



Tropical Weather Analytics, Inc.

Notable Investors

Jean Genest

CEO at Pole Air Aviation



Jim McGill

Chairman at MacroSolve, Inc



\$0 RAISED

0% of minimum target: \$50,000

0% of maximum goal raised: \$1,070,000

0 Investors

\$100 min for US investors.

Customers



Discovery



Discovery



Discovery

PITCH DISCUSSION UPDATES **1**

Highlights

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Deal Terms

Problem

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HIGHLIGHTS



Wholly owned IP

Proprietary technology developed with over \$108 million.



NASA Award

2017 Innovation in Earth Science & Remote Sensing Winner.



SUMMARY

PROBLEM Increasingly uncertain and extreme weather events due to climate change cost the industry and government billions of dollars each year.

SOLUTION Faster, higher resolution, custom weather analytics and forecasting to more accurately predict and prepare for

and forecasting to more accurately predict and prepare for extreme weather phenomena.

PRODUCT A NanoSat constellation that takes 3D wind measurements to reliably provide more accurate weather and early hurricane forecasts.

TRACTION \$108 Million Invested by NASA and DoD over a 10-year span., Winner of NASA's 2017 Innovation in Earth Science and Remote Sensing Award., Our work onboard the ISS is frequently featured in stories and technical write ups by NASA.

CUSTOMERS IBM, DTN, NOAA

BUSINESS MODEL Subscription/recurring payment

MARKET Approx. Market Size: 2.7B

COMPETITION TWA is the first company to routinely 3D map clouds and winds globally; currently, there are no competing offerings in the marketplace.

TEAM Chief Scientists from MIT, the Air Force Geophysics Lab & Times' "Most 100 Influential People" list; COO with \$300M+ in revenue generation & 2 exits.

VISION To save lives, reduce climate event damages by billions, and build a better world through more accurate weather forecasts.

USE OF FUNDS Build, launch and operate 2 NanoSats that will enable product delivery to customers.

MEDIA MENTIONS



Disrupting the way we understand the world's deadliest storms

ISS National Laboratory ⓘ



Looking into the Eye of a Hurricane

ISS National Laboratory ⓘ

DEAL TERMS

How it works ⓘ

ⓘ Deal type

Convertible debt

① Valuation cap	\$1,000,000
① Discount	20.0%
① Maturity date	June 29, 2025
① Type of security	Convertible debt
① Interest rate	5.0%
① Investment range	\$100 - \$100,000
① Funding goal	\$50,000 - \$1,070,000
① Closing date	June 30, 2022, 11:00 PM ET
① Carry	0%
① Investor Fees	\$0
① FORM C	FORM C 

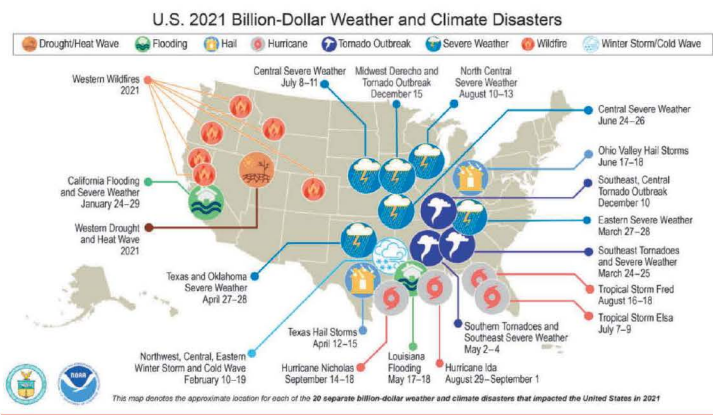
PROBLEM



Increasingly uncertain and extreme weather events due to climate change cost the industry and government billions of dollars each year.

Of all recorded weather disasters in U.S. history, tropical cyclones—also known as hurricanes— have caused the most deaths and destruction according to the National Oceanic and Atmospheric Administration (NOAA). 2020 broke the record with 22 weather and climate disasters, each averaging a cost of almost \$19.2 billion [1].

As if the intensity of hurricanes was not worrisome enough, 2020 marked the 10th consecutive year with eight or more billion-dollar weather disasters.



