Chino Valley Flyers

Official Club Newsletter

February 25, 2022 Volume 25 Issue 2 www. chinovalleyflyers.org

"To create an interest in, further the image of, and promote the hobby/sport of model aviation"

Inside This Issue

Quote of the Month:

"Without a thankful heart and a responsible attitude, neither America nor any other nation has the ability to remain great."

David Meyers

Support our Local Hobby Shop

They support Us.

John Stewart's AMR Canadian Cub

John's AMR kit is from Canada. John built it in 2014. It has a 120 inch wing span and power is a DLE 55 engine, it weighs 24 pounds. Still flying after all these years and looks like new.

Rick Nichols and his Electric C/L Stuntman

Bill Gilbert: CVMA President's Message

Members,

Due to the cancellation of this month's meeting due to weather, please let me give you an update of our club status:

- The Cabana expansion project is on hold. The steel building supplier, American Steel, has stated they cannot meet the Town of Chino Valley permitting requirements. We have asked for a refund of the $1040 deposit. We expect 3 to 5 day processing delay.
- We have begun dialogue with Steel Erections in Prescott Valley. They have experience erecting steel buildings in Chino Valley. We hope they can bid a simple flat roof/steel post shade structure (similar to existing cabana) that will be within our budget.
- We were due for crack seal/ surface seal on the runway this year (every 3rd year). Cost has gone up from $4,600 to $6,250. But we have been crack sealing annually (cost has gone up from $600 to $1,000). Runway is in good shape, and both Mark and I recommend crack sealing again this year, with surface seal next year. We have a lot on our plate this year. And, an extended cycle may be appropriate due to the annual crack seal preserving the runway.
- Batteries are still holding up; we are going to try and extend their life to the end of the year. (We have member approval to replace when needed at a cost of ~$990) member *Gary Cosentino* has taken over battery and solar system maintenance.
- Pilot Safety Fence; a small number of members have concerns that the fence may damage their planes. We obtained a sample of a cargo netting as a possible material; it is unsuitable due to the hundreds of zip ties that would be required to install/maintain it. Strength is also a question, within our thin "rope" construction limitations.
- We plan on proceeding with the chain link fencing this coming month (March). Field will be closed to flying while we work on the fencing. Hopefully, just 1 day.
- Name Change to CFV: Website update is complete, AMA, Bank, Town all notified and name changed over. Insurance Policy renewed, but under CVMA - that needs an update.

Vice President, *Mark Lipp* will put a question on the table whether we want contents coverage for the buildings. He will have a quote for the board to discuss at the next club Board of Directors (BoD) meeting.

- We need a member vote on the Logo, and to accept the governing documents changes (Constitution, By Laws, and Flight Training)
- *Bob Steffensen* will submit a form for non-profit application to the IRS, at a cost of up to $600.

(The $600 has already been approved by members).

