TERMA

LOCKHEED MARTIN

DTU Technical University of Denmark

Lockheed Martin Internship Report
Quality Technologies

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Contents

Preface

Interning at Lockheed Martin Aeronautics in Fort Worth, Texas has been a unique and challenging experience, both personally and professionally. Working with the production of a 5th generation stealth fighter, is an experience not many people without American citizenship get to experience. From the first day, the internship has kept me engaged and learning every day, with new experiences and extraordinary experiences being plentiful.

This internship would not have been possible without the commitment from Lockheed Martin, Terma and the Technical University of Denmark and the continuous effort to create close relations, even while on opposite ends of the world.

I would like to thank all of the incredible people I have met throughout the internship. Engineers, mechanics, operators, managers and business developers. The employees of Lockheed Martin, all contribute with their unique abilities and enthusiasm to create a world class product and work place.

A special thanks goes to the following people:

- Nils Tousdal – Thank you for your consistent engagement in the internship program and making sure Terma A/S kept engaged in the project, despite of changing coordinators and COVID-19. Without you, the internship wouldn't have come to fruition.

- Louise Daa Loufquist – Thank you for organizing and structuring the internship in a short amount of time. It has been incredible to see you develop contacts in unexpected places and manage stakeholders outside of your organization, to make sure the program succeeded.

- Bradley and Travis – Thank you for arranging all of our accommodation and helping us through the process of acquiring vehicles, creating local phone numbers and keeping us engaged in everything that goes on in Fort Worth. Throughout the whole trip, you have been like a foster family to us.

- Alexander Tramm – Thank you for your cheerful disposition, coordinating new and engaging tasks, sparring about work and IT incidents and generally being a wonderful coworker to be around. You made me feel like a part of the time and felt like the mascot of Quality Technologies.

- Sam Bartholomew – Thank you for enabling the intern team in our work and pushing the boundaries of what we were able to do. While not available to us on a daily basis, I always knew you were there to resolve any issue.

- Donald Weaver – Thank you for welcoming us in Fort Worth and making sure we always had someone to contact in an hour of need.

History of Lockheed Martin

In 1926 Lockheed Aircraft Company was founded by Allan Loughead and John Northrop. The name was phonetically spelled, to avoid misconceptions. One of their first successful aircrafts were the Vega model, which had a production volume of 128 units[1]. In 1929 Allan Loughead resigned and the company was carried forth by the remaining owners[2]. This lead the path for Lockheed Martin to become a conglomerate of differing partners and owners. Before the Second World War, Lockheed Martin was most known for their dual engine aircrafts e.g. Model 10 Electra (Made famous by Amelia Earhart) and model 14 super Electra[2].

During the early stages of World War II, Lockheed Martin responded to a request for design sent by the American Air Force. The design would materialize to become the P-38 Lightning interceptor, which would become one of the most successful aircrafts of the Second World War. Continuing on the success of the P-38[2], Lockheed Martin created the Advanced Development Division, more commonly known under the name of Skunk works. Skunk works proceeded to develop the P-80/F-80, U-2, SR-71 and F-117[3].

Air Force Plant 4

During the Second World War, foreign nations showed an increase interest in procuring American military equipment. Among the most sought after equipment, was the B-24 Liberator airplane. The B-24 Liberator was designed by Consolidated Aircraft Inc., but the aircraft manufacturer couldn't keep up with demand. The American government decided to react, by creating the Liberator Production Pool Program. The agreement allowed for the US government to create a new facility for aircraft manufacturing, whilst Consolidated Aircraft would manage the facility at an advantageous fee. In 1942 production began and around 3000 B-24 airplanes were either manufactured, assembled or modified in the facilities during the war. Towards the end of the Second World War, the army decided the B-32 dominator would me of higher value and ordered Consolidated Aircraft to change priorities[4].

Figure 1, B-24 Liberator as shown at the Great Texan airshown at San Antonio.

