

*The May 2nd, 2018 Edition of THE REVENGE HUMP DAY!*

*Page 1 of 28*

Welcome to the May 2nd, 2018 Edition of THE REVENGE HUMP DAY!

Spring is beautiful here in the Big Nooga. SHE WHO MUST BE OBEYED spent all weekend working in the yard with Cousin Carol sprucing it up. Jason, the deposed Emperor, came by and helped me tune up all of the lawn mowers. I got to show Jason a few tricks of the trade that takes the tune up from being a dirty job to no big deal. I think he was surprised. About the only big problem we had was when we tried to start the Craftsman Lawn Tractor the battery was dead. I put it on a good charger and we are going to start it this after noon. I have trouble doing a lot of manual things nowadays, but Jason has pitched in to help is dad.

Tistan, Bubba Bear, spent the weekend up at the Boy Scout Camp up near Nashville. Jamie, his mother went up with him and I bet she had a great time camping out with the boy. SWMBO (akka Nana) asked him if it was cold camping. Bubba Bear said only at night but that it was warm during the day. I can't wait to get the scoop from Jamie the next time I see her.

Brandy, Empress of the Known Universe, took her hellions to see 'The Avengers: Infinity War' and said that it was pretty good. The only drawback she said that it was part 1 of 2 parts. Now we have to wait for the next movie to put it all together. But I bet the good guys win.

Next Saturday, May 5<sup>th</sup>, Brandy will be hosting the May LibertyCon Meeting at Casa Spraker at 2:00 pm. This is the time of year that we start getting down to the details. I will be reporting that I have finished the Huckster Room and that we have 38 tables worth of goodies to tempt even the most jaded attendee. Hopefully within the next week I will be able to complete the descriptions for all the hucksters and get them sent to Fritz for inclusion into the program book. It won't be long until Rich Groller publishes the preliminary programming schedule on the website. As soon as he does, I'll let you know. If you would like directions to the meetings, please contact Brandy at [brandy@LibertyCon.org](mailto:brandy@LibertyCon.org) or [bspraker@LibertyCon.org](mailto:bspraker@LibertyCon.org).

So on that "Informative note", why don't y'all sit back and relax because here's the best in gossip, jokes and science for your reading pleasure!

*Uncle Timmy*

<G>~<O>~<S>~<S>~<I>~<P>~<S>~<T>~<A>~<R>~<T>~<S>~<H>~<E>~<R>~<E>~<I>

GOOD MORNING FROM NASA

From: "William Green" [whgconsulting@gmail.com](mailto:whgconsulting@gmail.com)

On a morning  
that began with the body  
feeling less energy than  
the day would demand,

On a morning

that started with a list  
of demanding, but uninspiring tasks,

It was a joy  
to be presented with  
a flight of the imagination  
and a revitalization of thoughts  
of possibilities.

<https://apod.nasa.gov/apod/ap180429.html>

<L>~<I>~<B>~<E>~<R>~<T>~<Y>~<C>~<O>~<N>

### 32ND ANNIVERSARY OF THE CHERNOBYL ACCIDENT

From: "Randy Bovell" [crbovell@epbfi.com](mailto:crbovell@epbfi.com)

Just a day ago, April 26 was the 32nd anniversary of the Chernobyl accident in 1986. I've tried, over the years, to learn as much as I can about the accident. I came across this web site, some time ago, and it appears to have been recently updated. View the galleries of places around the plant, like the city of Prypyat. I found it interesting, in reading the description of the Unit 5 & 6 gallery, that construction workers continued to work on the unfinished units, the day of the accident.

<http://chernobylgallery.com/>

Thanks, Randy Bovell

<L>~<I>~<B>~<E>~<R>~<T>~<Y>~<C>~<O>~<N>

### SIX UFO HAIKUS

From: "Denny Marshall" [artorpoems@hotmail.com](mailto:artorpoems@hotmail.com)

#### Six UFO Haiku

UFO stranded  
nothing wrong with the spaceship  
lost the keys again

landing UFO  
all personal surprised on  
aircraft carrier

UFO lands  
should have picked a better spot  
than a large minefield

landing UFO  
earthlings are surprised they had

no concept of clothes

landing UFO  
destination the South Pole  
looking for ice cubes

landing UFO  
occupant's shade of purple  
not the color green

<L>~<I>~<B>~<E>~<R>~<T>~<Y>~<C>~<O>~<N>

LOC on Revenge of Hump Day 2018-04-25

From: "John Purcell" [askance73@gmail.com](mailto:askance73@gmail.com)

Good gravy, Uncle Timmy, you certainly find a lot of really bad puns and short-and-thankfully-sweet jokes to share every week. As always, I enjoy a bad pun or a silly joke. As much as I do get a chuckle out of some of them, unfortunately I think the jury is still out as to their application to the dictum "laughter is the best medicine." The one joke with the punchline featuring the misspelling reminds me of a true story that happened to me.

Back in 1999, while finishing my Masters degree at Iowa State University, the ESL (English as a Second Language) class I was teaching had to write a compare and contrast essay. One young lady wrote hers about how New Year's Eve celebrations in her home city (Beijing) were different from those in America. The thesis statement read, "'In China, New Year's celebrations are not as pubic as they are in America.'" When I pointed out that she needed to proofread her essay and not rely solely on Spellcheck - because "pubic" is a real word just like "public," her intended word - her face turned a few lovely shades of red. To this day I use that little story to illustrate the value of proofreading a paper because a computer cannot tell a writer that the wrong word was used.

And with that, I shall leave you. Thanks for the weekly chuckles.

All the best, John Purcell

<L>~<I>~<B>~<E>~<R>~<T>~<Y>~<C>~<O>~<N>

Re: Math Quiz

From: "Jim Woosley" [Jimwoosley@aol.com](mailto:Jimwoosley@aol.com)

Math quiz...

No, I didn't "guess" the answers, I solved them.

<U><T><'><s><\*><C><O><M><M><E><N><T>

*NO SHIT SHERLOCK, AFTER ALL, YOU HOLD A PHD IN PHYSICS. UT*

<L>~<I>~<B>~<E>~<R>~<T>~<Y>~<C>~<O>~<N>

Re: The April 25th, 2018 Edition of THE REVENGE HUMP DAY!

