HOW YOU GROW MATTERS
POST COVID-19

AEROSPACE
WHAT SHOULD COMPANIES THAT INNOVATE ON PRODUCTS AND SERVICES BE DOING TO ACCELERATE BUSINESS RECOVERY AND PROSPERITY?
AEROSPACE

The aerospace sector is facing disruption on an unprecedented scale due to dramatic market dynamics caused by SARS-CoV-2, the virus responsible for the Covid-19 pandemic. Increased aircraft demand had been driving a production ramp-up of 30,000-plus aircraft over the next ten years. Now, those plans have hit a wall, and manufacturers and carriers are facing significant overcapacity. Because of Covid-19, it is now certain that demand for both leisure and business flights will be depressed for the foreseeable future. And while we want to travel in an environmentally friendly way, the development of modular, efficient aircraft and the decarbonization of propulsion through electrification and the use of hydrogen fuel cells is going to be initially in flux then put in the fast lane.

The Covid-19 pandemic and the global lockdown have upended every industry sector, some positively, others negatively. The pain and opportunity are not evenly distributed. Aerospace is squarely in the “severe pain” category. Altran, part of Capgemini, has identified four areas of focus for accelerating business recovery driven by product development and service innovation.

**ONE. THE CUSTOMER**

**TWO. SUPPLY CHAIN & OPERATIONS**

**THREE. PRODUCT DEVELOPMENT & SERVICE INNOVATION**

**FOUR. SUSTAINABILITY & PLANET CENTRICITY**
ONE. THE CUSTOMER

CUSTOMER EXPECTATIONS FOR PRODUCT AND SERVICE EXPERIENCES WILL BE DIFFERENT THAN BEFORE THE PANDEMIC, SO COMPANIES MUST CONTINUOUSLY LEVEL-SET ON THEIR CUSTOMERS’ NEW REALITIES.

Social and physical distancing and other restrictions will be part of our lives and will influence our behavior for the foreseeable future. The aviation industry needs to find out quickly what their customers’ new expectations are so they can make products and services that align with their needs and wants. When it comes to flying, the International Air Transportation Association released a survey in which 40% of passengers said they might wait six or more months after the outbreak is contained to travel by air again.1

While Covid-19 had dealt the aerospace industry a severe blow and it is suffering from the cratering of air travel and cancellation of new aircraft orders, production has resumed, and everyone is figuring out what it means to fly again. Post Covid-19, leisure and business customers will prioritize safety and cleanliness, including deep cleaning the workplace, and mandatory masks. Airlines will change the way we board planes and participate in privacy-preserving surveillance apps that track our health status. Touchless interactions and all things online and virtual will be embraced. Ahead are opportunities for the industry to experiment with new digital platforms that will help accelerate the recovery.

WHAT’S CHANGING?

EMPATHIZE WITH YOUR CUSTOMERS

The airline industry is contending with the collapse of demand for air travel that is not expected to recover to 2019 levels for three to five years, according to Airbus² and Boeing.³ The priority for the industry is to help the flying public feel comfortable about getting back on a plane, which will require a dramatic shift in customers’ expectations for health and safety protocols.

The fate of airlines, aircraft manufacturers, and their suppliers are inexplicitly intertwined, and they all are investing to ensure people return to the skies. A new passenger experience is emerging for booking, check-in, and in-flight service that together will bring back trust. Airports are installing thermal cameras, anti-microbial sprays, and using robots to disinfect surfaces with ultraviolet light. They are also adjusting seating configurations and using safe physical “distancing logic” to streamline the boarding process. The Hong Kong International Airport is testing full-body machines that kill bacteria instantly from head to toe.⁴

Airlines have started to promote the health, wellness, and safety features of the flying experience. Their efforts include designing cabin interiors that can be disinfected quickly and seating that takes into account social
distancing. Also, they are investing in improving cabin air quality by installing intelligent air filters, which has been a long-time complaint of crew members, and upgrading lavatories that can sanitize themselves in seconds with ultraviolet light to prevent the spread of infection.

DISRUPT BUSINESS MODELS TO MEET SHIFTS IN LIFESTYLES

Until Covid-19 changed the world, Airbus was forecasting 20-year demand for aircraft at just under 40,000 aircraft deliveries, and Boeing was projecting its 20-year revenue for aircraft sales and services would be nearly $16 trillion. Now, nobody knows how many commercial flights will take off in the next few years, let alone 20 years. Also, fewer flights mean less income for aftermarket sales and services of aircraft interiors, propulsion, and aircraft equipment.

