North Dakota Aviation Council

NORTH DAKOTA

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Summer 2019

Fly-ins are always a good idea.

RAIN or SHINE

Flyin - see page 6

North Dakota Aviation Quarterly (NDAQ)

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From the Editorial Committee

The fact that we had to delay publication of the summer issue until 4 of our 5 board members got back from EAA's AirVenture shows our passion. One of the shirts I read had, "Don't just stand there - fly something!" written on it. It's such an easy industry to be passionate about - there's always something happening, being invented, or worth remembering. Aviation is an amazing thing to be a part of!

We hope this issue fans your passion in aviation as much as it does ours!

Joshua

Do you have an interesting aviation story to share?

Our fall issue will center on technology and UAS development in our industry and state.

Submit your ideas or articles for consideration to:
ndaviationcouncil@gmail.com
or call (701) 328-9653

Front Cover: *(Top)* New Town – Aircraft from Dakota Territory Air Museum. *(Bottom)* DC-3 at Bismarck

Daren Hall, Chairman
North Dakota Aviation Council
dhall@fargojet.com

It's an Exciting Time in the Aerospace Industry

As I write this column, I'm heading out to Oshkosh for a quick trip after a busy week at the Fargo AirSho! One thing I love about events like this is how they showcase and teach people about our awesome industry. I've been to Oshkosh a number of times, usually in a working capacity, but this time I'm on a mission to see how the largest gathering of aviation enthusiasts in the world is reaching out to the next generation of aviators.

It's an exciting time in the aerospace industry! In fact, I don't remember a better time in my life to see what careers are readily available throughout the industry for current students or to those who may have always dreamed of pursuing an aviation career. With advances in technologies over the past few decades, aerospace offers some of the most innovative and cutting-edge technologies being applied in any industry. The pilot shortage we are currently experiencing is only the tip of the iceberg as far as what opportunities are available and most people often only think of the airlines as a pilot profession. In reality, and I know I'm preaching to the choir, but how many different pilot jobs can you think of? Corporate pilot, charter pilot, ag pilot, certified flight instructor, aerial tours pilot, bush pilot, missionary pilot, cargo pilot, special mission pilot, airshow pilot…the list goes on and on. An even bigger need is found on the maintenance side to keep these birds in the air. But going beyond those, there are numerous career fields in high demand now, and for the foreseeable future, including aviation manufacturing, FBO services, UAS operations, airport management, aircraft sales, avionics, electronics, aircraft special missions, aerospace engineering, aircraft interior design and completions, and again the list goes on and on.

NBAA BACE 2018: Darren Hall, Vice President of Marketing, Fargo Jet Center; Elayna Hall, Marketing Intern, Gulfstream Aircraft Corporation and UND Aerospace Student, at the NBAA Business Aviation Convention & Exhibition in Orlando, FL.

Over the past few years, we have seen a number of high schools across the state start aviation programs and provide almost seamless integration with the school systems' STEM programs. Classes like these can really give students insight into what careers are possible in the industry. In addition to the high school programs, there are many other resources online to help not only students but anyone looking to find a way into the industry. Many of these can be found through some of the national association groups, such as:

- **GAMA** - General Aviation Manufacturers Association: www.gama.aero/opportunities-in-ga/
- **NBAA** - National Business Aviation Association: www.jobs.nbaa.org/
- **NATA** - National Air Transportation Association
- **PAMA** - Professional Aviation Mechanics Association: www.pama.org/scholarship.html#/
- **AAAE** - American Association of Airport Executives: www.careercenter.aaae.org
- **NAAA** - National Aerial Applicators Association: www.agaviation.org/becomeanagpilot

Another hurdle we face when it comes to sharing our story is airport access. Airports like Fargo's Hector International Airport is not unlike many others around the county that are held within an 8-foot fence and heightened security which essentially tells people to "KEEP OUT." Sharing the "beyond the fence" story is an import responsibility we all have in ensuring our industry continues to thrive.

Kyle Wanner, Director
North Dakota Aeronautics Commission
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Statewide Airport Pavement Condition Study Completed

The North Dakota Aeronautics Commission is pleased to announce the completion of an update to the State's Pavement Condition Index (PCI) program. This is a project that the Aeronautics Commission conducts every three years where the pavement sections at each of the state's 72 paved, public-use airports is analyzed, inventoried, and provided with a recommended maintenance or replacement plan. An interactive web portal and training video on the results of this study is now available for public viewing from the studies page on the Aeronautics Commission website at www.aero.nd.gov.

This study is critically important since pavement projects are indicative of some the largest investments being made on our airports and therefore, being able to understand and maintain those pavements at a high level is incredibly important. North Dakota specifically, has approximately 57 million square feet of pavement that exists on its public-use airports. Throughout the years, these pavements have turned into a multi-billion dollar asset that needs to be maintained in the most cost beneficial way possible.

Airports in North Dakota have utilized PCI information to evaluate pavement conditions since the 1980s and having this study readily accessible makes it easier for community members to present the information to policy and funding partners when discussing the need, timing, and costs associated with future pavement rehabilitation projects.

The project website provides pavement section details with each layer's thickness being identified as well as a historical tracking of the maintenance that has been done to each pavement section. Information on new pavement sections as well as the historical maintenance related activity that has occurred on all airside pavements is information that Aeronautics Commission staff continually tracks so that the information can be included in the update that occurs every three years. This process helps each airport that receives federal funding to ensure that they are in full compliance with the pavement maintenance grant assurances that they are required to follow.

The interactive website from this study also provides an incredible tool in its "time line" capability for each individual airport. Anyone viewing the website is able to scroll to past, present, and future years to analyze what the condition of the pavements were in the past, where they are today, and what the pavement condition is projected to be in the future. The North Dakota Aeronautics Commission intends for this tool to be utilized to help ensure that the airport infrastructure in our state is well-managed, and to help each community identify the upcoming high priority projects at their airport and to budget accordingly.

The scale that is used for this pavement condition study ranges from 0-100, with three general categories that represent pavement conditions: Adequate (100-70); Degraded (69-55); and Unsatisfactory (54-0).

Besides providing information on pavement condition on an individual airport basis, we are also able to look at the statewide system as a whole and compare the weighted average PCI of the system to past studies. This helps us to analyze how we have been performing over time in maintaining our pavements. Back in 2015, the weighted PCI value for the state was 76. During the visual inspection of the pavements that occurred during the Fall of 2018, it was found that the current weighted PCI of the statewide pavement network was 79. This increase of three points is great news and, in all actuality, is quite significant as it takes quite a shift to move the needle in a positive direction on 57 million square feet of pavement. This upward shift shows that our airports are using this information to make progress in improving and maintaining their pavements.

As a user of the system, it is important to realize that a lot of time and effort goes into ensuring that the airside pavements are being maintained at our airports throughout North Dakota. The next time you are taxiing along on those pavements, take a moment to appreciate the time and effort of those people locally and around the state who work hard to try to keep it safe and usable for you and all other aviators for many years to come.

Wishing you smooth flying, Kyle

Incorporating Summer Fun in Flying Lessons

By Tajae Viaene, Assistant Chief Flight Instructor, Fargo Jet Center

"Whoa, could that be a fire out in the distance?" Those were the last words out of my mouth as we descended for a closer look. My student Tyler's eyebrows rose and his eyes opened wide as he said, "A farmer must be burning his field. I've never seen this up close before!" We flew many circles around the field in a Cessna 172 while curiously eyeing the orange flames and analyzing the rising smoke. He was surprised how high and how far the smoke could be seen drifting. With this, we were able to discuss wind drift and unconventional methods to determine useful runways when not in the vicinity of a windsock.