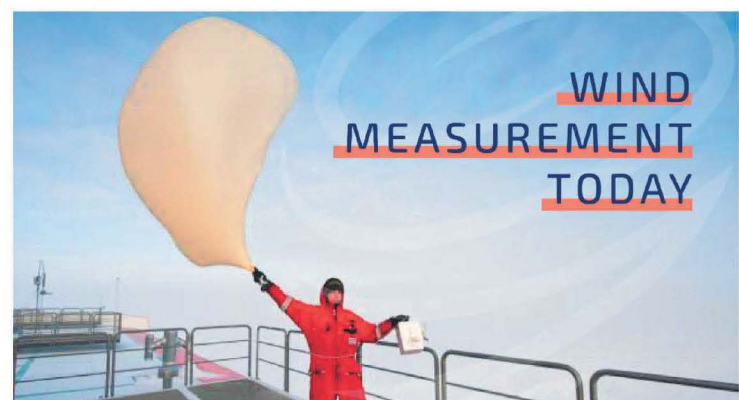
While you may consider the weather forecasts on your cellphone as pretty accurate for the next 1–3 days, test how accurately it predicts weather 8 to 10 days away. Turns out, they are unreliable [2]. This 8–10 difference matters to those who have weather timing pressures such as electric utility plants that need to account for the expected supply of solar and wind energy to grids. It also matters to the farmer who has to plan for irrigation cycles or needs as much time notice to protect their crop from freezes.

Early warning systems are a critical life-saving tool and accurate weather forecasting is crucial to first responders. The UN found that just 24 hours' warning of a coming tropical storm can prevent up to 30% of the ensuing damage and avoid losses of \$3–16 billion per year in developing countries[3]. Now more than ever, private industries and governments need early and accurate weather forecasts to safeguard lives and weatherize assets [4].

Current weather and hurricane forecast models can benefit from critical wind measurements, especially the polar regions and in particular, the polar vortex. The Polar Vortex is a band of wind that circles both poles and makes a sort of atmospheric wall that keeps the cold winds at the poles. The observed instability of the Polar Vortex has enormous impacts on our society because as “the wall” weakens or wobbles, cold air jets escape and lead to more persistent weather extremes [5].



At the Polar Vortex, current satellites mostly only measure the horizontal wind vectors. However, the vertical winds are currently unaccounted for and play just as critical a role in weather patterns. Vertical winds are currently observed in a limited capability by weather balloons and stations that only capture a localized region and are unable to observe from the upper atmosphere.





World Meteorological Organization's observer with a weather balloon.

Drastic fluctuations in the polar vortex are believed to be caused by climate change [6]. It is undeniable that climate change is monetarily affecting over 20 industrial sectors and all nations on a daily basis [7]. While political leaders try to agree on a global plan to reduce emissions, countries around the world would reap the benefits of better forecast solutions now. This is where TWA's NanoSatellite mission comes in to provide 2x more accurate forecasts.

SOLUTION



Faster, higher resolution, custom weather analytics and forecasting to more accurately predict and prepare for extreme weather phenomena.

We can't control the weather (yet!) but we can prepare for it. Tropical Weather Analytics' Hurricane Hunter NanoSatellite constellation will provide a high-frequency, high-resolution, 3D global measurement of wind velocities filling the gap in existing weather forecast models.

TWA's 3D measuring technique was developed through over \$108 million dollars in contracts from NASA, the Department of Defense (DoD), and commercial satellite companies along with nearly a decade of hurricane observations using the International Space Station. Our contracts were awarded to help solve the hurricane problem but it became apparent to our team that observational data from the frigid air churning over the North Pole, the Polar Vortex, was critical to understanding and predicting weather patterns.

Modern weather observations mostly come from weather stations, weather balloons, radars, ships and buoys, and satellites. Surprisingly, a large number of U.S measurements are still made by volunteer weather watchers [8]. Every 12 hours, hundreds of people in places around the world release huge, white balloons into the sky [9].

Current methods for forecasting weather are limited:

- **Weather balloons** are not at the poles, only sent up twice per day and measure a small fraction of the planet.

