



Highlights

[Contributions from 12K Programmers Result in Helicopter Flight on Mars](#)

[America's 500 Fastest Growing Companies? 9 Enterprise Storage Hardware, Software, & Networking Companies](#)

[Poll Results from our Implementing NVMe™ and NVMe-oF™](#)

When do we return to workplace normal? And what does that mean anyway?

For us, providing opportunities for companies to describe their approaches to solving enterprise storage industry problems via multi-sponsor zoom webinars has been the norm for us for several years. We intend to broaden the scope of our coverage to more topics, deeper analysis, emerging technologies, and to partner with industry leaders to provide the best interactive, competitive, challenging, thoughtful conversations available. Our webinar schedule is available at the end of each newsletter, along with a calendar of upcoming industry events. Of course, we can tailor a custom webinar to meet your needs.

Our reach extends well beyond webinars, of course. With over thirty years' industry leadership experience, we have the expertise to meet any of your enterprise storage strategic marketing needs – from content creation, digital marketing, market research, messaging and branding, product positioning, audience engagement – whether you are an established market leader or in an emerging technology space.

Cheers! Mike Heumann

“Responsive and Efficient Storage Architectures for Cloud Service Providers”

Tuesday, May 18
9:00am



America's 500 Fastest Growing Companies?

9 Enterprise Storage Hardware, Software, & Networking Companies



[Financial Times Ranking of America's 500 Fastest Growing Companies for 2021](#) is out and includes nine enterprise storage hardware, software, and networking companies, which we feature here:

[OwnBackup](#) #38 Absolute Growth Rate (1512.3), Compound Annual Growth Rate (152.6), 2019 Revenue (18.94), 2016 Revenue (1.18), Number of Employees (185), Founding Year (2015)

“OwnBackup believes that no company operating on the cloud should ever lose data. With comprehensive backup, visual compare, and fast recovery capabilities, we have helped hundreds of organizations through data loss and corruption crises. Our solution also provides enterprises with the performance and reporting required to meet compliance regulations in a number of industries. We provide secure, automated, daily backups of SaaS and PaaS data, including Salesforce. The company was co-founded by technology veterans with deep experience in data-recovery, data-protection and information-security. OwnBackup’s solutions provide built-in protection against data loss and corruption caused by human error, malicious intent, integration error and rogue applications.”

[SingleStore](#) #188 Absolute Growth Rate (354.5), Compound Annual Growth Rate (65.7), 2019 Revenue (35), 2016 Revenue (7.7), Number of Employees (143), Founding Year (2011)

“Time is Everyone’s Stiffest Competition.

A business’ ability to operate with true intelligence at speed can be the deciding factor in success or failure. SingleStore helps companies deliver value at higher velocity so they can make the most of every moment.

SingleStore handles transactions and analytics, effortlessly, at the same time. Structured, semi-structured or unstructured. Streaming and historical alike. Unified through a single-pane-of-glass experience to make timely, accurate insight accessible for every worker and every workload.

Giving you a business intelligence ecosystem to develop products and services with real-time analytics, machine learning, AI — breaking down data silos that stifle innovation. The pace of business is only accelerating.

Defining the future starts with delivering value right now.”

[MongoDB](#) #234 Absolute Growth Rate (267.3), Compound Annual Growth Rate (54.3), 2019 Revenue (421.72), 2016 Revenue (114.81), Number of Employees (1814), Founding Year (2007)

“MongoDB is the leading modern, general purpose database platform, designed to unleash the power of software and data for developers and the applications they build. Headquartered in New York, MongoDB has more than 24,800 customers in over 100 countries. The MongoDB database platform has been downloaded over 155 million times and there have been more than one million MongoDB University registrations.”

[GridGain](#) #245 Absolute Growth Rate (253), Compound Annual Growth Rate (52.3), 2019 Revenue (13.35), 2016 Revenue (3.78), Number of Employees (105), Founding Year (2010)

“GridGain® powers the digital enterprise with an in-memory computing platform built on Apache® Ignite that provides in-memory speed and massive scalability for data-intensive applications. It requires no rip-and-replace of existing databases and can be deployed on-premises, on a public or private cloud, or on a hybrid environment.”

