

SPEED.

"It became intoxicating. So, I pushed the lever on toward even greater speed." (*The Time Machine*, by H.G. Wells)

"She's the fastest hunk of junk in the galaxy." (Lando Calrissian, *Star Wars, Empire Strikes Back*)

"I feel the need; the need for speed." (*Topgun*)

Humans generally like to go faster. Once we walked. Then we rode horses. Then we gathered and reined multiple horses. Then we developed motors to make power in place to carry with us as we moved and we never looked back.

Fastest Cars

The threshold you need to beat is 1.74 seconds. If you make it into 2 second territory you've only made honorable mention. The Croatian Rimac Nevera can accelerate from a stop to 60 miles per hour in 1.74 seconds. This is the fastest production car ever made, and if you want one I hope your checkbook is big enough. They've only made 150 of them. The much more affordable Tesla Model S - Plaid edition, which is still in active production, ranks in second at a meager 1.94 seconds.

And those are just the ones fast off the starting line. The list of cars with the top speeds overall looks somewhat different. The first car ever made, the three-wheeled, tubular framed, internal combustion engine Benz Patent-Motorwagen in 1885¹, topped out at about 10 mph. The first car to top 100 mph was on January 31, 1905, when Arthur McDonald drove a 90hp Napier, hitting 104 mph. The record stood for all of 15 minutes. The first time a car crossed the 200 mph mark was the 1969 Dodge Charger Daytona racing at Talladega, Alabama in 1970.²

¹ https://group.mercedes-benz.com/company/tradition/company-history/1885-1886.html?source=post_page-----1d8f10cad8e5-----?r=dai

² <https://www.nascarhall.com/blog/the-200-mph-dodge>

The fastest street car with an internal combustion engine? Is it the SSC Tuatara, sporting a V8 1750 hp engine that will propel you to 295 mph? They make a model that isn't street legal that pushes the horsepower to 2200. Alas, it's not even in the top five anymore. For those with a lead foot I'm happy to report that for a measly \$3 million you can buy a Koenigsegg Jesko Absolut, which clocks in at 330 mph. We're approaching *half the speed of sound*.

Even one of the slowpokes on the list, the Lamborghini Aventador SVJ, with a top speed of 217 mph, will get you from Fruithill to Frankfort in under an hour, barring any State Police Troopers or deer get in the way.

But the speed of sound is old hat if you're looking at the rocket engines with wheels trying to set a new land speed record. Interestingly, no one has come close to taking out the current record holder since 1997, when Andy Green piloted the Thrust SSC up to 763.035 mph (1'227.985 kph) in Nevada's Black Rock Desert.³

Fastest Human

The fastest human, unaided by an electric or internal combustion motor, is currently still Usain Bolt. He still holds the world records in the 100m, 200m and 4x100m with times of 9.58 secs, 19.19 secs and 36.84 secs, respectively.⁴ On the 100m that's an average of 34 feet per second. And of course when you consider he starts at a stand still the speed he's got to hit has to be higher than the average.

Similar to the breakdown of cars above, tracking the speed of humans on foot over long distances results in a different list. When you look at the world's fastest marathoners, the current record holder is Kelvin Kiptum, a Kenyan, who ran the 2023 Chicago Marathon, 26.2 miles, in barely more than two hours, at 2:00:35.⁵ His average pace was 4:36/mile. That works

³ [https://www.fia.com/sites/default/files/basicpage/file/World Records.pdf](https://www.fia.com/sites/default/files/basicpage/file/World%20Records.pdf)

⁴ <https://usainbolt.com/athlete/>

⁵ <https://www.runnersworld.com/races-places/a45444247/chicago-marathon-2023-mens-winner/>

out to about 13mph, or about half the speed of Usain Bolt. When you consider that Bolt was running only 100m compared to 26.2 miles, the feat of physical strength involved is simply stunning.