- **Doppler Radar** stations have limited range and large regions such as the north and south poles as well as open ocean, are uncovered.
- **Aircraft** are limited to time and space (flight routes).
- **Microwave-based LEO and GEO satellites** are subject to interference from space and terrestrial sources. GEO satellites only measure wind in 2D and can only approximate the horizontal wind speed at a spatial resolution of several km.

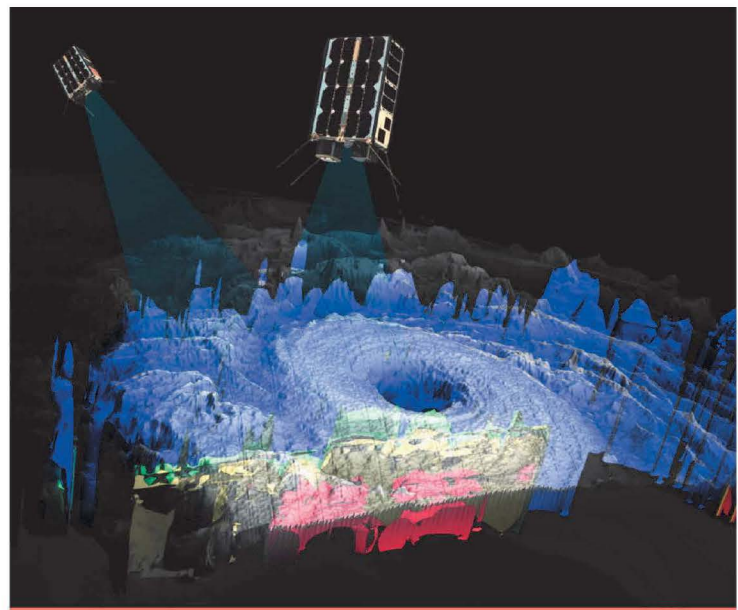
The measurements from our satellites will address a major deficiency in currently available wind data and will give meteorologists and scientists a more complete picture of atmospheric conditions and reduce the number of uncertainties that are factored into prediction models.

By plugging our truly unique, space-based 3D wind measurements into their models, forecasters will be able to extend weather forecasts and provide more accurate, reliable, and actionable predictions. This will allow governments and businesses to better plan and react to climate events and reduce deaths and damage during climate disasters since, in any climate event, time is critical. Knowing what will happen earlier is extremely valuable to the weatherization of infrastructure and evacuation efforts.

PRODUCT



A NanoSat constellation that takes 3D wind measurements to reliably provide more accurate weather and early hurricane forecasts.



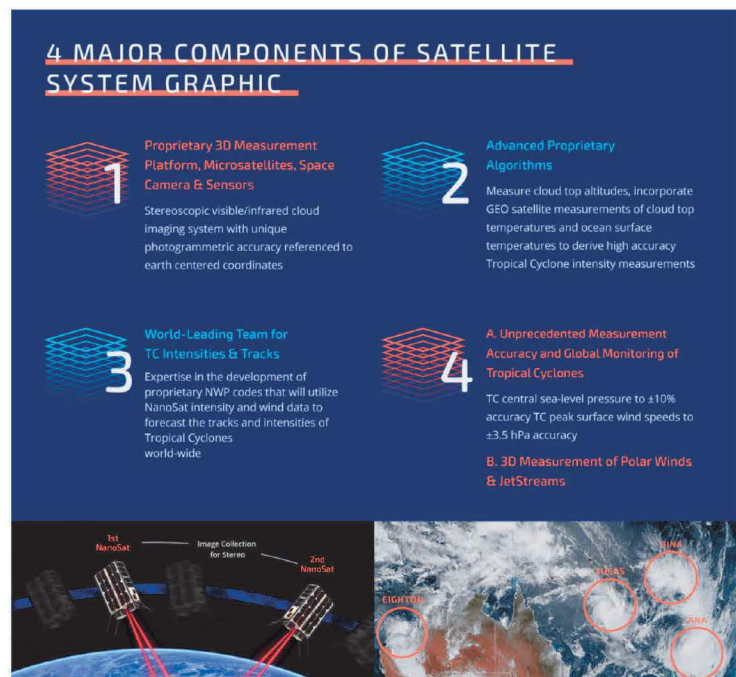
TMA's Hurricane Hunter NanoSatellite constellation consists of 8 color

Tropical Weather Analytics will own several pairs of satellites named Hurricane Hunters. These satellites will be capable of measuring polar vortex-derived weather systems with a high frequency proprietary technique that provides a unique, actionable dataset. The Hurricane Hunter Satellites will measure clouds and wind in 3D around the globe. These capabilities are highly attractive to large providers and aggregators of weather data such as IBM, Spire, and Tomorrow.

