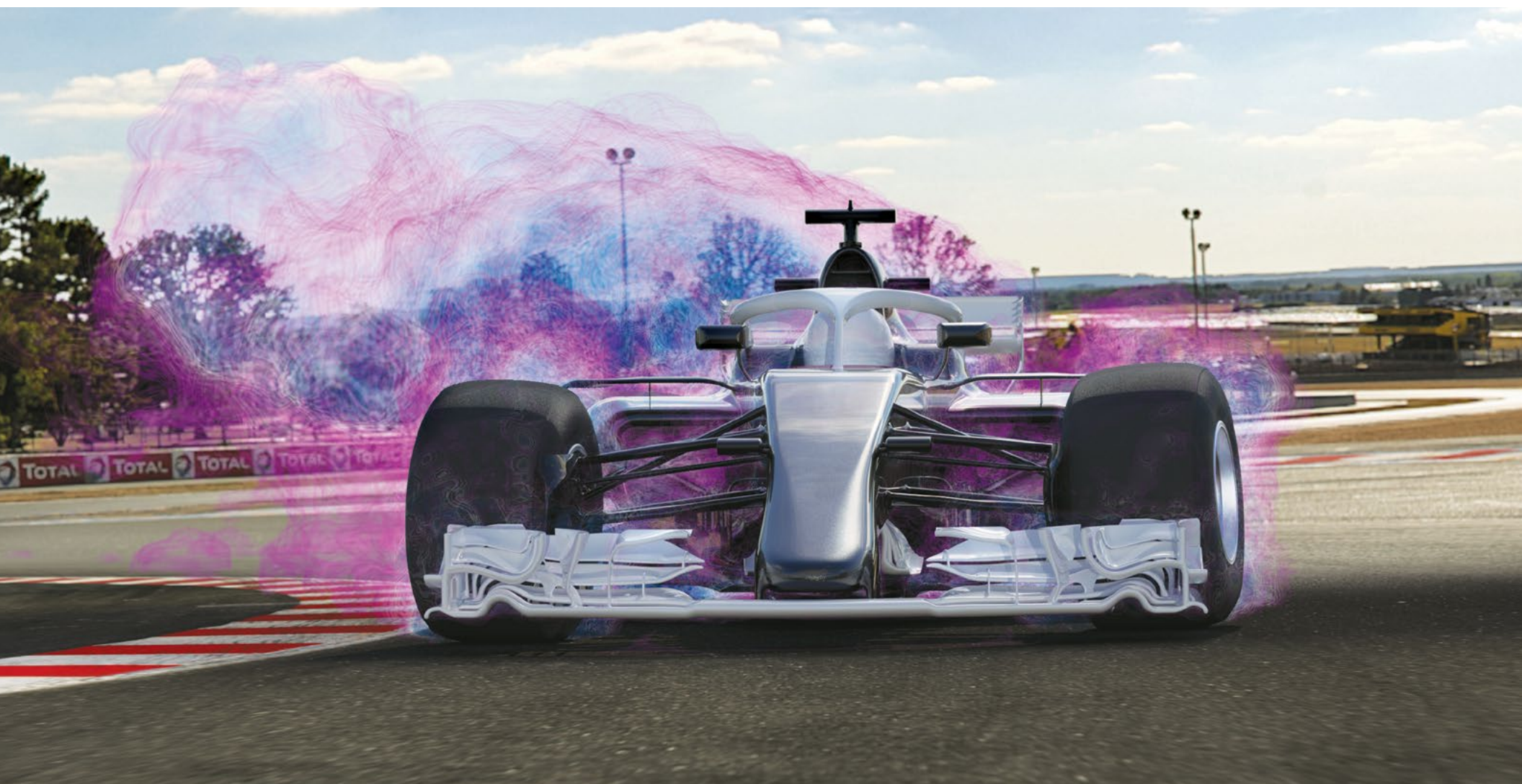
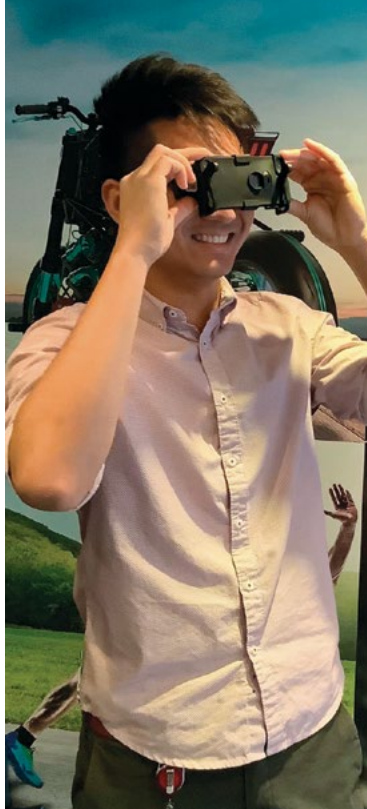