Bill

CVMA Flight Instructors

> *Al Marello* - Chief Flight Instructor

> Randy Meathrell - Control Line Flying

> Marc Nelissen-Basics

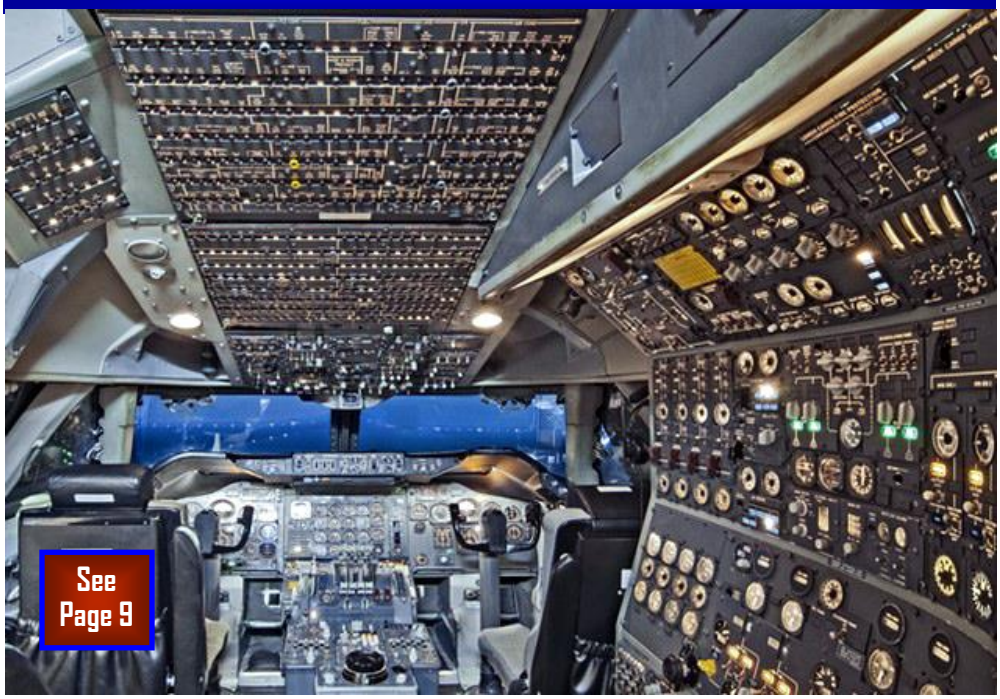
> Jack Potter-Gliders

CVMA NEWSLETTER

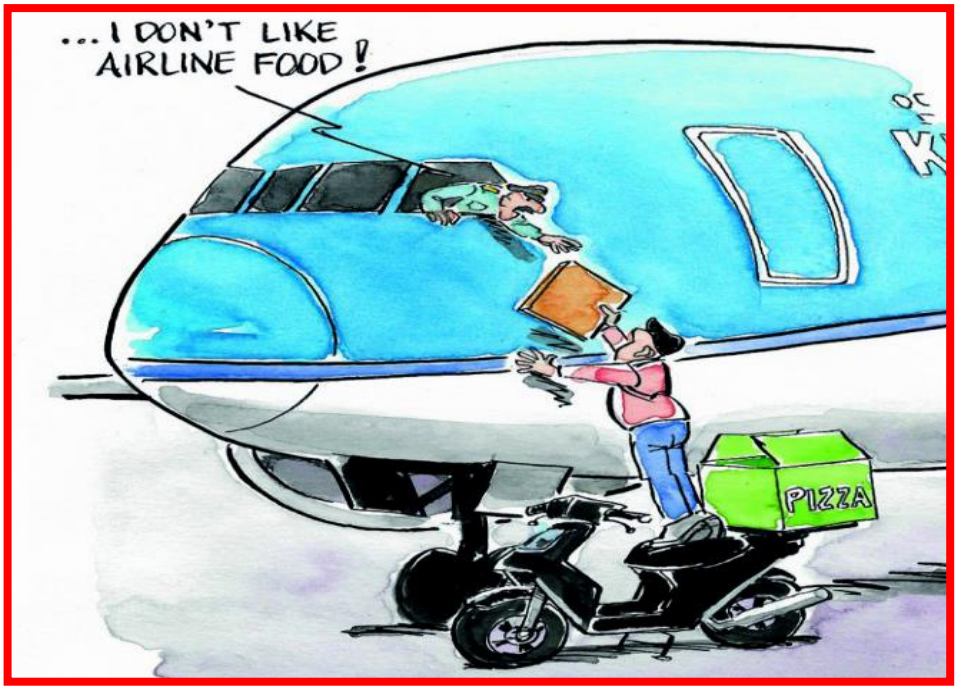
AMA Chapter #3789

Published Monthly

What Planes Cockpit is This?



See Page 9



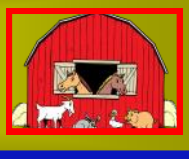
MARK YOUR CALENDARS

Events for 2022

- May 14 - Spring Fling fun fly and swap meet
- June 18 - E-warbird races
- July 4 - Pot luck Fun Fly & Chino Valley Town fireworks
- July 16 - Glider Endurance event
- Aug. 19-21 - IMAC Shootout
- Sept. 17 - Steve Crowe Fun Fly
- Oct. 15 - Fourth Annual Build & Fly Challenge
- Nov. 12 - Fall Swap Meet & Fun Fly
- Dec. 2 - Annual Christmas Banquet

WERE YOU BORN IN A BARN?

IF YOU ARE THE LAST ONE TO LEAVE THE FIELD CLOSE & LOCK THE GATE.