[Pure Storage](#) #288 Absolute Growth Rate (208.8), Compound Annual Growth Rate (45.6), 2019 Revenue (1359.82), 2016 Revenue (440.33), Number of Employees (2800), Founding Year (2009)

“Pure Storage (NYSE:PSTG) helps innovators build a better world with data. Pure's data solutions enable SaaS companies, cloud service providers, and enterprise and public sector customers to deliver real-time, secure data to power their mission-critical production, DevOps, and modern analytics environments in a multi-cloud environment. One of the fastest growing enterprise IT companies in history, Pure Storage enables customers to quickly adopt next-generation technologies, including artificial intelligence and machine learning, to help maximize the value of their data for competitive advantage. And with a Satmetrix-certified NPS customer satisfaction score in the top one percent of B2B companies, Pure's ever-expanding list of customers are among the happiest in the world.”

[Pluribus Networks](#) #330 Absolute Growth Rate (174.3), Compound Annual Growth Rate (40), 2019 Revenue (19.2), 2016 Revenue (7), Number of Employees (102), Founding Year (2010)

“Pluribus Networks enables customers to simplify increasingly complex network operations by modernizing, unifying and automating networking across distributed data center environments – inside the data center or at multiple sites across geographically distributed data centers and edge locations. Our Netvisor ONE open network operating system (OS) and our Adaptive Cloud Fabric, a controllerless next-generation SDN solution, distribute intelligence and state across every switch in the network. This novel approach to SDN creates a single logical programmable entity featuring multi-tenant, low latency and distributed network services (e.g., network slicing, edge computing, IOT and video traffic segmentation, L2VPN/L3VPN across distributed sites, multi-site unification). This dramatically increases performance, agility and resiliency while reducing operating costs and the potential for human error. By leveraging open networking hardware, customers can reduce networking capital costs by 30 to 60% over traditional vendors, eliminating vendor lock-in and accelerating innovation.”

[Nutanix](#) #365 Absolute Growth Rate (145.6), Compound Annual Growth Rate (34.9), 2019 Revenue (1236.14), 2016 Revenue (503.41), Number of Employees (5340), Founding Year (2009)

“Nutanix leverages its industry leading, 100% software-defined hyperconverged infrastructure to provide a single cloud platform that seamlessly brings to life your hybrid and multi-cloud strategy. Whether on-prem or in the cloud, you get unified management and operations with one-click simplicity, intelligent automation, and always-on availability.”

[DBSync](#) #434 Absolute Growth Rate (107.6), Compound Annual Growth Rate (27.6), 2019

Revenue (2.39), 2016 Revenue (1.15), Number of Employees (66), Founding Year (2009)

"DBSync was founded in June 2009 after initially serving as a product line of Avankia since 2002. With headquarters in Nashville, TN, and operations in Bangalore, India, DBSync is uniquely positioned to lead the integration & replication platform space with innovative SaaS and on-demand services and solutions. DBSync is a complete on-demand integration and replication provider that empowers companies to connect any combination of SaaS, cloud and on-premises applications together without the burden of installing and maintaining software and appliances. It is DBSync's mission to rapidly configure and deliver Integration-as-a-Service and solutions that dramatically reduce traditional integration costs for every customer, regardless of their data challenges."

[Veeam](#) #474 Absolute Growth Rate (81.3), Compound Annual Growth Rate (21.9), 2019

Revenue (890.40), 2016 Revenue (491.10), Number of Employees (4253), Founding Year (2006)

'When founded in 2006, we focused on simplifying backups for virtual machines.

We quickly became a leader in backup with the fastest and most reliable data recovery in virtual environments.

We make sure data is always available, protected and actively working for businesses across the globe. This means, regardless of where your data resides – physical systems, SaaS services, public cloud, private cloud, hybrid cloud, or multi-cloud – our platform helps hundreds of thousands of companies keep their businesses running.

