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Inside C2

Southern DAILY

Make Today Different

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Smoke from U.S. West wildfires leaves Easterners gasping

July 20 (Reuters) - Dozens of wildfires in the western United States and Canada, led by a massive blaze in Oregon, are sending smoke eastward, worsening air quality and causing colorful sunsets in some places.

More than 80 large wildfires in 13 western states charred nearly 1.3 million acres (526,090 hectares), an area larger than the state of Delaware, by Tuesday, according to the National Interagency Fire Center (NIFC) in Boise, Idaho.

But due to the jet stream and other cross-continental air currents, the regional disasters were being felt nationally.

Wildfire smoke prompted an advisory from New York health and environmental authorities on Tuesday for fine particulate matter as the region's Air Quality Index hit 118, which is unhealthy for sensitive groups such as people with breathing problems.

AQI readings well above 100 were also recorded in other Northeast cities, including Boston, Hartford and Philadelphia.

In Cleveland and Detroit, AQI topped 125, which NIFC meteorologist Nick Nauslar said was likely caused by smoke from Canadian wildfires in southeast Manitoba and southwest Ontario.

"Sunsets look prettier, redder, more colorful," said National Weather Service meteorologist Bob Orevic of the Weather Prediction Center in College Park, Maryland.

Unhealthy AQI readings were recorded on Monday in parts of Idaho and Montana, which, along with Washington state, are in the wind-driven path of smoke from southern Oregon's Bootleg fire, according to air resource adviser Margaret Key.

"Wildfire smoke exposure also increases susceptibility to respiratory infections including COVID, increases severity of such infections, and makes recovery more difficult," Key said



by email.

The Bootleg fire, already the country's largest wildfire, grew by 24,200 acres overnight to nearly 388,600 acres (157,260 hectares), about half the size of Rhode Island. Some 2,200 personnel managed to contain 30% of it, officials said.

As of Tuesday, the fire had destroyed 67 homes and was threatening 3,400 more. An estimated 2,100 people were under evacuation orders or on standby alert to be ready to flee at a moment's notice.

Report ad
Rising smoke from the fire raging in and around the Fremont-Winema National Forest about 250 miles (400 km) south of Portland has already produced at least two pyrocumulonimbus clouds, an unusual phenomenon often called fire clouds, the NIFC's Nauslar said.

"It can start to produce its own lightning, and essentially become a fire generated thunderstorm," he said by phone. This can cause rapid and erratic fire spread."



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WEA LEE'S GLOBAL NOTES

CORONAVIRUS DIARY 07/20/2021



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Everybody Needs To Be Vaccinated



The surge of the Delta variant and vaccine hesitancy now is leading to increasing hospitalizations and deaths.

According to the CDC, the average number of new COVID-19 cases each day in the past week was 32,278. That is a 66% jump from the average daily rate for the previous week. There were 258 Americans dead from COVID-19 each day this past week, up 13% from the rate of daily

deaths the previous week.

According to Dr. Rochelle Walensky, Director of the Centers for Disease Control, more than 97% of people getting hospitalized with COVID-19 now are unvaccinated and 99.5% of deaths are among the unvaccinated.

Doctors say one important reason adults should get vaccinated is to protect

children who are not yet eligible for the vaccine. Most Americans who are unprotected will likely contract the rapidly spreading Delta variant.

We really don't understand why those people are so selfish and don't want to be vaccinated and make other people sick, especially the children.

We are urging the government to force everyone to be vaccinated because this is a national emergency. We also need to stop the spread of wrong COVID-19 misinformation on social media that causes too many people to not believe the scientific proof to protect themselves and others.

All over the world people are suffering enough and struggling for their very lives. We need to take action to rescue the people at such a tragic time.



Southern DAILY Make Today Different

Editor's Choice



Palestinians celebrate on the first day of Muslim holiday of Eid al-Adha on the compound known to Muslims as Noble Sanctuary and Jews as Temple Mount, in Jerusalem's Old City. REUTERS/Ammar Awad



Salvadoran soldiers take part in a deployment ceremony for the Territorial Control plan in San Salvador, El Salvador. REUTERS/Jose Cabezas



Billionaire businessman Jeff Bezos is launched with three crew members aboard a New Shepard rocket on the world's first unpiloted suborbital flight from Blue Origin's Launch Site 1 near Van Horn, Texas. REUTERS/Joe Skipper



Spectators watch as billionaire businessman Jeff Bezos is launched with three crew members aboard Blue Origin's New Shepard rocket on the world's first unpiloted suborbital flight near Van Horn, Texas. REUTERS/Thom Baur



Horses climb a hillside that was burned by the Chuweah Creek Fire as wildfires devastate Nespalem in eastern Washington state. REUTERS/David Ryder



U.S. President Joe Biden receives a Buccaneers jersey from owner Bryan Glazer and quarterback Tom Brady as the president welcomes members of the NFL Super Bowl champion Tampa Bay Buccaneers to a reception on the South Lawn of the White House.

The New Face Of The Final Frontier
The Business Of Space



(Editor's Note: When Virgin CEO Richard Branson and his crew on the Virgin Galactic space airplane reached space last week 50 miles above earth, the achievement, while technologically monumental, was significant in heralding the inescapable commercialization of space and all that means and will become. Branson was upfront about his trip being a personal adventure while at the same time one by which he wanted to tell the public that now is the time to join him in space. But the even larger story is that Branson's ride into space marked the moment at which the dream became reality for an independent business owner, not by the hand of any government, to fly off into space and in just over two hours' time land safely back on earth. Branson's trip opened the door and now commercialization of space has begun./John T. Robbins)

Compiled And Edited By John T. Robbins, Southern Daily Editor

Richard Branson's achievement notwithstanding, today there is reason to think that we may finally be reaching the first stages of a true space-for-space economy. SpaceX's recent achievements (in cooperation with NASA), as well as upcoming efforts by Boeing, Blue Origin, and Virgin Galactic to put people in space sustainably and at scale, mark the opening of a new chapter of spaceflight led by private firms. These firms have both the intention and capability to bring private citizens to space as passengers, tourists, and — eventually — settlers, opening the door for businesses to start meeting the demand those people create over the next several decades with an array of space-for-space goods and services.

Welcome to the (Commercial) Space Age
In contrast to governments, the private sector is eager to put people in space to pursue their own personal interests, not the state's — and then supply the demand they create. This is the vision driving SpaceX, which in its first twenty years has entirely upended the

rocket launch industry, securing 60% of the global commercial launch market and building ever-larger spacecraft designed to ferry passengers not just to the International Space Station (ISS), but also to its own promised settlement on Mars. Today, the space-for-space market is limited to supplying the people who are already in space: that is, the handful of astronauts employed by NASA and other government programs. While SpaceX has grand visions of supporting large numbers of private space travelers, their current space-for-space activities have all been in response to demand from government customers (i.e., NASA).



But as decreasing launch costs enable companies like SpaceX to leverage economies of scale and put more people into space, growing private sector demand (that is, tourists and settlers, rather than government employees) could turn these proof-of-concept initiatives into a sustainable, large-scale industry.

This model — of selling to NASA with the hopes of eventually creating and expanding into a larger private market — is exemplified by SpaceX, but the company is by no means the only player taking this approach. For instance, while SpaceX is focused on space-for-space transportation, another key component of this burgeoning industry will be manufacturing.

Made In Space, Inc. has been at the forefront of manufacturing "in space, for space" since 2014, when it 3D-printed a wrench onboard the ISS. Today, the company is exploring other products, such as high-quality fiber-optic cable, that terrestrial customers may be willing to pay to have manufactured in zero-gravity. But the company also recently received a \$74 million contract to 3D-print large metal beams in space for use on NASA spacecraft, and future private sector spacecraft will certainly have similar manufacturing needs which Made In Space hopes to be well-positioned to fulfill. Just as SpaceX has begun by supplying NASA but hopes to eventually serve a much larger, private-sector market, Made In Space's current work with NASA could be the first step along a path towards supporting a variety of private-sector manufacturing applications for which the costs of manufacturing on earth and transporting into space would be prohibitive.

Another major area of space-for-space investment is in building and operating space infrastructure such as habitats, laboratories, and factories. Axiom Space, a current leader in this field, recently announced that it would be flying the "first fully private commercial mission to space" in 2022 onboard SpaceX's Crew Dragon Capsule. Axiom was also awarded a contract for exclusive access to a module of the ISS, facilitating its plans to develop modules for commercial activity on the station (and eventually, beyond it).

This infrastructure is likely to spur investment in a wide array of complementary services to supply the demand of the people living and working within it. For example, in February 2020, Maxar Technologies was awarded a \$142 million contract from NASA to develop a robotic construction tool that would be assembled in space for use on low-Earth



orbit spacecraft. Private sector spacecraft or settlements will no doubt have need for a variety of similar construction and repair tools. And of course, the private sector isn't just about industrial products. Creature comforts also promise to be an area of rapid growth, as companies endeavor to support the human side of life in the harsh environment of space. In 2015, for example, Argotec and Lavazza collaborated to build an espresso machine that could function in the zero-gravity environment of the ISS, delivering a bit of everyday luxury to the crew.

Visions of a space-for-space economy have been around since the dawn of the Space Age in the 1960s. Thus far, those hopes have gone largely unmet — but this moment is different. For the first time in history, the private sector's capital, risk tolerance, and profit motive are being channeled into putting people in space. If we seize this opportunity, we will look back on 2020 as the year when we started the truly transformational project of building an economy and a society in space, for space.

(Courtesy <https://hbr.org>)

Related
It Could Happen By 2023
Space Miners Want To Blow Up The Moon's Surface To Harvest Water



A rover descending from a Masten lunar lander.

We already use rockets to reach the moon, but soon we may use them to mine it for water. Three companies, including Lunar Outpost, Honeybee Robotics, and Masten Space Systems, are developing a novel system aimed at mining water ice from the moon with rockets, according to a blog post shared on Masten's official website. And it could happen in the year 2023.

A water ice-mining system could cover 12 moon craters per day

The moon's polar regions are thought to contain the most abundant deposits of water ice, especially in the shadowy bottom of larger craters. If future astronauts can harvest this precious material, we might have a shot at building a permanent human settlement on the moon, according to NASA authorities and space travel enthusiasts. More than keep astronauts alive, mining water ice from the lunar surface will enable us to break it down into hydrogen and oxygen, which are the primary ingredients for rocket fuel. In other

words, water ice on the moon could also fuel spacecraft on their way into deep space like a cosmic pit stop.



To drive mining technology forward, NASA issued the "Break the Ice Lunar Challenge," which aims to provide

\$500,000 to the most enticing resource-harvesting concepts amid the first phase, which will end soon, the winners of which will be announced August 13. One of the first prize-hopefuls is the Masten-Lunar Outpost-Honeybee Robotics group, pushing forward its Rocket Mining System to use a rocket engine equipped on a 1,800-lb (818-kg) rover. Once the rover moves to an area rich in water ice, the engine will activate, firing lunar gravel and dirt into a low-pressure device capable of sifting the ice from the moon rocks. "This system is projected to mine up to 12 craters per day and produce 100 kg (220 lbs) of ice per crater," said representatives of Masten in the blog post.

Multiple nations aim to settle the moon

All water ice retrieved from the moon can also fuel rocket engines, enabling the system to function for more than five years. If this concept surpasses all competitors, the rocket mining system will probably get there via a Masten lunar lander. Masten's first mission to the moon's surface will employ its XL-1 lander, and is slated to launch in 2023 atop SpaceX's Falcon 9 rocket. If all goes well, this launch will also lift NASA experiments, in addition to several commercial payloads, to the south polar region of the moon.

Lunar Outpost would design and build the rover for the Rocket Mining System, with Honeybee Robotics employing its PlanetVac technology to extract and move the lunar ice.



Water mining on the moon.

In short, these are very interesting times for the exploration of space. In

addition to NASA and related commercial projects, China and Russia plan to jointly build a permanent settlement on the moon, with the former also recently unveiling long-term plans to do the same on Mars. But we wouldn't call this a space race, not necessarily. There's more to be learned from a spirit of friendly collaboration and mutual support than ever before, in the coming decades. (Courtesy <https://interestingengineering.com/>)

(Article continues below)

(Article continues from above)

The New Face Of The Final Frontier
The Business Of Space

Compiled And Edited By John T. Robbins, Southern Daily Editor

The Five Industries That Will Be First To Do Business In Space



Companies around the world - in transportation, exploration, energy, construction or hospitality - are all looking upwards for the next growth opportunity. Space is quickly becoming a place where the industries that power our global economy will conduct business. What do we call an economic area like this, that is not limited to a single planet, and no longer has physical boundaries? We can't call it an industry, when private industrial groups can generate revenue and profit not only from the Earth but from near-Earth asteroids (NEAs), the Moon and Mars and beyond. It is simply a medium in which humanity conducts commerce.

Following are the industry sectors that will be the first to take advantage of our expanded economic sphere, and some of the specific opportunities for growth.

Energy

Valued at over \$8.4 trillion and growing at a 4.1% compound annual growth rate, energy is the largest industry on Earth. Humans are prolific energy consumers, and soon there will be more humans in space.

Jeff Bezos, Founder and CEO of Amazon, anticipates "millions of people living and working in space" in the coming decades. Bezos is so confident of this outcome that he is investing more than \$1 billion per year into his space transportation firm, Blue Origin. An in-space population of this magnitude will require enormous amounts of energy to live, work, and transit.



This energy will come from solar power, which is more effective when gathered in

space due to the lack of a filtering atmosphere; and chemical rockets, which will be the primary transportation mechanism for the foreseeable future.

The most efficient chemical rocket propellants are composed of cryogenic liquid oxygen combined with liquid hydrogen or methane. Initially, the propellant needed to fuel the space economy will be launched from Earth, as both the United Launch Alliance (a joint-venture of Lockheed Martin and Boeing) and SpaceX have proposed to do in the near future. However, there is a much more attractive way to source the propellants needed to support a sustained human presence in space: mining it.

Mining

The global mining industry has tumbled in recent years from a market value of more than \$1.6 trillion in 2010, to \$714 billion in 2016, but this may change quickly once the "global" definition of mining is transformed by the emerging space resource industry.

Space resources can be extracted from celestial bodies, most notably asteroids and the Moon. Goldman Sachs released a report earlier this year that declared asteroid mining is more realistic than perceived, with costs "comparable to traditional mines". The Goldman report also noted that "while the psychological barrier to mining asteroids is high, the actual financial and technological barriers are far lower."

The Government of Luxembourg believes so strongly in this emerging industry it recently created the \$227 million Space Resources ini-

tiative to establish Luxembourg as a European hub for space resources.



Its aim is to contribute to the peaceful exploration and sustainable utilization of space resources for the benefit of humankind. Space mining activities will initially focus on water and water-derived propellants to enable in-space infrastructure. Once this propellant is readily available, companies will begin sourcing structural metals for construction projects and eventually precious metals needed for in-space manufacturing or possibly for return to Earth.

Transportation

The most important resource that will be mined in space is water.

Water is critical for all life-support functions in space: sustenance, hygiene, and food production. Water can serve as an effective shield from the dangerous radiation present in space. Water is also the single most important feedstock for in-space refineries, which will produce rocket propellants for sale to transportation providers. Making propellants available beyond Earth's gravitational influence will lead to the creation of the first in-space superhighway — a series of fuel depots placed in strategic locations throughout the solar system. Imagine the growth potential of the energy, mining, and refining industries once they are freed from the constraints of an economy that is limited only to Earth. The in-space transportation and logistics firms who will consume these products are already well established and are headed by titans of industry:



Jeff Bezos (Blue Origin), Elon Musk (SpaceX), Richard Branson (Virgin Galactic), and Tory Bruno (United Launch Alliance). The door is now open to in-space mining firms like Planetary Resources (backed by industrial giant Bechtel and the Government of Luxembourg) to capture this increasingly important market by providing water and water-based propellants to the space transportation industry.

Construction

Today, the global construction industry competes with the energy industry for the title of the world's largest industry, and this rivalry will

continue in space. The first orbital construction systems will be deployed before the end of the decade. These robotic spacecraft will be capable of assembling large structures in orbit and repairing or refueling existing satellites. When combined with zero-gravity additive manufacturing techniques, this enables construction systems which can "print" and assemble massive structures in the medium of space.



The future of construction in space will look nothing like it does on Earth, but it will be equally valuable because the techniques and service offerings will apply across the entire in-space value chain. A propellant refinery can be assembled on orbit. Asteroid mines can be repaired autonomously. Solar power plants can be massively scaled and upgraded to meet the requirements of almost any project.

Hospitality and real estate

Humans can only live, work and play in space if they have shelter from the harsh environment of space. Today, the International Space Station (ISS) has had a sustained human presence for over 10 years, but this too will soon change.

Numerous commercial space station companies, including one created by billionaire hotel-chain-founder Robert Bigelow, are competing for lucrative contracts that range from supporting sovereign astronauts and high-net-worth tourists, to leasing space-in-space for orbital manufacturing and research and development programs. This new industry is anticipated to generate \$37 billion in the next decade alone.

Space habitats will be launched from Earth initially, but as the resource supply chain expands and metals from asteroids and the Moon become available, this sector will also come to rely on resources sourced from space.



Construction firms will combine high-quality metallic feedstocks with robotic orbital assembly fleets as we gain the ability to create orbital megastructures: hotels, factories, and permanent settlements that are no longer limited by size. The first cities in space will become possible as markets for real-estate on orbit emerge. Space will become affordable and profitable for developers.

Our global economy is limited by its very name. When we realize that Earth's economy is only the beginning, our concept of growth changes exponentially. For industrial firms who have the foresight to view space not as a stand-alone industry but as the next medium to conduct their business, the sky is not the limit. The only limitations are the ones we put on ourselves. (Courtesy <https://www.weforum.org>)

Space Coverage Gets Serious Attention

While public sentiment on whether billionaires should be leading the way in space may be mixed, public interest around the

race between Branson and Bezos has exploded. **Why it matters:** The billionaire space race is sparking widespread interest in spaceflight that could ultimately translate into future customers for their companies.

By the numbers: Not even halfway through July, mentions of the term "space race" in U.S. articles have ballooned, according to new data from Signal AI provided to Axios — more than tripling the amount of mentions last July.

•When it comes to name recognition, Bezos' Blue Origin has received a lot more attention this year than its rival — Branson's Virgin Galactic.

•Since July 2020, Virgin Galactic has received about a third of the number of total social media interactions (325,663) as Blue Origin (1,085,377), per NewsWhip.

•Elon Musk's SpaceX clobbers both, with nearly 3.5 million total social media interactions for the year.



The big picture:

Space coverage has historically been mostly in a niche — something that typically only broke through to the

mainstream with big launches, accidents or anniversaries.

But today, many news companies have hired designated space reporters, as private spaceflight takes off.

For space-specific news outlets, like Seeker, the space race has been a boon for traffic. A spokesperson tells the media that Seeker has seen twice the amount of views and minutes watched on its video content compared to the six months prior. (Courtesy [axios.com](https://www.axios.com))