3DEXPERIENCE®

2020 CALENDAR

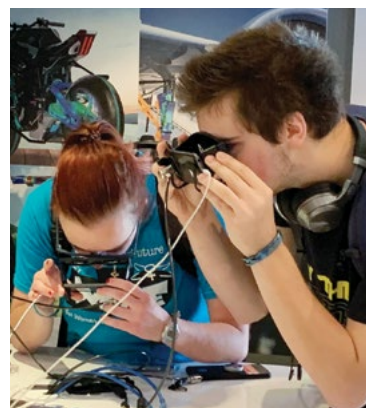




REVEAL THE WORLD

Our **3DEXPERIENCE®** Simulation on Wheels tour that traveled across the Midwest last fall was filled with VR experiences, short lectures, hands-on workshops and simulation competitions. Those who attended engaged with the power of simulation firsthand through a virtual replica of the real world, known as the “**3DEXPERIENCE** twin”. Attendees also engaged in enriching conversations with other users and SIMULIA’s technical team.

For more details and to find a tour stop near you, visit go.3ds.com/reveal.



INDUSTRY SOLUTIONS

Wherever you find yourself when you read this calendar, it's worth taking a moment to pause and look out your window. Some of what you see will have changed little since 1920 or even 1220— whether that's an ancient forest or a historic building. Meanwhile, other innovations would be unthinkable even just 20 years ago.

It's not just smartphones and drones—from the sustainability revolution to the communities of social media to the treatment of once incurable diseases, science has transformed society both technologically and culturally. 2020 looks utterly different from 2000. So how will 2040 look?

The answer to that question is being designed right now by you, our users. Some of the products and ideas you're working on will change the world radically, while others will preserve it for future generations.

In this calendar, you'll see some of the ways that SIMULIA products, harmonizing product, nature and life, are enabling engineers, scientists and medical professionals to create that world.

Learn more at 3ds.com/simulate.

The images in this calendar are for illustration purposes only. Pictures may vary from the actual product.



LET'S BE REALISTIC

Physical wind tunnel tests provide beautiful images of the airflow around vehicles, but the test results don't always hold up in the real world. This is because the road surface, surrounding structures and other vehicles can all affect the movement of air and increase drag. Realistic simulation reveals these effects and lets engineers optimize aerodynamics to maximize the true performance.

3-dimensional pathlines of air particles colored by velocity, simulated in PowerFLOW

