**Ivermectin Report**

**Peer reviewed study finds that ivermectin is a 100% effective prophylaxis for the Made-4-TV Virus and as a therapeutic remedy**

**By**[**Thomas Lifson**](https://www.americanthinker.com/author/thomaslifson/)

I expect the corporate media will ignore as much as possible the findings of a [peer-reviewed study](https://journals.lww.com/americantherapeutics/fulltext/2021/00000/review_of_the_emerging_evidence_demonstrating_the.4.aspx?fbclid=IwAR2lQQmnlvALejyMjPHoWQiRJxY9AoHCPljTO9uh8CTh4QkK_odmDmTXSZI) just published in the *American Journal of Therapeutics* that concludes that the readily-available, inexpensive (off-patent) drug ivermectin is effective in treating existing cases of Made-4-TV Virus and in preventing coming down with the illness. Unlike the experimental vaccines that we are being ceaselessly urged to take, ivermectin has been around for many years and is safe for all but a few people. From the [article](https://journals.lww.com/americantherapeutics/fulltext/2021/00000/review_of_the_emerging_evidence_demonstrating_the.4.aspx?fbclid=IwAR2lQQmnlvALejyMjPHoWQiRJxY9AoHCPljTO9uh8CTh4QkK_odmDmTXSZI):

Numerous studies report low rates of adverse events, with the majority mild, transient, and largely attributed to the body's inflammatory response to the death of the parasites and include itching, rash, swollen lymph nodes, joint paints, fever, and headache.75 In a study that combined results from trials including more than 50,000 patients, serious events occurred in less than 1% and largely associated with administration in Loa loa.76

Furthermore, according to the pharmaceutical reference standard *Lexicomp*, the only medications contraindicated for use with ivermectin are the concurrent administration of antituberculosis and cholera vaccines while the anticoagulant warfarin would require dose monitoring.

Another special caution is that immunosuppressed or organ transplant patients who are on calcineurin inhibitors, such as tacrolimus or cyclosporine, or the immunosuppressant sirolimus should have close monitoring of drug levels when on ivermectin given that interactions exist that can affect these levels.

The inventors of ivermectin received the [Nobel Prize in Medicine and Physiology](https://www.britannica.com/biography/William-Campbell-Irish-born-American-parasitologist#ref1229251).



Here is the abstract:

Recently, evidence has emerged that the oral antiparasitic agent ivermectin exhibits numerous antiviral and anti-inflammatory mechanisms with trial results reporting significant outcome benefits. Given some have not passed peer review, several expert groups including Unitaid/World Health Organization have undertaken a systematic global effort to contact all active trial investigators to rapidly gather the data needed to grade and perform meta-analyses.

**Data Sources:**

Data were sourced from published peer-reviewed studies, manuscripts posted to preprint servers, expert meta-analyses, and numerous epidemiological analyses of regions with ivermectin distribution campaigns.

**Therapeutic Advances:**

A large majority of randomized and observational controlled trials of ivermectin are reporting repeated, large magnitude improvements in clinical outcomes. Numerous prophylaxis trials demonstrate that regular ivermectin use leads to large reductions in transmission. Multiple, large “natural experiments” occurred in regions that initiated “ivermectin distribution” campaigns followed by tight, reproducible, temporally associated decreases in case counts and case fatality rates compared with nearby regions without such campaigns.

**Conclusions:**

Meta-analyses based on 18 randomized controlled treatment trials of ivermectin in MADE-4-TV VIRUS have found large, statistically significant reductions in mortality, time to clinical recovery, and time to viral clearance. Furthermore, results from numerous controlled prophylaxis trials report significantly reduced risks of contracting MADE-4-TV VIRUS with the regular use of ivermectin. Finally, the many examples of ivermectin distribution campaigns leading to rapid population-wide decreases in morbidity and mortality indicate that an oral agent effective in all phases of MADE-4-TV VIRUS SHOW-19 has been identified.

And here is the conclusion of the article:

Because of the urgency of the pandemic, and in response to the surprising persistent inaction by the leading PHA's, the British Ivermectin Recommendation Development Panel was recently coordinated by the Evidence-Based Medicine Consultancy Ltd to more rapidly formulate an ivermectin treatment guideline using the standard guideline development process followed by the WHO.

Made up of long-time research consultants, including the WHO, convened both a steering committee and a technical working group that then performed a systematic review and meta-analysis. On February 12, 2021, a meeting was held that included an international consortium of 75 practitioners, researchers, specialists, and patient representatives representing 16 countries and most regions of the world.

This Recommendation Development Panel was presented the results of the meta-analysis of 18 treatment RCTs and 3 prophylaxis RCTs including more than 2500 patients along with a summary of the observational trials and the epidemiologic analyses related to regional ivermectin use.

After a discussion period, a vote was held on multiple aspects of the data on ivermectin, according to standard WHO guideline development processes. **The Panel *found the certainty of evidence for ivermectin's effects on survival to be strong and they recommended unconditional adoption for use in the prophylaxis and treatment of* the *MADE-4-TV VIRUS.***

**SN15**

SpaceX’s Starship launch vehicle development is on track. Engineers successfully launched and landed the Starship SN15 prototype during a test flight last week. On May 5th, the stainless-steel SN15 vehicle lifted off from the Boca Chica Beach launch pad under cloudy skies. The vehicle soared 10-kilometers into the thick fog becoming nearly invisible but the six-minute-long aerodynamic flight went according to plan; the vehicle relighted its methane-fueled Raptor engines and touched down flawlessly on a nearby landing pad. Starship SN15 is the first test vehicle to ace the landing without exploding. SpaceX founder Elon Musk said on Friday that they “Might try to refly SN15 soon,” he wrote via Twitter.

"These test flights of Starship are all about improving our understanding and development of a fully reusable transportation system designed to carry both crew and cargo on long-duration interplanetary flights, and help humanity return to the Moon, and travel to Mars and beyond," the company stated. SpaceX’s goal is to build a fully reusable launch vehicle. Reusing Starship SN15 would provide engineers with valuable insight towards the spacecraft’s development. The next prototypes that are set to take flight SN16 and SN17 are already under assembly. Musk could opt for launching SN15 before launching the new vehicles or in between their test flights. Building a reusable launch system that can be as rapidly reusable as airplanes has not been done by any aerospace company yet. SpaceX is taking on the challenge to develop the spacecraft that could conduct multiple crewed flights per day. Falcon 9 is only 85% reusable, Starship will be designed for 100% reusability. –“The vehicle we’re working on, Starship is the holy grail of which is full reusability,” Musk said last year.

Starship will make use of a Super Heavy rocket booster to propel it to orbit. The first booster prototype is also under development, alongside a giant launch tower that is under construction in South Texas. Musk aims to launch the first Starship test vehicle to orbit by Summer this year. The company says that Starship will one day become the world’s most powerful launch vehicle. Starship will be capable of transporting one hundred passengers on long-duration interplanetary missions.

**The Global Syndicate**

Tyranny has been a constant theme in political philosophy for 2500 years. It profoundly influenced the creators of the Constitution, an important purpose of which is to forestall the tyranny that destroys political freedom and citizen rule. They lived it. They escaped it by coming to the frontier and forming a new nation, whose government would serve under the authority of the people, not the crown. A republic can only survive by force. That is to say, a force of opposition to government becoming so powerful as to obfuscate the rights of the individual person. Yes, it is the armed American that ensures the Bill of Rights, not government. Shall not be infringed is a protection of the people against the government.

In the writings of Classical philosophers and historians the Founders knew this tyranny would accelerate with each generation in the policies of the administrations. It is precisely why term limits are vital for the survival of the Republic.

The Greek historian Polybius in the second century B.C. laid out how a democracy degenerates into tyranny:

*So when [the rich] begin to hanker after office, and find that they cannot achieve it through their own efforts or on their merits, they begin to seduce and corrupt the people in every possible way, and thus ruin their estates. The result is that through their senseless craving for prominence they stimulate among the masses both an appetite for bribes and the habit of receiving them, and then the rule of democracy is transformed into government by violence and strong-arm methods. By this time the people have become accustomed to feed at the expense of others, and their prospects of winning a livelihood depend upon the property of their neighbors, and as soon as they find a leader who is sufficiently ambitious and daring . . . they introduce a regime based on violence.*

Many of these preconditions already exist in our country. Since Roosevelt’s New Deal, ambitious politicians of both parties have “stimulate[d] among the masses both an appetite for bribes and the habit of receiving them.” We call them “entitlements” rather than “bribes,” funded not by violently seizing the property of the rich, but by annually redistributing $1.6 trillion of the people’s wealth to the upper middle class and the rich through the federal income tax. Indeed, the top one percent of all earners pays 40% of income taxes, so naturally they feel entitled to the return on their investment, at the expense of small business and the working poor. They tax your gas, your groceries, your utilities, and even your unemployment benefits while laundering billions back to themselves through non-profits and charities and sweet book deals dumped in landfills every month.