[1] https://www.sps-aviation.com/story/?id=2440&h=Allan-Lockheed-1889-1969
[2] https://www.lockheedmartin.com/content/dam/lockheed-martin/eo/documents/ebook/Innovation-with-Purpose.pdf
[3] https://en.wikipedia.org/wiki/Skunk_Works
[4] https://en.wikipedia.org/wiki/United_States_Air_Force_Plant_4

Air Force Plant 4 has changed ownership throughout the years through a series of Acquisitions. Most notable is the acquisition by General Dynamics in 1953. General Dynamics had different planes produced at the facilities, with the most widely known being the F-16 Fighting Falcon[5]. Production of the F-16 began in 1975 and the first fully functional airplane was delivered in 1979[6]. Lockheed Martin acquired General Dynamics in 1993 and took over production of the F-16. The F-16 had an expected order volume of up to 1400 units[6] from the United States Air Force, but by the time the F-16 production shut down in Air Force Plant 4, more than 4600[6] units had been produced. While the F-16 was not the first fighter Lockheed Martin were manufacturing, it was the first fighter jet in serial production and was an advancement in capabilities for the Lockheed Martin Corporation.

F-117 and F-22

After the Vietnam wars, it was concluded that Soviet surface to air missiles (SAMs) were responsible for many losses of both bombers and fighters[7]. As a response, the development of low-observable aircrafts were contracted to several Aircraft manufacturers. Not much is known about this era, since the projects were classified as 'Black Projects' leaving few at Pentagon to even know about the projects[8]. Lockheed Martin was granted a contract in 1975 to develop two prototypes based on the Hopeless diamond investigation[9], issued by DARPA. While Lockheed Martin had been immensely successful with the C-130 Hercules, C-5 Galaxy and U-2 aircraft, none of them were categorized as fighter jets. Many of the parts were sourced from previous airplanes to keep development costs and lead times to a minimum[10].

Figure 2, F-22 shown at the Great Texas Air show at San Antonio air base.

The development of the F-117 was primarily done by the Skunk works facility based in Palmdale, California and by 1977 a technology demonstrator was flown[11]. In 1983, Lockheed Martin presented the F-117, which

[5] https://en.wikipedia.org/wiki/United_States_Air_Force_Plant_4
[6] https://en.wikipedia.org/wiki/General_Dynamics_F-16_Fighting_Falcon#Commencement_of_production
[7] https://www.darpa.mil/about-us/timeline/have-blue
[8] https://web.archive.org/web/20080306182056/http://www.airpower.maxwell.af.mil/airchronicles/apj/apj91/fal91/cunn.htm
[9] http://www.f117reunion.org/f117_history.htm
[10] Goodall, James C. (1992). "The Lockheed F-117A Stealth Fighter". America's Stealth Fighters and Bombers: B-2, F-117, YF-22 and YF-23. St. Paul, MN: Motorbooks International. ISBN 978-0-87938-609-2.
[11] https://en.wikipedia.org/wiki/Lockheed_F-117_Nighthawk#CITEREFEden2004

represented the emergence of stealth technology. While the plane had state-of-the-art technology, it wasn't a success in terms of production numbers and only 64 airplanes were ever made[11]. This technology demonstrator however gave rise to both the B-2 and F-22 in a new generation of airplanes.
The F-22 was conceptualized in 1981, but unlike the F-117 it was a concept to replace the F-15 and F-16 aircrafts. It was heavily influenced by the development of the F-117, but with the largest difference being advancements in computer-aided-modelling, which allowed for more refined shapes and curvatures. The F-22 would focus on weight and maneuverability to achieve air superiority, leading to the use of composites and exotic materials[12]. In 1991 Lockheed Martin won the bid for production of the first 5th generation fighter jet. This required Lockheed Martin to expand their facilities, which they did by acquiring General Dynamics and Air Force Plant 4. Until 2011, both the F-16 and F-22 were being produced at AFP4, with the F-22 building the capabilities required for manufacturing composite structures and stealth technology, which was later inherited by the F-35 aircraft[12].

The F-35 Lightning II

While the F-22 was a magnificent air superiority fighter jet still leading the class today, it was expensive and too advanced for any other nation to own. The cost and capacity of the airplane restricted it from being used by any other branch of military, but the United States Air Force.