TWA's Hurricane Hunter NanoSatellite constellation consists of 8 polar orbiting nanosats flying in pairs. The satellites will collect precise images of the same clouds at different angles using stereoscopic technique. The images are then combined, and processed through our proprietary algorithms to produce 3D renderings of clouds and high-resolution numerical values of wind velocities across all altitudes of the cloud structure.

Dozens of observations can be made of targeted areas over most of the globe and repeated at least 3 or 4 times each day with our nanosat constellation, which surpasses both the frequency and area covered by weather balloons (2X per day, only regional). By using this technique, we can measure cloud altitudes and motion (winds) in precise Earth-centered coordinates with spatial scales to an accuracy of +/- 100 meters and ~2 m/s (~4 mph), far exceeding current GEO and LEO satellite capabilities. Hurricanes, typhoons, cyclones, the polar vortex and clouds in the jet stream will all be measured at a frequency and resolution that does not currently exist.

TWA's field testing carried out at the International Space Station, resulted in several case studies that demonstrated 2x more accuracy in hurricane and weather forecasting prediction capabilities. Our Hurricane Hunter Satellites can provide comparable observation capabilities to a US fleet of aircraft at 1/25th of the cost. It is worth noting that a US fleet of aircraft is devoted to hurricanes in the U.S. only; TWA's observations will be global and would benefit many countries that don't have the same capabilities as the United States.





TWA's weather products include data packages for meteorological experts and a recurring subscription model for private users:

- Big data, high-frequency/high-precision 3D wind measurements that meteorologists and climate scientists will use to feed into their prediction models.
- Improved hurricane forecasts, especially benefiting countries that can't afford to have a dedicated fleet of aircraft comparable to the US.
- Low-cost software and apps that deliver actionable weather intelligence directly into users' hands.

TRACTION



\$108 Million Invested by NASA and DoD over a 10-year span.

Winner of NASA's 2017 Innovation in Earth Science and Remote Sensing Award.

Our work onboard the ISS is frequently featured in stories and technical write ups by NASA.

TWA's unique and proprietary technology development was supported by over \$108 million dollars in direct contracts with NASA, the Department of Defense, and Maxar. An additional \$25 to \$35 million was committed by NASA to carry out field testing aboard the International Space Station from 2013-2018.

TWA's algorithms have been refined and improved over nearly a decade of space observations and have been validated by a team of in-space mission scientists and case studies, resulting in TWA's winning of NASA's 2017 Award for Innovation in Earth Science and Remote Sensing.

CUSTOMERS



IBM
DISCOVERY



DTN
DISCOVERY



NOAA
DISCOVERY

TWA will develop software programs and apps for millions of end-users geared towards solving specific problems for a range of industries. For instance, farmers can use our weather app to increase their crop yield and the value of their land due to the earlier, more reliable weather forecasts our data provides. Such an app can be used by stock traders to get an earlier indication of crop and commodity values, or an insurance company looking to minimize risk or set proper rates for cities and properties at risk. The shipping and cargo industry can use weather intelligence to minimize loss and maximize rates as the weather plays a critical role in both ocean and land shipping. The solar industry can better determine demand and rates with our improved cloud forecasts. The apps are scalable and rely on users to input their data to obtain advanced hyper-local or macro weather intelligence that will help them mitigate risk and plan around climate events.

OUR TECHNOLOGY HAS A WIDE RANGE OF APPLICATIONS



BUSINESS MODEL



Subscription/Recurring Payment

Selling a product or service that customers pay on a recurring basis, usually month to month, or annually

As Tropical Weather Analytics owns the generation of a unique dataset, we are able to approach the weather data market as both a data provider and a user-centric applications developer, allowing us

to potentially benefit from a Software-as-a-Service (SaaS) and pay-per-use model.

