesses, governments, and community organizations like fire departments, community risk reduction offices...really anywhere where weather insights are very broad. There is a lot more awareness around how having better info can help individuals or entities like cities and governments because of factors like climate change.

Q: CAN YOU PROVIDE AN EXAMPLE OF HOW THE PRIVATE AND PUBLIC WEATHER SECTORS ARE WORKING TOGETHER? WHY IS THAT COLLABORATION IMPORTANT?

A: While public organizations are certainly doing critical work for the collective good, realistically they do not have the budgets or ability to invest in all the data they need to do their job. Cooperation between the public, private, and academic

sectors is crucial in order to adequately leverage our respective strengths and resources to achieve common goals.

Take something extreme like insurance companies, if they want to have better information to help them process claims more efficiently, or price their products better in certain geographic areas, for example, it doesn't make sense as a taxpayer to want to subsidize that. But, if all those insurance companies' customers bought weather stations after an extreme event like fire or major storm, those stations help create a footprint, help emergency managers react, and that's a good thing. We provide data to NOAA from Tempest stations without charge because we know realistically we're not going to get tons of money out of them for that, and it's the right thing to do.

You're treading on scary territory if you are talking about producing data and charging for it, when the mission of these organizations is geared towards saving lives. We won't put ourselves in that position when it comes to protecting people, especially from broad events, where organizations like NOAA exist to help. We're going to open the source of data for them.

e are planning to launch a series of community weather products in the future. Obviously, if a government has the budget to offer something for their community and is willing to pay us to do it, that's great. What we've seen is that everyone has limited budgets, so we are trying to find the people whose needs are most met by what we offer and in some cases it's police departments, emergency management, community risk reduction organizations. We want to have those organizations as clients...they have budgets to do their job and we can help. We also want to recognize when someone else has funded having data, making that data available to NOAA which helps to manage risk for everyone.

Q: WHY DOES THE WORLD NEED BETTER NEIGHBORHOOD-LEVEL WEATHER DATA AND DECISION SUPPORT?

A: It's more important than ever to have better local data. Sports just happened to be a niche I was following 20 something years ago.....not the most important now, but having better weather info has always been critical to helping businesses and government organizations run efficiently or to help keep people safe.

Q: CAN YOU TELL US SOME INTERESTING USE CASES FOR LEVERAGING NEIGHBORHOOD-LEVEL WEATHER DATA?

A: One practical use case comes when gardeners discover that if they have better localized weather information for their backyard or small farm, they can save water

and other resources throughout their growing seasons. Most importantly, tools that are compatible with our device (smart sprinkler controllers) allow you to skip watering if it's raining or about to rain. We can notify you of a freeze event so you can cover your outdoor plants, etc. So not critical, but valuable nonetheless.

Q: HOW IS WEATHER DATA HELPING TO MITIGATE THE EFFECTS OF CLIMATE CHANGE?

A: It allows researchers and scientists to measure and track changes in our climate over time. There was a time where it was harder to talk about climate change directly, just having better weather data by itself is not going to change the effect humans are having on the climate. One way it helps is if you have better weather info, you are better able to react to different or more extreme weather and save resources like energy and water because you have more information and can act from that to be more prepared. Keeping a climate record won't end the climate change debate, but will result in more informed debate around the causes and what to do about it.

Q: PEOPLE HAVE ACCESS TO MORE DATA THAN EVER BEFORE, AND WE'RE CONSTANTLY USING THAT TO MONITOR OUR HEALTH, HOMES, AND MORE. FOR THE AVERAGE PERSON, WHAT IS THE GREATEST BENEFIT OF HAVING WEATHER DATA AT YOUR SPECIFIC LOCATION?

A: Everyone always wants a very extreme example of actionable weather information, like evacuating from a flood. I think for emergency management, local or national weather services, the information they need to help communicate to people for saving themselves from extreme weather, we make our data available to those organizations for that purpose.

Where Tempest is having an impact on things like extreme flash floods, is where there's a dense array of weather stations in places. Measuring weather is helpful to predict where there is going to be flooding. No advantage over your neighbor, but helping your neighbor or yourself in bigger way.

It's similar in a sense to the Purple air monitor, by owning Purple air you are doing more to help the whole, not the individual, and the same goes with Tempest. There is always some marginal benefit, wherever you are, in the case of, a flood, probably less true than case of air quality sensor, if you live on side of a mountain, not effecting by a flood, but how much rain you measure helps the valley below.