There are wheelchair marathoners and sprinters that display incredible speed in their respective disciplines. The fastest wheelchair marathoner finished a race in 1:13:57. Tatyana McFadden, widely known as the fastest woman in the world, and an adoptee from Russia who was born with spina bifida, has 8 gold medals, world championship medals, and has set and holds multiple world records for her speed in her racing wheelchair.⁶

Fastest Animal

The horse is certainly trusty and the world relied on horses for transportation for many hundreds of years, but of course it is not the fastest animal. Then again, the answer may vary depending on how you're measuring. Fastest over a long distance and the horse might still be a contender, though the antelope takes the top spot. The fastest animal over a short distance would, of course, be the cheetah. But that's on land. The fastest bird? The peregrine falcon, which can incredibly hit speeds of up to 185 mph in a dive. But what about birds that run faster than fly? The roadrunner would rather run, and can get up to 20 mph. The fastest fish? There is no consensus winner in the water, but swordfish, sailfish and marlin, at speeds between 60-80 mph, are the top vote getters. What about the fastest insect? One source awarded this honor to the horsefly, flying at an estimated 90 mph. Another source claimed it was the Paratarsotomus Macropalpis, a spider-like mite which can move at 332 body lengths per second. That puts even Usain to shame. I submit every mosquito I've ever aimed for and missed as among the fastest, but they aren't in the same league. I'm just that slow.

Fastest Train

⁶ <https://tatyanamcfadden.com/race>

The fastest train was more than a millennia in the making. Wikipedia, known purveyor of only unassailable facts, reports that the earliest railway was actually something called a “rutway” in Diolkos, Greece around 700 BC, used to transport boats over land across the Isthmus of Corinth.⁷ The paved rutway had ruts or channels to guide the boats as they took their shortcut across land. But it wouldn't be until 1758 that the Middleton Railway was founded, and like so many wagonway systems before it, relied on wooden tracks and wagons. In 1812 it became the first railway to use steam locomotives. Eventually wooden rails were replaced by iron rails.

I don't know the average speed of the first steam locomotives, though at the time they were surely perceived as recklessly fast, new fangled. But the trains would only speed up from there. Fast forward another 250 years and you have the Shanghai Maglev, which has a dual honor as being the fastest publicly accessible train — at an eye popping 286 mph

Fastest Plane

Of course our aspirations to be fast didn't keep us on the ground. The Wright Brothers will be remembered as the first in flight in Kitty Hawk, North Carolina. On December 17, 1903, Wilbur's second flight (they took turns, and this was the fourth and last flight of the day) achieved 59 seconds of flight over about 852 feet of distance.⁸ With reported wind speed factored in the Wright Brothers' flyer had a total airspeed of about 34 mph (only about 6.8 mph ground speed). Eleven years later the first scheduled passenger flight flew from St. Petersburg to Tampa. That historic craft showed the game changing potential of flight. A trip between the two cities took two hours by boat, up to 12 hours by rail, and traveling around the bay between them took about 20 hours. The flight only took about 20 minutes.⁹ The Model 14 Benoist airboat weighed 1,250 lbs., was 26 feet long, and had a wingspan of 44 feet. It was powered

⁷ https://en.wikipedia.org/wiki/Timeline_of_railway_history

⁸ <https://www.history.com/topics/inventions/wright-brothers>

⁹ <https://www.space.com/16657-worlds-first-commercial-airline-the-greatest-moments-in-flight.html>

by a Roberts 6-cylinder, in-line, liquid-cooled, 75-horsepower engine, all for a top speed of 64 mph. The kicker was that it only had room for two, including the pilot.

Flight would only get faster. The first plane with a jet engine, the Heinkel He-178 flew for the first time on August 27, 1939. It could only fly for about 10 minutes, but would reach a screaming 375 mph while it was in the air. Great Britain wasn't far behind in the technology with the flight of the Gloster E.28/39, flying in May 1941, which was in the air for about 17 minutes and hit 350 mph.

And just six years after that, a whole new threshold for speed was crossed. U.S. Air Force Captain Charles. E. "Chuck" Yeager piloted the Bell X-1 faster than the speed of sound, making him the fastest man alive. The X-1 hitched a ride in the bomb bay of a Boeing B-29 to an altitude of 43,000 feet. On October 14, 1947, Chuck Yeager showed had had the Right Stuff, flying Glamorous Glennis, on just its ninth flight, to 700 mph, or Mach 1.06.¹⁰

The Concorde, in service from 1969 to 2003, offered snug (I was lucky enough to climb into one at a museum in Seattle about 15 years ago) but quick accommodations, cruising at a maximum of Mach 2.04 (1,354 mph).^{11 12}

But the master of the air, the machine whose speed record remains untouched, is the SR-71 Blackbird. The original Blackbird made its first flight on April 30, 1962. The single-seat A-12 soon evolved into the larger SR-71, which added a second seat for a Reconnaissance Systems Officer and carried more fuel than the A-12. The SR-71's first flight was on December 22, 1964.

Breaking records nearly every time it flew, the Blackbird achieved a sustained speed above Mach 3 on July 20, 1963, at an astounding altitude of 78,000 feet. The challenges kept coming: Zipping across the sky at 3,000 feet per second, the rules of navigation needed be rewritten. Visual references for conventional flying —highways, rivers, and metropolitan areas—were rendered obsolete, giving way to mountain ranges, coast lines, and large bodies of water.

¹⁰ <https://airandspace.si.edu/stories/editorial/breaking-sound-barrier-75th>

¹¹ <https://en.wikipedia.org/wiki/Concorde>

¹² <https://simpleflying.com/pure-speed-the-worlds-fastest-aircraft-then-and-now/>

Piloting the Blackbird was an unforgiving endeavor, demanding total concentration. But pilots were giddy with their complex, adrenaline-fueled responsibilities. “At 85,000 feet and Mach 3, it was almost a religious experience,” said Air Force Colonel Jim Wadkins. “Nothing had prepared me to fly that fast... My God, even now, I get goose bumps remembering.”

A fun fact about the enormous Pratt & Whitney engines on the SR-71, at altitude and at top speed the engine actually grows — 6” longer and 2.5” wider — from the heat of the engines and the air.

Fastest Boat

We’ve covered planes, trains and automobiles, but what about boats? Mankind has been sailing the seas for a couple millennia. Sailboats and ocean liners aren’t known or built for speed. I used to think the tri-hull Mark Twain runabout we hauled to Lake Barkley every weekend was fast, but then I learned about a cigarette boat; one of those long nose boats with 4 or 6 outboards mounted in the back. The old Westerfield Mark Twain occasionally struggled to pull the older brothers out of the water on their skis. These boats would not. The Outerlimits SV50, the world’s fastest mono-hull boat in production, with twin 2000 hp engines, and the MTI Pleasure 52, with its twin 1750 hp engines, each can hit 180 mph.¹³

If you remember my last paper it won’t surprise you that, apart from the animals in nature, my favorite examples of speed takes up back to the heavens, and quite a bit beyond the clouds.

Fastest Spacecraft

The mid-to-late 1960s saw the development and flight of the Saturn 5 rocket carrying the Apollo aircraft into space. It’s three-stage construction produced speeds in

¹³ <https://www.mby.com/features/fastest-boats-you-can-buy-129561>

excess of 15,000 mph for stage one, 17,000 for stage two, and by the end, the Apollo 11 spacecraft was hurtling through space at 25,053 mph.¹⁴

The space shuttle was “[t]he world's first reusable spacecraft launched like a rocket, maneuvered in Earth orbit like a spacecraft and landed like an airplane.” Used by NASA for 30 years, the Shuttle platform, with its reusable orbiter (the part everyone calls the Shuttle), reusable SRBs (solid rocket boosters) and the external fuel tank (the big orange tank under the belly), hauled 852 astronauts on 135 missions¹⁵, with a maximum velocity of 17,321 mph.¹⁶

Now we have SpaceX spacecraft reaching similar speeds, but carrying new records of payloads into orbit with Falcon 9, Falcon Heavy, and now Starship which beats even the enormous Saturn V in size and capacity.