We will sell raw data for a monthly subscription to high-end users, hurricane forecasts at a flat fee to countries, and low-cost apps to casual users across over 22 industrial sectors. High dollar monthly data subscribers are a long sales cycle, no matter the value of the product.

Our strategy is to improve our data algorithms with continuous data collection on every weather event and to continue to target the meteorology community. However, there are only 300,000 experts worldwide and high dollar monthly subscribers take time to acquire. Any demonstration of an improvement in weather forecast will become known and valued.

To accelerate our revenue growth we will concentrate on a select few industries with millions of users. By integrating our advanced wind data to improve weather forecasts, we can address specific problems and areas of need at a low cost without giving up our main data product.

1. Big data subscriptions \$6,000 – \$9,000 per month to meteorologists and scientists.
2. Hurricane forecasts \$10M per year to countries without aircraft observation capability.
3. Practical End-User Apps to millions of general users \$100/month

MARKET



2.7B

Approximate Total Market Size

The weather forecasting market is projected to grow to USD \$3.5 billion by 2026, at a CAGR of 5.1% from \$2.7 billion in 2021 [\[10\]](#). Accurate weather forecasts are essential and matter most to insurance companies preparing for disasters, wind-farm owners optimizing their turbines, airlines eager to save fuel, farmers planting crops, retailers marshaling stock, and first responders. As such, our offerings have the opportunity to impact multiple markets including agriculture, aviation, transportation & logistics, oil & gas, marine, renewable energy, meteorology, weather service providers, and medical.

Big data analytics and the growing concerns over climate change are forecasted to drive weather forecasting demand [\[11\]](#). The weather satellites segment is estimated to lead the weather forecasting systems market from 2021 to 2026 and is projected to grow further due to the increasing need for earth monitoring and weather observing systems to measure, monitor, and provide valuable inputs on several climatic parameters [\[12\]](#).



TWA is the first company to routinely 3D map clouds and winds globally; currently, there are no competing offerings in the marketplace.

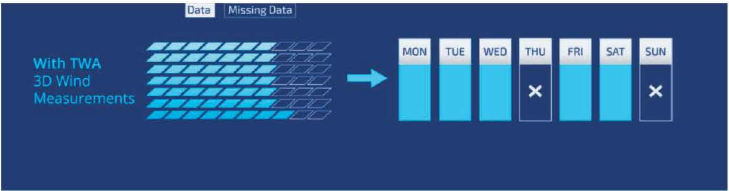
Our competitive landscape is unique in that our competitors are also part of our target market. The majority of companies that TWA would consider as competitors, except for those with their own satellite constellations, are working from the same government and private assets to produce weather forecasts [13].

A study comparing major weather providers on forecast accuracy from 2017 to 2020 found that The Weather Channel performed best globally out of 17 weather forecast providers. The Weather Channel, which uses IBM's AI, performed best achieving only 41.1% accuracy on one-day-out forecasts and 38.9% on two-days-out [14]. TWA provides earlier and 2x more accurate forecasts.



TWA is the only company that can routinely map clouds and winds globally in 3D. One of TWA's competitive advantages is its hold of strong intellectual property derived from over \$100 million dollars of research and development combined with over a decade of hurricane observations from the International Space Station. Our unique wind data will make us a key player in the market as TWA offers a critical piece of weather forecast data that no other government agency or company can provide. Potential competitors such as The Weather Channel, Tomorrow.io, DTN, will benefit from TWA's input. Our team will continue to innovate and adapt to market needs.





TEAM



Chief Scientists from MIT, the Air Force Geophysics Lab & Times' "Most 100 Influential People" list; COO with \$300M+ in revenue generation & 2 exits.

Meet the TWA Team:



Chief Executive Officer
A.T. STAIR

Retired Chief Scientist of the Air Force Geophysics Laboratory. / Program Manager and PI with overall responsibility on multiple satellite programs: Cirrus1, STS-4, Cirrus 1A, and Midcourse Space Experiment (MSX). / Chief Scientist of the Russian American Observation Satellites Program (RAMOS).