From: "David Watson" [thewatson@hotmail.com](mailto:thewatson@hotmail.com)

The unsustainable debt will be the end of the country. Sadly, at the rate we are going, I fully expect to see that day. I can just imagine what will happen when the I get a check and food for doing nothing stop getting theirs the same time the I worked my whole life and paid into Social Security stops getting theirs. All while our enemies continue to successfully stoke up racial tensions.

<T>~<H>~<E>~<J>~<O>~<K>~<E>~<S>~<S>~<T>~<A>~<R>~<T>~<H>~<E>~<R>~<E>

From: "Mike Waldrip" [waldripk@gmail.com](mailto:waldripk@gmail.com)

### IMPONDERABLES

1. Is it good if a vacuum really sucks?
2. Why is the third hand on the watch called the second hand?
3. If a word is misspelled in the dictionary, how would we ever know?
4. If Webster wrote the first dictionary, where did he find the words?
5. Why do we say something is out of whack? What is a whack?
6. Why does "slow down" and "slow up" mean the same thing?
7. Why does "fat chance" and "slim chance" mean the same thing?
8. Why do "tug" boats push their barges?
9. Why do we sing "Take me out to the ball game" when we are already there?
10. Why are they called "stands" when they are made for sitting?
11. Why is it called "after dark" when it really is "after light"?
12. Doesn't "expecting the unexpected" make the unexpected expected?
13. Why are a "wise man" and a "wise guy" opposites?
14. Why do "overlook" and "oversee" mean opposite things?
15. Why is "phonics" not spelled the way it sounds?
16. If work is so terrific, why do they have to pay you to do it?

17. If all the world is a stage, where is the audience sitting?

18. If love is blind, why is lingerie so popular?

<J>~<O>~<K>~<E>~<S>

### FRACTURED PROVERBS

A first grade teacher collected well-known proverbs. She gave each child in her class the first half of a proverb and asked them to come up with the remainder of the proverb.

1. Better to be safe than.....punch a 5th grader.
2. Strike while the .....bug is close.
3. It's always darkest before.....Daylight Saving Time.
4. Never underestimate the power of.....termites.
5. You can lead a horse to water but.....how?
6. Don't bite the hand that.....looks dirty.
7. No news is.....impossible.
8. A miss is as good as a.....Mr.
9. You can't teach an old dog new.....math.
10. If you lie down with dogs, you'll.....stink in the morning
11. Love all, trust.....me.
12. The pen is mightier than the.....pigs.

<J>~<O>~<K>~<E>~<S>

### THE BOSS

The boss was complaining in our staff meeting the other day that he wasn't getting any respect. The next day, he brought a small sign that read, "I'm the Boss!"

He then taped it to his office door. Later that day when he returned from lunch, he found that someone had taped a note to the sign that said,

"Your wife called, and she wants her sign back!"

<J>~<O>~<K>~<E>~<S>

### THE QUOTES OF STEVEN WRIGHT:

- 1 - I'd kill for a Nobel Peace Prize.
- 2 - Borrow money from pessimists -- they don't expect it back.
- 3 - Half the people you know are below average.
- 4 - 99% of lawyers give the rest a bad name.
- 5 - 82.7% of all statistics are made up on the spot.

- 6 - A conscience is what hurts when all your other parts feel so good.
- 7 - A clear conscience is usually the sign of a bad memory.
- 8 - If you want the rainbow, you got to put up with the rain.
- 9 - All those who believe in psycho kinesis, raise my hand.
- 10 - The early bird may get the worm, but the second mouse gets the cheese.
- 11 - I almost had a psychic girlfriend, ..... But she left me before we met.
- 12 - OK, so what's the speed of dark?
- 13 - How do you tell when you're out of invisible ink?
- 14 - If everything seems to be going well, you have obviously overlooked something.
- 15 - Depression is merely anger without enthusiasm.
- 16 - When everything is coming your way, you're in the wrong lane.
- 17 - Ambition is a poor excuse for not having enough sense to be lazy.
- 18 - Hard work pays off in the future; laziness pays off now.
- 19 - I intend to live forever ... So far, so good.
- 20 - If Barbie is so popular, why do you have to buy her friends?
- 21 - Eagles may soar, but weasels don't get sucked into jet engines.
- 22 - What happens if you get scared half to death twice?
- 23 - My mechanic told me, "I couldn't repair your brakes, so I made your horn louder."
- 24 - Why do psychics have to ask you for your name
- 25 - If at first you don't succeed, destroy all evidence that you tried.
- 26 - A conclusion is the place where you got tired of thinking.
- 27 - Experience is something you don't get until just after you need it.
- 28 - The hardness of the butter is proportional to the softness of the bread.
- 29 - To steal ideas from one person is plagiarism; to steal from many is research.
- 30 - The problem with the gene pool is that there is no lifeguard.

- 31 - The sooner you fall behind, the more time you'll have to catch up.
- 32 - The colder the x-ray table, the more of your body is required to be on it.
- 33 - Everyone has a photographic memory; Most of us just don't have film.
- 34 - If at first you don't succeed, skydiving is not for you.
- 35 - If your car could travel at the speed of light, would your headlights work?

<J>~<O>~<K>~<E>~<S>



<J>~<O>~<K>~<E>~<S>

**SYMPATHETIC HUBBY**

This guy is sitting at home alone when he hears a knock on the front door.

There are two sheriff's deputies there; he asks if there is a problem.

One of the deputies asks if he is married, and if so, can he see a picture of his wife.

The guy says "sure" and shows him a picture of his wife.

The sheriff says, "I'm very sorry sir, but it looks like your wife's been hit by a truck."

The guy says, "I know, but she has a great personality and she's an excellent cook."