The crisis is forcing the industry to aggressively review and manage costs by cutting production, reducing the workforce, and slowing the pace of future aircraft design and development. However, it is essential for aircraft makers to monitor these plans closely and update business models as demand starts picking up.

The relative success of employees working remotely is compelling many to reevaluate the necessity of unbridled business flights. And leisure travel by air will be suppressed until a vaccine is released and widely available. All told, the revenue from both long-distance and short-haul flights is uncertain, with implications for airlines to adjust their demand for wide-body, single-aisle, and twin-aisle aircraft.

For example, the elimination of the use of middle seats reduces capacity by 33%, which negatively impacts airline revenue, mainly for short-haul flights that compete with rail and personal vehicles. One stopgap solution is to reconfigure passenger planes to accommodate more space for freight. Recently, Airbus announced a cargo conversion option for its A330 and A350 wide-body aircraft to take advantage of the increase in demand for air freight.

In 2019, Amazon announced the expansion of its Amazon Air delivery network by leasing 15 cargo aircraft. The goal was to speed up Amazon’s e-commerce deliveries. Amazon had plans to increase the number of planes to 70 by 2021. Expanding e-commerce air cargo services that are more tightly aligned with last-mile logistics has the potential to improve the customer experience.

Independent of Covid-19, there has been a downward trend in demand by passengers for inflight entertainment and connectivity. This could be an opportune time for airlines to supplement their service revenue by offering 5G air-to-ground streaming service, online shopping, local and international content delivery, and innovative sponsorships such as brand activation.

With the financial pressures, aircraft manufacturers must still take into account the European Union’s new decarbonization standard, Regulation (EU) 2019/631. The regulation sets out CO2 emissions targets that, if not met, will result in fines. Any company that sells into the EU is required to comply.
Finally, airlines and aircraft makers need to find ways to appeal to Gen Zers and Millennials that now represent the dominant cohort of the flying customer base.\textsuperscript{12} While future investments will be delayed somewhat by Covid-19, aerospace manufacturers would be prudent to stay committed to investing in decarbonizing aviation. This includes exploring new modes of urban air transportation, such as electric vertical take-off and landing aircraft (eVTOLs), that will become a high-growth market later this decade.

**THINGS TO DO**

- Re-assess the customer journey and at-risk workflows that have changed as a result of the Covid-19 pandemic.
- Assess options that will help customers feel more comfortable with the new safety and hygiene protocols for air travel.
- Accelerate technology and innovation to address infectious disease spread and cabin design.
TWO. SUPPLY CHAIN & OPERATIONS

WE WON’T SNAP BACK TO THE WAY WE WORKED BEFORE. MANY COMPANIES WILL REEVALUATE THEIR GLOBAL SUPPLY CHAINS AND STREAMLINE THE WAY THEIR PEOPLE WORK TOGETHER, VIRTUALLY AND MORE AUTONOMOUSLY. THEY MUST MONITOR EMPLOYEE WELLBEING AS PART OF THE “NEW NORMAL” TO ENSURE A SAFE AND SECURE WORK ENVIRONMENT.

At the top of the list of urgent actions for companies in the aviation industry is bringing people back to work safely—in offices, factories, and facilities—while maintaining the option for virtual work without compromising security. Also, Covid-19 has paralyzed the aircraft manufacturing supply chain and network of subcontracts. So, just as necessary is the need to ensure supply chains are resilient, meet customer delivery and service expectations, and minimize cost, complexity, and risk.

SOLVE FOR EMPLOYEE WELLBEING

One of the more urgent actions for global companies in the new normal is bringing people safely back to work—in offices, factories and facilities—while maintaining virtual work without compromising security and minimizing risk. This may require putting in place new measures to meet customer delivery and service expectations. There are a variety of issues for bringing employees back to work, including:

- Deciding which employees to bring back and when, how many are required per shift, and which facilities to open first.
- Introducing new physical and digital tools to minimize the threat of a resurgence of infect.
- Launching robust contact tracing applications and workplace testing programs.
- Upgrading facility management and human resource workflows.
- Introducing symptom checkers, cough analysis and skin-tone analysis technology, and triage tools to detect early signs of infection.
- Establish strict protocols for sharing employee health information and contact tracing with government agencies while protecting employee privacy rights.