President
ILYA SCHILLER

Established track record for building businesses and creating products in the high tech industry. / Co-founder and CEO of Digital Ink, Inc. company responsible for developing the electronic pen system for communication using handwritten notes. / Directly responsible for over \$5.5M raised funds in two stages of venture capital fundraising for Digital Ink, Inc. / Vice president at KTAADN, Inc., an applied remote-sensing equipment company, which achieved 400% growth during his tenure.



Chief Operating Officer
DANIEL HARKINS

20+ years of experience in senior marketing and sales level positions in a variety of industries including: satellite, digital manufacturing, life sciences and biophysics instrumentation. / Co-inventor and co-author of the first paper demonstrating instrumentation capable of measuring gene expression in intact tissue. / Brought over 10 products to market. / Generated more than \$300 million in sales through comprehensive digital, direct and go-to-market strategies for over 10 products. / Served as sales and marketing director for 2 successful exits of two separate Private Equity firms. / Experienced in acquisitions for the satellite and manufacturing industries.



Chairman TWA Science Advisory Board
KERRY EMANUEL

Professor of Atmospheric Science at MIT (Massachusetts Institute of Technology). / Developed the accepted theory of the large-scale thermodynamics of hurricanes cementing his reputation as the world's leading authority on the physics of hurricanes. / Co-Founder and Co-Director of the Lorenz Center, an MIT think tank, devoted to fundamental inquiry into the understanding and prediction of global climate change. / Named one of the Times' 100 influential people of 2006. / Elected as a member of the U.S. National Academy of Sciences in 2007. / Author and Co-authored over 200 peer-reviewed papers.

VISION



To save lives, reduce climate event damages by billions, and build a better world through more accurate weather forecasts.

TWA's vision is a world where we reduce the number of lost lives and mitigate damage caused by hurricanes and other climate events. Earlier, more accurate hurricane and weather forecasts will help businesses and governments predict and plan before catastrophe strikes.

Data collected by our NanoSat constellation will be the first sentinel before disasters so that governments can safeguard lives and be an ally for weather-dependent businesses that need to predict and plan around the weather in order to serve their millions of customers, unimpeded.

USE OF FUNDS



Build, launch and operate 2 NanoSats that will enable product delivery to customers.

We are raising capital to meet and accelerate customer demand, and to support the continued interest and growth in multiple industries.

To further develop our capabilities, we plan to expand the team and make key hires for software and app development as well as sales and marketing.

Our priority is to build, launch, and operate two 6U- Nanosatellites for a minimum of 12 months.

EXPECTED USE OF PROCEEDS

15%

Engagement of Launch Service

25%

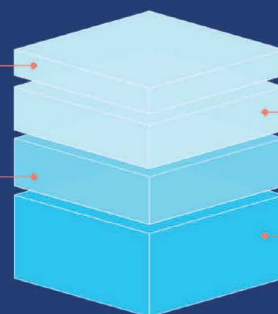
Manufacturing of NanoSats

20%

Sales and Marketing

40%

Working Capital



COMPANY



Tropical Weather Analytics, Inc.

Sat Applications/Earth Observation

World-Class Science and Engineering Team to Measure Hurricanes from Space – to provide faster, more accurate hurricane measurements and forecasts potentially saving billions of dollars and thousands of lives annually.

Website	weatheranalyticsinc.com/
Employee Count	7 People
Founding year	2016
Company type	Private

RISKS & DISCLOSURES



Risks and disclosures that are specific to our business and its financial condition.

We are a recently formed company and have limited operating history on which to evaluate our performance.

TWA was formed in August 2016. Since that time the company spend thousands of hours in R&D to bring the technology to the point of commercialization. Many studies were conducted for the best operational platform and sensors for this remote sensing technology. The company investigated the use of different platforms settling with microsatellites. That provided the best and most cost-effective way to provide observations globally. TWA has not yet commenced its principal intended business operations. Accordingly, TWA has a limited history upon which an evaluation of its performance and future prospects can be made. Our current and proposed operations are subject to all the business risks associated with early-stage enterprises. These include likely fluctuations in operating results as the Company reacts to developments in its market, manages its growth, and the entry of competitors into the market.

We expect to incur net losses until we can establish a consistent base of customers for the Company's product. There is no assurance that we will be profitable or generate sufficient revenues to support our operations.

