

FIRE DRONES

Unmanned craft could be the edge against wildfires,

FAA permitting

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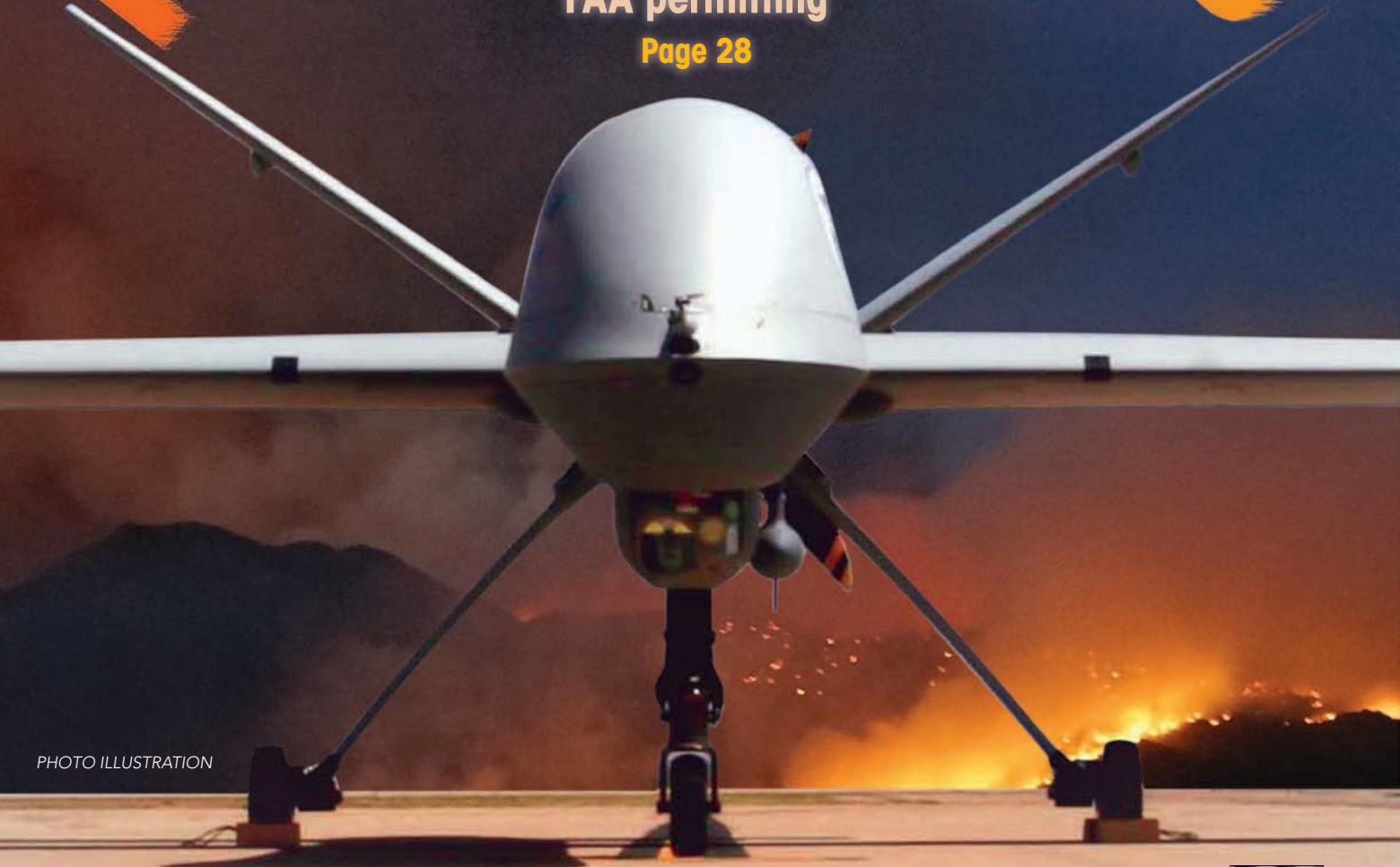


PHOTO ILLUSTRATION

NASA's Shin on planes of the future /14



Solving sense and avoid /34



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Upside of Mars One venture

ZA Architects

A rendering by the German firm ZA Architects shows how robots may dig underground caves — similar to basalt caves on Earth — for human inhabitants on Mars.

Like many aerospace engineers just beginning their careers, I yearn for another “giant leap for mankind,” specifically one on Mars. I don’t mean to belittle the scientific achievements and benefits to international cooperation from the International Space Station. I also recognize the knowledge gained by NASA’s space telescopes and robotic missions. But there is no achievement like sending human explorers beyond Earth’s orbit, something humanity hasn’t done since Apollo 17 in 1972.