Q: PG&E RECENTLY ANNOUNCED THE INSTALLATION OF 300 WEATHER STATIONS IN HIGH FIRE-THREAT AREAS ACROSS IT'S SERVICE TERRITORI TO HELP INFORM UTILITY OPERATIONAL PLANNING. IS THIS SOMETHING YOU THINK WE WILL CONTINUE TO SEE FROM OTHER UTILITY COMPANIES?

A: There are a lot of good reasons for providing weather stations to utilities. One is the ability to identify and manage the fire risk level of a specific neighborhood. The kind of weather network PG&E has helps anticipate when severe weather is likely to create downed power lines and hazards. With 300, not a crazy large number, they won't be able to use that to better predict where a fire going once it started, that's where it becomes very valuable to have large quantities of weather stations. If you have many thousands of tempests in an area, suddenly you're getting a real footprint and can help predict where a fire is going.

But weather stations are also useful for helping utility management day-to-day - monitoring energy use, tracking minor weather issues that create maintenance, etc. And remember, it is not the utility company's job to do evacuations, but they have a lot of liability as we've seen with recent fires in California. So the weather stations are one of many ways there are managing their liability risk.

Q: WEATHERFLOW-TEMPEST FREQUENTLY TOUTS ITS NEARCAST TECHNOLOGY - CAN YOU EXPLAIN WHAT THAT IS?

A: Nearcast Technology is one of our great strengths as a company, and it is essentially providing weather data that is on the microscale, informing you on the differences in what is weather doing here and a relatively short distance away. When we say Nearcast, we mean near in a sense of near in space, on a micro-scale. Another thing we mean by near is time: we are focused on what the weather is doing right now, later today, and tomorrow. That spills over, some people want to know what it did historically, or yesterday.

That's what we mean by Nearcast, the ability to provide this microscale short-term information that's more accurate than anything you can get elsewhere. In terms of how we do it, we have more measurements than anyone else, partially thanks to the Tempest network, and make it a point to scour the Earth for every weather observation that we can. We have a lot of IP and know-how around weather modeling, so we run weather models that are similar to government weather models but on a tighter scale (microscale), apply AI to then make that model output even better, more accurate, more tailored to microscale.

Q: IS THERE A SWEET SPOT FOR THE NUMBER OF TEMPEST STATIONS IN ONE AREA FOR BEST PERFORMANCE?

A: Ideal density of the stations varies by where you are. If you're in a flat area of desert, then you need less than in a hilly area, but it always helps to have a dense network. You get greater info on a micro-scale but also get redundancy. One thing we do well is taking this large amount of data and applying quality control checks to it. Someone may have a single Tempest poorly located, so its data is less helpful. But even in a bad location, with more data, it is easier for the computer system to recognize that a station will have limited value (or maybe no value for wind, but still good for rain and temperature).

Q: WEATHERFLOW-TEMPEST RECENTLY LAUNCHED AN EQUITY CROWDFUNDING CAMPAIGN ON STARTENGINE. CAN YOU TELL US A BIT ABOUT THIS AND WHAT IT MEANS FOR THE COMPANY?

A: We had been successful in the past with platforms like Kickstarter and Indiegogo and pre-sold a couple of million dollars worth of Tempest's during our initial launching phase. What's more impressive is how many we've sold since then - almost 35,000 worldwide and counting.

StartEngine is a platform where the relationship between the investor (in this case, just a regular person) and the company is much simpler, without big layers of overhead or people making money in the middle. Equity crowdfunding IS a bit like a baby version of going public, instead of issuing shares and having them listed on the stock exchange, you are selling shares to the general public without having to go through all these regulatory steps of being a public company. Nobody is an expert in picking a winner, and if a company already has success that's measurable, I would like to think that makes it more attractive and reduces risk. It seemed like a good way to get good value from investors while giving good value back to them - getting and giving good value.

The biggest reason we launched our campaign was to have a series of customer-clients who are passionate advocates for what we do, and we like the idea of building up that community. I love the idea of sharing success with those people, and it's good for us too - people who believe in our products benefit from ownership, that was the single biggest reason we did it.

You can stay up to date with all things WeatherFlow Tempest in 2022 by following us on our social media channels below and learn more about our StartEngine campaign **HERE**.

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