We continue to charge forward to innovate the industry and deliver simple, flexible and reliable solutions to our 400,000+ customers."

"How to Take a 360 Degree View of Your Organization's Cybersecurity"

Tuesday, May 25

9:00am



SecurityScorecard

Contributions from 12K Programmers Result in Helicopter Flight on Mars



The [contributions of 12K developers](#) result in the first powered flight on another planet. [Ingenuity Mars Helicopter](#) traveled 293 miles aboard the Perseverance Rover, then, hovering at an altitude of only 10 feet, made history. One of the engineering feats accomplished with this endeavor is keeping the weight of Ingenuity under four pounds to be able to fly in Mar's atmosphere. In Mar's atmosphere, Ingenuity [weighs only 1 ½ pounds](#).

The flight was accomplished with Linux, open-source software and a NASA-built program based on the Jet Propulsion Laboratory's (JPL) [open-source F' \(F prime\) framework](#).

Of interest: Maximum flight time is 90 seconds

Test flights will be 10-16 feet above the surface of Mars and last 20-30 seconds

Carbon fiber blades spin in opposite directions at 2400rpm to achieve liftoff

Mar's atmosphere is 100 times thinner than Earth's

One key objective is to survive extreme temperatures as cold as -90C

Radio signals take over 11 minutes to get from Mars back to Earth

"Nearly 12,000 developers on GitHub contributed to Ingenuity's software via open source. And yet, much like the first image of a black hole, most of these developers are not even aware that they helped make the first Martian helicopter flight possible."

"[Today, we want to make the invisible visible](#). So, we have worked with JPL to place a new Mars 2020 Helicopter Mission badge on the GitHub profile of every developer who contributed to the specific versions of any open-source projects and libraries used by Ingenuity."