DARPA had a large inventory of development programs, which were consolidated in 1994 under the name of Joint Advanced Strike Technology (JAST), which later got renamed to Joint Strike Fighter[13]. Boeing and Lockheed Martin were selected in 1997 to participate in the Concept Demonstrator Program, which required them to deliver two aircraft each. One STOVL and one CTOL aircraft. In the year 2000 the first prototype from Lockheed Martin flew under the X-35A designation[14]. In 2001 Lockheed Martin was declared the winner of the CDP and got awarded a system development and demonstration contract.

In 2006 the first F-35 – Serial AA-1, rolled out from Air Force Plant 4. While the airplane was functional, it was not combat ready. The F-35 procurement has followed a 'Continuous Capability Development and Delivery program' which have given the capability for early delivery and testing in an agile environment. This was unheard of for a military service aircraft and is still critiqued by analysts. In 2015 the F-35 entered service for both the United States Navy and Air Force[15]. While the aircraft is still not categorized as fully mission capable in 2022, it is largely due to missing integration with the Joint Simulation Environment, according to statements made by Lt. Gen. Eric T. Fick[16].

[12] https://en.wikipedia.org/wiki/Lockheed_Martin_F-22_Raptor#Origins
[13] https://www.globalsecurity.org/military/systems/aircraft/jast.htm
[14] https://news.lockheedmartin.com/2000-11-06-Air-Force-Flies-Lockheed-Martin-X-35A-JSF-Envelope-Expansion-Continues-on-Fifth-Flight
[15] https://en.wikipedia.org/wiki/Lockheed_Martin_F-22_Raptor#Production_and_procurement
[16] https://www.defense.gov/News/Transcripts/Transcript/Article/2002731/department-of-defense-press-briefing-by-under-secretary-of-defense-for-acquisit/

Preparation for interning at Lockheed Martin

Before the internship at Lockheed Martin could begin, it was important to be prepared and have a series of prerequisites done. The two major obstacles to overcome, was the issuance of a Visa, which required training plans, exchange policies, letters of recommendation and local sponsors. The Visa process was initiated in December 2020 and still only got approved under a month before departure. The second prerequisite to overcome was the security clearance. This is a formal process of which little information is disclosed. One should be aware that the process will not end with a confirmation email to neither employer nor employee. The process is ongoing and any employer will be notified if your security clearance is revoked.

Working in a world-class facility

As stated in the previously, Air Force Plant 4 has a long and proud history of producing the spearhead of the United States Armed Forces and continue to do so, with the next generation of airplanes and cutting edge technology being deployed from Air Force Plant 4. As such, there are a series of formal and informal requirements to attendees at the facility. Any individual is expected to carry a valid security badge, follow directions, not trespass and both conduct and dress in a professional manner. It is to be noted, that the facility seems big and open, but every move that is being done can be traced to an individual.
Anecdotally, there is a myth circling the plant among operators from the F-16 production era. After delivery of an F-16, a pilot discovered a piece of chicken bone flying around the cockpit while doing maneuvers. After investigations, it was found to have been a mechanic from the production floor who was responsible for the incident. He had enjoyed his lunch break in the cockpit of said F-16 and when the other mechanics returned he didn't have time to properly clean his remnants.

Training Classes

Various classes were offered to us during the internship. The following is a short description of the classes I was able to participate in.

CATIA Introduction

CATIA is the industry standard, when it comes to CAD modelling and simulations in the aerospace industry. During the first weeks of the internship, we were given a thorough self-study course in the use of CATIA and how it relates to the F-35 program. Much of the functionality and design/assembly methodology is similar to other CAD suites, but since every function could vary slightly and the user interface is not intuitive to use, it was good to have a guide.

Foreign Object Debris – FOD, Certification

Throughout the aerospace industry, it is common to have a special focus on cleanliness and orderly conduct of workspaces. This is not only to keep a good appearance to the public, but to avoid damage and possible termination of airplanes and their pilots.
Foreign objects are critical in and around all airplanes, due to the potential damage that debris can make in either motors through the air intake or fuel systems. However, debris can also travel through open spaces and get enough momentum to damage either the aircraft or the pilot. The force of a foreign object is not

only defined by the gravity constant, but often much higher during maneuvers. The F-35 is rated for 9G[17] of acceleration. With some simple calculus, it can be derived that a 415 gram wrench under 9G would excert the same force as a gallon of milk at 1G.