CRITICAL RC FLYING SAFETY ISSUES

Rick Nichols Club Safety Officer

I somehow keep learning of more ways that we can easily get ourselves in trouble. One of our members shared a story that we can take a lesson from. After reading his story I know that there is something to be learned from his experience.

His accounting of his experience tells me that this member is an educated person with skills that some of us may not possess. His awakening came after he fashioned a home-made battery charger from a circuit board and parts obtained from a flea market. His project was to build a charger to charge 2 cell batteries for his transmitter.

OK, I will shorten this and end the suspense! I think you all know what is coming next. Yup, he plugged his invention in and after a couple of minutes his unit had burned up and filled his home with smoke that had a nasty acrid smell. His wife was not very pleased as the home took a bit of airing out the next day.

My personal take on this story is that whether you are smart enough to build your own battery charger or buy one that is on the market, you never leave one unattended while charging. I thank our member for sharing his experience.

Now for a couple of fine-tuning points concerning general safety:

When starting your fuel motor or gas motor at the east end of our cabana area, do not pick your airplane up while it is running and proceed to carry past the pit area to the pilot's area to set it down and start flying. Please ask a fellow member to hold your airplane in the takeoff area while you walk to the pilot area and signal your helper to release your airplane for flight so you can taxi out safely for take off.

Most of our fuel or gas flyers tend to taxi back to the pits at the east end of the field to end their flight and shutting down while entering the pit area. This will change when the West end is used for the larger planes as we move our larger aircraft operations to the west end of the field later this year.

We have had chilly mornings for the winter with less activity at the field. I commend the members that are coming out in the cooler weather. I love to observe the help and guidance that all our members offer to our newer members and even us old guys. For us "old guys", please take the time to watch over the newbie's and offer them all the help and safety advice that you can. We all started out at one time or another with this sport and there was someone in our time to give us a nudge and a little help.

For us Control Line guys that are trying to re-live the times when we were 13 or 14 years old and learning about model airplanes, we are re-learning our old safety rules all over again and for some of us, sometimes we are learning them again the hard way, unfortunately.

Fly safe members!

RICK

Some of Our Club's C/L Activity!

Randy Meathrell's C/L Platter

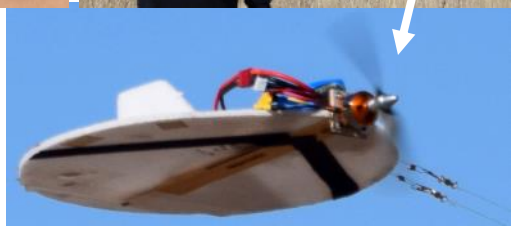
Randy Meathrell's C/L Nobler.

Rick Nichols' red Golden Hawk C/L.

The little Platter, is a nice trainer.

Matt Butler tries his hand at control line, he's flying Randy Meathrell's Platter .

Steve Zingali's C/L red - tailed Nobler in-flight.



Randy Meathrell launches the Platter as *Mark Lipp* tries his hand at flying C/L, he did a "figure nine" and almost got Randy, no one knew Randy could move so fast!

Brian Sutton's C/L Buster

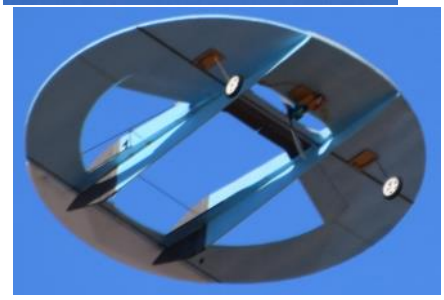
Harold Ellis helps *Steve Zingali* check the elevator position with the C/L handle on Steve's Nobler.

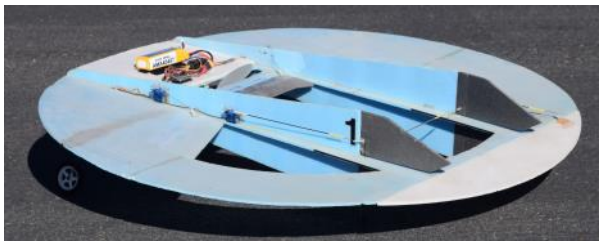
A gaggle of control line flyers at the circle. *Dave Domzalski, Brian Sutton, Rick Nichols, Harold Ellis, Matt Butler, Randy Meathrell* and *Steve Zingali*. Dave, Matt and Steve all tried their hand at flying control line at the circle.