Our original plan that day was to fly roughly 20 miles outside of Fargo where Tyler Gullekson was to practice teaching me flight maneuvers. He has been working toward becoming a Certified Flight Instructor and as I have already been instructing for several years, I had the pleasure of helping Tyler achieve this goal. Little did he know that day he would learn far more about the fundamentals of teaching than he had ever anticipated.

After we returned to the flight school at the Fargo Jet Center, I asked Tyler what he thought of our flight lesson. Without question, he immediately perked up and responded, "That was awesome!" It is my hope that the concept we discussed following this will stay with him for quite some time.

I have seen many burning fields, many tall towers, many small airports, grass strips, and too many beautiful sunsets to count. Don't ever lose your passion for the small wonders you see while flying above the earth, as many below will never see these things in their lifetime. Take the time to have fun while you teach, as there is something to be said about igniting the passion for flying in an up-and-coming aviator. A good flight instructor is one who incorporates fun in all aspects of learning and is able to show students not only what they need to accomplish to pass a checkride, but much more about the endless possibilities of fun and enjoyment they have available beyond earning their certificate.

Flight Safety in a Sprawling Area of Special-use Airspace

A joint civilian/military group supported by AOPA that works to ensure flight safety in a sprawling area of special-use airspace held its third annual meeting in Bismarck, North Dakota.

By Dan Namowitz - AOPA

The Powder River Council met May 1 to discuss issues facing users of the Powder River Training Complex that includes airspace in portions of Montana, North Dakota, South Dakota, and Wyoming.

Representatives of state and federal aviation agencies, the U.S. Air Force, airlines, aviation organizations, and pilots' groups attended the session in person or by phone, said Kyle Lewis, AOPA Great Lakes region manager.

With all attending states' aviation departments noting growth in regional aviation activity, the need to adopt safety precautions in the airspace, which is used for military training while other flight operations also take place, is growing, Lewis said.

"The Powder River Council was formed as a venue allowing stakeholder concerns to be voiced directly to the Air Force and the FAA," he said."Those discussions are being transformed into solutions, and while some problems must be resolved by the military and the FAA, pilots and operators using the area should be familiar with how to operate VFR safely in special-use airspace and military operations areas."

Following a review of a 2018 AOPA **survey** of airspace users conducted by AOPA and the National Business Aviation Association, discussion turned to a variety of areas that can improve safety, such as enhancing the use of the notices to airmen system and adopting "dynamic scheduling" of military training operations in the complex.

It was noted that pilots should become familiar with **air traffic control assigned airspace**, which can be reserved on short notice for special operations and be prepared to flight plan accordingly.

Communications upgrades were recommended in areas ranging from radar, VHF radio, and the "lack of functionality" of the FAA's special-use airspace website to improving the integration of the status of special-use airspace into third-party flight planning apps.

Some in attendance expressed interest in reviewing data on the amount of activity within the complex's airspace to help determine further safety policies.

Lewis urged pilots to report any conflicts or operating constraints they encounter when flying in the area, and he noted that the flight-safety practices developed from the discussions may provide useful well beyond the borders of the Power River Training Complex.

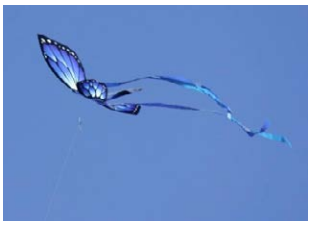
"Military operations area and special-use airspace expansion is occurring across the country, and lessons learned from Powder River can be implemented elsewhere," he said.

Summertime Planes on the Plains

By The Staiger Consulting Group

"More than anything else the sensation is one of perfect peace mingled with an excitement that strains every nerve to the utmost, if you can conceive of such a combination."
–Wilbur Wright

Fly-ins and fundraisers,
Pancakes and planes,
Student career days,
Hot dogs on hot tarmac,
Spraying crops. . .and even cicadas!
Wheels and wings,
Wings and wine,
Photo and art contests,
Air shows and drone camps,
Counting cattle from the air,
Golf ball drops,
Hangin' in a hanger with the door open...



Oh, the simpler life when the weather warms. Work takes on a different tone and fun just gets more fun. With events happening everywhere, aviation enthusiasts can gather and celebrate flight at any number of activities in our region. Maybe this is the summer you take a class or learn to fly!

Check out any number of activities
found on these and other calendars of events:
www.aero.nd.gov/events
www.globalair.com/calendar/aviation-events.aspx
www.hangar.aopa.org/events

Get out there and enjoy some of that rare summer air.

Stacy Krumwiede, Bonnie Staiger, Mike Krumwiede

New Tools for Safety

Jay M. Flowers, FAA Safety Team Program Manager, ND Operations
701-492-5809, jay.m.flowers@faa.gov

As the FAASTeam Program Manager (FPM) for North Dakota, I am challenged with monitoring the Accidents and Incidents within the state and with our Operators when they are abroad.

To do this, we FAASTeam FPMs, must work closely with our Flight Standards Offices, the Management Team, and the Aviation Safety Inspectors, to stay on top of what has been happening and how we intend to assist the General Aviation (GA) population in correcting the issues we find.

Approximately 14 months ago, the National FAASTeam put into motion the designing and application of a new software tool that will assist FPMs in staying more on top of the times than on the side trying to catch up. This new tool is the FAASTeam Data Analysis Tool or as we like to call it, the FATDAT. Basically the tool was designed to reduce our workload in recording each safety related event. Events which often times take months or even years to conclude.

The FATDAT, allows us to pull events on a National or State level as the inspectors complete their work. The FPMs then assess the risk with completed accident and incident data. Sources such as the NTSB and other sources within the FAA have been mainstream linked to the FATDAT which allow us to see what is happening to our airmen now instead of two years ago.

What does this do for the airmen of North Dakota? The information I pull from FATDAT alerts me to risk and potentially lethal actions found during these investigations. It then gives me the support of the National Performance Plan to mitigate those risks by presenting topics and events that support correcting the issues.

Over the past 10 years, 79 Accidents occurred, 45 of those involved Landing. Currently, the number one safety issue is crosswind landings.