Therefore detection and removal of FOD is essential in every step of the production of the F-35 and all employees have a shared responsibility to find and remove any such debris. The course set forth procedures for how to handle tools, consumables and appropriate containers for use in production and at time of inspection.

Geometric dimensioning and tolerances

Mechanical and industrial engineering is dependent on mating and aligning parts. The ordinary way of handling dimensioning and tolerances are through a dimension, with an allowed deviation.
In the evolution of more advanced products, it has been discovered to be insufficient and often creating too strict tolerances – especially around holes. The next generation of dimensioning and tolerances are based on geometric constraints, such as surfaces and alignments of shapes. These tolerances and dimensions can seem foreign and counter-intuitive at first, but with the appropriate training become an invaluable tool for mating parts. The F-35 uses the geometric dimensioning and tolerances standard in accordance with ASME Y14.5 and therefore training was supplied.

Camera operator training

While in the Lockheed Martin facilities, many technologies, processes and products are in plain view. Often small details improve the performance of the F-35 and many of these accumulate to make a class-leading aircraft. A human being is often not sufficiently adequate to identify and remember these details and therefore not a huge threat to the security of the F-35 program. Cameras are however a threat towards the security of the F-35 program and therefore all usage of cameras are forbidden inside of the facility, unless an operator has been certified to use cameras.

As part of the internship, Computer vision and machine learning was included in the execution of projects. Computer vision is based on the usage of live camera feeds and therefore certification was needed. After a self-learning session and a briefing, the camera operator certification was issued.

[17] https://www.af.mil/About-Us/Fact-Sheets/Display/Article/478441/f-35a-lightning-ii/

Tasks and everyday work life

The internship has been a dual experience. Engineering on implementation of advanced solutions have been a valuable experience, with users and customers that appreciates and understand the value of the technology stacks and push forward for the next leap in technology. Often the technologies delivered are just behind the bleeding edge of technology, due to restrictions and review processes, but still surpass expectations and improve the quality of a world class product. While the engineering has been fun and challenging, the most valuable part of the internship have been to experience the processes and organization that make up a defense contractor and its interaction with the surrounding world. Listening to Greg Ulmer in Congress defend and explain how the F-35 program is evolving is one thing, but to actually feel his strategic decisions and vision all the way down to the production floor and in our everyday work is different and bolsters the image of Lockheed Martin as a strong and well managed enterprise. While we can see the direction of the organization, Lockheed Martin leadership also shows their recognition of their individual teams and their contributions. It was noticed, that a vice president included recognition of the international student internship and the solutions delivered by these programs.

Observations:

The internship started with a slow pace. The Quality Technology team utilized engineering hours on classified projects with short deadlines and the team had to investigate our skills and where they saw most potential in our work. The initial month was almost exclusively used for training, configuration of digital assets and discussing preliminary project ideas. Digital assets are considered one of the biggest tools, but also threats to the security of the F-35 program. This means that any software, however small or big needs approval. These approvals are concatenated into a pool of software available to a certain group of employees. These pools are extensively maintained by employees submitting requests and IT personnel scrubbing request for potentially malicious software.

Engineering interns are not encompassed as part of the main engineering pool. This is due to most exchange interns not being citizens of the United States of America. This formality, restricts us from access to the full Lockheed Martin Internal (LMI) group and instead we are categorized as Foreign Suppliers, registered under Terma A/S. Previously this group also encompassed big groups of engineers. Recently engineers from the foreign suppliers group were moved to the LMI group. This has removed a large group of software and security maintainers and left the Foreign Supplier group dwindling and becoming ill maintained. Furthermore the exchange program has been dormant due to COVID travel restrictions. These factors has resulted in less maintenance of the system. This left a large burden to be lifted, in updating, requesting and handling software and security updates with a group of IT-personnel which often hadn't heard of the foreign supplier group.

Several times our immediate manager, Sam Bartholomew, expressed displeasure with the situation. Throughout the process he showed support and let us know, that if we ever experienced considerable setbacks, he would be ready to step in and push for action. Sam put action to his words and escalated problems and had them resolved in an expedited timeframe to ensure the engineering team worked to the fullest capacity.
Every engineer and manager throughout the program, has shown nothing but full support and appreciation for our work and presence. On days where the IT-management team seemed to work against us, our

engineering colleagues shared stories of their experiences with the IT-management system and gave their consolation by describing it as a general issue that any defense contractor experiences to ensure the security of information.

