The Massachusetts Institute of Technology is one of the most well-known engineering universities in the world. To be able to do an internship at this world-renowned institute was a dream come true for the authors of this article. They both went to Cambridge to experience how it felt to be amongst true nerds.

Pierre stayed at MIT from October 2009 to February 2010, whereas Niek arrived in mid-February and left in August. This article reflects their personal experiences and gives an insight into the work that was done.

After hearing a couple of stories about students who crossed the Atlantic, both of our minds were set on only one thing: going to Boston, the oldest and maybe the most European city in the United States of America. Moreover, who hasn’t heard of the movies The Boondock Saints, or The Departed? All Boston. Diverse as the city is, in population (approximately 15% for instance is Irish), in suburbs, it is also a city with a lot of education: Boston University, Tufts University and Harvard University to name just a few. And of course: MIT. Boston is the largest city in New England, where the USA separated from Britain, and home to a number of top sports teams: the Boston Red Sox (Baseball), Bruins (Hockey) and, last but certainly not least, the Celtics (Basketball). You should have seen the city after they lost to the LA Lakers. Cambridge is one of the suburbs, having a large student population, due to the presence of both MIT and Harvard in the very same city!

MIT itself has a number of schools, one of them being the School of Engineering. The department of Aeronautics and Astronautics is part of the School of Engineering, and is subdivided into smaller labs. The lab we both went to is called the Human Automation Laboratory, or HAL. HAL is a relatively small group which has expertise in human-machine interaction and mainly focuses on operator interaction with Unmanned Aerial Vehicles (UAVs), which was the main topic for both of our researches. Right now, the shift of manned vehicles (especially military aircraft as we know them now) to UAVs is going at a fast pace; most of the airstrikes and reconnaissance done in Afghanistan for instance, are done by UAVs controlled from a remote base in Las Vegas.

Pierre: “My assignment during the internship was to research the behavior of operators in single operator, multiple UAV scenarios. Not only the behavior of the operator was of importance, the main topic was to find out if operators would self-adjust their workload if the tools for doing that were handed to them.

The simulation used, the Onboard Planning System for Unmanned Vehicles (UxVs) in Support of Expeditionary Reconnaissance and Surveillance (OPS-USERS), provided the operator with a complete overview of the situation on the battlefield. The operator had supervision over multiple vehicles (not all aerial). The operators could assign tasks to the group of UxVs, but did not have the ability to directly control the UxVs. Operators were prompted to replan the path of the UAVs every so-many seconds. The computer was in control of actually coming up with a new plan, but the operator had control over which task he found more important. After a potential target was found, the operator was prompted to identify the target. Once an enemy target was found, the weaponized vehicle was activated to visit the target, prompting the operator once he arrived at the target to ask for confirmation for launch.

My research was focused on determining the ability of the operator to regulate his own workload. In earlier version of the
software, the operator was prompted to make a new plan every once-in-a-while if the automation came up with better plan. In the research I performed, an additional dial was added so the operator could regulate the interval at which he was prompted to come up with a new plan.”

Niek: “As you can imagine, a UAV is a very complex system, and can easily overload a human operator with a lot of information and tasks to be performed. Moreover, add a multitude of UAVs to the equation, and an operator will need all, if not more, than his maximum attention for processing every task. A task could be to enter new waypoints for the UAV, or assist in emergency situations, but more commonly, processing imagery of the UAV’s sensors for potential targets.

In order to help the operator, we envision an algorithm which adapts and helps the operator schedule his tasks, based on the importance, duration and reward of the task. For simplicity reasons, we limited the type of tasks to search tasks. An experiment, named HOSS (Helping Operators Schedule Search tasks), was conducted to see whether the scheduling tool actually improved the operator’s efficiency or not. Results will (hopefully) be published soon.”

TIPS
To enter the United States of America, one can expect blood, toll, sweat and tears, or less dramatic, a multitude of documents that need to be filled in. After a visit to the US consulate in Amsterdam, you will get your visa, if everything goes well of course.

Moreover, finding a house is a process in which one is either lucky, or needs to put in a lot of effort.

Pierre: “Finding adequate and payable housing in a city like Boston may not be the easiest task to do. There’s a wide range of places you don’t want to be and rooms you don’t want to sleep in. It took me a month to cancel my room in one of the most dangerous areas of Boston and get a new room in the center of Cambridge. This final room was as close to the lab as it was to the Cambridge fire station, both a blessing and a curse. Never before did I have the joy of waking up to the sound of a fire truck thundering through my room, or so it seemed.”

Niek: “I found a place in an Independent Living Group. It was fun for the months I spent there, and meeting other people is easy when you have to live with them. However, finding a cheap room in Cambridge is difficult; all rooms are around and above 800 dollars! Of course, MIT has a number of undergraduate and graduate dormitories, but ‘full’ students at MIT get the first pick, so you need to be lucky in order to get a dorm room. Also, it might be possible that you need to take the ‘Test Of English as a Foreign Language’ (TOEFL). Plan this beforehand, since this test is quite expensive and the results may take a while.”

THE FUN STUFF
Apart from working, there was also time to travel and actually have fun.

Pierre: “Since a good friend of mine was working at Lockheed Martin in Texas, the choice was easily made. While flying for six hours for a weekend’s visit would be considered crazy at home, it didn’t feel that strange at all when I was in the US. Of course New England was also on the line, including a trip to one of the small ski stations of New England, Mount Sunapee, in the White Mountains.”

Niek: “My first trip was a flight to Florida, where I saw one of the most awesome things in my life: an actual space shuttle launch, STS-131 Discovery to be precise. Moreover, Boston’s location allows one to go to New York, Washington, Montreal and Toronto for fairly low prices; a bus ticket to New York was only 12 dollars! I finished my internship with a conference in Toronto – awesome!

Moreover, Boston is a city in which you can really relax. I spent days in the Boston Common, the biggest park in Boston, or at Harvard Square. I started playing rugby and sailing at MIT, a great way to meet new people. As long as you put your own back into it, you will have the time of your life. You’ll definitely regret the day you need to go home. I know I did…”

Pierre: “I finished my time in the US of A. with a trip to Minden, the world’s gliding capital near Reno. The extraordinary view combined with the atmospheric feature called ‘Wave’ made an unforgettable experience. Add a thermalling competition with two golden eagles and an almost continuous existence of thermals, and one can see that I couldn’t have dreamt of a better ending to my USA trip!”