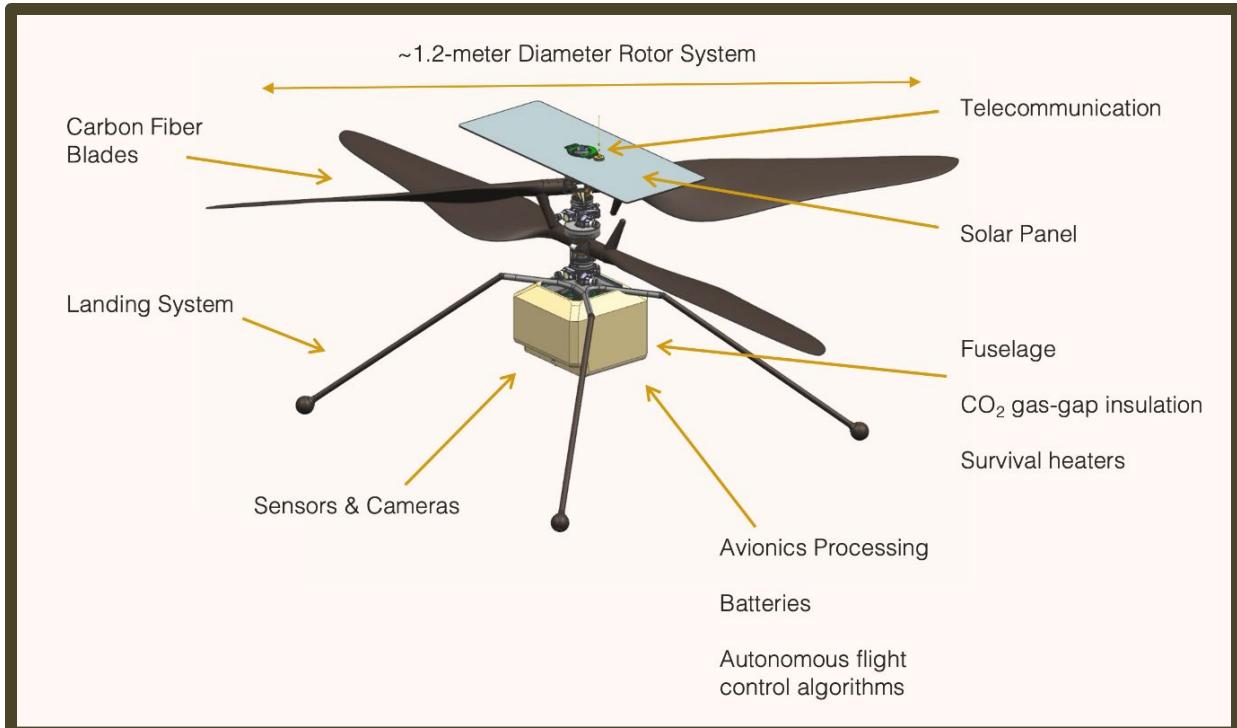


[Nat Friedman, CEO, GitHub](#)

The helicopter's program is powered by Linux on a [Qualcomm Snapdragon 801](#) running at 2.26GHz, a processor found in smartphones like Samsung's Galaxy S5, which is faster than Mars Perseverance's rover processors. NASA-grade CPUs and chips must meet [NASA's High-Performance Spaceflight Computing \(HPSC\)](#) radiation standards. The customized processors

take years of design work and testing before certified for space. NASA's newest general-purpose processor is an [ARM A53 variant from Raspberry Pi 3](#). As a demo project, Ingenuity can use a more modern CPU. The Snapdragon 801 has 2GB RAM and 32GB flash memory.

The flight control software runs at 500Hz. Timothy Canham, a JPL flight software engineering explains, "We literally ordered parts from [SparkFun](#). This is commercial hardware, but we'll test it, and if it works well, we'll use it" (which is exactly what happened).



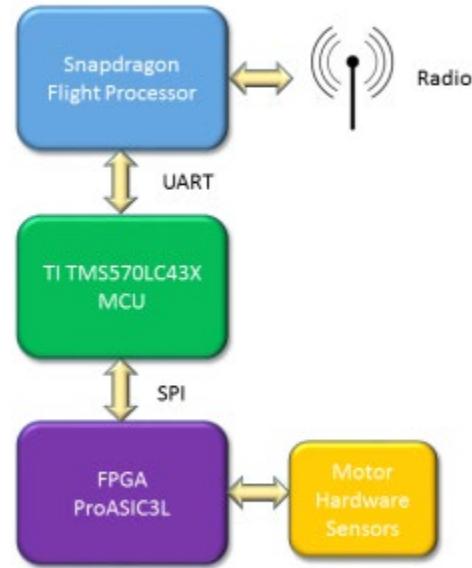
[Canham explains](#) that off-the-shelf hardware "tends to be more powerful because it's more recent and its cheaper too compared to older components that have been specially designed to operate in space. But it also means that it's not as reliable and less robust from a radiation and thermal perspective. The silicon on the Snapdragon 801 is tuned for use on Earth, not Mars."

[NASA's Jet Propulsion Laboratory](#) in Southern California oversaw the system architecture, design, and development. JPL also built the fuselage and integrated the full vehicle. AeroVironment of Simi Valley, California, built the rotor system, landing gear, and solar panel substrate. SolAero Technologies of Albuquerque, New Mexico, integrated the solar panel.