Plans for exploration of the Martian surface have been in the works since at least 1952, when Wernher von Braun published “The Mars Project,” the first serious technical study of how that might be done. Yet despite the mind-boggling leapfrogs in

technology of the Apollo era and the founding of the Mars Society advocacy group in 1998, arguably the most public interest in sending humans to Mars was generated in the last three years by two Dutch entrepreneurs. Bas Lansdorp and Arno Wielders in 2012 announced plans for Mars One, a non-profit organization based in the Netherlands aiming to send humans on a one-way trip to Mars to establish a permanent settlement by 2027 and beam home videos for a reality TV show.

I’ll leave it to others to assess the technical and financial merits of the Mars One proposal and the ethics of sending people on a one-way trip. Still, a recent exchange in my creative writing class at the University of Maryland showed me there might be im-

portant lessons in the Mars One saga, regardless of the controversy swirling around it. One of my classmates apparently heard about Mars One in the media, but when she brought up the topic in class, she confused this startup advocacy group with NASA.

I was troubled to hear such a garbled version of reality, but I realized that it was the first time I’d heard anyone outside my engineering class mention space exploration. The positive aspects of Mars One are that it has created buzz outside the science community, and its organizers have demonstrated the potential of building public support.

In just three years, Mars One says it convinced more than 200,000 people from around the globe to sign up for a flight to Mars with no return date.

It also has raised almost \$800,000.

That dollar figure, of course, is nowhere enough to get to Mars. But it proves people are genuinely excited enough about the idea to put their money in it.

Imagine what might happen if NASA, with its years of technical expertise and laboratory infrastructure, could get people as excited about a Mars mission as the Mars One organizers did with its applicants.

As engineers, we tend to hide in our isolated, jargon-filled bubble, with little thought to sharing the cool stuff we do with the wider public. We have watched the nation's fervor for space exploration during the 1960s diminish to something few people today think about and even fewer people understand.

The will to explore, however, is



Mars One

Mars One's timeline envisions first humans landing on Mars by 2027, 16 years after the Dutch project's founding.

something that everyone can comprehend and get excited about. Mars One has sparked that excitement once again by making space feel accessible to the average person. It's now up to NASA and the rest of the world's aerospace leaders to use that spark to ignite a legitimate mission to Mars.



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News From Intelligent Light

Reduce Data Three Orders of Magnitude while Retaining Full Fidelity

Interaction between turbines in a wind farm may lead to a loss of energy. Researchers at Penn State University simulated an array of five NREL 5-MW turbines calculating 10 full rotor revolutions. This created 10 terabytes of CFD data, far exceeding the storage capacity of their compute cluster. Using FieldView XDB workflows reduced the data by three orders of magnitude while retaining full resolution of the original volume grid.

Quantitative Results Made Possible via XDBs

The XDB surfaces were trimmed in FieldView based on wake expansion and then used to integrate fluxes of mass, momentum, power density, and Turbulent Kinetic Energy in cross planes above and below hub height. The result: a better understanding of atmospheric boundary layer interaction and its effect on power generation.

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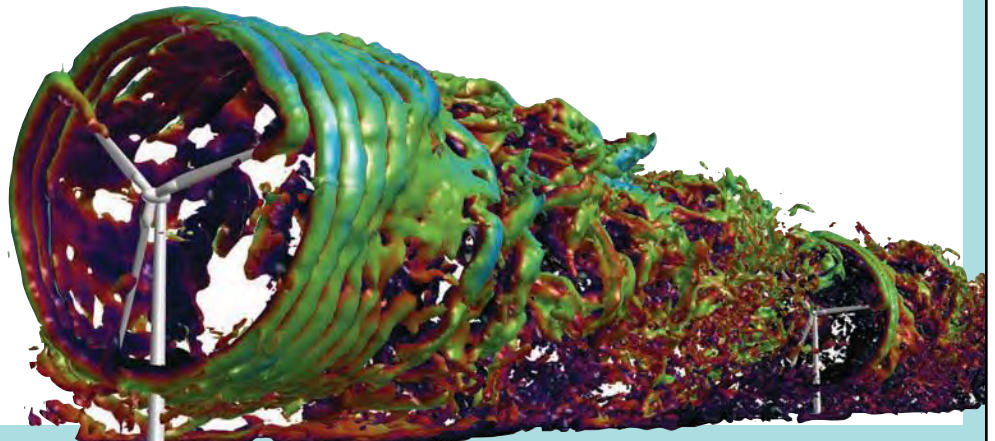


Image produced by Intelligent Light via XDBs from "Turbulence Transport Phenomena in the Wakes of Wind Turbines", Jha et al, AHS 70th Annual Forum, Montreal Quebec, 2014.