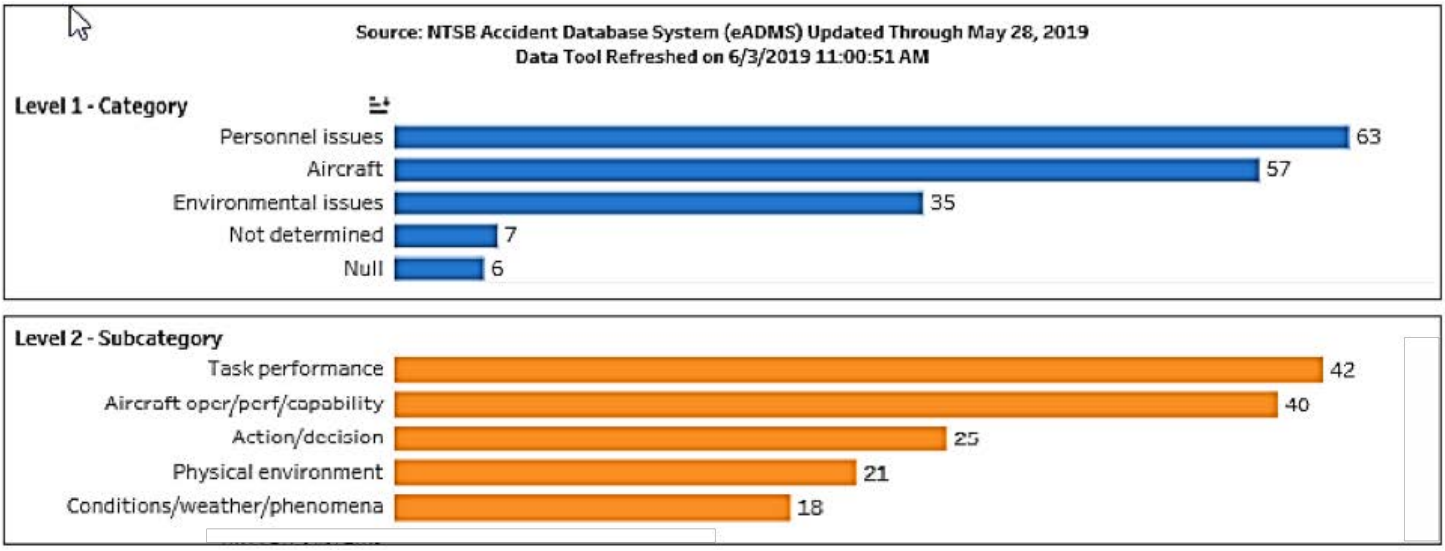
As you can see above, of the 79 accidents, there were more than 155 causal factors relating to airmen in the Landing phase. Leading the list of issues found?

- Task performance – lack of proficiency
- Aircraft Performance – lack of performance knowledge by the airman
- Action or decision making – did not know what to do, or more importantly, when

As an airman, you must take on the challenge of improving your skills through Flight Instruction and proficiency training. Not once every two years when you get a Flight Review, but every couple of months. Challenge yourself on every flight to fly smarter and to gain control of the "Good Enough" level you find your flying to be right now. Basically, "I GOT THIS" should be your new motto!

Safety is a motivated action which requires attention, skill, and refreshment throughout time.

Fly Safe!



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A message from...

*By **Matthew Remynse**, President,*
Airport Association of North Dakota

Greetings from the Airport Association of North Dakota (AAND),

For me, when I think about summer and airports, I immediately start thinking about fluffy pancakes, sizzling sausage and, of course, construction activities.

Hopefully, everyone will be out flying this summer, enjoying the abundant fly-ins available this year. Fly-ins are a great way to promote aviation in our communities and get the next generation excited about our industry. I had the pleasure of attending the Mandan Airport Planes and Pancakes earlier this year. The volunteers there had a great display of static aircraft and activities for the kids. And of course there was a long line for the pancakes and sausage, which for me is the best part of the fly-ins! The volunteers at our airports do a great job of putting together these fly-ins and I encourage everyone to attend at least one. Once you have been to one or two, they become addicting.

As you are traveling to the next fly-in, remember summer is the time of year when airports are in full swing with their construction projects. In June, Kyle and his staff at the North Dakota Aeronautics Commission awarded numerous grants for great projects throughout the state. So with the many projects ongoing, surfaces may be closed or ramps extra congested, so check the NOTAMs or call the airport manager or FBO to see if there are any closures at the airport you are planning on flying into. Also, the hay is growing well, so be cautious of the

haying equipment that is prominent on airfields July through August. And as always, be careful of the wildlife that is moving this time of year.

Lastly, a few updates on the AAND. The organization elected its 2019 officers to the board at the Upper Midwest Aviation Symposium. I'd like to welcome Jordan Dahl and Rodney Schaff as new members on the AAND board. Jordan is the Operations Specialist for the Fargo Airport and will serve as the Treasurer. Rodney Schaff is the President of the Bowman Airport Authority and will serve as the District Five representative. I'd also like to thank Jim Lawler for the all the work and time he has put into AAND over his career. After serving for over two decades, Jim has stepped down from the AAND board. Throughout his time in AAND, Jim served as Vice-President, Treasurer, and District Representative. Jim has a wealth of knowledge and he will be missed, but we wish him all the best!

As you are out and about this summer, please check the NOTAMs or call the airport operator; we are always happy to provide a report on the activity at our field. Also, don't forget to create your legacy and stamp your passports when stopping in at a new airport this summer. I hope everyone has a fantastic summer with many hours of flying!!

Mike McHugh, Education Coordinator
North Dakota Aeronautics Commission

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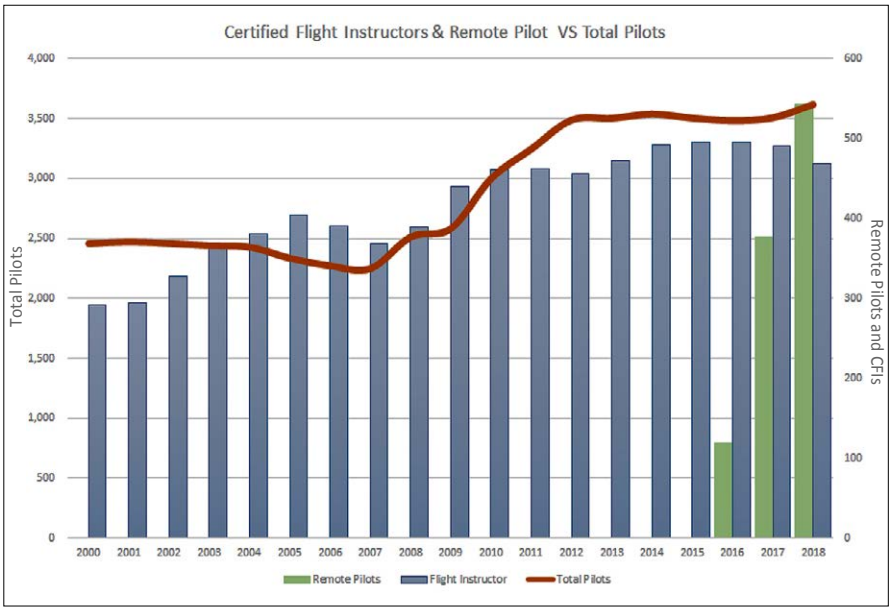
Is There A Pilot Shortage?

I hope by now you have heard from a number of sources about the workforce shortage in our industry. As an aviation community, we have been working to raise awareness for aviation careers around the state. Together the North Dakota Aeronautics Commission, the North Dakota Aviation Council, the Fargo and Minot air museums, the University of North Dakota, the Department of Career and Technical Education, and many other groups are providing youth education and promotion of aviation careers around the state. Now we are faced with the key question: is it working?

As you can see by the chart, the total number of pilots in the state has held steady since 2012, but there was a slight increase in 2018. If we break that down, we have seen an increase in student pilots in our state by approximately 10 percent per year for the last three years. This is great news! We have also seen the number of remote pilot certificates (UAS/Drone pilots) grow to more than 600 in less than three years. That is more than half of the number of private pilots we have in our state. While the aviation community can celebrate these accomplishments, there are also some concerning numbers in this data. An area of major concern is our Certified Flight Instructor (CFI) numbers. While the total number of pilots is steady to increasing, CFIs are on a downward trend. With fewer instructors available, it is continually becoming more and more challenging to train and grow our pilot numbers.