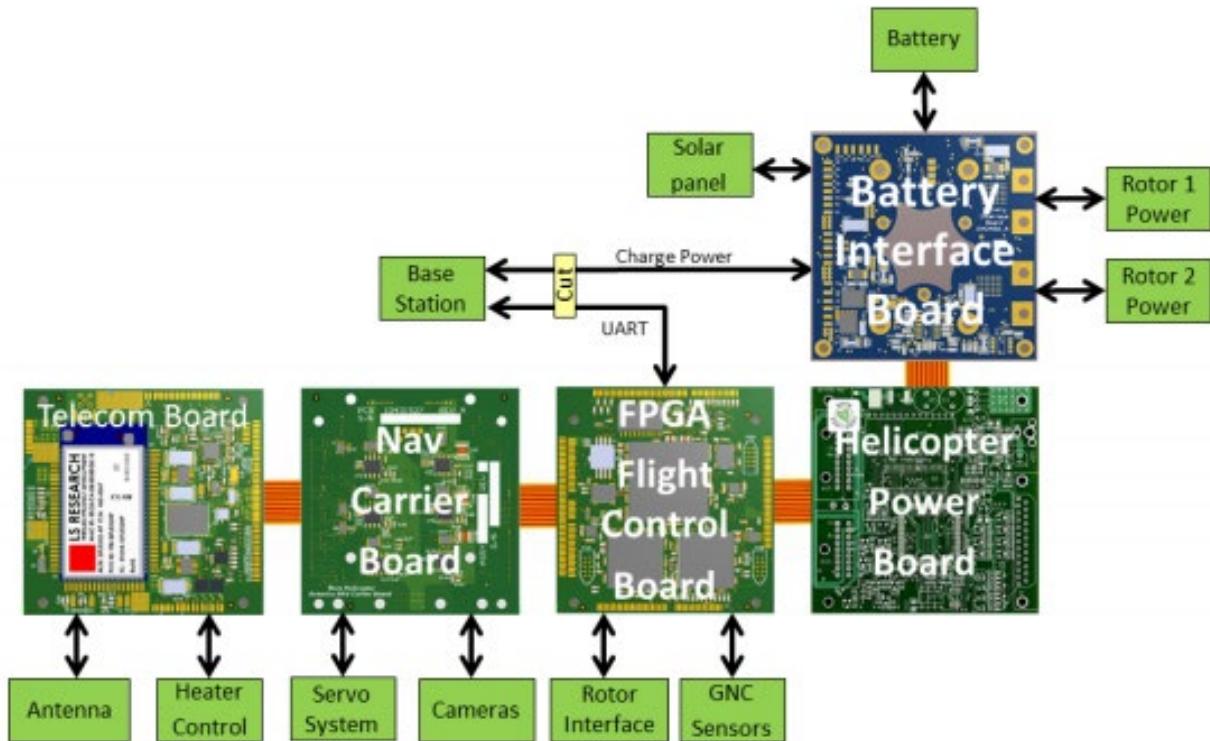
NASA Ames Research Center in California's Silicon Valley and NASA's Langley Research Center in Hampton, Virginia, provided rotorcraft expertise, computational fluid dynamics analysis, and optimization of the blade design. Contractors from [AeroVironment](#), [Lockheed Martin](#), [Qualcomm](#) and [thousands](#) of open source developers [around the world](#) made this flight possible.

For those of you interested in learning more about the avionics of this historic flight, [here is an excerpt](#) from NASA's Jet Propulsion Laboratory: The FPGA implements the custom digital functions not implemented in software due to resource limitations of the processors (e.g. I/O or bandwidth limits), timing requirements, power considerations, or fault tolerance considerations.

The FPGA device is a military-grade version of MicroSemi's ProASIC3L, which uses the same silicon as the radiation-tolerant device from the same family. The FPGA performs all critical I/O to the sensors and actuators, and fault management functions including detecting error flags from the MCU and hot-swapping to functioning MCU in case of an error. The FPGA performs vehicle flight control including an attitude control loop operating at 500 Hz, an outer motor control loop, waypoint guidance, sensor I/O from the IMU, altimeter and inclinometer, and analog telemetry for current and temperature sensing. It is responsible for system time management, interfaces to the IMU, altimeter and inclinometer sensors. It implements the "inner" motor control loop used for the two brushless rotor motors and the six brushed motor servos (three at each rotor swashplate), as well as power management and thermal control functions. Most communication on the helicopter avionics flows through the FPGA. The FPGA implements 25 separate serial data interfaces (SPI, I2C, UART, SENT) to enable multiple paths of communication between the three processors, GNC devices (both IMUs, altimeter, inclinometer), all 8 motors, battery monitor, and external ADC. During cruise, and prior to deployment, the helicopter FPGA communicates to the FPGA on the base station to report telemetry. Once the helicopter is deployed from the host spacecraft, the FPGA manages the power and operational state for the entire helicopter. It turns on and off the other avionics elements as they are needed, implements thermostat control of the survival and operational heaters, monitors the battery cell voltages, and performs cell balancing. Being one of only two elements that is always powered post-deployment (the other is the battery monitor), the FPGA maintains precision spacecraft time, implements alarm clock functions, and generates real-time interrupts for the rest of the system. The helicopter FPGA implements most of the fault protection on the vehicle. It collects telemetry and health status from a variety of sources and responds to them as a function of the operational state. It operates the pair of FC processors as



a primary and hot spare, determining when to switch from one to the other, and restoring critical state data to a processor after it has been power cycled. Critical data used by any of the processors is stored in the FPGA. Triple module redundancy is applied to critical flip-flops, as resources permit, to add additional protection from SEU. Helicopter motor control is divided between the FPGA and software. For each of the six, brushed DC motor servo controllers, the FPGA generates the PWM drive signals and reads the absolute position sensor. For the two brushless DC rotor motors, the FPGA implements the commutation loop, driving the motors with space vector PWM (SVPWM). A closed-loop angle tracker produces a rate measurement and a smooth, low-lag, angle measurement from the Hall signals that feeds into the SVPWM algorithm. The FPGA also implements novel approaches to compensate for the inductive lag of the motor and calibrate out variations of the Hall sensors.



Poll Results from our G2M Research Multi-Vendor Webinar:

[Implementing NVMe™ and NVMe-oF™ for Cloud Service Providers](#)

with [Kioxia](#), [Lightbits](#), and [Western Digital](#)

What is your organization's greatest concern when using cloud computing and storage? (select one):

Overall Cost:	6%
Cost Predictability:	17%
Performance:	11%
Performance Predictability:	11%
Security/Data Privacy:	33%
Other Concerns:	6%
No concerns/no opinion:	17%

When looking at building your own datacenter, what is your greatest concern? (select one):

CapEx/upfront costs:	19%
Scalability:	38%
Avoiding vendor lock-in:	10%
Hiring needed skillsets:	5%
Achieving the ROI expected:	10%
Other:	0%
No opinion:	19%



Enterprise Storage Events – All Virtual

April 29	Azure Storage Day
April 29	Hardware Accelerated Blockchain Operations
May 4	Great Storage Debate: Hyperconverged vs. Disaggregated vs. Centralized
May 4-7	KubeCon + CloudNativeCon
May 5-6	Dell Technologies World
May 11	IBM Think
May 12-June 10	Pure Storage Accelerate Digital 2021
May 19	Spring Summit: Supercharging IT
May 25-26	VEEAM ON

G2M Research Multi-Vendor Webinar Series

Our March webinar “One Year after COVID-10: How Did Storage Architectures Perform for Biotech AI Modeling & What Can We Learn From This?” was sponsored by [Panasas](#), (Adam Marko, Andrew Bartko), [NGD Systems](#) (Scott Shadley), [Weka](#) (Greg Mazzu), and [NetApp](#) (Esteban Rubens). You can view the webinar [here](#) and a pdf of the slides [here](#).

Our 2021 webinar schedule! Click on any of the topics to get more information about that specific webinar. Interested in Sponsoring a webinar? Contact [G2M](#) for a prospectus.



- May 18: [Responsive and Efficient Storage Architectures for Social Media](#)
- May 25: [How to Take a 360 Degree View of Your Organization's Cybersecurity](#)
- June 15: [It's 2021 - Where Has NVMe-oF™ Progressed To?](#)
- July 13: [Computational Storage vs Virtualized Computation/Storage in the Datacenter: "And The Winner Is"?](#)
- Aug 17: [AI/ML Storage - Distributed vs Centralized Architectures](#)
- Sept 14: [Composable Infrastructure vs Hyper-Converged Infrastructure for Business Intelligence](#)
- Oct 12: [Cloud Service Providers: Is Public Cloud, Private Datacenter, or a Hybrid Model Right for You?](#)
- Nov 9: [The Radiometry Data Explosion: Can Storage Keep Pace?](#)
- Dec 14: [2021 Enterprise Storage Wrap-up Panel Discussion](#)



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with Quantifiable Results