I'm also fascinated by the speeds of satellites we've left up in orbit. “A rocket must accelerate to at least 25,039 mph (40,320 kph) to completely escape Earth's gravity and fly off into space... Orbital velocity is the velocity needed to achieve balance between gravity's pull on the satellite and the inertia of the satellite's motion -- the satellite's tendency to keep going. This is approximately 17,000 mph at an altitude of 150 miles... To maintain an orbit that is 22,223 miles above Earth, the satellite must orbit at a speed of about 7,000 mph.”¹⁷ That particular altitude is the sweet spot for holding what's known as a geosynchronous orbit, with a satellite holding in one spot relative to Earth as the planet rotates.¹⁸

¹⁴ https://en.wikipedia.org/wiki/Saturn_V

¹⁵ <https://www.nasa.gov/space-shuttle/>

¹⁶ <https://www.nasa.gov/reference/the-space-shuttle/>

¹⁷ <https://science.howstuffworks.com/satellite6.htm>

¹⁸ This is distinct from a geostationary orbit only in that geostationary orbits track along the equator.

But I'm particularly interested in a couple spacecraft we've watched slip the surly bonds of Earth entirely. Voyager 1 and Voyager 2, launched sixteen days apart in 1977, have both now reached what scientists call "interstellar space," well outside our solar system. Voyager 2, as of February 27th, 2024, at 8:03p ET, was 12,629,943,913 miles from the Sun, traveling at an astonishing 34,390.98 mph. Voyager 1, launched second, was eager to catch up and left Voyager 2 way behind. As of that same time, Voyager 2 was 15,129,578,603 miles from the Sun, traveling at a staggering 38,026.77 mph. I cite that specific time and distance, because both spacecraft are still zooming through the cosmos, and you can track their "live" mission status on the JPL/Nasa website.¹⁹ I say "live" because the delay from their transmissions is pretty lengthy. Voyager 2 is 18 hours, and Voyager 1 is 22 hours "light time" away.

However all of these fast things, some natural, and many man made, still aren't the fastest objects in the world. Even the Earth itself is moving at a piddlin' 67,100 mph as it revolves around the sun.²⁰ In fact, the fastest object on Earth left the planet in 1957.

Fastest Thing Ever?

Between May and October 1957, the United States government conducted a series of 29 nuclear tests on the Nevada Test Site, some 60 miles north of Las Vegas. Among those tests were a pair known as Pascal A and Pascal B. These were to determine the effects and effectiveness of subsurface nuclear explosions. Pascal A was lowered 500 feet beneath the surface of the earth in a shaft. The yield was substantially higher than expected. The same test was performed with Pascal B, only in this case, a one-ton steel cap was placed over the shaft and welded into place. When Pascal B was detonated the blast sent the steel cap into the air. The cap was never found, and some believe it left earth's orbit. A camera filmed the

¹⁹ <https://voyager.jpl.nasa.gov/mission/status/>

²⁰ <https://www.space.com/33527-how-fast-is-earth-moving.html>

blast, but only managed to capture the cap in a single frame. Robert Brownlee, with the Los Alamos National Laboratory estimated the steel cap reached a speed roughly six times Earth's escape velocity. For those that dozed off, that velocity is about 25,000 mph. If the Pascal B manhole cover story is true, the fastest object ever made was accidental, and left Earth's atmosphere and orbit at approximately 150,000 mph.

Our obsession, our fascination, with speed is unceasing. Even viewing fast moving things at slower speeds so that we can actually perceive what's happening is fascinating. I highly recommend a youtube channel, for you or your kids or grandkids, called The Slo-Mo Guys. We used to write using stone tablets, then quills and ink bottles, and eventually the printing press came along. Now we have super computers in our pockets, each with more computing power than what keeps the Voyager spacecraft functioning and flying, that run apps that can reproduce text or even generate entirely new audio or visual content at increasingly fast speeds²¹ with increasing (and terrifying) accuracy. There may well be a day when our cars are fully self-driving and moving at even greater speeds, communicating faster with us and with other vehicles. What will our bullet trains and spacecraft look like then? Where will they take us and how quickly? Perhaps we might one day approach the speed of the fastest thing in the world — not a manhole cover but rather how quickly a politician whose term ends returns to irrelevance. We can be sure mankind will continue to push the limits of physics to push us forward faster.

²¹ https://en.wikipedia.org/wiki/Moore's_law