Inspections and subjectivity

As part of the initial scoping for projects, Alexander Tramm was quick to see an untapped resource in the engineering team. As Alex had previously been working with Danish engineering interns, he was aware of the capabilities and limits.

The interns were introduced to a section of engineering that is most often overlooked. Visual inspection of filling material. Whether these materials be organic or inorganic, defects are sure to arise when a material is applied in a liquid state and left to harden. Manual labor and material deviances leads to these processes resulting in inconsistent results and requires visual inspection for evaluation. Visual inspections have long been a qualitative measure, not easily quantified with measuring tools, but rather with descriptions of defects to look out for. Previously these descriptions have been transferred from engineers to training personnel and further to inspectors and operators whom look for defects. Relaying information about visual details can be hard and neither vision, nor personnel is consistent in assessing defects. The human mind is prone to select the path of least strain to the individual. In the case of visual inspection, it gives more lenient inspection results which can affect Lockheed Martin, by increased cost from DCMA.

Computer vision and real time unbiased opinions

Lockheed Martin has recognized this challenge and meanwhile identified the amount of resources it takes to train a reliant inspector. To reduce the strain on the most qualified inspectors, it has been chosen to pursue new technologies to assist upcoming inspectors by giving them a tool to use in their daily work. With the technological leaps being made by computer vision researchers, it is now possible to quantify defects from video inspections by looking for undesired features. These types of problems are best known as computer vision classification problems. By using a computer algorithmic approach, the problem of inspector subjectivity is reduced.

By using state of the art neural network architectures, it is possible to even categorize very minute defects, while using untrained personnel. It is however important to note that these technologies are not better than the data they are being fed with. These technologies are often expected to be a replacement for an expert witness. This couldn’t be further from the truth and require a high amount of work from designers and engineers to translate requirements to scenarios for the neural network to learn from. These concepts are also referred to as Artificial intelligence, since the neural network needs to be fed with experiences of good and bad scenarios, to learn from. In case of the neural network chosen for implementation in Quality Technologies projects, annotations have to be made in individual images, with a frame surrounding relevant areas. To train a consistent neural network it is required to have more than 10.000 annotated images. This can be just as time consuming as training new inspectors, but delivers more consistent results throughout the lifetime of the inspection tool.

If substantial changes to the visual identity of the inspected area is being made e.g. change of hue of filler material or new cameras being used, the neural network is not necessarily able to accommodate these changes and reliability might become worse. To regain the full capability of the tool, it needs to be retrained

on an augmented set of data with a small set of new scenarios or trained on a full set of images taken of the new conditions with annotations made by experts.

All of the above needs to be taken into consideration before developing new tools for visual inspections, as there are both advantages and drawbacks of computer vision with neural networks.

Auto-labeler

Quality technology had identified a set of challenges for the group to deploy more neural networks on the production floor. The main problem was the time consumed for collecting and annotating pictures for use with the neural networks. Data is time consuming to gather and while the initial idea was to let inspectors, operators and managers collect the data, it is not possible to reallocate personnel to such menial tasks. This left the quality technology department spending weeks and months both collecting and annotating images for use in training.
To overcome this challenge, Quality Technology developed a system to automatically collect images and annotate these images with minimal human involvement.

The current system is in a Proof-Of-Concept state, where much of the functionality is still under development. As part of the internship, we developed on the capabilities of the machine, by adding precise kinematics to the internals of the machine. Furthermore the UI was not user friendly and had excessive steps to do simple operations. The UI was overhauled, with improvements to interactiveness and responsiveness giving a more fluid and intuitive interaction with the machine.