Member's RC Models at The Flying Field

Steve Zingali's Geo Bat UFO

Steve Zingali's 30" Wingspan foam plane, he calls it his little "VTO Rocket Jet"! It does take off vertically too.





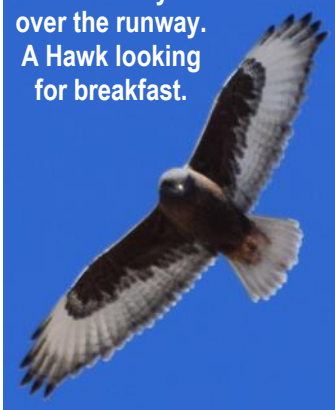
Steve Zingali's Geo Bat UFO. This is a real nice electric flyer he designed years ago, flies great.

Bill Gilbert's very nice Pitts, a great bi-wing gas powered model.

Below is *Clint Manchester's* very nice scale looking B-25.

Three boxes added to transmitter rack for prospective members, General Information, Chino Valley Flyers applications and Academy of Model Aeronautics (AMA) applications.

A natural flyer over the runway. A Hawk looking for breakfast.



Steve Zingali's foam C/L designed after a Russian-like WWII fighter.

The Sixth-Generation Tempest: A Proposed British Royal Air Force Fighter Jet

By Ethen Kim Lieser *

Having high hopes is surely an understatement when it comes to this particular plane — as it aims to leapfrog the next-generation capabilities of the world's most advanced fighter jets today, such as the highly respected F-35, F-22, J-20, and the Su-57.
According to Marine veteran and defense writer Alex Hollings at Sandboxx, (web site for military members), the teams that are engaged in developing the Tempest include "a laundry list of defense contractors who are currently working on facets of the forthcoming aircraft, and they've made some lofty claims about what this new fighter will be able to do. With industry partners like BAE Systems (the aircraft lead), Rolls-Royce, Leonardo, and MBDA already on board, it appears that they mean business.
The United Kingdom's Defense Secretary Gavin Williamson noted that "we have been a world leader in the combat air sector for a century, with an enviable array of skills and technology, and this strategy makes clear that we are determined to make sure it stays that way. It shows our allies that we are open to working together to protect the skies in an increasingly threatening future—and this concept model is just a glimpse into what the future could look like."

However, according to Hollings, "the leap from the fifth to sixth generation is more about marketing than it is about function. Generational designations are effectively just industry shorthand to describe the design and production process that went into a platform." He continues: "While there are no formal requirements for the informal title of '6th generation' fighter, there are a number of assumptions defense experts have made regarding the capabilities such a jet would need to bring to the table. Some anticipated capabilities include the use of artificial intelligence to assist the pilot, the ability to manage drones in support of the fighter, and all the advancements that came along in the fifth generation, including stealth and data fusion."

From the information already divulged by BAE Systems and the UK government, the Tempest looks like it will indeed possess those next-generation technologies and capabilities. "Tempest is one of the UK's most ambitious technological endeavors and designed to deliver a highly advanced, adaptable combat air system to come into service from the mid-2030s," the UK Ministry of Defense said in the following statement.

"This next generation combat aircraft, which forms part of a wider combat air system, will exploit new technologies as they evolve to respond to the changing nature of the battlespace, addressing increasingly high-tech and complex threats and conflict," it added.

One of the more exciting technologies that the Tempest will tap into is the brand new Multi-Function Radar Frequency System, which is being developed by aerospace company Leonardo specifically for the new fighter. "This system will leverage massive amounts of computing power to collect and process a claimed ten thousand times the data of existing radar systems. As Leonardo puts it, the Tempest will be able to gather and process the 'equivalent to the internet traffic of a large city every second,' offering its pilot a positively unmatched degree of situational awareness. If the F-35 is considered a 'quarterback in the sky,' Leonardo hopes to make the Tempest into an offensive coordinator," Hollings writes.