Contact tracing applications and workplace testing programs ensure a swift and safe return to work, but privacy protection needs to be included in HR workflows. The same goes for symptoms checkers and triage tools that detect early signs of Covid-19. Companies need to be transparent with their employees about how health information and contact tracing data is shared with government agencies and how they are protecting employee privacy.
NORMALIZE TO YOUR UPENDED SUPPLY CHAIN

The phased restart of production will depend on raising passenger confidence in flying. However, the compounding challenge is that national economies are operating at different speeds, and lockdowns are out of step, which generates supply uncertainty. How do aircraft manufacturers assess the status of their suppliers and their capability to restart at the required level of production during the Covid-19 recovery? How do they prepare and manage work transfers? How can they assess and improve supplier performance to cope with the new challenges through audits and assessments?

In addition to figuring out how to answer these tough questions, the aircraft aftermarket, which is a significant cash generator for the industry, is suffering from the closure of airline operations. At the same time, there is an increase in the number of parts being released onto the aftermarket. For example, Boeing has added more than one billion excess airplane parts to GoDirect Trade, a blockchain platform designed by Honeywell to prove the origin of the parts and ensure they comply with safety standards.\textsuperscript{13}

The oversupply of secondhand parts has the potential to drown the market for retired aircraft. It will likely open the door to “re-insourcing” and more versatile and innovative production systems.

The pedigree and origin of parts and components have always been an issue in aerospace. Continued severe financial pressure will drive changes in inspection and authenticity practices with improvements in supply chain surveillance. Automation of quality controls may provide some benefits, as might more technology-enabled transparency and assurance of record-keeping, such as electronic signature schemes and distributed ledgers. Such measures do, however, require acceptance and deployment across the extended supply chain, and by the regulatory community to be effective.

ANTICIPATE THE DOWNSIDE RISKS OF NEW WAYS OF WORKING

Supply chains are interdependent, non-linear, and complex. In every industry, including aerospace, companies are taking steps to ramp up supply while evaluating ways to de-risk their supply chains. For example, gauging the risk profile of their global footprint and evaluating options, including transforming to a more regional model.

Another priority will be adding more intelligence to the supply chain to manage the crisis over a long period of uncertainty and predict the onset of failures to ensure maximum agility. It’s not easy to switch from one supplier to another. In the aerospace sector, for example, supplier decisions are primarily driven by regulations and not necessarily tied to systemic risk.

Separately, the cybersecurity risk profile is different because of threats and vulnerabilities from an increase in open collaboration, changing supplier ecosystem, and virtual work. What is abnormal network activity needs to be reevaluated. The massive shift to becoming a remote-work organization is not without challenges. One increasing risk is new cybersecurity threats. For example, spear-phishing email attacks related to Covid-19 have increased by 667% since the end of February 2020.\textsuperscript{14}
MAKE PROBLEM RESOLUTION AN ESSENTIAL SERVICE

Financial pressures in the aerospace industry are expected to accelerate the shift from asset-based models to service-based models that reflect the total cost of ownership (TCO). In turn, this is likely to motivate the integration of guided diagnostics and predictive maintenance services that will require investments in asset-management capabilities to maintain and operate critical technologies. The declining cost of gathering and processing the data on which such management capabilities depend may lower the barriers to adoption. And the established financial models for aircraft and engines might apply to other, less capital-intensive assets.

Companies will need to reinforce processes, methods, and tools for engineering to integrate TCO in the decision-making process and key performance indicator computations. This is an opportunity to bring the full potential of digital-twin technology to bear. For example, digital copies of equipment can be used to create and perform comprehensive training, standard operating procedures, and maintenance tasks. Using digital twins, companies can analyze machine history and real-time activity to evaluate before and after performance and spot anomalies. And expert maintenance crews can “teleport” into any piece of equipment to explore the operation of the subsystems.