<J>~<O>~<K>~<E>~<S>~<of>~<the>~<W>~<E>~<E>~<K>

From: "Jim Woosley" [Jimwoosley@aol.com](mailto:Jimwoosley@aol.com)



<https://patriotpost.us/memes>

<J>~<O>~<K>~<E>~<S>





<https://patriotpost.us/memes>

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<https://patriotpost.us/memes>

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From: "Douglas Dudash"



<J>~<O>~<K>~<E>~<S>

**When you bought an elephant and are reading  
the instructions**



<J>~<O>~<K>~<E>~<S>

**My humans are jerks.**



<J>~<O>~<K>~<E>~<S>



<J>~<O>~<K>~<E>~<S>



<J>~<O>~<K>~<E>~<S>



<S>~<C>~<I>~<E>~<N>~<C>~<E>~<S>~<T>~<A>~<R>~<T>~<S>~<H>~<E>~<R>~<E>

From: "Tim Bolgeo" [tbolgeo@epbfi.com](mailto:tbolgeo@epbfi.com)

EUROPE ACCELERATES STUDIES ON REUSABLE LAUNCHERS

Apr 23, 2018, Thierry Dubois | Aviation Week & Space Technology

[http://aviationweek.com/space/europe-accelerates-studies-reusable-launchers?NL=AW-05&Issue=AW-05\\_20180425\\_AW-](http://aviationweek.com/space/europe-accelerates-studies-reusable-launchers?NL=AW-05&Issue=AW-05_20180425_AW-05_69&sfvc4enews=42&cl=article_4&utm_rid=CPEN1000001477803&utm_campaign=14597&utm_medium=email&elq2=62eb25bf5a024289ac3a82dce10cbee7)

[05\\_69&sfvc4enews=42&cl=article\\_4&utm\\_rid=CPEN1000001477803&utm\\_campaign=14597&utm\\_medium=email&elq2=62eb25bf5a024289ac3a82dce10cbee7](http://aviationweek.com/space/europe-accelerates-studies-reusable-launchers?NL=AW-05&Issue=AW-05_20180425_AW-05_69&sfvc4enews=42&cl=article_4&utm_rid=CPEN1000001477803&utm_campaign=14597&utm_medium=email&elq2=62eb25bf5a024289ac3a82dce10cbee7)

It is 5:00 p.m. local time on July 15, 2030, in Kourou, French Guiana, and the final countdown is underway for Ariane Next, Europe's first reusable launcher. The last decade has brought an accelerated evolution of the launchers built by ArianeGroup under the leadership of the European Space Agency (ESA). Ariane 6 had a relatively brief career—almost three times shorter than its predecessor.

Rewind to 2018. The launch of SpaceX's Falcon Heavy, although it was of limited significance on the satellite launch market, was the watershed event. Before it, European players were content with reusability demonstration programs, just as any other research and technology activity. After it, the debate moved to "when" from "if." For the second time in four years, ArianeGroup, ESA and state agencies made a move in reaction to SpaceX's prowess in reusable launchers.

When, not if, say European space pundits.

#### SMALL-SCALE DEMONSTRATOR TO FLY IN 2020

In 2016 and 2017, the most common stance in the European industry was doubt. "Is there a business case for reusing a launcher?" was a question heard many times. Experts were pointing out that building one reusable launcher per year may not make sense. The vehicle would be in the realm of prototypes, "with associated uncompetitive costs and risks in quality." ArianeGroup CEO Alain Charneau said as recently as December 2017 that reusability was "probably the technology of 2050, when it will be mature and with a greater launch rate."

A clear signal came this month, at the annual press conference of GIFAS, the French aerospace industry's lobbying association. "Reusing the booster [the launcher's first stage], that's for tomorrow, not the day after tomorrow," Chairman Eric Trappier said April 12.

But the first indications of a change of heart came just after the near-perfect execution of the Falcon Heavy's mission on Feb. 6. Five days later, ESA Director General Jan Woerner wrote on his ESA blog, "The world has moved on and . . . requires that we reassess the situation." He was referring to the 2014 decision of ESA ministers to develop a new launcher family comprising the single-use Ariane 6 and Vega C.

"At that time, I succeeded in placing . . . the possible development of reusability among the high-level requirements," he added. "Due to time and cost pressure, however, these aspects did not make it onto the agenda for Ariane 6 and Vega C." Woerner soon posted a second blog entry asserting that the 2014 decision "was the right choice." But, for the long term, he did not change his opinion that "the kind of approaches seen so far would . . . fail to convince."



Callisto, the first European reusable launcher demonstrator, is scheduled to fly in 2020. Credit: CNES

On March 2, Jean-Marie Astorg, head of launchers at French space agency CNES, concurred (he later declined an interview with Aviation Week). “Let’s go for it!” he stated in a CNES publication. “Elon Musk must be credited for having shown [first-stage reusability] is technically feasible, and he is about to demonstrate the business case.”

The possibility of a reusable version of Ariane 6, before Ariane Next, also emerged. CNES has demonstration programs in reusability, and Astorg said, “We will see whether this technology will be applied to Ariane 6 or, later, to Ariane Next.” Arianespace CEO Stephane Israel, who is also executive vice president of ArianeGroup, in charge of civil launcher programs, agrees. “We have to look at all the evolutions possible for the Ariane; reusability is one,” he told Aviation Week in March.

Again, that was a departure from earlier statements. In December 2017, Charneau suggested a new version of Ariane 6, around 2030, may benefit from an engine developed for a reusable launcher. On Ariane 6, it would not be reused but would bring lower costs, he said at the time.

For the Prometheus engine demonstrator, ArianeGroup and its partners target a unit cost of about €1 million (\$1.2 million), or 10 times less than the cost of producing existing engines such as the Vulcain 2. Tests are scheduled to start in 2020.

It is safe to say that ESA will soon endorse studies conducted at the national level. CNES is collaborating with Germany’s DLR and Japan’s JAXA on designing a launcher demonstrator planned to fly late in 2020 called Callisto, an acronym for “Cooperative Action Leading to Launcher Innovation in Stage Toss-back Operations.” It will be 15 m (50 ft.) high

with a 1-m diameter, powered by a cryogenic liquid oxygen and hydrogen engine, and feature four deployable ailerons at its top. Toss-back will be executed at an altitude of 50 km (31 mi.). The engine will be reignited at an altitude of 1 km for a soft landing.

Callisto will be used “to acquire a good command of the complex return of a launcher, the requalification operations between two flights and to put a precise number on the cost of an operational launcher with a reusable first stage,” Christophe Bonnal, an expert at the CNES launcher directorate, said early this month.

In 2025, Themis—a demonstrator 10 times larger than Callisto—may use the Prometheus engine.

The European industry sees reusability as a way to halve Ariane 6’s costs, which remains the ultimate goal.

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## MEET THE NUCLEAR-POWERED SPACESHIPS OF THE FUTURE

by Staff Writers, Moscow (Sputnik) Apr 24, 2018

[http://www.spacedaily.com/reports/Interstellar\\_for\\_Real\\_Meet\\_the\\_Nuclear\\_Powered\\_Spaceships\\_of\\_the\\_Future\\_999.html](http://www.spacedaily.com/reports/Interstellar_for_Real_Meet_the_Nuclear_Powered_Spaceships_of_the_Future_999.html)

illustration only

Spaceships using conventional hydrogen-oxygen fuel will be able to take people to the moon, Mars or Venus. But human exploration of other planets in our solar system, and beyond it, will require the creation of ships harnessing the power of nuclear fission and nuclear fusion, including via the concept of nuclear pulse propulsion.

The idea for a rocket propulsion system that makes use of explosive combustion was first proposed by Russian explosives expert Nikolai Kibalchich in the late 19th century. However, it was Polish-born American nuclear physicist Stanislaw Ulam who came up with the concept of using nuclear explosions to power spacecraft. Ulam came up with the idea in 1947, a decade before the Sputnik 1 satellite and the dawning of the space age. Ulam’s proposal envisioned the use of a metal shield attached to the ship to harness the power of a nuclear explosion and push the ship forward.



## PROJECT ORION AND PK-5000



In the late 1950s, American scientists led by physicists Ted Taylor and Freeman Dyson began work on Project Orion, a program to create a model of a nuclear pulse propulsion system-powered spacecraft. The Project Orion vehicle concept included a nuclear pulse unit and coolant storage tanks, a pusher plate and two stages of shock absorbers to absorb the energy from nuclear blasts and propel the ship forward, along with a payload section to the front of the ship.

In addition to its speed, the concept was touted for theoretically being able to carry a payload an order of magnitude above that of conventional fuel rockets. Scientists estimated that if a nuclear charge was detonated once every three seconds, the ship would be able to reach 3 percent of the speed of light, thereby allowing humanity to reach Alpha Centauri, the closest solar system outside our own, in about 140 years.

Speaking to Rossiya Segodnya science contributor Tatyana Pichugina about Project Orion, cosmonaut, historian and science fiction writer Anton Pervushin explained that the idea was attractive in the fact that "only with the help of a nuclear pulse propulsion system can a spaceship accelerate to significant relativistic speeds." In this way, Pervushin noted, "the distant planets of our solar system will become accessible, and it will become possible to organize the first interstellar expedition."

Naturally, the concept of nuclear-explosion-powered spacecraft was also explored by Soviet scientists, including physicist Andrei Sakharov, the father of the Soviet hydrogen bomb. With a spacecraft dubbed "vsryvolet" (literally "explosion-flier"), the Soviets' work was focused on the possible use of the concept for large, long-distance space exploration.

Sakharov's concept, dubbed PK-5000, was aimed at using explosions to power ships with a payload of 1,000 tons or more and 10-20 cosmonauts.

Work on Project Orion, and its Soviet analogue, was halted in 1963 following the signing of the Partial Test Ban Treaty, which prohibited nuclear weapons testing in Earth's atmosphere, in space and underwater.

## **THERMONUCLEAR PROPULSION**

In 1971, German-American physicist Friedwardt Winterberg published a scientific paper proposing the use of thermonuclear-powered reactions triggered by intense electron beams as a means to accelerate spacecraft. According to space historian Willis L. Shirk, the energy produced by a nuclear fusion reaction is an estimated 26 million times greater than that of a conventional hydrogen-oxygen propellant, and over 4.3 times than that of nuclear fission.

In 1973, scientists from the British Interplanetary Society formed Project Daedalus, a vision for a nuclear fusion-powered propulsion system.

Tatyana Pichugina writes: "Thermonuclear fusion occurs inside stars. Creating it on Earth would require immense temperatures and hydrogen or hydrogen-helium fuel. Calculations have shown that the energy of thermonuclear fusion of a mixture of deuterium and helium-3 could enable flight speeds of 36,000 km per second, or 12% of the speed of light.

At such speeds, Daedalus would be able to reach the star of Bernard, 5.9 lightyears from Earth, in half a century. For comparison, the Voyager 1, currently the world's fastest spacecraft, accelerated to 17.02 km per second through its gravitational maneuver near Saturn."

Structurally, Project Daedalus envisioned a large 50,000 ton fuel tank, out of which small amounts of deuterium/helium-3 mixed fuel pellets would be sent to the combustion chamber for detonation every second, with the resulting plasma exhaust stream directed via a powerful magnetic nozzle. The unmanned vessel would carry a 500 ton useful payload consisting of scientific equipment.

Work on Project Daedalus was canceled in 1978. In 2009, British Interplanetary Society scientists supported by the Tau Zero Foundation began work on Project Icarus, its spiritual successor.

Icarus envisions sending multiple probes across multiple solar systems within 15 light years of Earth to carry out detailed studies of stars and planets. Like Daedalus, the project requires helium-3 for fuel, which can be found in ample quantities on Neptune or Jupiter, but which is scarce on Earth. Based on the current pace of technological development, such foreign-planet mining, and hence such a mission, may not be possible until the year 2,300.

Ultimately, Anton Pervushin believes that so long as the nuclear test ban treaty remains in force, nuclear pulse propulsion will inevitably remain a theoretical concept. Furthermore, as Pichugina explained, in addition to legal issues, a number of technical questions remain unresolved. These include how to apply fuel to the combustion chamber, how to amortize acceleration, how to protect crews from cosmic radiation, and in general determining the most efficient types of spacecraft.

Still, as Pervushin noted, if humanity wants to escape the bonds of our solar system and send large spacecraft to those close by, nuclear pulse propulsion remains the only realistic option.

#### **POSTSCRIPTUM: NUCLEAR FISSION FOR ELECTRICAL PROPULSION**

In addition to the ambitious proposals for interstellar nuclear fission and nuclear fusion propulsion, Soviet scientists worked intently from the 1960s to the 1980s on nuclear fission electric power propulsion systems, which transform nuclear thermal energy into electrical energy, which is then used to power conventional electrical propulsion systems.

The Soviet space program pioneered and worked to improve the technology with the Kosmos series of satellites, which, while generally successful, had their reputation somewhat marred following the emergency descent of Kosmos 954 in 1978, which spread radioactive debris over northern Canada.

The Soviets continued to experiment with these technologies well into the late 1980s, and even envisioned the use of nuclear fission-based energy as a realistic means to reach Mars.

Source: Sputnik News

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## BELL V-280 PASSES 140 KT. ON WAY TO 'CRUISE MODE'

Apr 26, 2018, James Drew | Aerospace Daily & Defense Report

[http://aviationweek.com/vertical-flight/bell-v-280-passes-140-kt-way-cruise-mode?NL=AW-05&Issue=AW-05\\_20180427\\_AW-05\\_258&sfvc4enews=42&cl=article\\_5\\_2&utm\\_rid=CPEN1000003019593&utm\\_campaign=14648&utm\\_medium=email&elq2=765632bdc3ab4dd68ff17733f3e2689b](http://aviationweek.com/vertical-flight/bell-v-280-passes-140-kt-way-cruise-mode?NL=AW-05&Issue=AW-05_20180427_AW-05_258&sfvc4enews=42&cl=article_5_2&utm_rid=CPEN1000003019593&utm_campaign=14648&utm_medium=email&elq2=765632bdc3ab4dd68ff17733f3e2689b)



Bell confirms an Army experimental test pilot has now flown the V-280 Valor prototype and the company is actively encouraging the Marine Corps to fly too.

Bell

NASHVILLE, Tennessee—As the Bell V-280 Valor continues cruising through test cards in Amarillo, Texas, the company now expects to meet all the key performance parameters set by the U.S. Army under the Joint Multi-Role Technology Demonstrator (JMR-TD) initiative “by the end of summer.”

Jeffrey Schloesser, Bell’s executive vice president of strategic pursuits, tells Aerospace DAILY the next-generation tiltrotor prototype so far has achieved a speed of 140 kt. (half speed) with proprotors 60-deg. forward. Valor first flew on Dec. 18, 2017.

“We’re at the point now where we’re switching to an L-39 chase jet rather than a chase helicopter, because we’ll be going faster than helicopter speeds,” he says. “During the summer, we plan on reaching most of the required performance parameters that were part of the test program. One of those is cruise mode, also known as ‘airplane mode’ or ‘zero-degree pylon.’”

Once the company has met the Army's requirements under JMR-TD, it will begin working through its own test objectives, including autonomous flight and potentially going above 300 kt. (the objective speed is 280 kt.). Bell will install a mission equipment package provided by key supplier Lockheed Martin, including a Pilot Distributed Aperture System. Just like the Lockheed Martin F-35 Lightning II's AAQ-37 Electro-Optical Distributed Aperture System, Valor's "PDAS" will provide V-280 operators with 360-deg. unobstructed visibility.

Bell won't give an exact month for when it expects to hit cruise mode, nor will it confirm flying autonomously this year or next.

"We're following our test cards, as you'd expect for an all-new, clean-sheet design," Schloesser says. "Eventually you'll see us flying autonomously; that's something we've set as a goal for the program. That won't be this summer, but it's not years away—it's imminent. If not this year, early next year."

As confidence in the V-280 swells at Bell, the company is actively encouraging government test pilots to come and fly it. Many service members have already visited Bell's facilities in Dallas/Fort Worth, Texas, to fly the simulator and see the systems integration laboratory, but the company also wants government experimental test pilots at the controls during the test program.

Schloesser confirms that an Army pilot already has flown the V-280 during testing and provided a debriefing to the JMR-TD program team at Huntsville, Alabama's Redstone Arsenal. The warrant officer is an experimental test pilot from the "Night Stalkers" 160th Special Operations Aviation Regiment.

Now that an Army aviator has taken the reins, Schloesser also encourages the Marine Corps to get involved. Valor is one of several candidates for the Pentagon's Future Vertical Lift-Medium, an Army-led, multiservice acquisition program aimed at eventually replacing the Army Sikorsky H-60 Black Hawk and Marine Corps Bell H-1 Huey. Since JMR-TD is a risk-reduction exercise for FVL, Bell encourages both services to monitor testing, review the data, and fly.

"We'd like to invite other experimental test pilots from the Marine Corps to also play a role," Schloesser says. "The more they get to fly the aircraft in all its modes—hover through cruise—the better. As much as the test data will prove out what we believe to be the facts, having service test pilots who can give a subjective analysis from the reality of them flying is really important."

While the Marines are already believers in tiltrotor technology, having adopted the Bell-Boeing V-22 Osprey, Bell has a ways to go in convincing the Army that tiltrotors are safe, affordable, producible in large numbers, and as agile as a helicopter.

"While speed and range are absolutely critical to this program, I can't overemphasize that the agility at hover, near-hover, and slow speeds is absolutely critical. We'll prove that, too," Schloesser explains. "The Army is the one we have to convince, and they have very stringent requirements for operations on the 'X,' in the objective area. Level 1 handling is going to be critical to demonstrate."

“I don’t expect the Army to trust our word, but take a hard look at the test results. We’re going to prove this aircraft is every bit as agile as a helicopter on the ‘X.’”

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## ANATOMY OF SIKORSKY-BOEING SB-1 DEFIANT

Apr 19, 2018Graham Warwick | Aviation Week & Space Technology

[http://aviationweek.com/vertical-flight/anatomy-sikorsky-boeing-sb-1-defiant?NL=AW-05&Issue=AW-05\\_20180427\\_AW-05\\_303&sfvc4enews=42&cl=article\\_6&utm\\_rid=CPEN1000003019593&utm\\_campaign=14516&utm\\_medium=email&elq2=69f00ab1ef374c9391f27eb915c5ebdf](http://aviationweek.com/vertical-flight/anatomy-sikorsky-boeing-sb-1-defiant?NL=AW-05&Issue=AW-05_20180427_AW-05_303&sfvc4enews=42&cl=article_6&utm_rid=CPEN1000003019593&utm_campaign=14516&utm_medium=email&elq2=69f00ab1ef374c9391f27eb915c5ebdf)

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[6&utm\\_medium=email&elq2=69f00ab1ef374c9391f27eb915c5ebdf](http://aviationweek.com/vertical-flight/anatomy-sikorsky-boeing-sb-1-defiant?NL=AW-05&Issue=AW-05_20180427_AW-05_303&sfvc4enews=42&cl=article_6&utm_rid=CPEN1000003019593&utm_campaign=14516&utm_medium=email&elq2=69f00ab1ef374c9391f27eb915c5ebdf)

Developed for the U.S. Army’s Joint Multi-Role Technology Demonstration, precursor to the Future Vertical Lift program, the Sikorsky-Boeing SB-1 Defiant is a coaxial-rotor compound helicopter. The aircraft is to fly in 2018, and the team is aiming for a speed of 250 kt., with increased range and hot-and-high performance compared with current helicopters. A critical goal is to demonstrate the tactical value of the configuration, with its rigid coaxial rotors and pusher propulsor, to the medium-lift utility mission now performed by the Sikorsky UH-60 Black Hawk.

Credit: Sikorsky-Boeing

### 1 | LOW-DRAG HUBS

For yaw control at low speed, differential longitudinal cyclic pitch produces differential torque on the rotors. Hub fairings reduce drag at high speed and were increased in size when manual blade fold was added to the demonstrator. A derotated aero sail fairing between the hubs also reduces drag.



### 2 | RIGID ROTORS

A coaxial lift-offset rotor generates lift on the advancing sides of contrarotating rotors, reducing retreating pitch and delaying stall on the retreating blades to enable higher forward speed. Rigid rotors provide high control power for agility and are placed close together to reduce drag. The propulsor enables rotors to be offloaded and slowed in forward flight to reduce drag and noise and enable higher speed.

### 3 | PUSHER PROPULSOR

The variable-pitch propulsor, powered from the main transmission via a flexible drive, can be declutched in flight and on the ground to reduce noise and enhance safety. Propeller thrust can be reversed in flight, enabling level-attitude acceleration and deceleration. In

hover, propeller forward/reverse thrust can be used to point the fuselage. The SB-1 is powered by two 4,000-shp Honeywell T55s.

#### 4 | ACTIVE CONTROLS

The SB-1 has fly-by-wire flight control, with active rudders and elevators on the tail. Active vibration control is key to enabling high-speed flight with rigid coaxial rotors. Aircraft and sensor data are used for virtual monitoring of loads on critical components for condition-based maintenance.

#### LINEAGE



XH-59A, 1973-81. Credit: Sikorsky X2 Technology Demonstrator, 2008-11. Credit: Sikorsky

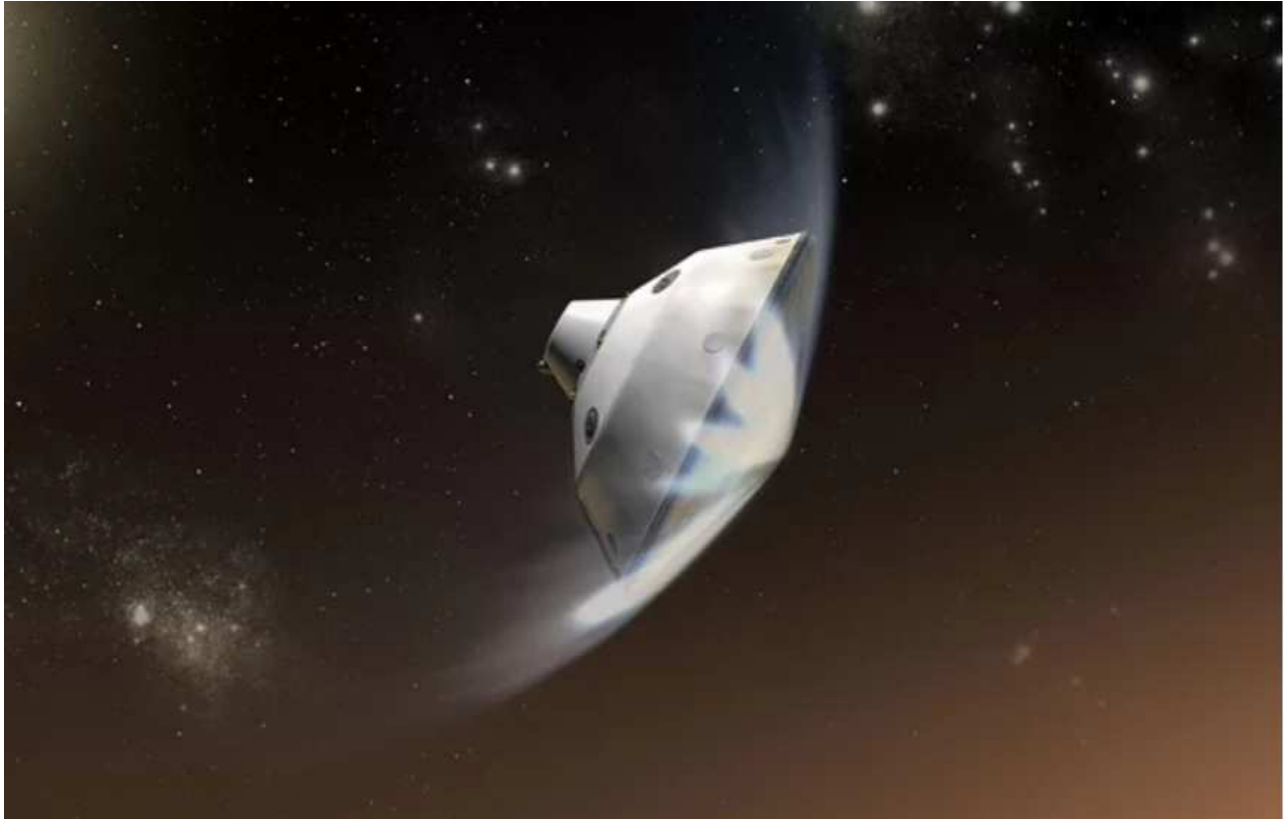


S-97 Raider, 2015-present. Credit: Sikorsky

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## HEAT SHIELD FOR NASA'S MARS 2020 ROVER CRACKS DURING TEST

By Doris Elin Salazar, Space.com Contributor | April 28, 2018 08:30am ET  
<https://www.space.com/40438-nasa-mars-2020-rover-heat-shield-crack.html>



This artist's concept depicts the entry of NASA's Curiosity rover through Mars' upper atmosphere. The Mars 2020 mission will use aspects of this design for its project. Credit: NASA/JPL-Caltech

The heat shield for NASA's upcoming Mars rover suffered a fracture during testing recently, but the incident won't change the mission's launch date, agency officials said.

The Mars 2020 mission is designed to search the Red Planet's surface for signs of ancient microbial life, and the six-wheeled robot will also hunt for and characterize potentially habitable environments. The mission is scheduled to launch in 2020, when Earth and Mars are properly aligned for an interplanetary mission, and arrive at the Red Planet in early 2021.

The heat shield's structural damage, located near the shield's outer edge, happened during a weeklong test at the Denver facility of contractor Lockheed Martin Space, according to a NASA statement released Thursday (April 26). The test was intended to subject the heat shield to forces about 20 percent greater than those it will experience when it hits the Martian atmosphere for entry, descent and landing operations.

The Mars 2020 team found the fracture on April 12. Mission management at NASA's Jet Propulsion Laboratory in Pasadena, California, will work with Lockheed Martin to lead an examination of the cause of the crack and to decide if any design changes should be made, NASA officials said in the statement.

The incident won't delay the Mars 2020 launch, though, which is currently targeted for July 17, 2020, the officials added.

It's important to investigate this crack, because the heat shield is part of the spacecraft's thermal protection system, designed by engineers to keep the Martian rover safe as the vehicle experiences intense heat during atmospheric entry.

NASA officials said the current heat shield will be repaired to permit continued prelaunch spacecraft testing. The Mars 2020 mission team will develop a new heat shield structure over the next year, and once that's completed, the new shield will receive other important components like thermal protection tiles.

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#### JUST ADD SEAWATER: ANCIENT ROMAN CONCRETE GETS STRONGER OVER TIME

[Michael Irving](#), July 5th, 2017

<https://newatlas.com/roman-concrete-stronger-seawater/50343/>



An ancient Roman pier is still standing in a bay in Italy, and researchers have studied samples of the concrete to explore the secrets of its long-lasting strength(Credit: J.P. Oleson)

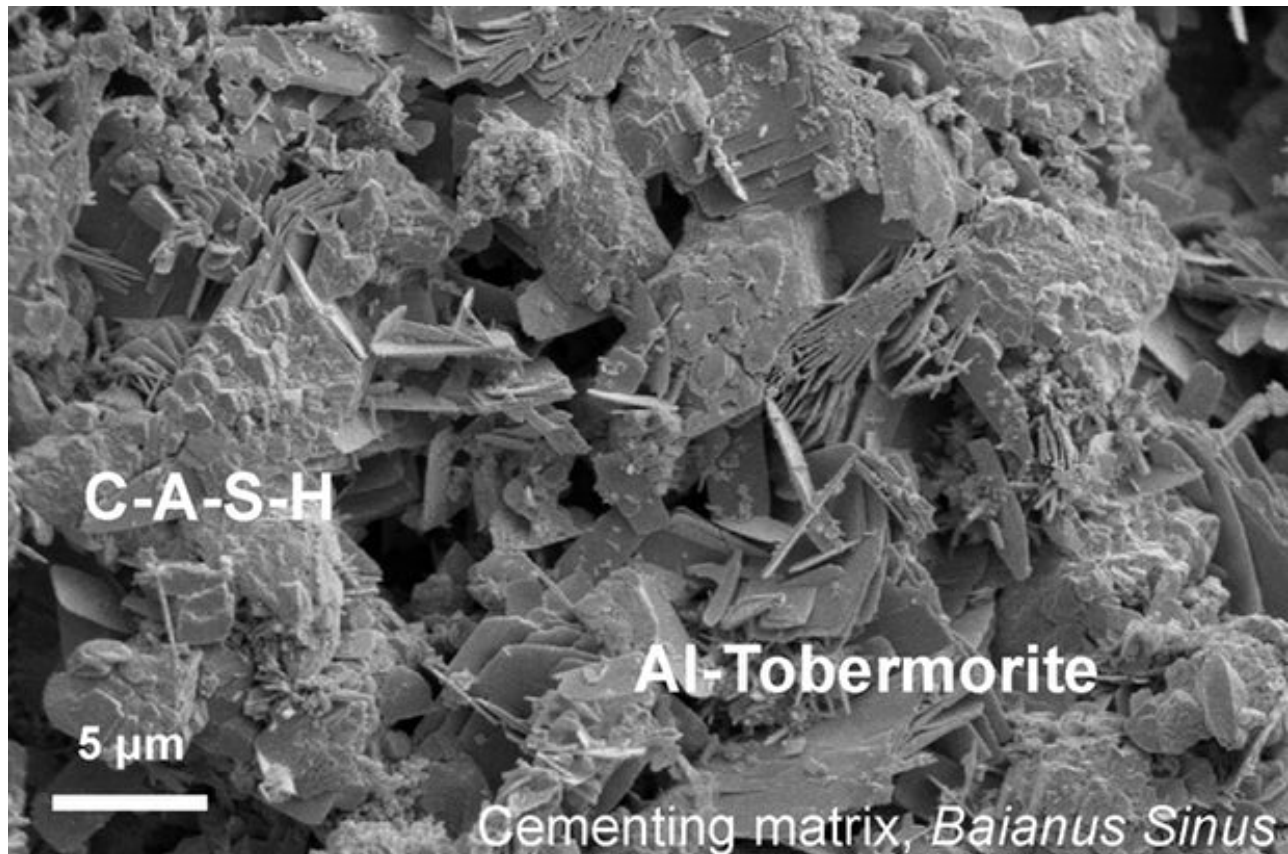


Leave modern concrete structures in the ocean, and a few decades later they'll be in need of replacing, or at least a serious patch job. Meanwhile, ancient Roman concrete is still standing strong after thousands of years, and not only does it resist damage, but the salt water actually makes it stronger. X-ray examinations have found the key to the mixture's incredible longevity, which could help improve modern recipes.

In recent years, we've [electrified concrete](#) to melt snow, made it more [fire-resistant](#), added bacteria to make it [self-heal](#) any cracks that form, and have found ways to "[program](#)" it to be stronger. But it seems that the Romans were way ahead of their time, with a superior method for making concrete that could stand the test of time.

Although the complete recipe has been lost over the millennia, studies of samples have shown that volcanic ash, lime and seawater are the main ingredients. But the real magic seems to happen when those ingredients interact with the environment – specifically the saltwater incessantly pounding on the surface.

Researchers from Berkeley Lab and the University of Utah took samples of ancient concrete from 2,000-year-old harbor structures in Orbetello, Italy, and studied them in the X-ray research center at Berkeley Lab's Advanced Light Source (ALS) to try to find clues to its durability.



A microscope image of a mix of volcanic ash, lime and seawater, which has resulted in the growth of Al-tobermorite crystals(Credit: Marie Jackson)

"At the ALS we map the mineral cement microstructures," says Marie Jackson, lead researcher on the study. "We can identify the various minerals and the intriguingly complex sequences of crystallization at the micron scale."

The team found that when seawater seeps into the concrete, it dissolves the lime inside. Normally, this kind of corrosion would destroy modern concrete in a matter of years, but it actually strengthens the Roman stuff by allowing crystals of Al-tobermorite and phillipsite to grow, plugging the holes.

"We're looking at a system that's contrary to everything one would not want in cement-based concrete," says Jackson. "We're looking at a system that thrives in open chemical exchange with seawater."

Reviving this long-lost, ingenious technique would certainly be handy today, but the exact formula is still unknown. The researchers are experimenting with different combinations of seawater and volcanic rock to try to unlock its secrets, which could be useful for building longer lasting seawalls, dams and piers.

The research was published in the journal [American Mineralogist](#) and the researchers describe their work in the video below.

Sources: [Berkeley Lab](#), [University of Utah](#)

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## **RUSSIA LAUNCHES FLOATING NUCLEAR POWER PLANT; IT'S HEADED TO THE ARCTIC**

[BILL CHAPPELL](#), [Twitter](#), April 30, 2018:33 PM ET

<https://www.npr.org/sections/thetwo-way/2018/04/30/607088530/russia-launches-floating-nuclear-power-plant-its-headed-to-the-arctic>

A massive floating nuclear power plant is now making its way toward its final destination at an Arctic port, after Russia's state nuclear corporation Rosatom launched the controversial craft over the weekend. It's the first nuclear power plant of its kind, Russian officials say.

Called the Akademik Lomonosov, the floating power plant is being towed at a creeping pace out of St. Petersburg, where it was built over the last nine years. It will eventually be brought northward, to Murmansk – where its two nuclear reactors will be loaded with nuclear fuel and started up this fall.

From there, the power plant will be pulled to a mooring berth in the Arctic port of Pevek, in far northeast Russia. There, it will be wired into the infrastructure so it can replace an existing nuclear power installment on land.

Critics of the plan include [Greenpeace](#), which recently warned of a "Chernobyl on ice" if Russia's plans to create a fleet of floating nuclear power stations result in a catastrophe.

Russian officials say the mandate of the Akademik Lomonosov is to supply energy to remote industrial plants and port cities, and to offshore gas and oil platforms.



The Akademik Lomonosov, which the Russian energy company Rosatom calls "the world's only floating nuclear power unit," left port on Saturday. Rosatom

"The nuclear power plant has two KLT-40S reactor units that can generate up to 70 MW of electric energy and 50 Gcal/hr of heat energy during its normal operation," [Rosatom said](#). "This is enough to keep the activity of the town populated with 100,000 people."

It will take more than a year for the power plant to reach its new home port. The original plan had called for fueling the floating plant before it began that journey, at the shipyard in central St. Petersburg – but that was scuttled last summer, after concerns were raised both in Russia and in countries along the power plant's route through the Baltic Sea and north to the Arctic.

Greenpeace in Russia, for instance, said it collected [more than 11,000 signatures](#) against the plan to put nuclear fuel into the plant while it floated along St. Petersburg's shores.

When Rosatom announced its change of plans last summer, Rashid Alimov, coordinator of the Greenpeace Russia anti-nuclear project said that the organization "still considers the very concept of a floating nuclear power plant too dangerous and a senseless technological solution."

Rosatom says it hopes the floating nuclear power plant will be online in 2019. It adds that the power plant "is designed with the great margin of safety that exceeds all possible threats and makes nuclear reactors invincible for tsunamis and other natural disasters."

The idea for an offshore nuclear power plant has also been floated in the U.S. – or more specifically, off of New Jersey's coast. That plan arose in 1969, when the Public Service

*The May 2nd, 2018 Edition of THE REVENGE HUMP DAY!*

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Electric & Gas Co. of New Jersey wanted to put a nuclear plant in the Atlantic Ocean, some 11 miles northeast of Atlantic City.

To enact that plan, suppliers were lined up, and millions of dollars were spent; a mockup was even built. But popular resistance emerged against it, and as [The New Yorker](#) reported in 1975, "More than 50 construction & operating permits were required, & none yet issued."

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