"In keeping with that breadth of awareness, BAE aims to create what would effectively be a virtual cockpit pilots will use in conjunction with a similar augmented reality interface to that of the F-35. Pilots would be able to customize every facet of the cockpit around them, using digital switches that can be rapidly re-mapped to serve different roles. The helmet interface and heads up display would allow the pilot to place the information they need where they can use it most," he concluded.

New Propulsion System

In addition, Rolls Royce is hard at work on a new propulsion system that can take on more heat than previous engines. "These new engines are expected to be more efficient and powerful that past iterations, creating the significant power the Tempest will need to leverage directed energy weapons that are likely to come. The aircraft's heat dissipation will also be manageable, according to BAE, so pilots can prioritize capability over stealth, or vice versa," Hollings claims.

Seamless drone compatibility is being looked at as well. "And like the U.S. Air Force's Skyborg program, Australia and Boeing's Loyal Wingman, or Russia's recent efforts to pair their Su-57 with the Hunter UCAV, the Tempest will be designed to operate with its own flock of drones. Hollings concludes, "These drones will extend the Tempest's sensor reach, engage targets on the pilot's behalf, and potentially even sacrifice themselves to save the crewed aircraft from inbound attack,".

Ethen Kim Lieser is a Washington state-based Science and Tech Editor who has held posts at Google, The Korea Herald, Lincoln Journal Star, Asian Week, and Arirang TV.

Model Airplane News
Scientific Models Control Line
February 1969 Advertisement

IS RUSSIA'S SU-57 THE WORST STEALTH FIGHTER ON THE PLANET?

by ***Alex Hollings***

https://www.sandboxx.us/blog/is-russias-su-57-the-worst-stealth-fighter-on-the-planet/

Russia's Sukhoi Su-57 is one of only four operational 5th generation fighters anywhere on the planet, keeping the rare company of China's Chengdu J-20 and America's Lockheed Martin F-22 and F-35. Each of these fighters was developed with different specialties in mind but share a collective focus on a few specific design elements that have come to define their generation of aircraft, including stealth and data fusion capabilities.

There's little doubt that America's stealth fighters are the best in the world, with China continuing work on the WS-15 engine they believe will bring the J-20 on par with America's dogfighting champion, the F-22 Raptor. The *F-35 Joint Strike Fighter*, on the other hand, isn't an acrobatic prize fighter like the F-22, nor is it a long-range interceptor like the J-20. It is, however, an incredibly sneaky flying supercomputer that can make other platforms in the area *more lethal* through its presence. Russia's Su-57 is widely seen as the least stealthy of the 5th generation entrants, but there's more to a fighter jet than radar cross-sections.

The long road to the first Su-57 taking to the skies began in 1979 under the former Soviet Union, with plans to field a next-generation fighter that could enter service in the 1990s. However, the collapse of the Soviet Union in 1991 practically halted progress on the program, leaving America's F-22 Raptor to claim the title of first stealth fighter unopposed with its first flight in 1997. Real development on the modern fighter program began once again in earnest in 2002, with America's F-22 set squarely in the program's sights.

By 2007, Russia's PAK FA program, which was short for "'prospective aeronautical complex of front-line air forces" in Russian, was once again steaming toward fielding a real stealth fighter. India, keen to have their own 5th generation aircraft, agreed to team up with the Russians to continue development and begin procuring what would eventually become the Su-57, but the partnership wasn't to last. In 2018, the Indian government signaled their departure from the program despite Russia's promising claims about their first batch of prototype fighters, and while India's official reasons didn't suggest problems with the program itself, unofficially, rumors swirled that India had given up the PAK FA program because the fighter it produced simply wasn't *stealthy enough* to survive in highly contested airspace, alongside a list of other concerns.

Nonetheless, Russia persevered. A total of 12 prototype Su-57s were constructed for testing and assessment, and just months after India backed out of the program. Russia's Defence Ministry signed a contract to purchase the first two serial production Su-57s, slated for delivery in 2019 and 2020. Russia had already placed their prototype fighters in "operational service," deploying them to Syria for little more than headline fodder and a few promotional photos, but these first two production jets were to be something more: They would not only represent Russia's top-of-the-line fighters, but they would also be the nation's first-ever production stealth aircraft.

The long road to the first Su-57 taking to the skies began in 1979 under the former Soviet Union, with plans to field a next-generation fighter that could enter service in the 1990s. However, the collapse of the Soviet Union in 1991 practically halted progress on the program, leaving America's F-22 Raptor to claim the title of first stealth fighter unopposed with its first flight in 1997. Real development on the modern fighter program began once again in earnest in 2002, with America's F-22 set squarely in the program's sights.

By 2007, Russia's PAK FA program, which was short for "'prospective aeronautical complex of front-line air forces" in Russian, was once again steaming toward fielding a real stealth fighter. India, keen to have their own 5th generation aircraft, agreed to team up with the Russians to continue development and begin procuring what would eventually become the Su-57, but the partnership wasn't to last. In 2018, the Indian government signaled their departure from the program despite Russia's promising claims about their first batch of prototype fighters, and while India's official reasons didn't suggest problems with the program itself, unofficially, rumors swirled that India had given up the PAK FA program because the fighter it produced simply wasn't *stealthy enough* to survive in highly contested airspace, alongside a list of other concerns.

Nonetheless, Russia persevered. A total of 12 prototype Su-57s were constructed for testing and assessment just months after India backed out of buying the fighter. The Su-57 may not be the stealthiest or most technologically advanced 5th generation fighter on the market, but it's still a product of Russia's long and storied history of developing highly capable combat airframes. The same firm responsible for the Su-57 also produces incredibly capable 4th generation fighters like the Su-35, so it comes as little surprise that Russia's first stealth fighter is no slouch in acrobatic performance.

The Su-57's 3D thrust vectoring gives the fighter a huge degree of maneuverability and is far superior at executing acrobatic movements at lower speeds than its non-thrust vectoring competition in the F-35 and J-20A (the J-20B is expected to add thrust vectoring capabilities). Thrust vector control allows the pilot to orient the engines of the fighter independently from the fuselage, making
extremely sharp turns possible, or even flying forward while pointing the nose, and weapon systems, down at an opposing aircraft. Even the F-22 Raptor, widely seen as the most capable air-to-air fighter on the planet, is limited in its thrust vectoring capabilities in comparison. It's worth noting, however, that the sort of acrobatics thrust vectoring allows for a scrub of a great deal of the fighter's speed, making it an approach to air combat that isn't prized by all air forces.

The Su-57 also boasts the second-highest top speed of the class, topping out at Mach 2, just a few hundred miles per hour slower than the F-22.

Conclusion: The Su-57 may be the "worst" 5th generation fighter, but it's still a highly capable fighting machine.

James Webb Telescope Launched - Reaches Orbital Destination*

By Joey Roulette

After traveling nearly one million miles, the James Webb Space Telescope arrived at its new home on Monday. The spacecraft's arrival checks off another tricky step as scientists on Earth prepare to spend at least a decade using the observatory to study distant light from the beginning of time.

The telescope launched to space on Dec. 25, with astronomers all over the world holding their breaths. But the $10 billion telescope still needed to power through the first leg of its setup phase. Earlier this month, astronomers resumed breathing when the observatory unfurled its heat shield and deployed its mirrors and other instruments with few surprises — a remarkable feat given the telescope's novel design and engineering complexity.

And on Monday January 24, 2022 around 2:05 p.m. Eastern time, engineers confirmed that the James Webb Space Telescope successfully reached its final destination.

Far right is the Big Bang, the telescope is at 9 billion years after the Big Bang.

The telescope arrived at a location beyond the moon after a final, roughly five-minute firing of the spacecraft's main thruster, sweeping itself into a small pocket of stability where the gravitational forces of the sun and Earth commingle. From this outpost, called the second Lagrange Point or L2, the Webb telescope will be dragged around the sun alongside Earth for years to keep a steady eye on outer space without spending much fuel to maintain its position.

"We're one step closer to uncovering the mysteries of the universe," Bill Nelson, the administrator of NASA, said in a statement. "And I can't wait to see Webb's first new views of the universe this summer!"

The James Webb Space Telescope, named after a former NASA administrator who oversaw the formative years of the Apollo program, is seven times more sensitive than the nearly 32-year-old Hubble Space Telescope and three times its size. A follow-up to Hubble, the Webb is designed to see further into the past than its celebrated predecessor in order to study the first stars and galaxies that twinkled alive in the dawn of time, 13.7 billion years ago.

Webb's launch on Christmas morning capped a risky 25-year development timeline dotted with engineering challenges, mistakes and cost overruns that made its voyage to space all the more nerve-racking for astronomers and space agency administrators. The telescope tightly bundled up to fit inside a European Ariane rocket, unfurled dozens of mechanical limbs and instruments. These included five layers of a thin foil-like plastic that were stretched taut to the size of a tennis court to shield Webb's instruments from the sun's heat. Later, the telescope unfolded a 21-foot-wide array of 18 gold-plated mirrors that will help bounce light from the cosmos into its ultrasensitive infrared sensors.

The instrument side of the telescope, facing away from the sun, will be cloaked in frigid darkness, while the other side, or the outermost layer of the sun shield, will deflect temperatures as hot as 230 degrees Fahrenheit. This helps accomplish a key challenge in Webb's design of keeping the telescope's sensors cool so that stray heat doesn't interfere with its infrared scans of ancient galaxies, distant black holes and planets orbiting other stars.

Deploying the telescope to the L2 neighborhood also helps keep the temperatures low while providing enough sunlight for the Webb's solar panels, which generate electricity. But the telescope isn't parked at precisely L2 — it will revolve around the point's center once every 180 days in an orbital ring some 500,000 miles wide to expose its solar arrays to sunlight.

"If we were perfectly there, we would be blocked by the Earth, such that we wouldn't get our electricity," said Scott Willoughby, the telescope's program manager at Northrop Grumman, the primary contractor for the observatory. "So we do this halo orbit." Stationing the spacecraft at this distance from Earth will also help conserve its limited fuel supplies.

"If you try to stay closer, you've got to expend fuel to stay there," Mr. Willoughby said. But less fuel is needed to station the Webb at L2, he said, "meaning the mission life for this vehicle will be the longest." This month, one mission official suggested that the spacecraft could remain operational for up to 20 years.

"The last 30 days, we call that 30 days on the edge, and we're just so proud to be through that," said Keith Parrish, NASA's commissioning manager for the telescope, in a news conference on Monday. "But on the other hand, we were just setting the table." With the telescope's instruments deployed and its arrival at L2 complete, months of smaller steps lie ahead before those of us on Earth can begin to see the spacecraft's vivid views of the cosmos. For the next three months, engineers will watch as algorithms help fine-tune the position of the Webb's mirror segments, correcting any misalignments — as accurately as one-10,000th of a hair — to allow the 18 hexagonal pieces in its array to function as a single mirror.

Engineers must then calibrate the Webb's scientific instruments, test its ability to lock onto known objects and track moving targets before astronomers can use the telescope for science operations beginning this summer. Amber Straughn, a deputy project scientist for the telescope, said during a NASA online broadcast on Monday that the first year of observations using the Webb have already been scheduled. "The best is yet to come," said Mr. Parrish, NASA telescope Manager.

* *https://www.nytimes.com/2022/01/24/science/james-webb-telescope-arrival.htmlAfter Million-Mile Journey, James Webb Telescope Reaches Destination*

Guess the Cockpit: Concorde Supersonic Airliner *

For a fleeting thirty years during the 20th century, supersonic commercial air travel was a reality. But on October 24, 2003, that era came to an abrupt end. That day, British Airways operated its last commercial Concorde service from JFK International Airport to London Heathrow. Air France pulled its Concordes from service a few months earlier. Thus, it would be the Concorde's last ever commercial flight in a career that started in January 1976.

The Anglo-French Concorde was co-developed by BAC, a forerunner of BAE Systems, and Aerospatiale, now a part of Airbus, and has a storied history.

The Concorde was never the commercial success for which its creators had hoped. Environmental and operational limitations of the Concorde hampered its commercial appeal among airline customers. Only 20 of the planes were ever built, and just 14 of them were production aircraft. The Concorde saw service with only two airlines — Air France and British Airways — on just two routes.

However, its lack of commercial success doesn't diminish its role as an icon of modern aviation and as a technological marvel, one which plane makers and aerospace start-ups still talk about replicating. In fact, 16 years after its last flight for British Airways, the world is still without a viable form of supersonic passenger service.

Together, Aérospatiale — a predecessor of Airbus Industries — and British Aircraft Corporation agreed to produce a four-engine, delta-wing supersonic airliner.

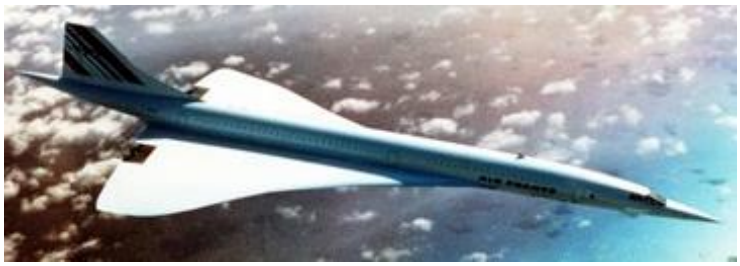
At the same time during the 1960's, engineers in the US and the Soviet Union were working on supersonic airliners of their own. The American Boeing 2707 never made it past the drawing board, while the Soviets' Tupolev TU144 made it into service but was quickly retired because of performance and safety problems.

The Olympus engine's afterburners, used on the Concorde, gave it the signature smoky takeoffs. Each engine produced 38,000 pounds of thrust. The Concorde had features found on no other Western commercial airliner, such as the double delta wing and an adjustable drooping nose that gave pilots better visibility on takeoffs and landings. In normal flight, the nose and visor were raised. The Concorde was operated by a crew of three: two pilots and a flight engineer. In 1967, the Concorde was presented to the public for the first time in Toulouse, France.

The first Concorde prototype made its maiden flight in March 1969. On October 1, 1969, Concorde made its first supersonic flight. The sleek supersonic jet captivated the public immediately. More than a dozen airlines from around the world placed orders for the jet. However, the Concorde soon encountered opposition.

One of the byproducts of supersonic flight is the sonic boom, which can be unpleasant or distressing to those on the ground. As a result, the Concorde was limited to routes over water, with minimal time spent soaring over land.

In addition, residents near airports that were home to the Concorde fleet protested the amount of noise generated by the plane's four massive turbojet engines. The engines fell silent for the last time in October of 2003 when it completed its last flight.



* https://www.businessinsider.com/concorde-supersonic-jet-history-2018-10#on-november-29-1962-the-governments-of-france-and-great-britain-signed-a-concord-agreement-to-build-a-supersonic-jetliner-hence-the-name-of-the-plane-that-resulted-concorde-2

Airbus Thinks Hydrogen is a Renewable Energy for Aviation *

Glenn Llewellyn - Airbus Vice-President, Zero-Emission Aircraft

Innovative technologies are putting meaningful reductions in aircraft emissions tantalizingly within reach. It's now up to the entire industry to decide whether we're ready to seize this opportunity or simply carry on with business as usual.

Airbus, has made the decision. They are ready - Today - Now - Immediately.

Airbus wants to be the catalyst for change and are prepared to explore any technology pathway that has the potential to go there.

Hydrogen is emerging as a game changing contender in this respect. Why hydrogen? There are a number of reasons. ***First***, hydrogen offers the possibility to significantly reduce and potentially eliminate all of aviation's greenhouse gas emissions. In other words, a potential "true zero" solution: no CO2 , NOx, SOx, and soot emissions. That's astounding progress compared to today's conventional jet engines.

Water vapor is still emitted via hydrogen, but by eliminating soot, persistent contrails can be significantly reduced or eliminated.

Second, "green hydrogen" (i.e. produced by renewable sources) is expected to ramp up at a large scale over the next decade, which will make hydrogen increasingly cost-competitive with existing options, such as jet fuel.

Hydrogen would also essentially allow aviation to be powered by a renewable energy.

Third, a major advantage with hydrogen is that it can complement existing refuelling options at most major airports, thereby facilitating wide-scale adoption.

The list of hydrogen's advantages goes on, many of which are described in further detail available at the Airbus web site. (See below)

Although there's no "silver bullet" solution to emissions reduction, Airbus is confident hydrogen will be a method toward climate-neutral aviation.

Hydrogen power is an investment Airbus is willing to make today to ensure the viability of aviation into the future.

* *https://www.airbus.com/en/innovation/zero-emission/hydrogen*

Where's Our Spring Weather?