THINGS TO DO

- Leverage crisis-disruption models to help inform supply chain risk and transparency as well as product mix over time.
- Install symptom checkers, epidemic sensing, and contact tracing systems and dashboards for a global health status of the organization, while respecting employee privacy.
- Continuously test evolving perimeters, create trust levels, and improve network reliability.
- Institutionalize “citizen” tools and ad-hoc ways of working remotely.
- Make digital interactions as rich as physical relationships from remote field support to virtual training and sales.
- Invest in intelligent customer support, this is no longer a “nice to have” option, but a “must-have” especially for Tier 1 and Tier 2 suppliers.
Aerospace companies and airlines provide essential products and services that people use every day. That will not change. But the way planes are designed, developed, and produced will. And the necessity of social distancing, even after companies get back to work, is going to be a catalyst to increase automation in factories, offices, and other facilities. By embracing cloud-native and subscription models, aerospace engineers can test ideas quickly and lower the cost to upgrade systems. Airlines can deploy intelligent processes and applications for customer service, contactless passenger experiences, and airline ticketing applications across different markets.

Accelerating digital transformation initiatives will serve to lower cost and elevate responsiveness. The new builder models span everything from model-based systems engineering, virtual twins for simulations to advancements in 3D design to optimize for cost and performance. And a digital continuity culture and approach creates a seamless design process that stitches together market requirements, design and production to streamline operations. Finally, it is abundantly clear that differentiated offerings must align with an increasingly virtualized economy, where the service is as important as the physical product.

**GIVE PEOPLE MORE FREEDOM, BUT IN A DEFINED WAY**

Most companies are learning that they don’t need all their employees to be on-premise every day. A lot of office and computational work can be done off-premise. At the same time, engineering collaboration in the aerospace sector between teams around the world is increasing and may continue to increase in the coming years. The use of computer-aided engineering (CAE) software over a virtual private network will become more acceptable, allowing stress, acoustics, materials, and process engineers to conduct multi-physics modeling and simulation activities remotely and at home.  

Many engineering organizations have developed a culture where know-how and knowledge are exchanged through various means. If remote work is going to be more permanent, there needs to be a way for staff to conduct virtual meetings that go beyond a transactional discussion to replicate the collaborative work style of in-person discussions, both formal and informal, that are dynamic and often spark new ideas. For example, in the aerospace sector, to ensure optimal calculations of aerodynamics requires a lot of simulation. In the process, engineers have conversations that have nothing to do with the actual project but are a way to transfer knowledge and insights and may lead to new design ideas. As the workforce demographics changes, a critical
challenge is to figure out a way to transfer the knowledge of experienced engineers to their younger colleagues in a virtual environment. This requires a digital equivalent of the informal “water-cooler” experience.

There will also be a need to bring teams together so they can complete contractual transactions, discuss projects, and negotiate the delivery of documents. Recently Airbus has announced a contactless process for delivering its commercial plans that ensures business continuity and will be a blueprint for the future.  

VARIABLE BUILDER MODELS FOR VOLATILE TIMES

The lessons of supply disruption caused by Covid-19 lockdowns will stay with us for some time, as will the interruption of access to expertise and skills both within the organization and across the value chain. Out of necessity, this puts the emphasis on information-based activities at the expense of physical build-and-test regimes. Virtual design and validation can be conducted from a home office or a local office hub and can be scaled by exploiting compute and storage infrastructure available from an on-demand service. An inevitable loss of productivity or efficiency in reaching an optimal solution may be acceptable if the “wasted” resource is only computation.

Exploiting these trade-offs requires a mature and controlled engineering process. Configuration management, an understanding of dependencies, and the implications of the sequence in which engineering decisions all become crucial for distributing, scaling, and parallelizing the design-investigate-amend process. For example, simulated environments have always been part of getting products to market. In the new normal, they will play an even more critical role in risk management by ensuring optimal calculations of aerodynamics. Recent market trends suggest OEMs will add more automation to reduce lead times and costs, such as optimizing the changing cabin layouts to comply with the anticipated sanitary and passenger density regulations.

It’s also a good time to push forward and embrace a start-up culture. For example, a consortium of Airbus, Rolls-Royce, and McLaren, stepped up to make ventilators for Covid-19 patients as part of the VentilatorChallengeUK. This required finding new supply sources and transforming existing production lines. The consortium has supplied hundreds of ventilators to hospitals so far, with more to follow, with maximum output slated for early May. This proves that big companies can turn on a dime when their teams have clarity of mission, including explicit constraints, engineering objectives, and specifications.

Finally, the production system will need to move from single product facilities to become more adaptable and flexible. Parts reusability and design based on platforms are part of the answer. It is likely that OEMs will push in this direction, affecting product lifecycle management, and promoting digital continuity both internally and across the supply chain. Other opportunities include getting rid of single-use tools and replacing them with adaptable workstations. This shift will decrease production rate targets but improve factory flexibility and speed up amortization when launching new programs.
MAKE IMPLICIT KNOW-HOW EXPLICIT

Knowledge sharing becomes imperative when companies move to different work styles, such as distributed collaboration, global project teams, virtual engineering, and decentralization. The low hanging fruit includes keeping systems and product documentation up to date, capturing know-how of individuals familiar with critical systems, and managing the transition of new and retiring workforce.

And as aerospace manufacturers expand their relationships with third parties on sensitive systems, they must also codify the knowledge of key subject-matter experts and carefully control the release of information, so it’s compliant with regulations. A robust and shared toolchain needs to be available where technical know-how is codified and formalized in ontologies that can bring together different domains and the relationships of diverse concepts across assembly, flight physics, and propulsion.

It is the aviation industry embraces its role in a broader ecosystem, there is a vast opportunity to analyze and reason better about our world. A key step is to more efficiently capture and retrieve knowledge in a way that allows engineers and operators to make better decisions. Here, knowledge graph technology and ontologies can bring together multiple domains, including airspace operators, flight controllers, airlines, aerospace researchers, and service providers. For example, an aviation risk ontology can model traffic management, flight-related activities, aircraft rules, flight conditions, and aviation incidents to reveal complicated, concealed, or unpredictable risks.

THINGS TO DO

- Model the next steps to restart and optimize projects, product roadmaps, and customer expectations.
- Virtually validate processes, assets, products to reduce costs, and speed time to market.
- Democratize cloud-native automation and simulation environments to mitigate the lack of onsite presence.
- Deploy digital twins for remote control, virtual factory monitoring, and predictive maintenance.
- Adopt robust collaborative research platforms and open-source datasets.
- Represent organizational knowledge, artifacts, and domains—such as implicit and explicit knowledge, and technical documentation—in ontologies.
HOW YOU GROW MATTERS   POST COVID-19

FOUR. SUSTAINABILITY & PLANET CENTRICITY:

COVID19 IS A TAILWIND FOR COMPANIES TO CONSIDER STAKEHOLDER DEMANDS FOR GREATER ENVIRONMENTAL RESPONSIBILITY THAT WILL IMPACT THE R&D AGENDA FOR INITIATIVES IN AEROSPACE, PREVENTATIVE HEALTHCARE, SMART CITIES, URBAN MOBILITY, GREEN FLIGHT, AND OTHER AREAS.

Governments and businesses will learn many lessons during the Covid-19 recovery. The most profound may be the newfound awareness of our planet-centricity and how fragile our interdependencies really are. There is an appreciation that we are one planet, regardless of national boundaries, and we have become more acutely aware of the need for more equitable healthcare, the importance of addressing climate change and bringing prosperity to all people.

The magnitude of the impact on aerospace manufacturers and airlines is significant. The imperatives are business viability, economic interests, and effectively responding to the various scenarios for what will happen to customer demand. At the same time, the pandemic does allow us to inform our approach for how to deal with other global challenges, such as climate change and the need for governments and businesses to embrace international collaboration with a focus on prevention and preparedness.

ACCELERATE TO A SUSTAINABLE FUTURE

Sustainability is a global challenge that must still be managed during the Covid-19 crisis. For the aerospace industry, this will mean balancing expectations of achieving environmental targets by giving research and technology teams the latitude to experiment with new materials, performance improvements, and by adapting electrification capabilities being developed in the automotive industry.

When reducing the carbon and waste footprints of industry and energy production becomes a priority and contributes to improved customer experience and profitability, every company in the ecosystem should be motivated to act. The collective obligation of the aerospace industry and ecosystem will be to invest in renewable energy and prioritize “reduce, reuse, and recycle” in business objectives to drive the needed revenue growth, especially post-Covid-19.

Here are three target areas of opportunity that have always been on the research and technology agenda of aerospace which should be prioritized.

1. **Green Flight**
   Public money will be essential for supporting the aeronautics value chain as it transitions to green flight. This support will likely be provided in exchange for more virtuous corporate behavior. For example, government demands that companies take steps towards fulfilling national COP21 commitments. In addition, companies should establish
sustainable design and production objectives, create more localized supply chains, and negotiate technology transfers of alternative energy technologies. In time, as the aeronautical product architecture matures, green flight will become a reality.

2. **Urban mobility & smart cities**

There has been relentless urbanization over the last few decades with negative environmental and social impacts. But as everything ground to a halt and air pollution abated, Covid-19 gave us a glimpse of what a healthier world looks and feels like. Even with all the uncertainty around the unfolding of new mobility scenarios and preferences, several significant trends will shape how we manage growing urbanization.

One is the re-invention of urban mobility as a transformational act to improve the prosperity of residents and communities. It’s not about cars, e-scooters, or free public transportation. Instead, it’s about stitching together multiple forms of transportation and figuring out how to optimize the whole system. One of the most pressing questions is: How will emerging mobility alternatives connect to form a unified, dynamic, multi-modal urban transportation network?

3. **eVTOLs**

The electric vertical take-off and landing vehicle is one of the new modes of transportation that will be integrated into the urban environment for commuting to work and transporting goods. The first wave of eVTOLs is expected to launch in about five years. Of course, progress is never a straight line, especially in the era of the Covid-19 pandemic. Still, eVTOLs are expected to be part of the smart-city infrastructure that spans an array of requirements, including advanced air traffic management, purpose-built charging stations, pollution monitoring systems, vehicle-to-vehicle communications, and data ownership.

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**FORMALIZE YOUR APPROACH FOR THE NEXT CRISIS**

Airline operators and aerospace manufacturers are dealing with a crisis of confidence by the flying public. But the crisis has also created a window of opportunity for industry leaders to aggressively address the next Black Swan or rare but impactful events. These usually arrive with shocks that pose a significant or even existential threat to a business. The challenge to traditional risk management models is the dependence on measuring the rate of loss due to some factor of behavior and pricing in the business model or seeking to insure against it. What’s needed is a more holistic view of risk by integrating sophisticated forecasting models to reflect more significant degrees of uncertainty. Crisis management and business continuity planning are also inadequate for businesses that will be subject to a systemic threat with severe consequences.
THINGS TO DO

- Align and reprioritize research and technology initiatives to the new post-Covid-19 reality.
- Profoundly understand new business models and the pace of sustainability innovation.
- Rebalance cost and spending without compromising on decarbonization of aircraft.
- Revisit your formal processes and standards for continuity and crisis management.

“This generation has its sights set on something different: moving the planet to a better place. So, as we ignite new categories of economic growth and prosperity, we should prioritize the vulnerable in our society and not take our environment for granted.”

– Walid Negm, Group Chief Innovation Officer, Altran
3. Gates, Dominic, “Boeing tells workers terms of voluntary layoffs, says air travel recovery will take years,” Seattle Times, Apr. 27, 2020
4. Fox, Alison, “Hong Kong Airport is Testing Full-body Disinfectant Machines That Clean Passengers’ Clothing and Bodies,” Travel + Leisure, May 5, 2020
5. Rizzo, Cailey, “Airplane Cabin Designers Unveil Potential Plane Seat Ideas for When We Can Travel Again (Video),” Travel + Leisure, Apr. 24, 2020
6. “Cabin air quality,” Civil Aviation Authority
7. Laris, Michael, “Scientists know ways to help stop viruses from spreading on airplanes. They’re too late for this pandemic,” The Washington Post, Apr. 29, 2020
8. Reid, David, “Airbus ups 20-year new jet forecast with mega-cities tipped to drive growth,” CNBC, Sep. 18, 2019
11. Sawers, Paul, “Amazon leases 15 more Boeing planes to expand air cargo network by 28%,” VentureBeat, Jun. 18, 2019
12. Fromm, Jeff, “Transitioning Travel To The Millennial Market,” Forbes, Sep. 5, 2018
13. del Castillo, Michael, “Honeywell Is Now Tracking $1 Billion In Boeing Parts On A Blockchain,” May 7, 2020, Forbes
17. Davies, Rob, “We made right choice in ventilator race, says UK consortium head,” The Guardian, Apr. 21, 2020
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