By looking at this data, I would like to think that our efforts around the state to promote youth aviation education opportunities are paying off. This is shown by the growth of our student pilot and remote pilot populations which both exceed the national average. Also, freshman enrolling at the University of North Dakota - Aerospace, from cities around North Dakota are growing. This fall, enrollment numbers show 39 incoming freshman from 23 North Dakota cities. The number of North Dakota students pursuing aerospace at UND has been on the rise, and we look forward to that continuing.



Is there a pilot shortage?

The data shows the answer is YES! If we work together, we can help continue to grow the interest in aviation careers among our youth and spark interest in aviation careers. There is no one person or group that can eliminate the pilot shortage but together we grow the industry.

Career Day!
At Bismarck Aero Center

Annual Aviation Career Day at Bismarck Aero Center, sponsored by the ND Business Aviation Association.

UND Flying Team Earns 17th National Championship

UND AEROSPACE
UNIVERSITY OF NORTH DAKOTA

By Connor Murphy

The University of North Dakota Flying Team earned its 17th national championship in the SAFECON competition this past May, hosted at the University of Wisconsin-Madison. The team has now finished first or second in 30 of the past 36 years at the National Intercollegiate Flying Association's (NIFA) annual flight and safety competition and convention.

UND student aviators took first place in six of SAFECON's 12 events, with all 14 competing members contributing to the team's overall point total. Events tested a wide range of pilots' abilities both on the ground and in the air, from aircraft recognition to manually navigating cross-country flights.

"This was a total team effort," Head Coach Lewis Liang said. "We had a young team that had to work hard after losing experienced upperclassmen. They knew it was a rebuilding year, and we asked them to do their best – they gave it their best this week."

"The team had big shoes to fill," Assistant Coach Ryan Guthridge said. "They spent the year grinding it out with grit and determination, and their work ethic brought home a championship. The feeling is unreal."

Co-captains Steve Roche and Adam Douville led this year's championship team. Roche earned first place finishes in Aircraft Pre-flight Inspection and Short Field Landing; Douville took first in the Ground Trainer and Traditional Navigation events.

Other first place event finishes came from Benjamin Ediem in Simulated Comprehensive Aircraft Navigation, and Garret Turco and Jason Preston in Unlimited Navigation.

High placings in other events solidified the team's overall first place finish. Paul Lindseth, Dean of the John D. Odegard School of Aerospace Sciences, said they persevered against the country's best of the best to win it all.

"Congratulations to the students who made this such a great team effort, they were each huge contributors," Lindseth said. "Hats off to Lewis Liang and Ryan Guthridge – they had a young team and were able to instill them with the confidence to win. It's a fierce competition that ensures a bright future for aviation nationwide."

Aviation department chair Jim Higgins highlighted a larger team effort behind the UND Flying Team, when considering the university's resources and dedication to success. Students practicing can easily put in 40-hour weeks, and many staffers make the extra effort to give them quality preparation.

"I couldn't be more proud of the team," he said. "Very balanced scoring indicates that everyone put in a lot of work and it was a true team effort. The support of everyone involved at the Odegard School—the flight instructors, operators, maintenance staff, faculty and dean's office—is an indicator of the quality we have at UND."

Posing with their haul of trophies, the 2019 UND Flying Team made the most of their odds as a young team. Fourteen students participated in this year's competition at the University of Wisconsin-Madison. Photo courtesy of UND Aerospace.

Team Member Spotlight: *Alexis Hesse*

Hometown and High School: Bismarck, ND Legacy High School class of 2017

Major: Commercial Aviation/Unmanned Aircraft Systems Operations
Events you competed in at Nationals: Computer Accuracy & Traditional Navigation

Q. *What did it mean for you to represent North Dakota at the National SAFECON?*

A. I was honored to have the opportunity to represent the University of North Dakota with the flying team. The competition was incredibly beneficial to my college experience and it was very rewarding to be able to share the championship with my teammates and coaches after working so hard all year.

Challenges Facing the A&P Shortage

UND AEROSPACE
UNIVERSITY OF NORTH DAKOTA

By Dan Kasowski, Director of Maintenance, University of North Dakota

Over the past several years its seems no matter who you talk to, any aviation trade journal you pick up, or any FBO you stop at, everyone is looking for experienced, dedicated aircraft maintenance technicians. Boeing estimates the aviation industry will need 189,000 aircraft technicians in North America by 2037.

The big question is, why is it so hard to find qualified aircraft technicians? A part of the answer is simply about 30 percent of the current aircraft technicians are at or near retirement age, and they are retiring faster than they are being replaced. However, we are also losing maintenance technicians

to other positions in our industry. The NBAA has research showing technicians are moving to new positions for better compensation, benefits, career advancement, and scheduling.

Another dilemma we are facing is the lack of interest in young people to learn a trade skill. The United States is working through a severe shortage in the technical workforce, and aviation draws the short straw because it takes so much longer to be work-ready in comparison to other skilled trade careers. Other industrial maintenance and vehicle maintenance trade schools can produce skilled technicians in approximately 18 months, but aircraft mechanics take longer to train and there is a more rigorous regulatory barrier to overcome. The Aviation Technician Education Council (ATEC) estimates that 30 percent of those who finish an aviation maintenance training course end up accepting employment in another industry. More recently the oil and gas industry has been the hottest, but amusement parks and railroads have also ranked very high in stealing A&P's from our industry.

Today's young adults seeking education in the trade field are largely looking at the future of technical work, such as robotics, composite design, 3D printing, computer programming, and

advanced propulsion. Technicians do not generally want to learn a trade that takes them many decades into the past; this technology puts them in a market repairing vintage aircraft, antique tractors, and collector automobiles, which are not markets that are burning up the industry.

The workforce has changed over the years. Young adults are not joining companies with the intention of remaining there until retirement. Surveys show 43 percent of millennials plan to leave their current jobs within two years, and only 28 percent have plans to stay beyond five years. The current median age of aviation mechanics in the U.S. is 51, which is nine years older than the median age for the broader U.S. workforce, according to the Bureau of Labor Statistics.

With these challenges in mind, what can we do to successfully grow our aircraft maintenance workforce? All throughout the aerospace industry, teams are working in strategic ways to spur interest, create attractive messaging, and evaluating and maintaining standards that positively affect workforce development.

If we are coming up short with ideas, we can look to similar industries for inspiration from their success in addressing workforce shortages, such as a supply-chain problem. One example was from Kentucky, where the local community engaged pre-college students while offering competitive wages and sponsorships to help students graduate with the hard and soft skills for their industry - all debt free! One may hazard to guess that since the aviation industry is so large and the upcoming deficit so broad, we are overlooking ways to locally address the shortage. A local example in North Dakota is the career fairs that help children envision a future in aviation. This past May, over 800 fifth grade students from the Bismarck and Mandan area spent a day learning about 18 various aviation careers, including maintenance. In our local high schools, aviation courses are also helping teens to explore maintenance at their local airports.

Our industry needs to come up with creative ways to make aviation maintenance attractive to young adults, create stable positions with good compensation and benefits, as well as provide opportunities for career advancement and family-friendly scheduling. If we can create a workforce culture that technicians will thrive in, they will also stay. These changes would benefit not only new technicians, but our trusty long-time technicians. It starts with you!

By Nels Lund, Airport Planner
North Dakota Aeronautics Commission

Preventive Maintenance and What it Can do for Your Airport

Pavement maintenance may not be the most exciting topic to read about, but it is vital to airports. By not being proactive and finding cost-effective solutions now, it can require the use of an extensive amount of an airport's funds in the future.

Pavement distresses due to weathering, raveling, cracking, construction defects, and others can wreak havoc on your pavements if not properly maintained. For example, weathering causes loss of fine aggregate which can lead to raveling, which is loss of coarse aggregate. The loss of these larger aggregates is a Foreign Object Debris (FOD) issue, which if ingested by a jet or kicked up by a prop plane can damage aircraft or injure people and has the potential to be a great safety risk. By detecting these defects early and having a proper pavement maintenance plan, you can save yourself many headaches and thousands of dollars down the road.

Aircraft with greater loads than the pavement is designed for can also cause distresses on your pavement that can shorten the life of your pavement. The FAA requires airport pavement design to have a minimum structural life of 20 years, but to achieve this requires regular maintenance. By not maintaining your pavements regularly, you could expect to pay more for a major rehabilitation or costly reconstruct sooner than you were expecting. The Aeronautics Commission advocates for and recommends that routine maintenance is performed on an as-needed basis. In some cases, this may require an airport to perform crack sealing on an annual basis.

Preserving your pavements by crack sealing, performing seal coats, and ensuring your pavements and surrounding areas have proper drainage will greatly enhance the safety and longevity of your airfield. Ensuring proper drainage on your pavement surface and grading of grass areas surrounding the pavements will prevent surface water from getting into the base and subbase through cracks or eroding your pavement edges. Installing edge drains, or underdrains, will allow existing groundwater to drain away from your pavement's base. These distresses can cause heaving during the freeze-thaw cycle and pumping which creates voids under your pavement and eventually failure of your pavement.

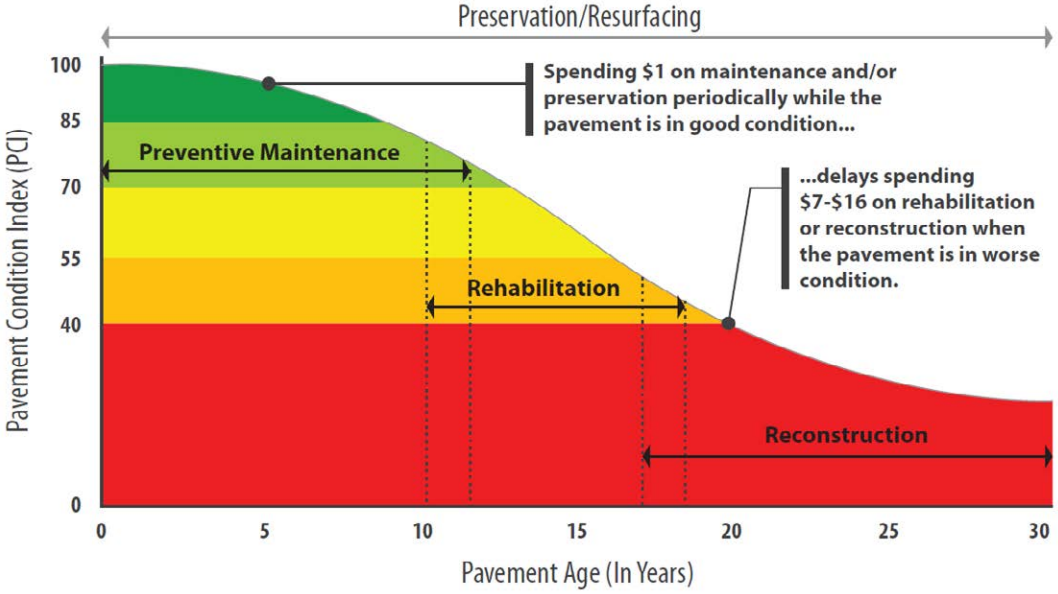
In our State's Pavement Condition Index (PCI) study, the surface of the pavement is analyzed. Each area of pavement is given a PCI score. The PCI score is taken as a snapshot in time when the inspection is conducted. If the PCI is above the critical PCI values below, then preventive maintenance is recommended. If the PCI is below the critical PCI values, then rehabilitation or reconstruction is recommended.

Critical PCI Values

- 60 for General Aviation Taxiways and Aprons
- 65 for Commercial Service Taxiways and Aprons
- 70 for General Aviation Runways
- 75 for Commercial Service Runways

Understanding what each pavement's PCI score is and what distress types are causing that score will help to determine what type of work needs to be done and the most economical method of preserving pavement. The graph below shows an example of a typical pavement deterioration curve and provides a visual representation on why it is important to spend a little for preventive maintenance now, which could delay spending much more on a costly rehabilitation or reconstruction down the road. Surface treatments such as a seal coat are also a very cost-effective way to extend the pavement life of pavements suffering from weathering or raveling.

Pavement maintenance is crucial for your airfield and staying on top of it can not only stretch your airport's dollars, but also maintain a safe and efficient airfield.



Aeronautics Commission Awards $3.5 Million for Airport Infrastructure Grants

By Kyle Wanner, Executive Director

The North Dakota Aeronautics Commission recently finalized approximately $3.5 million in infrastructure grant allocations to 165 individual projects at 66 different public-use airports throughout the state.

Additionally, the Aeronautics Commission provided aviation education grants as follows:

- **$7,930 to the Dakota Territory Air Museum** in Minot for equipment to promote Unmanned Aerial System technology programming to K-12 students.
- **$11,895 to the Missouri River Area Career and Technical Center** to help purchase aviation simulator and computer equipment to enhance rural North Dakota high school aviation programs.

The revenue source for these grants is derived primarily from state tax collections on aviation fuel and aircraft sales. A majority of these grant allocations will also match federal grants that are anticipated to be received for 2019 airport projects.

The state of North Dakota fully understands the benefits of smart and efficient infrastructure as well as the economic impact and heightened standard of living that our airports provide to their communities. These airport grant allocations will go a long way to help leverage federal funding for high priority airport projects within North Dakota while at the same time ensuring that our statewide aviation system is being maintained.

The aviation education grants will also greatly help to support K-12 aviation education and STEM programming which is critically important during a time when the aviation industry throughout the country is experiencing shortages in pilots and many other aviation-related careers. The state is excited to partner with our public airports, schools, and aviation museums to provide support and enhance opportunities for the aviation industry throughout North Dakota.

Provided on this page is a listing of each of the public airports that received a state grant, along with a description of at least one of their funded projects. A full listing of the airport grants and dollar amounts can also be found in the news section on the Aeronautics Commission website.

Congratulations to all of the communities on their grant awards!

Commercial Airport Grant Awards:

Bismarck	Runway 13/31 Reconstruction – Final Phase
Devils Lake	Pavement Maintenance
Dickinson	General Aviation Taxilane Construction
Fargo	Expand Cargo Apron
Grand Forks	Corporate Area & Apron A Rehabilitation
Jamestown	Snow Removal Equipment Upgrade
Minot	General Aviation Apron Reconstruction
Williston	Runway 11/29 Pavement Repairs

General Aviation Grant Awards:

Ashley	Design Lighting System Rehabilitation
Beach	Construct Hangar Taxilane
Beulah	Purchase Mowing Equipment
Bottineau	Design for New Terminal Building
Cando	Runway, Taxiway, & Apron Rehabilitation
Carrington	AWOS Repairs
Casselton	Pavement Maintenance
Cavalier	Design Lighting System Rehabilitation
Columbus	Beacon Light Replacement
Cooperstown	Runway Protection Zone Land Acquisition
Crosby	AWOS Repairs
Drayton	Pavement Maintenance
Edgeley	Pavement Maintenance
Ellendale	Design for Taxilane Construction
Enderlin	Pavement Maintenance
Fessenden	Tree Obstruction Removal
Fort Yates	Pavement Maintenance
Garrison	Taxilane Reconstruction
Glen Ullin	Construct Lighting System Rehabilitation
Grafton	Pavement Maintenance
Gwinner	Construct Taxilane
Harvey	Pavement Maintenance
Hazen	Design Airside Pavement Rehabilitation
Hettinger	Taxiway Rehabilitation
Killdeer	Terminal Building Design
Kindred	Airfield Drainage Improvements
Kulm	Turf Runway Maintenance
Lakota	Pavement Maintenance
Langdon	AWOS Repairs
Leeds	Pavement Maintenance
Linton	Construct Lighting System Rehabilitation
Lisbon	Pavement Maintenance
Mandan	Reconstruct Taxiways
Mayville	Purchase Mowing Equipment
Milnor	Relocate Access Road
Minto	Drainage Improvements
Mohall	Design Runway Extension
Mott	Pavement Maintenance
New Rockford	Design for Pavement Rehabilitation
New Town	Pavement Maintenance
Oakes	Apron Drainage Improvements
Page	Pavement Maintenance
Park River	Access Road Construction
Parshall	Airport Layout/Master Plan Update
Pembina	Snow Removal Equipment Repairs
Rolla	Pavement Maintenance
Rugby	Pavement Maintenance
Stanley	Purchase Snow Removal Equipment
St. Thomas	Pavement Maintenance
Tioga	Design Taxiway Rehabilitation
Valley City	Replace PAPI and Beacon
Wahpeton	Taxilane Reconstruction
Walhalla	Pavement Maintenance
Washburn	Design for Fuel System Construction
Watford City	Pavement Maintenance
West Fargo	Airport Layout/Master Plan Update
Westhope	Pavement Maintenance
Wishek	Pavement Maintenance

No Habla Español

By Ron Lundquist, Pilot, FedEx

Flying in Mexico, or anywhere international, is no big mystery. It just takes a little pre-trip study. Procedures and airport signage are mostly the same as in the U.S., and controllers speak English, though not always very well. Differences include: many non-radar areas, transition altitudes and levels, and respective customs procedures from city to city.

A recent trip to Toluca, Mexico was a lot of fun and slightly challenging at the same time. I considered myself lucky as my first officer had flown down there several times and briefed me on what we should expect. Toluca lies 40 miles west of Mexico City, and its population is around 820,000. Including the surrounding area, it's close to two million. Add Mexico City, which is around nine million, and you have some of the most populated real estate on the planet.

Founded around the 13th century by indigenous people, the Spanish established a more modern city in the 16th century after defeating the Aztecs and the Matlazincas. Since 1830, it has been the capital of the state of Mexico. The name Toluca originates from the name Tollocan, which is from the name of the god Tolo. The name Tollocan means "place of Tolo or God." It really is a beautiful area, but poverty is prevalent and crime is high. Air crews are warned not to stray too far from the hotel.

Toluca's climate is cool and dry in the winter with wet, humid summers. Thunderstorms grow quite tall and can make it interesting trying to land. Average high temperatures throughout the year are the mid-60's to mid-70's, and average lows are anywhere from the mid-30's to the mid-40's. The airport's elevation is 8466 feet. Even aircraft with excess performance need to consider density altitude when flying in and out of Toluca.

Controllers in many foreign countries, especially Latin and South American, relate differently to pilots than they do in the U.S. Here in the states, if you ask for 30 degrees right to avoid weather and there's a mountain you'll run into, the controller will no doubt say something like "You may want to go the other way around that cell" or simply "Negative, there's a mountain there you're going to hit". In Latin or South America, the controller might say, "Roger, turn 30 right for weather". They figure you know where you are at and what you want to do. Being self-reliant and aware when flying down there is a must, along with being assertive.

The flight started in Memphis on a pleasant Sunday afternoon. Our 767-300 was loaded before we got to the airplane, and the weather looked great all the way to Toluca with just a few pop up thunderstorms along the way. Licenciado Adolfo López Mateos International Airport, the Toluca airport, was mostly clear and favoring runway 15 which we land on almost every time, my first officer said. We departed Memphis and made our way southwest, over Jonesboro, Shreveport, and Corpus Christi. Crossing the border at McAllen, some thunderstorms started to crop up along the route. We took up a heading for Queretaro, Mexico but had to deviate to the west to get around them staying on the upwind side.

Finally nearing our destination, we started our descent. We checked in with Toluca approach control and they said to expect VOR approach to runway 33. Since we had briefed and loaded the ILS to 15 into the FMS, I, as pilot monitoring, changed it to 33. We briefed that and were cleared to the initial approach fix. Just then, approach control changed their mind and said to expect ILS 15 and turn left to join the localizer. Ok! We changed the box, edited minimums, and slowed down. We were close to the airport and well above the glide slope. I told the first officer be prepared to go around or discontinue the approach as I wasn't sure we could be stable by 1000 feet AGL, which is our procedure.

We continued and approach control changed the plan again. We were told to break off the approach and switch back to VOR 33, climb and maintain 15,000, and were cleared direct to the IAF. Approach control said they had a VIP flight coming in from the south and they wanted to land 33. Swapped everything again to runway 33 and pressed on. The rest of the

approach was uneventful. The higher ground speed, due to the high density altitude, was really noticeable at touchdown. Not wanting to excessively heat up the carbon fiber brakes, we used over two thirds of the 13,780 foot runway.

Our stay in Toluca was over way too soon and we were ready to leave a day later. Customs paperwork was completed, cargo loaded, and runway 15 departure briefed. We called for taxi clearance and you guessed it, runway 33! I slowed down the taxi to give my first officer time to change the FMS, calculate new performance, and brief the departure. The new SID had us proceeding eight miles north of the airport then turning back to overfly the field before continuing on the departure. We were required to stay within 11 miles of the airport when doing this turn, as there is very high terrain to the northwest. The high density altitude made our turn radius a lot bigger than we'd expect at sea level.

I pushed up the General Electric CF6-80C2B6F engines and it was pretty underwhelming. Normally with 60,200 pounds of thrust each they are pretty snappy, but it was that density altitude again. We rolled down the runway seemingly forever, rotated slowly, and established our climb. We hit the eight mile fix and started the turn back. Our traffic collision and avoidance system (TCAS) went off and we observed a target at the same altitude heading straight for us. The departure controller called out the traffic but said he was not talking to him. Just then, the TCAS gave a resolution advisory (RA) telling us to "Climb, climb now" and we increased our rate of climb. We acquired the traffic visually and they passed off our left, slightly below us. We notified ATC that we had had an RA and were resuming the departure.

"If you do get a chance to fly in Mexico, I would recommend it..."

They cleared us direct to the APN VOR and told us to contact Mexico Center. They acknowledged our check-in and cleared us all the way to our cruise altitude of Flight Level 370. We passed over Mexico City, Tampico, and finally over Brownsville as we crossed back into the United States.

It was a fun trip overall. There were a few curve balls, but we joke that the only thing constant in our business is change. The density altitude thing is something we don't experience everyday. English not being the controllers first language is a real challenge. They address Mexican pilots in Spanish and us in English, and that doesn't do a whole lot for situational awareness! If you do get a chance to fly in Mexico, I would recommend it. Do your homework though, study before you go, and it really helps to have someone with that's been there before.

Hettinger's Airport Takes Off

By Mason Defoe | Reprinted with permission from Adams County Record

Almost one hundred years ago, Hettinger's airport was a place only a few people would be at on a regular basis. However, this started to change shortly after 1930. William Odu was a big help in getting the Hettinger airport built up to what it is now. With a passion for aviation, Odu was continually trying to make upgrades to the airport. At the beginning of its time, Hettinger's airport just had a single grass runway and just one hangar.

However, this would soon change when Nick Mamer, a well known and established pilot of his time, needed a place to stop for fuel along his flight from St. Paul, Minnesota to Spokane, Washington for the night. The next morning, he would continue the trip to Seattle, Washington. Hettinger's airport soon became a regular fuel stop for Mamer on a regular basis. Mamer would eventually go on to create the large airline company known as Northwest Airlines.

During World War II, traffic in the sky started to slow down so not as many people needed to get from one place to another. As a result, Cecil Melby bought the only hangar on the property. While he owned this hanger during the war, the building served as a night club which was operated by the American Legion. Eventually, Jay B. Lindquist bought the hangar from Melby and owned it until the early 1970s when the Federal Aviation Administration came to him with a proposal to make the facility public.

Since 2000, the airport has done a number of updates. The Adams County Airport Authority has received $460,000 in state grants and $4,500,000 in federal grants to upgrade the airport in many different ways. Just a few years ago in 2016, the airport received a new runway. The original asphalt runway was laid in the early 1970s and was rebuilt a few years later in 1978. Roughly twenty years ago was the last time the runway was re-done before 2016.

From one hangar to fourteen hangars now, the airport has been critical to Hettinger since it was initially built.

Equipping with ADS-B Out/In

Considerations for ADS-B compliance in North Dakota

Part 2 (You can find part 1 in the Winter 2019 issue page 10)

By Zach Peterson, Private Pilot, Aviation Enthusiast, and Aviation Sales Manager at Appareo

PIREP:

I couldn't think of a better way to celebrate the 4th of July holiday than a day-trip from JKJ to ELO. It was a dream day, with smooth air and the sun shimmering off the lakes as I danced between little bunches of fair-weather clouds. The forecast was virtually flawless, and the only consideration was the 20 plus knot headwind on my return flight.

Life was grand until I reached Ely Municipal.

There were no indications from the Prog Charts of adverse weather, but when I got back into the air a bank of convective cells was forming a NE/SW wall. The holes between the cumulus clouds were too small to punch through and I couldn't escape some of the worst turbulence I've flown in. I was forced off my intended course and started flying airport to airport to keep my options open. As I struggled to maintain a +/- 500 foot altitude at maneuvering speed with the rollercoaster of up and down drafts, there was another aircraft at altitude and on an intercept course. Spotting traffic that is five miles out during the day is hard enough, but certainly exacerbated by continuously changing light conditions and turbulence.

This might sound like poor decision-making and a chain of events that could lead to an incident, but while I was being beaten around like the 182 was attached to the end of a baby's rattle, I was within all operating parameters, in contact with MSP Center, had the latest available weather on screen, and was aware of other traffic in the area.

Center indicated no radio contact with the rapidly closing target. I didn't want to descend because of the increased chop, trying to get ahead of my unknown friend was unwise, I couldn't turn north, and a 180 would have been undesirable with the little convective cells that seemed to spawn from my wake. I informed MSP Center I was equipped with ADS-B In and making an immediate turn from 250 to 170, to avoid the traffic. We came within less than two miles of each other.

Twenty minutes after getting back on course and picking my way through the clouds over GPZ, a convective cell overtook the area. I watched this both on my iPad and outside, before entering the pattern at Longville Municipal and landing to refuel. The target that appeared to be on a long final was far enough out that I didn't question being off the runway before he had even setup for landing, and I waved to the pilot in the amphibious Caravan as I topped off the tanks and prepared to get back in the sky.

Descent:

What was going to be a casual day of sightseeing turned out to be quite the little adventure. I was not flying within future ADS-B Rule airspace, yet being equipped let me see the big picture around the weather, maintain contact with ATC at a low altitude, and expeditiously choose the best course of action for self-separation when traffic at altitude was approaching. To the other pilot's credit, it was the fact that they were ADS-B Out equipped that made both MSP Center and me aware that (s)he was there.

Additionally, ADS-B Out makes you a target for other aircraft to avoid and gives ATC a more accurate picture of your location at lower altitudes (useful in more situations than just "water or trees"). ADS-B In weather products can provide you with additional information to help make a decision about diverting ahead of arriving at your intended destination and traffic pictures are also useful on the ground during times of reduced visibility.

Entering the pattern:

Practical considerations for equipping extend beyond your personal choices and where you currently fly. While I cannot say for certain that you will pay more to equip with ADS-B Out the longer you wait, it is a very reasonable assumption. If you plan to sell your aircraft it is important to anticipate that it may *not* be worth more with ADS-B Out, but could be worth *less* if you are not equipped since the next owner will be forced to incur the expense if they plan to fly in Rule Airspace, and likely at a higher cost than what you would spend now.

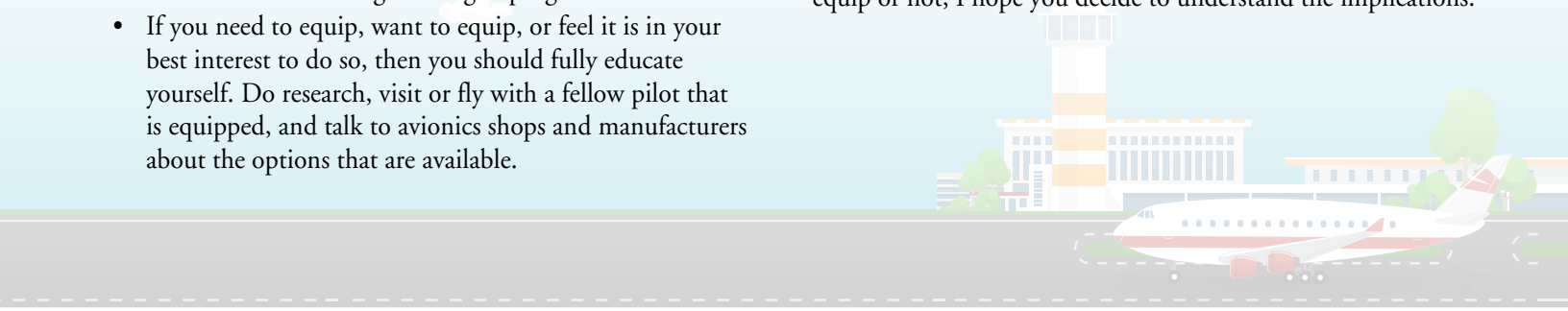
Tie-down:

All of our choices are motivated uniquely, and trying to decide on how to proceed can be a challenge. To assist your decision-making process, the following steps may be helpful:

- Understand if you need to equip given the airspace you plan to fly in.

  www.faa.gov/nextgen/programs/adsb/
- If you need to equip, want to equip, or feel it is in your best interest to do so, then you should fully educate yourself. Do research, visit or fly with a fellow pilot that is equipped, and talk to avionics shops and manufacturers about the options that are available.
- Schedule your installation with an avionics shop or A&P IA that can provide service after the sale, and look past the "cheapest option." Instead, search for the best value:
  1. *Save cash out of pocket by equipping during other related work like a transponder certification.*
  2. *Invest in hardware and not labor by fully understanding the differences between 978 and 1090.*
  3. *Avoid pairing legacy transponders with digital ADS-B Out hardware to mitigate the possibility of system failure and unplanned future costs.*
  4. *Consider updating to a digital encoder and an ADS-B transponder antenna during the installation.*
  5. *Reuse what's practical, but don't take shortcuts. Run new wires and cable as needed.*

Above all else, inform yourself and ensure that what you know is based on fact and not opinions. This article was written as a launchpad, and regardless of whether you choose to equip or not, I hope you decide to understand the implications.



Mustang arriving with Cold Ale (Photo Courtesy Marshall Hill)

D-Day Plus 75 at Dakota Territory Air Museum

The Normandy landings were the allied invasion of Normandy on Tuesday June 6, 1944 known as Operation Overlord during World War II. Also known as D-day it was the largest seaborne invasion in history. More than 150,000 allied troops landed along a 50 mile stretch of heavily-fortified French coastline, to fight Nazi Germany on the beaches of Normandy, France. More than 5000 ships and 11,000 aircraft supported the D-Day invasion.

D-Day plus 75 Anniversary was celebrated at the Dakota Territory Air Museum on June 6, 2019, with 700-plus in attendance.

The event was a brainchild of Warren Pietsch and put together by our events coordinator, Robin Brekhus. The program included four area WWII veterans and presentations by the two commanders from Minot Air Force Base. Col. Cochrane told the story about painting invasion stripes on thousands of aircraft prior to the D-Day invasion. Knowing the magnitude of the invasion would overwhelm the Allied Forces' capacity to identify friend or foe, the plan to paint a specific black and white scheme was kept secret

until hours before the scheduled invasion. In order accomplish the mission, the troops came up with all manners of applying the paint.

While Col. Cochrane was telling the story, several airmen from the base and some civilians were painting invasion stripes on the museum's C-53 with mops and brushes as they did in 1944. Since Canadian forces were a part of D-Day, it was appropriate that Robert Pengelly, Consul from the Consulate General of Canada office in Minneapolis, as one of our guest speakers. The North Dakota Military Vehicle Collectors Assoc. was in attendance with numerous jeeps and other era military vehicles.

Another event that was very popular was the delivery of Ale by the Mustang "Little Horse." After the D-Day invasion and the forces had pushed inland several miles, the British came up with the idea of delivering Ale with the Spitfires to the troops on the battlefield, nicknamed Beer Barrel Bombers.

In order to reenact the Ale from Above activity, we joined forces with the local A Typical Brewery who provided the two kegs of Ale which were eventually attached to the hard points on the Mustang "Little Horse." Also involved with the project was the veteran's organization, Foundation for Exceptional Warriors (FEW) with whom the museum shared the net profits. An Ale From Above club, was organized and memberships were sold to supporters in the area. For $200, the donor an Ale From Above t-shirt and custom designed mug and got to drink from the kegs after the flight. Those donating $500 also got a specially designed leather Bomber jacket.

WWII Vets L-to-R: Lynn Aas, John Sinn, John Benter, Ed Zilli (Photo Courtesy Eloise Ogden)

Presenting the Flags (Photo Courtesy Marshall Hill)

After the program and the painting of the invasion stripes, the five WWII veterans and several other local veterans were transported in WWII jeeps to the C-53 for their flight which was accompanied by the Mustang with the kegs attached and the museums British Spitfire. They both flew formation with the C-53 while it made a couple of passes over the museum. When they landed, the kegs attached to the Mustang were cracked and a few drinks of Ale were enjoyed by the Ale from Above members. The museum netted $4,200 from the Ale from above event which it shared with the veterans group.

Painting invasion stripes on the C-53 (Photo Courtesy Marshall Hill)

Do you have an interesting aviation story, event or photos to share?

Do you have airport events, aviation awards, or aviator adventures to share? We would like to hear them! Submit your ideas or stories for consideration to ndaviationcouncil@gmail.com.

Thank you...

Maurice Cook, thank you for your 20 years of service!

Maurice has recently stepped down as a member of the North Dakota Aeronautics Commission, which is a position that he has held since 1999.

Over that time, Maurice has been instrumental in guiding the state agency through regulatory and administrative updates.

His service to the state of North Dakota is appreciated!

Welcome...

The North Dakota Aeronautics Commission welcomes a new commissioner, Kyle Hummann.

Kyle resides in Mandan and is the chief pilot for Missouri Valley Aviation Management, responsible for daily operations of two corporate jets, flying both domestic and international flights.

He has been flying for over 30 years with experience as a flight instructor, a line pilot, and Director of Operations for a local fixed base operator. Kyle has also served as the Director of Flight Operations for the State of North Dakota.

He and his wife, Kimberly, are working to pass a passion for aviation and farming on to their two young boys.

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Aircraft Pictured:

1981 Cessna 182RG

GARMIN Upgrades

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- G500 with GAD43e
- GTX330ES ADS-B
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North Dakota Aviation Quarterly
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CALENDAR of EVENTS

Check out the online calendar for details on these events: www.aero.nd.gov/events

August 2019

Tioga Drone Camp — Aug 10 to Aug 12 D60 Tioga, ND

Kindred Fly-In — Aug 10 K74 Kindred, ND

Fargo Air Museum - Youth Camp — Aug 10 KFAR Photography

B-29 FIFI in Bismarck — Aug 12 to Aug 19 KBIS Bismarck, ND

Kulm Windfest August 16-17

Kulm 10th Anniversary Fly-In Breakfast — Aug 17 D03

DTAM 23rd Annual Sweepstakes Drawing — Aug 17 KMOT Dakota Territory Air Museum

CAF Air Power History Tour — Aug 21 to Aug 25 KFAR Fargo Air Museum

Milnor Fly-In BBQ — Aug 25 4R6 Milnor, ND

September 2019

International Peace Gardens Fly-In — Sep 2 S28

Cessna 195 convention — Sep 4 to Sep 8 KBIS Bismarck, ND

Beulah Fly-In — Sep 07 95D Beulah, ND

Valley City Fly-In Supper — Sep 7 KBAC Valley City, ND

Hettinger Fly-In Breakfast — Sep 14 KHEI Hettinger, ND

Fargo Air Museum - Celebrity Dinner and Auction — Sep 14 KFAR Fargo Air Museum

DTAM Women, Wings and Wine — Sep 19 KMOT Dakota Territory Air Museum

Fargo Air Museum - Youth Camp — Sep 21 KFAR Engineering

Enderlin Sun-Fest Weekend Fly-In — Sep 22 5N4 Enderlin, ND

October 2019

Props and Hops — Oct 3 Y19 Mandan, ND

Fargo Air Museum - Youth Camp — Oct 12 KFAR October Sky/Rocket Party Propulsion

Night At the Museum Hangar Dance — Oct 19 KMOT Dakota Territory Air Museum

Fly Girls Presentation — Oct 19 KFAR Fargo Air Museum

One Book, One Community - Fly Girls — Oct 28 Fargo Air Museum Author Keith O'Brian will be at the Fargo Air Museum. Author of *Fly Girls - How Five Daring Women Defied All Odds And Made Aviation History*

November 2019

Fargo Air Museum - Youth Camp — Nov 9 to Nov 30 KFAR Aviation

***SAVE THE DATE!* UMAS 2020 March 1-3 • Grand Hotel, Minot, ND**

Please send your event dates to ndaero@nd.gov.