The modern update of ancient “bribes” also comprises massive borrowing and printing of counterfeit money. These practices have created nearly $27 trillion in government debt, five trillion more than GDP. The tyrants of Polybius’ day redistributed the wealth of the rich; today the Agency government confiscates the future wealth of the young and generations of the unborn who will be stuck with the bill.

And this largess will increase dramatically if the Virtual Joe and his gang or criminals successfully passes into law several new [mechanisms](https://www.nationalreview.com/the-morning-jolt/bidens-trillion-dollar-train-wreck/?utm_source=Sailthru&utm_medium=email&utm_campaign=MJ_20210428&utm_term=Jolt-Smart) for redistributing wealth:

* $1.9 trillion America Rescue Plan
* $2.3 trillion American Jobs Plan
* $1.8 trillion American Families Plan
* $1 trillion Green New Deal for Cities
* $180 billion Green New Deal for Public Housing
* $15 trillion over 15 years Thrive Act

Most of this money will be spent on various transfers to voters, and subsidies to favored businesses and feckless state governments that run their own redistribution engines.

As for “government by violence and strong-arm methods,” modern tyranny for decades has relied on de Tocqueville’s “soft despotism,” an insidious coercion through a regulatory regime that Tocqueville predicted, one which “covers the surface of society with a network of small complicated rules, minute and uniform, through which the most original minds and the most energetic characters cannot penetrate.” All the money to be redistributed will come with a plethora of such intrusive regulations from the agencies managing it. These rules and regulations limit citizen freedom in numerous ways, from what they can do with their own property to how they run their own businesses, all accompanied by fines and fees that extract even more revenue.

During Donald Trump’s presidency, however, we saw another form of “strong-arm methods.” The politicizing of the FBI, the CIA, and the DOJ, along with Special Counsel Robert Mueller’s investigation–– agencies with coercive investigative powers backed by military-level lethal force–– produced the tyrannical bullying of several members of Trump’s administration, most egregiously General Michael Flynn. Meanwhile, old-fashioned physical violence and intimidation in the streets dogged Trump’s political rallies, and even followed Trump supporters to restaurants and other public venues.

Just as Virtual Joe’s redistributive ambitions have gone far beyond what passes for “normal,” the violence in the streets last year exploded to levels not seen since the Sixties. Led by Antifa and Black Lives Matter, these “peaceful protestors” looted, burned, and vandalized cities across the country, the mayhem mysteriously abating in time for the election. Billions of dollars in property damage and scores of killed and wounded were the toll. Just the threat of such violence undoubtedly intimidated the judge and jurors in the Derek Chauvin trial. Why else wouldn’t the judge approve a change in venue, or sequester the jurors?

Violence is now the trump card in daily politics and culture. Corporations have gone “woke,” sending millions of dollars to Black Lives Matter and promoting their “systemic racism” lie. City governments and public school districts must factor in the chance of violent protests in their policy decisions. Even worse, the principle of equality before the law, a bedrock of political freedom, has been abandoned for political favoritism, in part because authorities are wary of igniting violence. Derek Chauvin was convicted of two murder charges, decisions not even close to being beyond a reasonable doubt. But the unidentified DC cop who murdered a protestor at the Capitol on January 6––a woman veteran who was not threatening the officer’s, or anybody’s, life––has not even suffered professional sanction, let alone an indictment and trial.

Violence for me, but not for thee.

Worse yet, Antifa has openly said that their violence is a tool of intimidation in the pursuit of political goals. CrimetheInc., an Antifa ally, has bragged that the outcome of the Chauvin trial was due to the street violence. It goes on to make explicit this link between violence and political aims: “You put yourself in a weaker bargaining position by spelling out from the beginning the least it would take to appease you. It’s smarter to appear implacable: So you want to come to terms? Make us an offer. In the meantime, we’ll be here blocking the freeway and setting things on fire.” This tactic is exactly what Hitler instructed his Sudetenland Nazi stooge, Konrad Henlein, to do in negotiations with the Czech government in 1938: “We must always demand so much that we cannot be satisfied.” What “satisfied” the Nazis was the destruction of Czechoslovakia.

What is disturbingly different from the Sixties, moreover, about last year’s violence is that the Democrat establishment has not just tolerated the violence, but often encouraged and promoted it––just as Representative Maxine Waters did during the Chauvin trial when she incited protestors to get “confrontational” if the wrong verdict was given. Apprehended rioters were rarely charged or tried, and police forces were ordered to stand down, or forbidden to use crowd-control tools. Many mayors seemed to embrace the philosophy of Baltimore mayor Stephanie Rawlings, who during the riots in 2015 told the press, “We gave them [rioters] space to destroy.”

As Daniel Henninger [suggests](https://www.wsj.com/articles/joe-bidens-art-of-the-non-deal-11619647864?mod=hp_opin_pos_1), this tactical use of violence may be why Virtual Joe and his gang of criminals have not even tried to make a deal by compromising with Republicans. Democrats’ wield their razor-thin margin in the House and Senate like a sword of Damocles to destroy everyone in their way. Virtual Joe wants to bully Americans into accepting the Global Syndicate’s policies, written by think tanks and Marxist academics:

*Virtual Joe is no street anarchist, but the political “change” confronting Americans after more than a year living with the Made-4-TV Virus—constant antipolice protests, migrants streaming across the southern border, D.C. statehood, blowing up the legislative filibuster, packing the Supreme Court and some $6 trillion in new federal spending—is a lot of nonnegotiable bulldozer.*

Finally, Polybius’ link of tyrannic ambition to mediocre politicians who “hanker after office, and find that they cannot achieve it through their own efforts or on their merits,” describes Virtual Joe to a T. This 1960’s politithug is a long-time senator with few legislative achievements he still will own, a vicious pit-bull on the Senate Judiciary Committee where he shamelessly demagogued Robert Bork and Clarence Thomas, a plagiarizer and unseemly harasser of women, a two-time loser in his bid for the presidency, a fabulist and grifter who monetized the office of Vice President to enrich his family, and a lightweight so light that his own boss, Barack Obama, said, “Don’t underestimate Virtual Joe’s ability to fuck things up.” Only a pandemic, disruptive lock-downs, and the Democrat primary threat of socialist Bernie Sanders––along with a probably fraudulent election, and a groveling media running interference–– could get such a meritless mediocrity into the Oval Office.

If Virtual joe and his gang of criminals are successful at leveraging street-violence for political gain, the century-old progressive dream of transforming our Constitutional Republic into a tyrannical technocracy will be much closer to fulfillment, our country much closer to bankruptcy, and our government much closer to a “regime based on violence.”

On that dismal day, we won’t be able to say that we hadn’t been warned for 2500 years.

The same people who crucified Christ, attempted three times by military action on this continent to destroy our nation, smashed the middle class in 1929 and destroyed the twin towers are still in power. They are still trying to remove freedom and liberty from the earth forever. Let’s stop them.

**Avoiding the Uncertainty Principle**

The uncertainty principle, first introduced by Werner Heisenberg in the late 1920's, is a fundamental concept of quantum mechanics. In the quantum world, particles like the electrons that power all electrical product can also behave like waves. As a result, particles cannot have a well-defined position and momentum simultaneously. For instance, measuring the momentum of a particle leads to a disturbance of position, and therefore the position cannot be precisely defined.

In recent research, published in *Science*, a team led by Prof. Mika Sillanpää at Aalto University in Finland has shown that there is a way to get around the [uncertainty principle](https://phys.org/tags/uncertainty+principle/). The team included Dr. Matt Woolley from the University of New South Wales in Australia, who developed the theoretical model for the experiment.

Instead of [elementary particles](https://phys.org/tags/elementary+particles/), the team carried out the experiments using much [larger objects](https://phys.org/tags/larger+objects/): two vibrating drumheads one-fifth of the width of a human hair. The drumheads were carefully coerced into behaving quantum mechanically.

"In our work, the drumheads exhibit a collective quantum motion. The drums vibrate in an opposite phase to each other, such that when one of them is in an end position of the vibration cycle, the other is in the opposite position at the same time. In this situation, the quantum uncertainty of the drums' motion is canceled if the two drums are treated as one quantum-mechanical entity," explains the lead author of the study, Dr. Laure Mercier de Lepinay.

This means that the researchers were able to simultaneously measure the position and the momentum of the two drumheads—which should not be possible according to the Heisenberg uncertainty principle. Breaking the rule allows them to be able to characterize extremely weak forces driving the drumheads.

"One of the drums responds to all the forces of the other drum in the opposing way, kind of with a negative mass," Sillanpää says.

Furthermore, the researchers also exploited this result to provide the most solid evidence to date that such large objects can exhibit what is known as [quantum entanglement](https://phys.org/tags/quantum+entanglement/). Entangled objects cannot be described independently of each other, even though they may have an arbitrarily large spatial separation. Entanglement allows pairs of objects to behave in ways that contradict classical physics, and is the key resource behind emerging quantum technologies. A quantum computer can, for example, carry out the types of calculations needed to invent new medicines much faster than any supercomputer ever could.

In macroscopic objects, quantum effects like entanglement are very fragile, and are destroyed easily by any disturbances from their surrounding environment. Therefore, the experiments were carried out at a very low temperature, only a hundredth a degree above absolute zero at -273 degrees.

In the future, the research group will use these ideas in [laboratory tests](https://phys.org/tags/laboratory+tests/) aiming at probing the interplay of quantum mechanics and gravity. The vibrating drumheads may also serve as interfaces for connecting nodes of large-scale, distributed quantum networks.

**Government Anti-Employment Plan**

For the last 110 days, the jobs reports have been disastrous. In a colossal and feverish effort to abolish everything Trump, Virtual Joe and his band of criminals have gone full fascist by paying people to stay home, instead of letting them go to work. Absenteeism across the nation averages 13%, while unemployment in most States hovers around 22%. In some sectors, unemployment is a whopping 35%, because the federal government is subsidizing people who do want to binge on Netflix, play video games, and order Uber eats because they’re too drunk to drive.

Right on cue, just after Minneapolis Fed chief Neel Kashkari [admitted that expanded unemployment insurance](https://www.zerohedge.com/economics/kashkari-slams-hawkish-critics-while-pretending-stimulus-isnt-helping-wall-street) was keeping workers out of the labor market, contributing to Friday's disappointing employment number, the US Chamber of Commerce released a statement calling for ending the $300 weekly supplemental benefit.

Executive Vice President and Chief Policy Officer Neil Bradley released the following as [a statement](https://www.uschamber.com/press-release/us-chamber-calls-ending-300-weekly-supplemental-unemployment-benefits-address-labor), saying that while there might have been a time when the benefit was needed, that time has now passed. **"Paying people not to work is dampening what should be a stronger jobs market" and is hurting the overall recovery,** he said.

"The disappointing jobs report makes it clear that paying people not to work is dampening what should be a stronger jobs market. **We need a comprehensive approach to dealing with our workforce issues and the very real threat unfilled positions poses to our economic recovery from the pandemic.**One step policymakers should take now is ending the $300 weekly supplemental unemployment benefit. Based on the Chamber’s analysis, the $300 benefit results in approximately one in four recipients taking home more in unemployment than they earned working.”

While Dems often butt heads with the Chamber of Commerce, the Party and its leader, President Joe Biden, certainly won't appreciate this growing chorus of opposition as they try to order up even more stimulus under the guise of "infrastructure".

In an interview with CNBC, Bradley repudiated a question about whether businesses need to simply raise wages. He noted that wages were actually a bright spot in Friday's report, and that the problem is b**usinesses aren't just competing with each other for workers, but with the government,** which is paying workers more to sit at home than businesses can afford to pay them to work.

CNBC's David Faber concluded by affirming that this debate is "far from over".

Elaborating on the issue, [Mark Glennon at Wirepoints elaborates on how](https://www.zerohedge.com/personal-finance/torrent-federal-cash-stifling-return-work-fed-repeats-historic-error-reverse)  **the torrent of cash pouring into the economy from both the federal government and the Fed, which are now "joined at the hip" (as former Fed economist Henry Kauffman recently wrote), is contributing to damaging worker shortages and ultimately undermining the recovery, just as the CoC asserts.**

It’s key to first to get your mind around how much money Washington is pumping out, which isn’t easy. So far, lawmakers have enacted six major pandemic relief bills costing about $5.3 trillion. For a little perspective, that’s 27% more than the entire federal budget for 2019, the last fiscal year before the pandemic. And now the Biden Administration wants to spend an additional $4.5 trillion.

Through it all, the Fed has been the Treasury’s enabler. It has already wished into existence $3.5 trillion since the pandemic started, used to purchase notes and bonds. And it says it expects to continue that buying at a clip of $1.4 trillion per year while keeping interest rates low, rates that already are negative, being lower than inflation.

Here’s another bit of historical perspective. In 1988, Democratic Senator Lloyd Bentsen said this in a debate during his candidacy for Vice President: “You know, if you let me write $200 billion worth of hot checks every year, I could give you an illusion of prosperity, too.”

That $200 billion would be only $450 billion today. But this year’s projected federal deficit is five times higher than that even without the Biden Administration’s new spending proposal. The Fed is now creating as much money as Bentsen decried in today’s dollars every four months.

**Granted, not everybody has benefited from federal largess. Some individuals have suffered immense financial hardship from the pandemic.**

But that definitely has not been typical. Federal assistance has been so vast that total personal income in every state has actually been higher during the pandemic than before. As a Pew Research report put it, “The sharp increase in government transfer payments more than offset a slight decline in inflation-adjusted earnings, which include wages from work plus extra compensation such as employer-sponsored health benefits, as well as business profits.”

Nor have state and local governments suffered. Federal relief for almost all of them together with their own reserves has exceeded losses caused by the pandemic. Many needed no help at all, as we detailed [here.](https://wirepoints.org/the-states-2020-financials-are-in-bidens-billions-in-new-federal-aid-arent-needed-wirepoints-special-report/)

Even before Friday's report, [South Carolina and Montana](https://www.zerohedge.com/economics/south-carolina-follows-montana-ending-all-supplemental-federal-unemployment-programs) had already moved to end the expanded unemployment benefits. Will we see more states follow suit in the coming days?

\* \* \*

Today's payrolls print was the second biggest miss in history (second only to last March) as despite 7 million job openings, only a net 266k additional Americans got jobs.

***Who could have possibly***[***seen this coming***](https://www.zerohedge.com/markets/there-are-absolutely-no-job-seekers-how-trillions-stimulus-sparked-historic-job-market)***?***

The economy still remains 8.2 million jobs short of pre-lockdown levels after the April jobs report published Friday signaled a slow, long road to recovery.

Only [266,000 jobs](https://www.bls.gov/news.release/pdf/empsit.pdf) were added last month, far below the estimated million forecasters predicted. Unemployment was expecting to go down, not up, as it did to 6.1 percent while the government continues to dole out generous benefits to incentivize Netflix and couch surfing over a paycheck.

The April jobs numbers were so low, CNBC’s Steve Liesman appeared to believe there may have been a typo on air.

“It looks like 266,000. It looks like it was a big disappointment at 266, but maybe I have that wrong,” Liesman said, before confirming the number on the Bureau of Labor Statistics website. “Yes, 266 is correct … We have some issues here.”

The low numbers follow several months of disappointing jobs figures as employers struggle to recruit laid-off staff who earn just as much, if not more, in government unemployment benefits. [According](https://www.wsj.com/articles/millions-are-unemployed-why-cant-companies-find-workers-11620302440) to the Wall Street Journal, more job openings exist this spring than did in the days leading up to the pandemic.

Job growth only averaged 524,000 per month over the last three months presenting an ominous sign a full recovery will be slow.

According to [*Bloomberg*](cohttps://www.bloomberg.com/news/articles/2021-05-06/companies-warn-of-u-s-labor-shortages-economists-call-temporary), economists are apparently stupefied by the effect of government paying people *not* to work during the pandemic;**there's a giant shortage of people willing to return to the workforce.**

From Chipotle, to MGM, to [McDonald's](https://www.zerohedge.com/markets/whatever-it-takes-tampa-mcdonalds-exposes-americas-systemic-labor-shortage-forced-pay), companies are now widely reporting that **they can't find - or entice - enough workers to fill open positions** now that America has largely emerged from MADE-4-TV VIRUS SHOW lockdowns. Executives, who are decidedly less 'baffled' than the economists, are blaming 'stimulus checks and generous unemployment benefits' for hampering their efforts to hire.

**Montana has become the first state to cancel unemployment benefits** due to an 'unprecedented worker shortage.' This was confirmed by the [results of the latest, April, NFIB Small Business survey](https://www.nfib.com/content/press-release/economy/small-business-owners-struggle-to-find-qualified-workers/), which found that**a record 42% of companies reported job openings that could not be filled.**

The key quote from NFIB Chief Economist Bill Dunkelberg was “Main Street is doing better as state and local restrictions are eased, but finding qualified labor is a critical issue for small businesses nationwide." And the explicit admission that Virtual Joe’s "trillions" in stimulus are behind this predicament:

**"Small business owners are competing with the pandemic and increased unemployment benefits that are keeping some workers out of the labor force."**

As if it wasn't clear, the NFIB added that "finding eligible workers to fill open positions will become increasingly difficult for small business owners."

**In Late April, the**[***Wall Street Journal***](https://www.wsj.com/articles/restaurants-serve-up-signing-bonuses-higher-pay-to-win-back-workers-11619359201?mod=cxrecs_join#cxrecs_s)**reported that restaurants are even offering *signing bonuses*.**

*Full-service and high-end restaurants like Wolfgang Puck’s Spago Beverly Hills, where servers can earn $100,000 a year with tips,****also are struggling to recruit workers****. Mr. Puck said in an interview that expanded unemployment benefits and new options like personal chef gigs are contributing to staffing shortages at Spago and his other restaurants.*

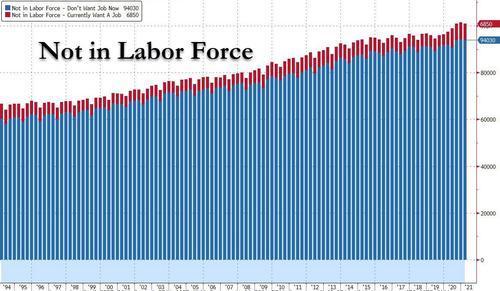
*“****I don’t think we should pay people to stay home and not work if there are jobs available****,” he said.*

*...*

*Illinois-based Portillo’s Hot Dogs LLC boosted hourly wages in markets including Arizona, Michigan and Florida, and is offering $250 hiring bonuses. The chain has hired social-media influencers and built a van called the “beef bus” to help recruit. Still, many of the chain’s 63 restaurants remain understaffed, said Jodi Roeske, Portillo’s vice president of talent.*

*“****We are absolutely struggling to get people to even show up for interviews****,” Ms. Roeske said.* McDonalds is reportedly paying people $50 to show up for the interview. We used to drive down to Olympic Blvd to pick up temporary day workers for cash to work in our microfactory when employees wouldn’t show up for work.

BLS data showed that there were over 100 million Americans who are out of the workforce - of which just 6.85 million were **looking for a job**. The rest are just hanging out at home, spending our money on booze and waverunners.

[](https://www.zerohedge.com/s3/files/inline-images/not%20in%20labor%20force%204.8_4.jpg?itok=Aze2xmNU)

Consider the following striking anecdotes:

* When the Made-4-TV virus show season opener, Melissa Anderson laid off all three full-time employees of her jewelry-making company, Silver Chest Creations in Burkesville, Ky. She tried to rehire one of them in September and another in January as business recovered, but they refused to come back, she says. **“They’re not looking for work.”**
* Sierra Pacific Industries, which manufactures doors, windows, and millwork, is so desperate to fill openings that **it’s offering hiring bonuses of up to $1,500 at its factories in California, Washington, and Wisconsin.**In rural Northern California, the Red Bluff Job Training Center is trying to lure young people with extra-large pizzas in the hope that some who stop by can be persuaded to fill out a job application. “We’re trying to get inside their head and help them find employment. Businesses would be so eager to train them,” says Kathy Garcia, the business services and marketing manager.**“There are absolutely no job seekers."**

These are not one-off cases: these real-life events, revealed by Bloomberg, expose the striking statistical reality in the US: on April 1 the NFIB (National Federation of Independent Business) reported that in March a record-high percentage of small businesses surveyed said they had jobs they couldn’t fill: 42%, vs. an average since 1974 of 22%.

Even JPMorgan [admitted last month](https://www.zerohedge.com/economics/jpm-it-appears-there-worker-shortage) that for normalcy to return, **people must not only be employed but must *want* to be employed** - and suggested that as long as Virtual Joe wants to buys votes, ***workers will sit on the sidelines.***[*Bloomberg*](https://www.zerohedge.com/economics/job-openings-soar-2-year-high-labor-market-starts-overheating) even admitted that ***trillions in Virtual Joe’s funny money are now incentivizing potential workers not to seek gainful employment,***and instead sit back and collect the next stimmy check for doing absolutely nothing in what is becoming the world's greatest "under the radar" experiment in Universal Basic Income. And if he doesn’t come up with the cash, they will say it’s racist and begin burning the city to the ground.

Yet, *now Bloomberg* reports that 'economists' and other assorted Marxists **are apparently "unclear about what’s really causing this gap and how long it will last."**

"There is definitely a job paradox that’s going on," according to Bank of America senior US economist, Joe Song, who says that while it's difficult to quantify, "but it’s clearly a challenge that’s weighing on a quicker pace of recovery."

*While the mythical unemployment rate probably fell to 5.8% last month, according the median estimate in a Bloomberg survey of economists, the true average is somewhere around 16% and more like 22% in more rural areas. Further, the employment to population ratio -- which measures the share of the population that is employed -- is still more than three percentage points below where it was before Made-4-TV Virus Show-19.*

*Lingering health concerns, ongoing child care responsibilities and the inability to do some jobs from home are just some of the reasons why Americans are reluctant to return to work. Some are also*[*retiring*](https://www.bloomberg.com/news/articles/2021-04-30/more-americans-are-considering-retirement-because-of-covid)*early. Some are coming out of retirement to cash in on the wages employers are willing to pay for people with good work ethics and skills.*

***And anyone who previously made less than $32,000 per year is better off financially in the near term receiving unemployment benefits,****according to economists at Bank of America. -Bloomberg*

Now, the argument has begun to shift to 'fair wages' - with the Economic Policy Institute's Heidi Shierholz, former Labor Department chief economist under Obama, saying: "Employers are like: ‘Why the hell, if there are so many people who need jobs, **can’t I find somebody really awesome, really cheap?**"

Of course, as massive stimulus 'coincides' with massive inflation across several categories, the definition of 'really cheap' is now relative. A gallon of milk jumps over 11% in the last 100 days. A gallon of gas went up 33%. Wood went up a whopping 300%. All since Virtual Joe seized power using cheat-by-mail in the 2020 Selection.

"If we’re having that kind of job shortage at a time when the economy is still in front of what almost everybody thinks is going to be a very substantial boom over the next six months, I am concerned about inflation and inflation expectations," former Treasury Secretary Larry Summers, a good friend of Jeffrey Epstein, told *Bloomberg TV*in an interview.

You ain’t seen nothing yet.

According to policy makers, including Fed Chair Jerome Powell (another criminal in Virtual Joe’s gang), the labor market screwup is only temporary - and workers will 'likely' return to the labor force after their extended jobless aid programs are over.

Which begs the question - if employers are already having trouble attracting workers back into the labor force, **why do we need a $1.8 trillion 'human infrastructure' plan**?

BTW: The wildly uneven US economic recovery since the Made-4-TV virus show began in early 2020 has given rise to dangerous levels of inequality, otherwise known as the "K-shaped" recovery. The "K" represents an immediate recovery for the rich but continued economic hardships for the working poor.

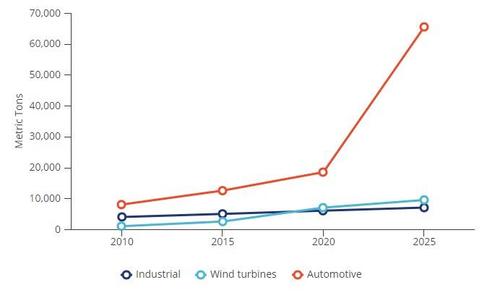
Payrolls are still millions of jobs short of Virtual-Joe’s stimulus checks. Corporate America understands this souring picture and has found a way to capitalize on an increasingly larger population of working poor Americans by opening a flurry of dollar stores across the country.

**The CCP Commodity Strategy**

America businesses are trained to think on a quarterly basis. Investors are greedy and ruthless in the desire to see 10-20 times their money in 90 days. The CCP has a long-range strategy. They knew the planet would become more and more reliant on microchips. Microchips, and the Lithium batteries that store energy for them, are made from Rare Earth Elements.

From ventilator and chip shortages to what kind of ships traverses through which canals, the linkages and nodes of the global economy have rarely been in the spotlight as much as they have over the last 12 months. Many of these disruptions are short-term ones, but they have also brought attention to longstanding challenges of supply chain resilience and dependence.

**One of those challenges is that of The Global Syndicate’s grip on rare earth elements (REEs), through the CCP. These are key elements in permanent magnets that are in everything from smart phones and wind turbines to electric vehicles and missile guidance systems.**

*[](https://www.zerohedge.com/s3/files/inline-images/2021-05-06_14-02-32.jpg?itok=sdjXE0uB)*

*Source: Statista estimates; Quest Rare Minerals.*

**This is not the first time these 17 elements that sit at the bottom of the periodic table have raised alarm from Tokyo to Washington.**Back in 2010, Beijing was roundly accused of [embargoing REE exports](https://www.eastasiaforum.org/2013/08/18/did-china-really-ban-rare-earth-metals-exports-to-japan/) to Japan as Sino-Japan relations soured.

At the time, China was responsible for some 90%-plus of REE supplies globally, even though its estimated reserves are around just 25%-33% of the global total. Given the wide belief in Japan and the United States—which also happen to be the largest importers of REEs—that China could weaponize this resource, its supply monopoly raised hackles and intensified calls for diversification.

A decade since, has much changed? I had trekked to Inner Mongolia’s Baotou Rare Earth Hi-Tech Zone back in 2010 to gain more insight into China’s designs on the REE industry and how that affected the global market. It’s worth revisiting this industry now to understand how its dynamics shaped Beijing’s thinking and intent on managing this resource.

**“Selling gold for the price of radishes”**

**China has long viewed REEs as a strategic resource, with the industry’s development spurred by a quip supposedly attributed to Deng Xiaoping: “The Middle East has oil, but China has rare earths.”**

Yet as China became the dominant supplier of REEs over subsequent decades, it saw the price of REEs plummet, hardly the price-setting influence that an OPEC exerted on oil prices. That frustrated the economic nationalists in Beijing, [grumbling that](https://finance.sina.com.cn/roll/2020-10-12/doc-iivhuipp9211674.shtml) **China was essentially “selling gold at the price of radishes.”**

Much of that frustration stemmed from the government’s inability to regulate a wild industry that was rife with smuggling. At one point in 2011, [it was estimated](http://finance.people.com.cn/n/2012/0827/c1004-18837152.html) that there was a gap of 120% between REE volumes that China officially exported and what other countries imported. **Meanwhile, REE mining was also**[**exacting a hefty**](https://e360.yale.edu/features/china-wrestles-with-the-toxic-aftermath-of-rare-earth-mining)**environmental toll.**

The Chinese government decided it needed to consolidate the REE industry. Beijing thought it could clean up the illegal business, while also receiving some of that price-setting power that has long eluded it. What’s more, the move also dovetailed with [rolling out](http://www.gov.cn/zwgk/2012-07/20/content_2187770.htm) the original “strategic emerging industries” initiative, the start of China’s effort to indigenize supply chains and move up the value chain.

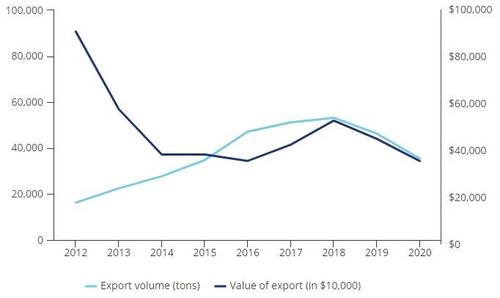
**In other words, why export this resource for pennies when China should keep more of it for its own tech industries of the future?**

This is where Baotou comes into play. Part of the industry restructuring was intended as a “resource for technology” play. That is, instead of exporting REEs, China did what it knows best: set up zones to attract high-tech manufacturing investment in exchange for easy access to critical materials. Baotou, of course, was and still is China’s largest production base of REEs.

**Did the strategy work?**

Although economic nationalist in orientation, China’s REE policy was a far cry from banning exports (see Figure 2). The stringent export quotas in the 2011-2012 period certainly drove a spike in prices, but that was short-lived. By 2014, it became apparent that China was ramping up exports rather than reducing them, and prices quickly corrected and have remained relatively low since. The reality reflects Beijing’s perennial struggle in imposing its will on a fragmented, messy, and profit-driven industry.

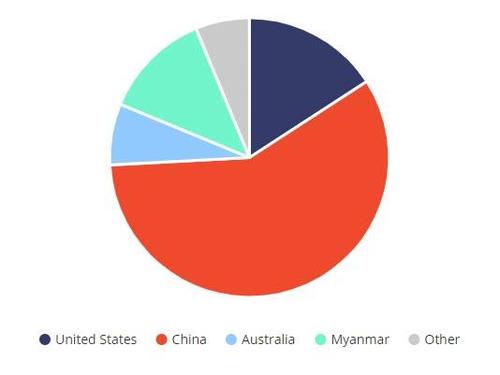
***Figure 2. China’s REE Exports Have Not Declined Over Last Decade***

*[](https://www.zerohedge.com/s3/files/inline-images/2021-05-06_14-05-29.jpg?itok=v2cS2RV-)*

*Source: Wind.*

It is also not entirely clear whether an actual embargo took place in 2011 or whether it was the result of Beijing’s export quotas. But whatever the judgment in hindsight, the damage has already been done to China as a reliable supplier of REEs, leading to gradual resource diversification. China is now just under 60% of global REE production (see Figure 3).

***Figure 3. Global Share of REE Production (in tons)***

*[](https://www.zerohedge.com/s3/files/inline-images/2021-05-06_14-07-46.jpg?itok=GCAjjXTJ)*

*Source: US Geological Survey.*

**The relative abundance of REE reserves globally, it turns out, means that China’s bid for price-setting power rested on faulty assumptions of its leverage**. Despite national security hawks’ continued pitch for exercising pricing power, Beijing seems to have recognized that it no longer has a monopoly on production.

Instead of obsessing over what’s in the ground and how much to sell it for, China appears to have shifted tactic to redouble its effort on developing the midstream REE processing industry and downstream end products like magnets.

A clear indication of that focus was President Xi Jinping’s [recent visit](http://www.nbd.com.cn/articles/2019-05-20/1333698.html) to Jiangxi—a major hub of REE production. Rather than a mining operation, Xi toured JL Mag, a downstream company that supplies magnets to the likes of Goldwind and BYD. We will look further at the midstream and downstream dynamics of the REE industry in future analysis.

What is the solution? Destroying the CCP would be temporary at best. The Global Syndicate is just using them for its goal of controlling the world. No. The real solution is asteroid mining. Out there, rare earth elements are not so rare.

**Voting with Your Feet**

The U.S. Census Bureau released its once-in-a-decade national census on April 26. Most of the discussion about the census has focused on states losing or gaining seats in the U.S. House, a process known as reapportionment. Marxism is not popular with most Americans.

Seven Marxist states will be down one member of the House: California, Illinois, Michigan, New York, Ohio, Pennsylvania, and West Virginia. Colorado. One Marxist State gained a seat, as illegal aliens were counted in that State as residents on the Census; Oregon. Patriot States all gained citizens; Florida, Montana, North Carolina, and Texas netting two.

States that consistently grew faster than the national average over the past ten years are in line to gain representation in Congress while Marxist States are quickly losing creditworthiness. States add population three ways: have more births than deaths (referred to as natural increase), attract more people from other states than move out (known as domestic migration), or attract migrants from other nations (both legally and illegally). Democrats fought vigorously to prevent President Trump from asking for the Census to verify citizenship status. As expected, illegals were included in the formula for calculating Congressmen, and yet Marxist States lost representation. Citizens must have fled those States at much higher rates than reported.

For some 20 years, more Californians and New Yorkers have left their respective states than have moved into them from elsewhere. Being in the [top three most expensive](https://meric.mo.gov/data/cost-living-data-series) places in which to live, coupled with the nation’s highest income taxes, has something to do with that.

California and New York have also seen declines in their birth rates, as high housing costs and gender dysphoria are major deterrents to family formation. Both of those States were flooded with illegal immigrants filling up sanctuary cities.

**Lower Taxes Encourage Growth**

Most domestic migration is due to shifting national employment patterns. States with higher costs—land, labor, taxes, regulatory compliance, and energy—lose out to states with lower costs. Some industries are more immune to these pressures, such as New York’s financial sector and California’s Silicon Valley.

The tax rate differentials between the states were amplified after the Donald Trump tax cut in December 2017. This change to the tax law capped the state and local tax deduction (SALT) to $10,000 per filing household.

Some 30-40 percent of federal individual income tax filers itemize their deductions. Before the change, taxpayers could take an unlimited deduction on their property taxes and either their sales taxes or income taxes. This federal tax policy provided a subsidy to high-tax states by dampening the advantage held by low-tax state and local governments.

Changes were immediately seen in job creation among the states after the tax cut. In the four years prior to the 2017 tax cut, private-sector job growth in the 27 states where the average 2016 SALT deduction was under $10,000—the low-tax states—ran a modest 30.5 percent higher than in the high-tax states.

But the 2017 tax cut put a turbocharger on job creation in the low-tax states, with job growth from December 2017 to December 2019 on the eve of the MADE-4-TV VIRUS SHOW hitting 4.5 percent in the low-tax states compared to 2.2 percent in the high-tax states, an astounding 107.8 percent advantage. In manufacturing, the low-tax states saw job growth of 3.5 percent compared to 1.3 percent in the high-tax states, a growth rate advantage of 176.4 percent.

**High Taxes and Tighter Lockdowns**

President Trump correctly predicted what would happen between States that were open and States that chose to stay locked down. Reapplying high tax rates in New York and California paled in comparison to imposing lockdowns than did low-tax states as causes for mass migration, although the severity of the lockdowns and associated pain in job losses and business bankruptcies were devastating and in most cases permanent.

Looking at job growth from the 2017 tax cut to March 2021, the latest month [reported](https://www.bls.gov/), shows that low-tax states lost 0.02 percent of their private workforce compared to high-tax states, which are still down 5.1 percent, some 99.6 percent greater job losses than in the low-tax states.

Put another way, had the high-tax states only lost jobs at the same rate as the low-tax states, there would be 2.2 million more people employed in the private sector in those 23 states. Over time, as people move to find work or a better job, those 2.2 million jobs would support about 6 million people—enough population to account for eight U.S. House seats.

States that tax more tend to regulate more than do low-tax states. Burdensome regulations can be just as harmful to job formation as high taxes.

**Freedom Leads to Growth**

Every year, Canada’s Fraser Institute leads a [multinational team](https://www.smu.edu/cox/Centers-and-Institutes/oneil-center/research/economic-freedom-of-north-america) of economists and public policy experts to rank the level of economic freedom in states and nations. Their [Economic Freedom of North America](https://www.fraserinstitute.org/studies/economic-freedom-of-north-america-2020) report for 2020 rated the states with three fundamental factors: government spending, taxes, and labor market freedom, with the latter category looking at things such as the minimum wage, the percentage of government employees working as a share of total employment, and the prevalence of labor union membership.

Fraser ranked Florida as the second-freest state, Texas as No. 3. Florida was the seventh-fastest growing state, Texas had the third-highest growth rate.

At the other bottom of the ranking—the anti-freedom states—Fraser ranked New York as 50th, California 49th, Alaska 48th, West Virginia 47th, and Vermont 46th. All of the bottom five that could lose a congressional seat did—Alaska and Vermont only have one at-large member and thus could lose no more.

In fact, not one state in the bottom 15 for freedom ranked in the top 10 fastest-growing states. And not one state in the top 15 for freedom ranked in the slowest-growing bottom 10 states.

**You Can’t Count People Who Aren’t There**

Trying to make up for the anti-growth consequences of their anti-jobs policies, some states spent heavily to augment their census numbers. California spent [$187 million](https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2020/01/24/red-states-push-for-last-minute-census-advantage)—about $4.73 per capita—on advertising and grants to nonprofits who assured the state’s substantial population of illegal aliens that there was no threat of being deported in responding to the census.

New York allocated [$60 million](https://www.ny.gov/2020-census/census-2020-complete-count-outreach-grants-local-government) for a similar effort, but [fell 89 residents short](https://www2.census.gov/programs-surveys/decennial/2020/data/apportionment/apportionment-2020-tableB.xlsx) of not losing a seat. In the week prior to [census day on April 1](https://2020census.gov/en/important-dates.html), New York was [losing 291 people every day to MADE-4-TV VIRUS SHOW-19](https://www.nytimes.com/interactive/2021/us/new-york-covid-cases.html). Had Gov. Andrew Cuomo not so badly mismanaged his state’s MADE-4-TV VIRUS SHOW-19 response by sending infected seniors to assisted living homes, his state might have kept its congressional seat.

But you can’t count someone who’s already moved away. Freedom matters and—along with a nice climate, natural resources, and access to trade—largely determines the long-term growth trajectory of a state.

**Redistribute the Consequences of Bad Choices**

But the Biden-Harris administration can largely erase competitive differences among the states. President Joe Biden has so far resisted calls from his [Democrat congressional allies](https://www.cnbc.com/2021/04/27/calls-to-end-salt-deduction-cap-threaten-passage-of-bidens-tax-plan-.html) to reinstate the full SALT deduction for high-earning taxpayers in blue states, but an agreement might be struck as part of a federal tax increase package. If so, depending on the details of any new federal tax law, it may erase a significant portion of interstate tax competition.

There are other Biden-Harris threats to red state advantages. A ban on fracking would hit oil- and gas-producing states particularly hard. A carbon tax would be particularly harmful to West Virginia, oil and gas states, and manufacturing.

A federal minimum wage hike would hit low cost-of-living states, which also tend to be low-tax states. Federal labor law regulation could level labor freedom differences between the states.

Ongoing transfers of borrowed federal money to states and local government has so far favored high-tax states, which often have massive unfunded government worker pension obligations. These bailouts allow poorly managed states to continue to spend and tax more, delaying the inevitable fiscal reckoning.

Lastly, the federal government’s ongoing run at the dollar printing press threatens to ignite a round of inflation not seen since the late 1970s. This would monetize government debt—again, generally helping spendthrift, big-taxing states at the expense of states that have kept a more conservative fiscal house.

It’s highly unlikely that California Gov. Gavin Newsom, now officially on track for that state’s second-only recall election of a governor, will suddenly decide to cut the nation’s highest personal income tax rate or reduce the state’s crushing regulatory climate. Even if he did, a majority of the state legislature sits to his left—which is hard for non-Californians to comprehend. Instead, Newsom will likely lean into his progressive left ideology and call on fellow Californian Kamala Harris to rescue California by imposing its brand of aggressive, high-tax nanny-statism on the entire nation.

As Winston Churchill observed, “**The inherent vice of capitalism is the unequal sharing of blessings. The inherent virtue of Socialism is the equal sharing of miseries.”**

**Grumman Space Progress**

While all the news has been about the private companies making huge progress in space, the big boys are not sleeping. With the successful docking of Mission Extension Vehicle 2, or MEV-2, to the Intelsat 10-02 satellite last month, Northrop Grumman not only repeated the task of successfully attaching one of their MEV spacecraft to a functioning satellite but also successfully proved the ability to grab a still-transmitting telecommunications satellite without disrupting service.

The success of both MEV-1 and -2 has led to an increasing interest in the use of those crafts after their current five-year missions with their present satellites are complete.  Meanwhile, Northrop Grumman has already begun work on the next generations of remote, on-orbit servicing and debris clean-up vehicles.

**MEV-2 builds on MEV-1’s success**

[Launched in October 2019](https://www.nasaspaceflight.com/2019/10/proton-rocket-launch-northrop-extension-vehicle/), MEV-1 rendezvoused with its target satellite, Intelsat 901, on 25 February 2020, [successfully performing an automated rendezvous and docking in an area of Earth orbit known as the GEO graveyard](https://www.nasaspaceflight.com/2020/02/northrop-grumman-history-mission-extension-vehicle-docks-satellite/).

The GEO graveyard is located approximately 300 kilometers above Geostationary orbit, which itself resides at 35,786 km above Earth sea level.

The first-ever docking in this type of Earth orbit, MEV-1 successfully demonstrated the ability to grab a still functioning but not transmitting or operational-in-that-regard satellite and provide mission extension propulsion and attitude control services.

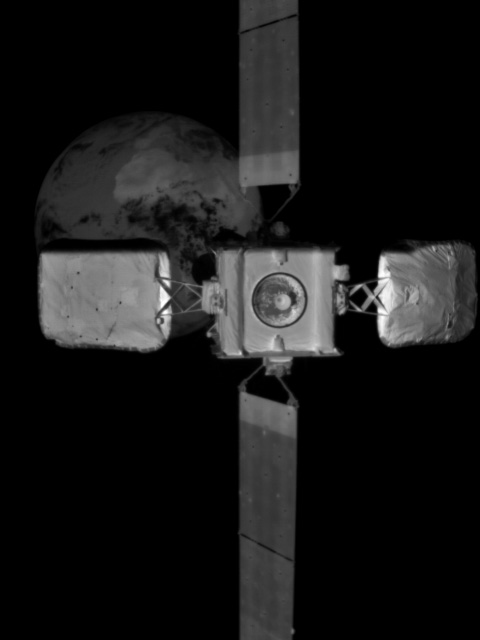
[MEV-1 successfully maneuvered Intelsat 901 back down into the operational GEO belt](https://www.nasaspaceflight.com/2020/07/mission-extension-vehicles-validate-lifeline/), allowing it to continue to use its still operational telecommunications services even though its onboard propulsion system was running out of fuel to keep the satellite stable in orbit.

Building on the success of MEV-1, [MEV-2 successfully launched in August 2020 on an Ariane 5 ride-share mission into Geostationary transfer orbit](https://www.nasaspaceflight.com/2020/08/ariane-5-launch-va253/).  It then spent the months after launch slowly raising its orbit up to GEO altitude inside GEO’s operational area assigned to its target satellite – Intelsat 10-02.

Therein is the first major difference between the two missions.  MEV-2 was not grabbing a non-operational but still functioning satellite; it was instead given the obligation of docking to a still-transmitting telecommunications satellite in Geostationary orbit.

In this case, going directly to the target satellite while it was still operational in some ways simplified the operations of getting MEV-2 to the correct point in space where it was ready to dock to Intelsat 10-02.

According to Joe Anderson, Director, Mission Extension Vehicle Services, Northrop Grumman, in an interview with NASASpaceflight, “Docking on MEV-1 in the graveyard orbit, we had to use a lot of special operations to avoid [Radio Frequency] interference with other operating satellites in GEO as we were drifting past them.”



*Intelsat 10-02 seen from MEV-2 during the latter’s hold during approach at the 15-meter Waypoint ahead of docking on 12 April 2021. (Credit: Northrop Grumman)*

“MEV-2 was a little bit simpler for us because we didn’t have that; we weren’t drifting past other satellites.”

Something from MEV-1 that was not originally planned for inclusion on MEV-2’s mission but proved so useful with MEV-1 that Northrop Grumman decided to make it a normal procedure was a calibration — or practice — approach prior to the actual docking.

“On MEV-1, we had incorporated something we called a calibration approach.  Because it was the first time, we wanted to do a practice approach to the client and make sure all our sensors were tuned up properly and that all the systems on both the client’s satellite and our satellite behaved properly as we got close,” said Anderson.

“We found, actually, that that was a really good idea.  Originally, we didn’t intend to continue that on our subsequent dockings.  But based on what we learned there, we decided that that’s something we definitely wanted to incorporate into our future missions as well.”

Another key change with MEV-2, and a lesson learned from MEV-1, was the addition of a Waypoint, or location along the approach vector where the MEV stops to ensure it is properly aligned with its docking target on the client satellite.

For MEV-1, three Waypoints were used, one at 80 meters distance, one at 15 meters, and the final at 1 meter, at which point the docking sequence was carried out.

“What we found from that,” explained Anderson, “is that it would improve our performance and our confidence in our alignment for the docking if we were to add another waypoint about 3 meters behind the client.”

The new Waypoint was employed on MEV-2’s approach to Intelsat 10-02 and allowed for better control of the actual docking timing given the satellite would still be transmitting to customers on the ground.  The new Waypoint also allowed better confirmation of alignment with the liquid apogee engine on the back of Intelsat 10-02, which was MEV-2’s docking target.

“Intelsat wanted to establish a service window for their customers.  Their customers knew when they might expect a disturbance in their traffic,” noted Anderson.

However, that never happened.

**SEE ALSO**

* [MEV-2 Launch Coverage](https://forum.nasaspaceflight.com/index.php?topic=49210.0)
* [MEV Coverage](https://forum.nasaspaceflight.com/index.php?topic=39714.0)
* [Click here to Join L2](https://www.nasaspaceflight.com/l2/)

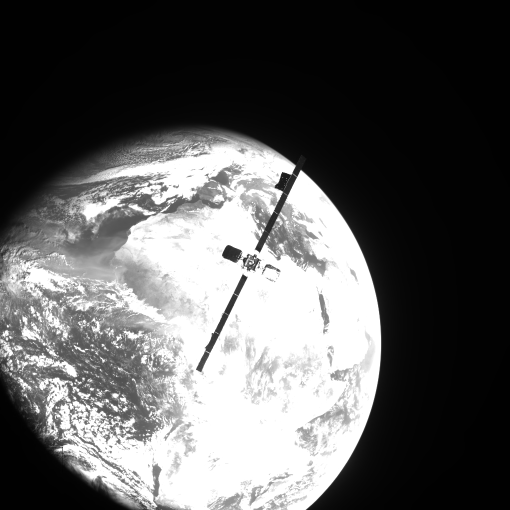
“[Adding that Waypoint], that was a good decision.  It really paid off for us on MEV-2, as when we did dock, we had zero transients.  We had no customer outages.  None of Intelsat’s customers experienced an outage when we docked.”

Docking was conducted in the same manner used for MEV-1, with a docking probe on MEV-2 extended into the liquid apogee engine on Intelsat 10-02.  Once the docking probe passed the smallest part of the nozzle opening, known as the throat, the probe expanded and, like a wall anchor, provided a secure way to slowly pull Intelsat 10-02 down onto the docking clamps of MEV-2, which themselves attached to Intelsat 10-02’s launch adapter ring.

The method for docking an MEV with a satellite that was never designed to be docked to or serviced in space is a careful part of the overall Mission Extension Vehicle design.

“The key there is really finding those features that are present on a large number of GEO satellites that we could attach to because we’re docking to satellites that were not designed to be docked with or serviced,” noted Anderson.  “There are two key factors that are present at about 80% of all of the satellites in GEO.  That is a liquid apogee engine and a launch adapter ring.”

The launch adapter ring is no longer needed once the satellite separates from the rocket’s upper stage that launched it. The liquid apogee engine is only used for the initial orbit-raising maneuvers to begin the process of getting the satellite into a proper geostationary orbit after launch.



*Intelsat 10-02, seen from MEV-2 while the latter was approximately 80 meters behind the satellite on 12 April 2021. (Credit: Northrop Grumman)*

Additionally, the MEVs have to be able to dock to satellites using different buses.  These different buses have different properties that affect automated rendezvous and docking operations, such as reflectivity, orientation of solar panels, and placement of attitude control thrusters.

In fact, even though MEV-1 and MEV-2 both docked with Intelsat satellites, Intelsat 901 and 10-02 use completely different buses, which had to be accounted for when MEV-2 approached its target.

As Anderson related, “The client satellites for MEV-1 and MEV-2 are two different satellite buses.  One was made by Space Systems/Loral at the time, Maxar now, and the other by Airbus.  Those satellites each have their own particular features.  They look different, they have different reflective properties, they have different ways that they do their attitude control, and so you have to be very careful about accounting for all of those as you do your rendezvous approach and docking.”

**Success and future**

The success of the MEV program so far has certainly been seen throughout industry, with interest growing from potential clients.

“After MEV-1, we received a lot of calls.  ‘Can I get that MEV next?’  ‘Can I get it now?’  ‘If we have a problem, is there any way I could use it?’  ‘MEV-2 is coming, can I get MEV-2?’  We got a lot of interest like that.”

“I’ve been saying for quite some time that this market is a ‘build it and they will come’ type of market.  We’ve seen good evidence of that since I started working on this in 2012 and visiting customers.”

In particular, Anderson noted interest within the community as far back as 2012; however, a major hesitation from customers was due to their need for such services immediately while not having a way to adequately predict what their needs would be three, four, or five years later.

Anderson found that as the years passed, potential customers would continue to say they required the service right then… but those specific needs changed from year to year.

“That was the first evidence of: if we build it, if we are there in orbit, those customers will be there,” said Anderson.  “There is just this latent demand for this type of service.”

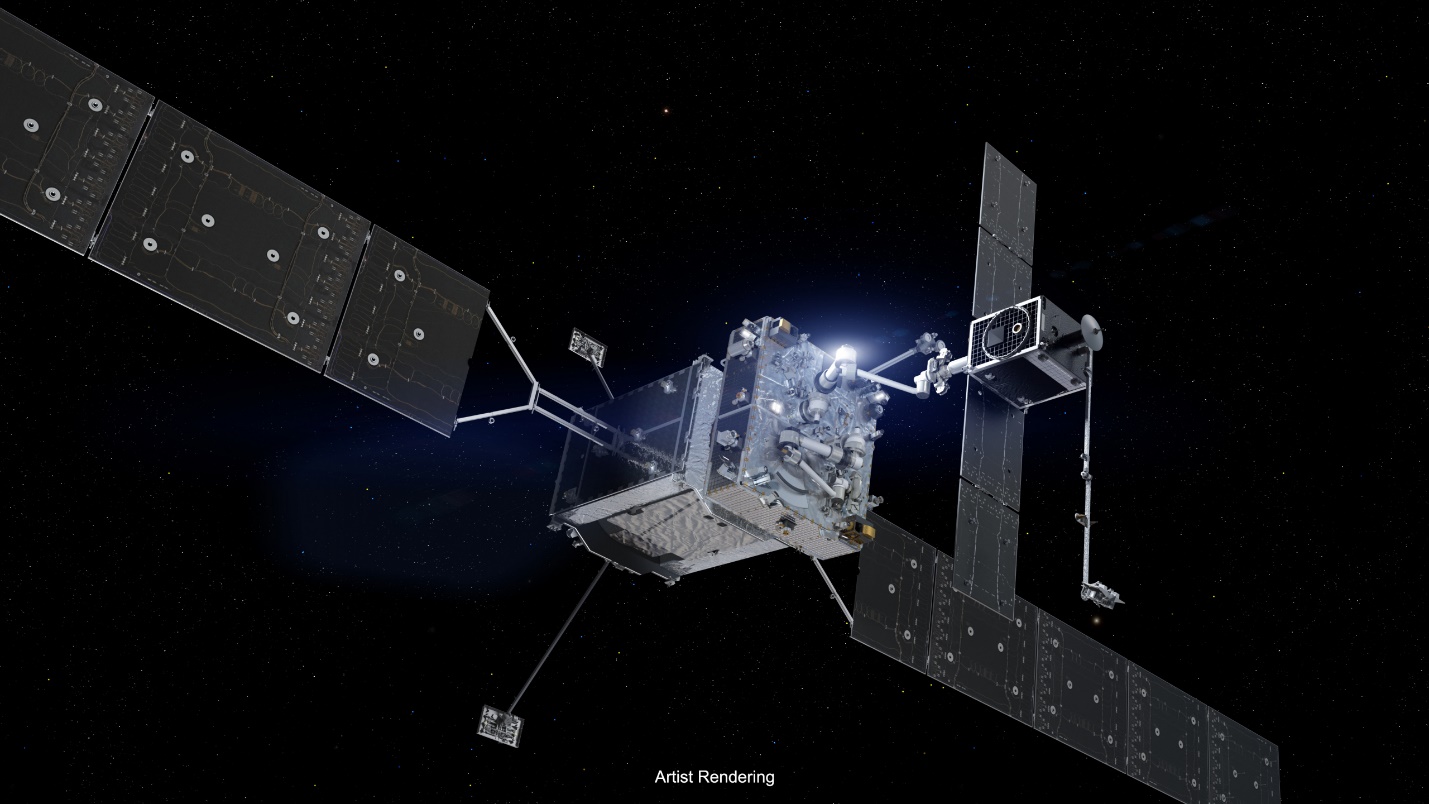
But in all of those yearly and regular conversations where Anderson sussed out what the changing needs of customers were, a pattern clearly emerged.  There was a large need for different types of robotic, automated servicing missions for perfectly fine and still operational satellites that were simply running out of fuel to continue to be able to point in the correct direction for service as well as to maintain the orbits needed for those operations.

In part, this has led to the development of not just the next generation beyond the MEVs but the next generation beyond the next generation, so to speak, of automated, geostationary orbiting servicing fleets.

“First, we have our next generation system that we’re already constructing.  It’s called our Mission Robotic Vehicle and that’s done in a partnership with DARPA, where DARPA is providing the robotics system.”

Basically a mini-MEV, these Mission Robotic Vehicles will be able to move from satellite to satellite in Geostationary orbit installing propulsion augmentation systems called mission pods, to satellites like Intelsat 901 and 10-02 that are still functioning but simply running out of propellant for attitude and/or orbital control.

The mission pods would provide six years of mission extension service in the form of attitude control.



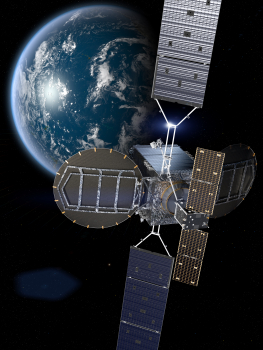
*Artist’s depiction of a Mission Robotic Vehicle holding a mission pod. (Credit: Northrop Grumman)*

After attaching the mission pods, the Mission Robotic Vehicle (MRV) would undock and move off on another mission.  In addition to attaching mission extension pods, the MVRs would be able to grab satellites and move them into different orbits as well as assist with debris clean-up activities in GEO.

“We are doing studies into the feasibility of using that robotic vehicle to grapple debris in the GEO orbits,” noted Anderson.  “There is some debris there.  It’s not a huge problem in GEO, but there are some cases where customers would be very interested in having a piece of debris removed.  We are looking at and evaluating the feasibility of doing those types of missions out in the GEO belt.”

This opens the possibility that the technology employed on the MRVs could be used for other debris cleanup operations, specifically the more cluttered low Earth orbit environment.

“All of this technology could be applied to those types of debris removal problems,” said Anderson.  “Now the issue that we see with it right now is there is no customer base.  There is no one right now that is incentivized to pay for those types of services.”



*A mission pod attached to a client satellite. (Credit: Northrop Grumman)*

But even beyond that, the third generation of robotic servicing vehicles are already in the planning stages, as well as how they will integrate with future satellites launched towards geostationary orbit.

“We’re already starting our generation three, a third generation of GEO servicing for refueling of prepared satellites,” related Anderson.

“Our approach is to start doing refueling with satellites that are prepared for refueling.  We’re developing refueling interfaces that we would like to make an open industry standard.  Then our vision here is that by 2025, every new satellite that is launched is prepared for servicing in some way.”

This third generation of vehicle would not just be able to perform refueling operations but also robotic servicing as well using robotic arm technology to repair elements on the exterior, or even interior, of satellites — including an ability to remove and replace solar arrays.

“Designing solar arrays so they can be taken off or put back on or add additional solar arrays to it… absolutely, that’s on the roadmap,” enthused Anderson.  “That really gets to the next step of our roadmap, actually.  Beyond satellites prepared for servicing is in-space manufacturing, in-space assembly of spacecraft.”

“That’s something we see coming.  There’ll be a lot of development and incremental capabilities of that over this decade, but we think it really starts to become a capability that we can utilize in the 2030s and beyond.”