Scaling of systems

While the Neural Networks were already being deployed, performance in executing said models were less than ideal. Many user interfaces had been developed and deployed from Matlab, which is good for rapid deployment, but MATLAB is not able to utilize all of the resources available in a modern laptop. From a

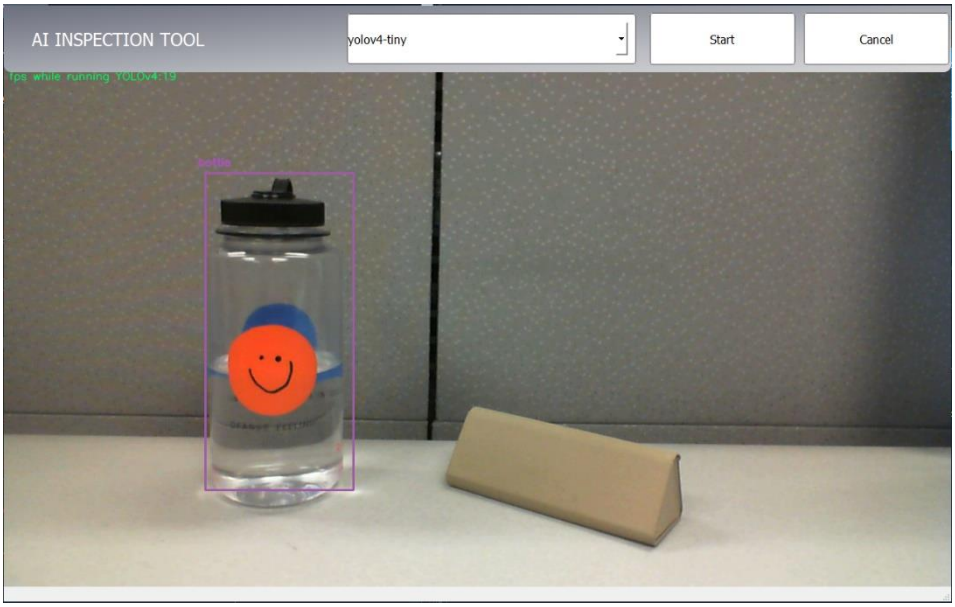

Figure 3, Computer vision interface using a publicly available YOLOv4 architecture.

performance standpoint, this is less than ideal. To overcome this challenge, a system for deploying simple

models were developed, utilizing all of the resources available on a computer. A typical interface can be seen on Figure 3, Computer vision interface. The user interface exceeded expectations, with focus on usability of operator, even under constrained conditions. While the interface is simple, looks are deceiving. The UI focused on usability for operators, unlike previous interfaces with too many buttons and meaningless information. Behind the user interface is a series of optimizations and performance increases that make it the fastest UI and most reactive AI tool to date at Quality Technologies.

Security and intellectual property

Modern companies rely heavily on their intellectual property (IP). IP can be protected in many ways, but most often patents or trade secrets are the way for public enterprises. These trade secrets risk leaking to other companies as employees are transferring jobs, but at the risk of litigation. Defense contractors' work with a different constraint, where selling or transferring trade secrets under the correct circumstances can be considered anywhere from a felony to high treason. No single individual at Lockheed Martin is interested in leaking classified material and take both intellectual property and national security seriously.

Lockheed Martin ensures all proprietary information is signed off to them through their employment contracts and many technologies are considered mission critical and potential candidates for becoming classified information. Therefore it is worth mentioning that anything developed on Lockheed Martin equipment or at a Lockheed Martin facilities is to be considered their property.

Life Outside of Air Force Plant 4

While Lockheed Martin and the F-35 is a big part of the internship, many other experiences can be had while living in Fort Worth. Both Dallas and Fort Worth have a sizzling cultural scene, with many experiences to be had. While not every place visited could be listed, here is a short summary of the most extraordinary places.

Completed visits:

Fort Worth: Seventh street, magnolia street and the Stockyards are popular destinations and with good reason. The areas are lively and serve good food and drinks. The Stockyards is special, in that many people come for the rodeos and are dressed in cowboy attires. This is not a costume, but their tradition and heritage. Multiple stores sell high quality clothing in these styles.

We had the pleasure of attending the Fort Worth Stock show and Pro Rodeo. These events are not for the faint of hearted and show a culture much unlike the Danish one. Breeding animals are groomed and styled excessively and at the rodeo, animals are treated with respect but to our perception violently.