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JANUARY 2020

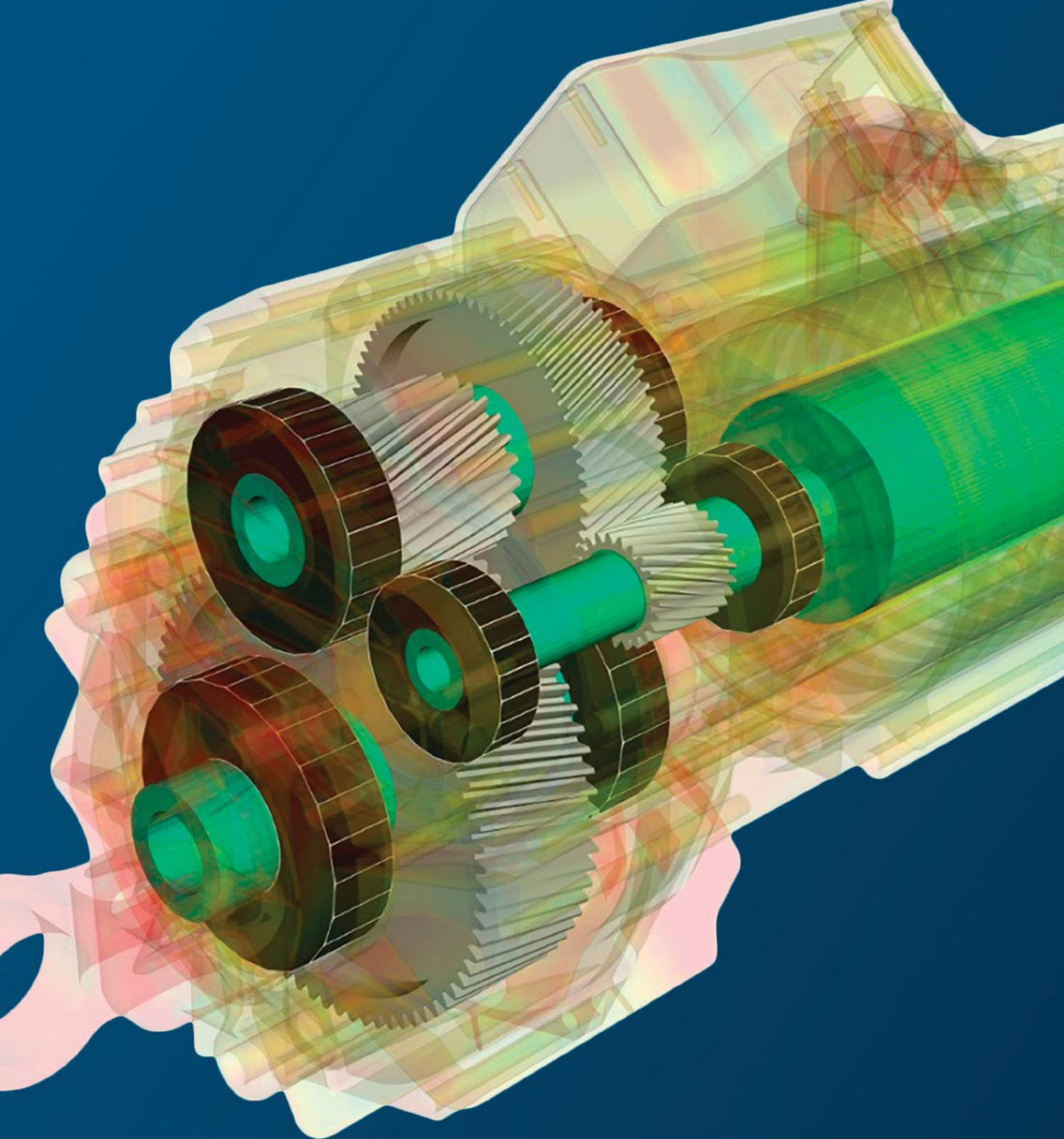
	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
WEEK 1	30	31	1	2	3	4	5
WEEK 2	6	7	8	9	10	11	12
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WEEK 4	20	21	22	23	24	25	26
WEEK 5	27	28	29	30	31	FEBRUARY 1	2

DECEMBER 2019

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 30 31

FEBRUARY 2020

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TRUST THE DRIVE

Electric motors are much quieter than internal combustion engines. Ironically, this silence means that drivers now hear other forms of noise previously covered by the sound of the engine. The high-pitched tonal noise and vibration of the transmission is perceived by drivers as unpleasant. The electric drive system can be analyzed to find the sources of this noise in order to reduce it with coupled electromagnetic, multibody and vibration simulation.

Multibody simulation model of an electric motor in Simpack

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FEBRUARY 2020

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
WEEK 5	27	28	29	30	31	1	2
WEEK 6	3	4	5	6	7	8	9
WEEK 7	10	11	12	13	14	15	16
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JANUARY 2020

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MARCH 2020

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GREAT STRIDES

The human knee is a complex joint with four different bones and numerous muscles, tendons and ligaments that all need to move as one. Damage to these or to the cartilage that cushions the bones can cause joint pain and possible injury. Simulation can model the exact distribution of stress and strain within the joint, allowing researchers to study knee injuries, choose the best surgical procedure to treat an injury or customize a knee replacement to their patient's needs.

*Mechanical simulation of
a knee with Abaqus*

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MARCH 2020

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
WEEK 9	24	25	26	27	28	29	1
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FEBRUARY 2020

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MAKING WAVES

The planet is undergoing a radical change in how it produces its energy. From 2013 to 2018, the world's installed wind power capacity doubled and huge offshore turbine farms now generate gigawatts of power cheaply and sustainably. At sea, waves can put considerable strain on wind turbine structures. Simulation allows even the worst storms to be simulated in order to build stronger turbines.

Waves impacting an offshore wind turbine simulated with XFlow

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APRIL 2020

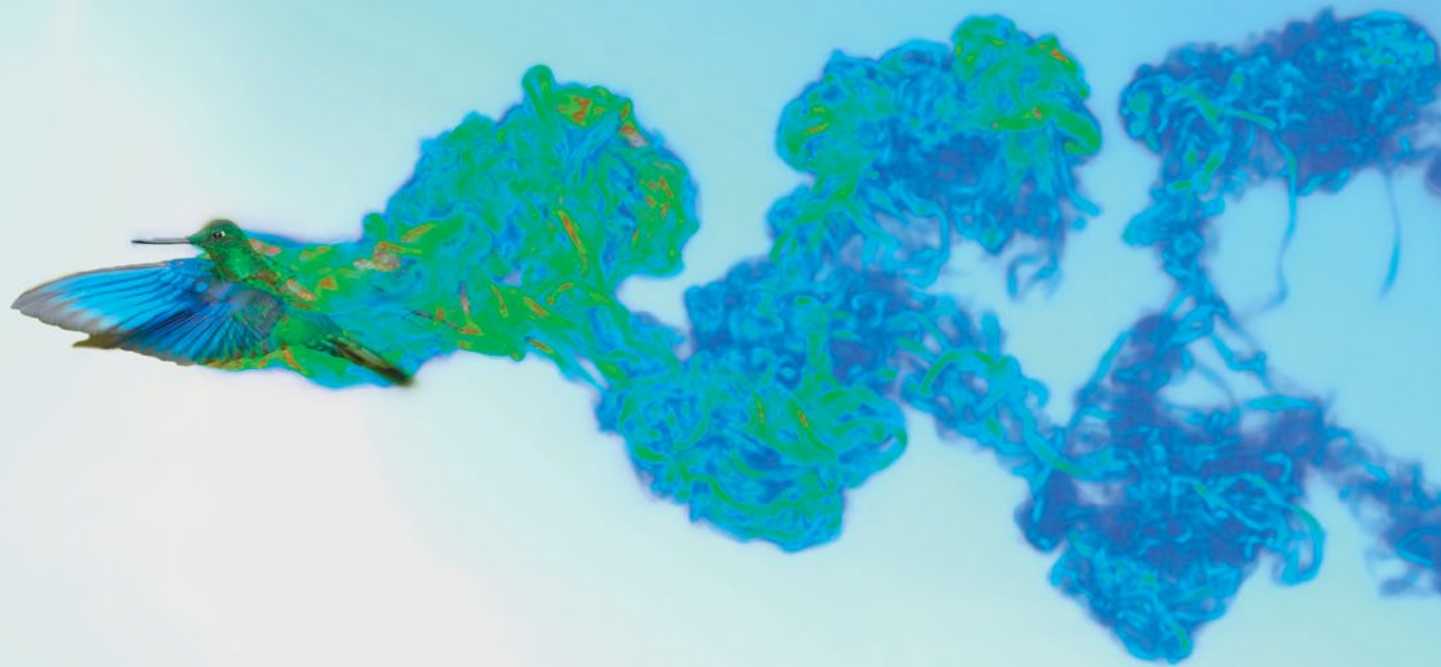
	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
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WEEK 18	27	28	29	30	MAY 1	2	3

MARCH 2020

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AN IDEA WITH WINGS

The tiny ruby-throated hummingbird is one of the world's greatest fliers. Light and agile, the bird can hover precisely enough to sip nectar from a hanging flower, but also regularly migrates 1,400 km (900 miles) across the Gulf of Mexico without stopping to eat or drink. This is possible due to its highly-evolved wings, which are both highly maneuverable and very energy efficient. Studying the aerodynamics of bird wings may help engineers develop small, efficient drones.

Aerodynamic simulation of a hummingbird flapping its wings in PowerFLOW

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MAY 2020

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
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APRIL 2020

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JUNE 2020

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CATCHING THE SUN

In the past few decades, the cost of solar power has fallen over 99%, and the cost per megawatt-hour for solar energy is now often cheaper than fossil fuels. Part of this is due to increased conversion efficiency—modern solar panels can convert a greater percentage of the sunlight they absorb into electricity. Electromagnetic simulation can model the behavior of light as it passes through the layers of glass, silicon and conductors that make up the solar cell and optimize the cell geometry to maximize the power output.

Electromagnetic simulation of light waves inside a solar cell optimized to improve efficiency, simulated in CST Studio Suite

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JUNE 2020

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
WEEK 23	1	2	3	4	5	6	7
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WEEK 26	22	23	24	25	26	27	28
WEEK 27	29	30	JULY 1	2	3	4	5

MAY 2020

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JULY 2020

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STAY CONNECTED

Mobile technology has matured rapidly since the turn of the century, and the fifth generation (5G) is almost ready for rollout. 5G technology allows faster data and more simultaneous connections, making applications for autonomous vehicles and remote surgery a lot more feasible. However, 5G uses higher frequencies with very different behavior than lower radio frequencies. SIMULIA simulation can be used to analyze performance of both 5G devices and network infrastructure.

Antenna pattern for a 5G smartphone, simulated in CST Studio Suite

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JULY 2020

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
WEEK 27	29	30	1	2	3	4	5
WEEK 28	6	7	8	9	10	11	12
WEEK 29	13	14	15	16	17	18	19
WEEK 30	20	21	22	23	24	25	26
WEEK 31	27	28	29	30	31	AUGUST 1	2

JUNE 2020

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AUGUST 2020

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ENJOY THE RIDE

For many motorcycle owners, the experience is as important to them as the journey itself. Mechanical simulation is used to analyze the vehicle suspension and optimize the whole bike to give the best ride experience.

Von Mises stress in a motorcycle swingarm, simulated with Abaqus

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AUGUST 2020

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
WEEK 31	27	28	29	30	31	1	2
WEEK 32	3	4	5	6	7	8	9
WEEK 33	10	11	12	13	14	15	16
WEEK 34	17	18	19	20	21	22	23
WEEK 35	24	25	26	27	28	29	30
WEEK 36	31	SEPTEMBER 1	2	3	4	5	6

JULY 2020

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SEPTEMBER 2020

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TICKET TO CONNECTIVITY

The rise in ridesharing has given people an alternative to transit, but has also made traffic congestion worse in many cities. To encourage ridership on buses and light rails, agencies are investing in improving the passenger experience. Wi-Fi is now standard on many trains and buses, and simulation can be used to model coverage and find the optimal place to mount the Wi-Fi antenna to improve the ride.

Electric field from a Wi-Fi antenna on a bus evaluated with SIMULIA CST Studio Suite

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SEPTEMBER 2020

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
WEEK 36	31	1	2	3	4	5	6
WEEK 37	7	8	9	10	11	12	13
WEEK 38	14	15	16	17	18	19	20
WEEK 39	21	22	23	24	25	26	27
WEEK 40	28	29	30	OCTOBER 1	2	3	4

AUGUST 2020

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OCTOBER 2020

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ON TRACK TO SUSTAINABILITY

In the mid-20th century, rail travel was written off. Compared to planes and cars, the train appeared to be obsolete as a form of passenger transport. Today, passenger levels in countries across Europe and Asia have never been higher. The train has made a comeback as a solution to the challenges of urbanization and climate change. Simulation is helping rail engineers develop state-of-the-art trains that are lighter, faster, smarter and more comfortable.

*Airflow around a high-speed train
in PowerFLOW*

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OCTOBER 2020

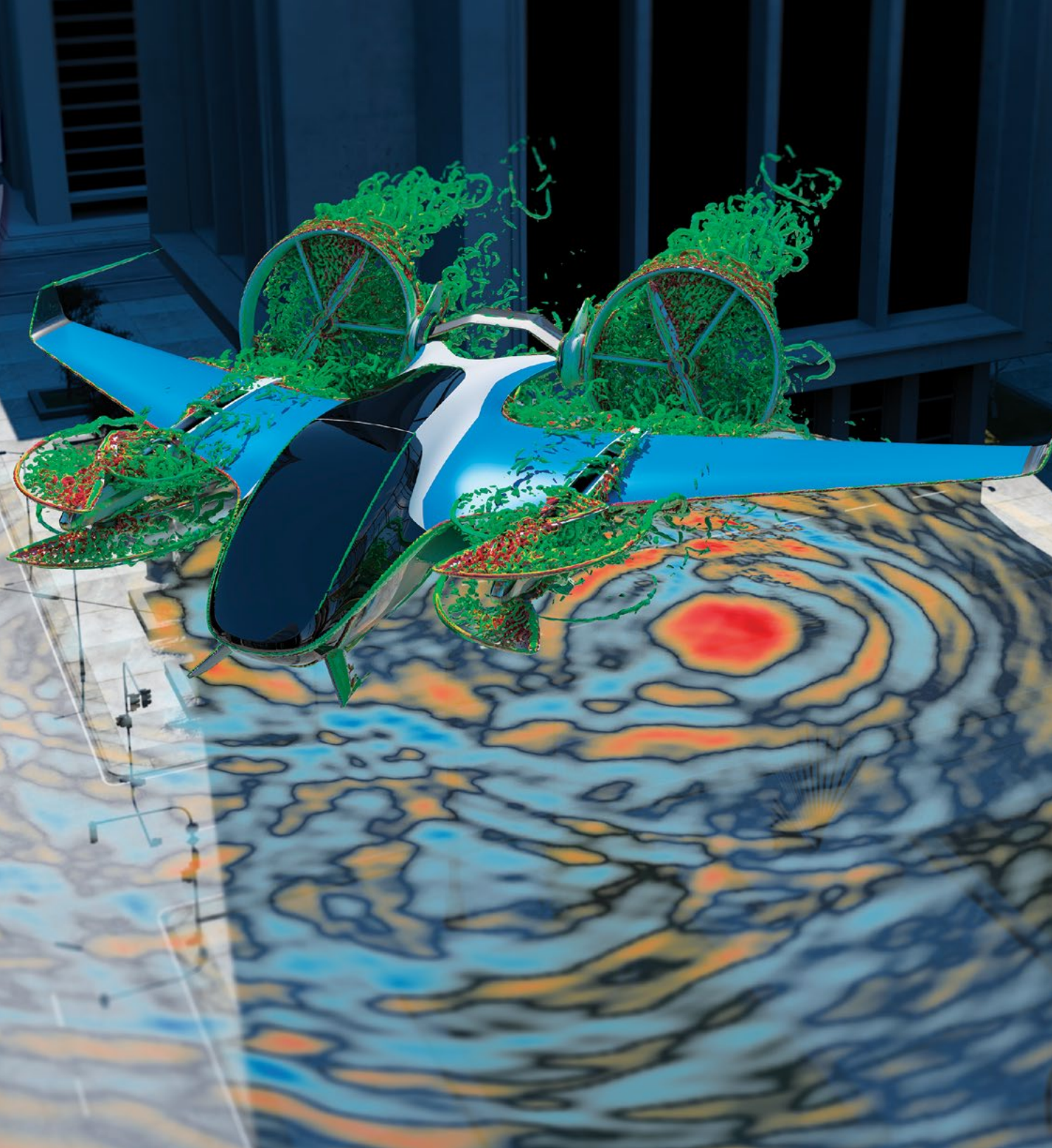
	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
WEEK 40	28	29	30	1	2	3	4
WEEK 41	5	6	7	8	9	10	11
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WEEK 44	26	27	28	29	30	31	NOVEMBER 1

SEPTEMBER 2020

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NOVEMBER 2020

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TAKE TO THE SKIES

The majority of the world's population now lives in cities, and urbanization is expected to accelerate even further in the future. Existing transport infrastructure is at its limits, and increasing awareness of air pollution and road safety means cities are trying to take cars off the road. Electric vertical take-off and landing (eVTOL) technology may be one of the more speculative solutions, but leading technology firms are taking it seriously as a possible basis for air taxis.

Acoustic simulation in PowerFLOW of an air taxi taking off, showing both air flow and sound

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NOVEMBER 2020

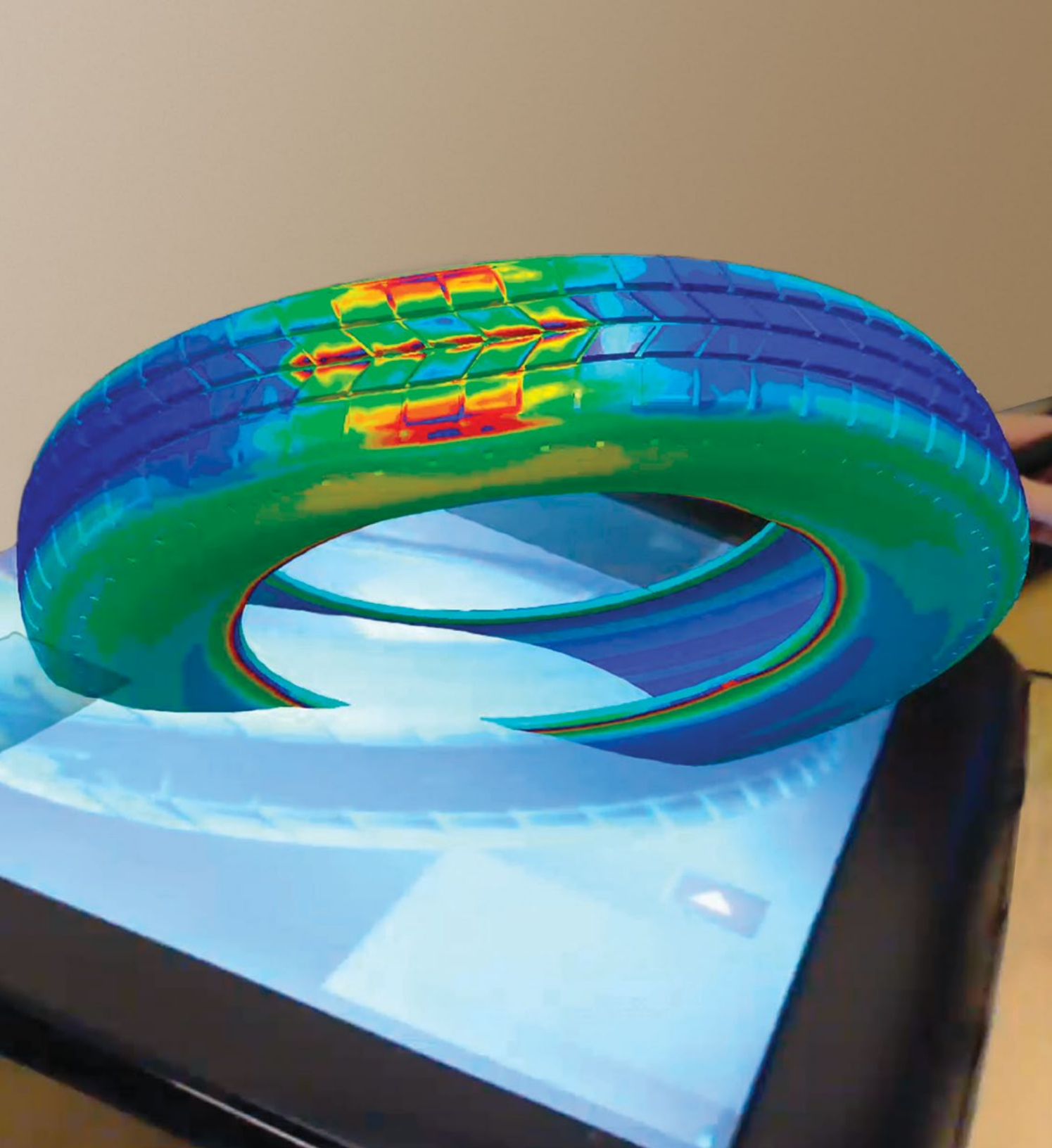
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WEEK 48	23	24	25	26	27	28	29
WEEK 49	30	DECEMBER 1	2	3	4	5	6

OCTOBER 2020

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DECEMBER 2020

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VISION OF TOMORROW

We spend more and more of our time staring at screens, but they can only ever be a flat opaque replacement for the physical world. The aim of virtual reality is to break the spell of the screen and provide a way for people to take advantage of powerful visualization tools in a new environment. From 3D tablets that let users manipulate their designs by hand, to goggles that can overlay simulation results in a real-world setting, there are numerous virtual reality tools already in use in many industries globally. Users of SIMULIA tools can easily create VR experiences on the **3DEXPERIENCE** platform.

Deformation of a tire simulated in Abaqus, shown as part of a VR experience on a Z-Space display

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DECEMBER 2020

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
WEEK 49	30	1	2	3	4	5	6
WEEK 50	7	8	9	10	11	12	13
WEEK 51	14	15	16	17	18	19	20
WEEK 52	21	22	23	24	25	26	27
	28	29	30	31	JANUARY 1	2	3

NOVEMBER 2020

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JANUARY 2021

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Europe/Middle East/Africa
Dassault Systèmes
10, rue Marcel Dassault
CS 40501
78946 Vélizy-Villacoublay Cedex
France

Asia-Pacific
Dassault Systèmes K.K.
ThinkPark Tower
2-1-1 Osaki, Shinagawa-ku,
Tokyo 141-6020
Japan

Americas
Dassault Systèmes
175 Wyman Street
Waltham, Massachusetts
02451-1223
USA