Austin: Austin is the capitol of Texas and home of the University of Texas. Expect to see Longhorn merchandise, which is their local mascot. The city is known for the Bullock Texas State History Museum, the Capitol, Barton Springs Pool and endless parties on Rainy Street and Sixth Street.

Figure 4, The Texan Capitol, based in Austin.

Mineral Wells: A small town outside of Fort Worth that used to bottle mineral water. Now the town is almost desolate and the old industrial complex is being converted into a spa. Nearby there is also a state park worth visiting.

San Antonio and Joint Base San Antonio: San Antonio is known for its river walk with both bar and restaurants close by. San Antonio also hosts Joint Base San Antonio. The base is responsible for training pilots and it also hosts the Great Texas Airshow every year. I had the opportunity to get close to everything from F-15s to F-35s and a lot of heritage and cargo planes. Be prepared to see kids standing in line to sit in a C-5M cockpit.

Oklahoma and Winstar Casino: Gambling is outlawed in Texas, but one hour north of Texas is the Winstar World Casino. The casino is owned by the Indian tribe who are native to the lands. The surrounding area is a nature preserve and both are worth visiting. We decided to only bring cash, since the first trip to the ATM is the hardest and it only gets easier from there.

Figure 5, Winstar Casino

Planned trips after time of writing:

New Orleans: New Orleans is known for its French heritage, voodoo, the Mississippi river and crawfish. Visit both the French quarter and bourbon street, but be prepared to see many facets of the city.

Big Bend: Texas have very few national parks. Big bend is one of them and can be incredibly beautiful. The area is all dessert, but with small oases.

Guadalupe: A different national park of Texas is Guadalupe, which has the highest peak of Texas. Bring adequate footwear, I bought a set of Merrel MOAB vent 2 at an affordable price online.

Yosemite: Yosemite is one of the best know national parks besides Yellowstone. It is surprisingly affordable to take a trip to Yosemite, if you are prepared to sleep in your car. Turo have cars fully loaded with air mattresses and sleeping bags. I specifically hope to see Yosemite Falls and El Capitan gorge.

Rocky Mountains: The Rocky Mountains national Park is placed on the continental divide and as such, some great scenery can be had. Trail Ridge road is my main goal and I hope to go to the summit of the road in an altitude of 12183 feet.

Yellowstone: Yellowstone contains a huge geyser by the name of Midway Geyser basin as part of the Grand Prismatic Spring, which is a must see. If the geyser doesn't erupt, then Old Faithful is –as the name implies, sure to erupt. Lamar Valley is the best place to go watch Bison. Old Faithful Inn is also on the itinerary as the largest wooden structure in the world.

Zion: Weeping rock, a day hike, Lower emeralds pool are the highlights of Zion. It is also enroute from Salt Lake City to the Grand Canyon.

Takeaways from My Internship

Working with the F-35 at Lockheed Martin has been an insightful experience. The facilities of the F-35 are world class, but often problems arise that needs to be analyzed and corrected. No single problem can be solved in a day and rightfully so. If a bad correction is made, it can and have cost human lives.
Serving both the Danish and American armed forces through my internship has been an honor and I hope to continue my career in a manner that is as meaningful as servicing the F-35 stealth fighter.

Future Interns

If you are reading this, contemplating whether to participate in the Lockheed Martin exchange program sponsored by Terma A/S, then my best advice is to apply as soon as possible! This is a once in a lifetime experience and while this report list some of the major events, many more were had.

Lockheed Martin and Terma both value and support their interns to the fullest and try to integrate them as engineers in the F-35 program. Previous interns have a tendency to show their support and show up in different stages of the internship to help. If your only desire is to work on the F-35 and nothing else, the team will allow it. If you wish to spend as much of your time travelling the United States and experience as many cities as possible, they'll make sure your working hours are flexible enough to accommodate this. The exchange is technical, challenging and engaging on the F-35, but meanwhile it is also a designed to be a cultural exchange. Denmark have close ties to America and understanding both the culture and business aspects of America is invaluable in whatever direction you are trying to develop your career.

Don't be afraid to speak up and voice your opinion. Seek challenges and explore the problems at hand. This is what makes Danish engineers unique and is a skill in high demand in the United States of America.

List of figures: