



DroneClash 2019 - Press Pack

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DroneClash 2019

Drone-on-drone battles to spark counter-drone innovations

A “safe landing” is crucial if the widespread use of drones is ever to “take off”. For society to accept drones, the development of effective counter-drone technology to safely bring down rogue drones is vital. That’s why the Delft University of Technology in the Netherlands is organising “DroneClash. On Saturday 16th March 2019 international teams will compete in this spectacular competition - a kind of airborne Robot Wars. The aim is to take down as many enemy drones as possible. As well as having to avoid enemy drone attack, teams will also have to dodge a whole series of counter-drone measures, chosen in collaboration with the event’s sponsors - the Dutch Ministry of Defence and the Dutch Police.

Hacking

At random intervals throughout the event, a “rogue” drone (in the form of a TinyWhoop - a very small consumer drone) will fly through the DroneClash hangar. Members of the audience will be challenged to get the drone down out of the air by means of hacking - one of the most promising counter-drone measures. The fastest hackers will compete for prize money totalling €1,000. Interested in taking part? Please send an email to hacking@droneclash.nl and you will be given access to code.

Try it yourself!

Not quite ready to don your hacking *white hat*? Don’t worry, you can also take part in the challenge to down the TinyWhoop drone. If you have an idea for a (safe) counter-drone intervention, you can test it out at DroneClash. Whether it be a tennis racket, a football or a telescopic drone catcher, we are curious to see your ideas.

Note: Please do not use sharp, explosive or other dangerous objects.

Exhibition

DroneClash also offers a platform for organisations in the field of counter-drone technology. At the ClashExpo, developers and businesses can demonstrate their products and exchange ideas about this relatively new field.

Practical information

Date: Saturday, March 16, 2019

Location: Hangaar 2 Valkenburg airport (coordinates 52.175558,4.415721)

More information: <http://www.droneclash.nl>

Ticket sales: <http://www.droneclash.nl/tickets/>

Drone bestrijdt drone op DroneClash

Om drones op een goede en veilige manier in de maatschappij te laten 'landen', is de ontwikkeling van counter-drone maatregelen cruciaal. Daarom organiseert de TU Delft op zaterdag 16 maart 2019 'DroneClash'. Tijdens deze spectaculaire competitie, een soort Robot Wars in 3D, moeten deelnemende internationale teams met hun eigen drone(s) zoveel mogelijk andere drones uit de lucht zien te halen. Daarnaast moeten ze een hele reeks 'counter-drone' interventies zien te ontwijken. Na een eerste succesvolle editie in 2018 wordt het publiek dit jaar uitgenodigd om actief mee te doen.

Hacken

Zo nu en dan zal er een 'verdachte' drone door de DroneClash hangar vliegen (een TinyWhoop: een hele kleine consumentendrone). Het publiek moet proberen de drone door middel van hacken uit de lucht te halen. De snelste hackers dingen mee naar een prijzenpot van EUR 1.000. Wil jij hier wel eens mee oefenen? Stuur dan een email naar hacking@droneclash.nl.

Probeer het zelf!

Is hacken niet je ding? Maar heb je wel ideeën over hoe je een drone wilt neerhalen? Neem dan je eigen (veilige!) counter-drone attribuut mee. Tennisracket, voetbal of telescopische drone vanger? We zijn benieuwd naar jullie ideeën. Graag geen scherpe, explosieve of anderszins gevaarlijke attributen.

Expo

DroneClash biedt ook een platform voor iedereen die betrokken is bij de ontwikkeling van counter-drone instrumenten. Op de DroneClash Expo kunnen ontwikkelaars en bedrijven hun producten demonstreren en hun ideeën over dit relatief nieuwe veld uitwisselen.

Meer informatie

DroneClash

Contactpersoon: Amber Marijs 0649146064

Datum: zaterdag 16 maart 2019

Locatie: Hangaar 2 Valkenburg airport (coördinaten 52.175558,4.415721)

Meer informatie: <http://www.droneclash.nl>

Kaartverkoop: <http://www.droneclash.nl/tickets/>

Beeldmateriaal: <https://drive.google.com/file/d/1NyJtbRWWBUloUKLMCjR6HEOnAfMGOx7q/view?usp=sharing>

DroneClash 2019 Team Summaries

A3T (AKA the Aerobatic Twente Tech Team)

Team type: student team from the University of Twente in Enschede, the Netherlands.

Country: the Netherlands (with international members from India, Sint Maarten, Syria, Switzerland and with a mentor from Canada).

DroneClash debut? No. In 2018 team A3T's attempt at DroneClash victory ended prematurely, when their drones were hacked.

Team Spokespeople: Paul Apurv, an Engineering student from India and Radhika Kapoor, a Creative Technology student from Switzerland.

Other Members: Radhika, Ziad, Tyrell, Apurv, Abhinav, Sidhharth, Gabriel (team mentor).

Motivation for entering DroneClash: the learning experience and the fun! Radhika Kapoor from Switzerland says: "I saw an ad on Facebook. It was something along the lines of 'Learn how to build drones, fly drones and crash drones' and I thought, how cool is that? So here I am... It's been fun figuring how how to build drones and understanding what goes where."

Interesting facts: the team has good links to local industry. Carbon fibre company, Fiberneering is providing the team with materials and a place to practice flying their drones.

Team video: <https://www.youtube.com/watch?v=TViYGdVAhnM>

Blue Phoenix

Team type: student team from the Delft University of Technology in the Netherlands is made up of six Masters students from the Control and Simulation course

Country: the Netherlands (with international members from Italy and Cuba)

DroneClash debut? Yes

Team Spokespeople: Alberto Bonifaz (Italian) and Jonathas Laffita Van Den Hove d'Ertsenryck (Cuban)

Other Members: Matteo Barbera (Italian), Henricus Basien (German), Bart Bouwels (Dutch), Alejandro Daniel Noel (Spanish), Frédéric Dupon (Belgium), Raoul Mink (Dutch), Tom Suys (Belgian), Shawn Schroter (Dutch)

Motivation for entering DroneClash: the engineering challenge and the lure of prize money. Most of the students are new to drones, having first designed, built and flown drones as part of their thesis projects. Alberto Bonifazi explains:

"For our Bachelors thesis project we were challenged to create an autonomous racing vehicle. My team won the final bachelor thesis competition with, what was basically, a race drone able to fly autonomously through gates. Since then, I have kind of caught the bug. I've enjoyed flying and crashing quite a few drones."

Interesting facts: the team are rather new to flying drones. Alberto Bonifazi explains: "we are new to flying drones, we are unlikely to be the best pilots in DroneClash. We fully intend to make up for this in precision weapons and clever defence mechanisms. We don't want to give everything away but suffice to say... we will be coming for your propellers!"

Team video: <https://www.youtube.com/watch?v=-uRxeh3-n40>

Bluff by Flyability

Team type: company team

Country: Switzerland

DroneClash debut? Yes

Team Spokesperson: Geoffroy Le Pivain

Other Members: Arnaud Garnier, Stefano Zampieri, Paul Ghestem (Instagram: Blueman FPV), Valentin Naïnemoutou (YouTube: [Golden val](#), Instagram: sr_golden_val)

Motivation for entering DroneClash: Durability testing! Geoffroy Le Pivain and his teammates work for Flyability, a Swiss company that designs and builds industrial-strength drones which are engineered to enter hostile environments like gas and oil tanks. DroneClash gives them the chance to subject Flyability's Elios drone to a whole new level of hostility.

Interesting facts: Elios has already been subjected to a tough and varied testing regime which has included everything from sharp objects to apples, ping pong balls and beer bottles. Additionally, the team plans to simulate the DroneClash experience, by flying a drone into Elios at 50 km/h ahead of the competition on March 16th.

Team video: <https://www.youtube.com/watch?v=VmVhX9NxNYk>

Dipol

Team type: drone hobbyists

Country: Germany

DroneClash debut? No. Runners-up in 2018.

Team Spokesperson: Dr. William Thielicke

Other Members: Klaus-Peter Neitzke, Ruben Jubeh

Motivation for entering DroneClash: this Teutonic trio met at a UAV event and have been flying friends ever since. For Dipol, DroneClash is very much about the enjoyment they get from engineering, however having been pipped to the post in 2018, €30,000 in prize money is admittedly a big pull.

Interesting facts: team Dipol's motto is strangely pacifist in spirit: "Minimalinvasiver angriff" (a play on the idea of "minimal invasive surgery") is roughly translated as "minimal invasive attack." So what can we expect? Keyhole conflict and homeopathic hostility? A soft landing for opponent drones? Dipol's approach is more about standing their ground (or should that be air space?) than shrinking to the sides of the arena. William Thielicke, a biologist with a special interest in flight, explains:

"What we learnt last year is that the three dimensional nature of DroneClash means it is really very difficult to make contact with other drones. Your opponents can move in all directions - and very quickly. We believe that by increasing the size and the strength of our drones, we have a strong chance of taking out the competition."

Team video: https://www.youtube.com/watch?v=Ecunz5E_Rfc

Murica

Team type: FPV freestylers and makers of flying machines

Country: US

DroneClash debut? Yes

Team Spokespeople: Peter Sripol and Sam Foskuhl

Other Members: Ummagawd (AKA Tommy Tibajia), StingersSwarm (AKA Kevin) and Synman95 (AKA Clay Payne)

Motivation for entering DroneClash: Spectacular fun and possible victory!

Interesting facts: Peter Sripol and Sam Foskuhl are professional tinkerers. They run their own "make workshop". It's here that their whacky flying machines are dreamt up and built. Machines that have been tested at NASA, no less. Machines that feature on Peter Sripol's YouTube channel, like a (manned) drone in the form of a Santa Sleigh or a KFC bucket aeroplane.

Ummagawd is a free-styling Californian drone pilot who has made a career out of his aerial acrobatics, earning FPV superstar-status and more than 40,000 followers on YouTube. If the nose-diving angles and precision pullouts he displays in team Murica's promotional video are anything to go by, OMG, DroneClash opponents have something to reckon with!

Team video: <https://www.youtube.com/watch?v=FtAXnUzOw5c&t=164s>

QEptains

Team type: drone entrepreneurs and FPV enthusiasts

Country: Netherlands

DroneClash debut? Yes, however Niels Meerdink was a member of the winning Laced Horns team in DroneClash 2018.

Team Spokesperson: Pieter Boomsma

Other Members: Niels Meerdink, Dennis Mennema, Ralph Hogenbirk, Thomas de Koster and Luuk Treffers

Motivation for entering DroneClash: flying fun and possible victory

Interesting facts: Quadcopterenzo is the drone business behind team QEptains. This web-shop for all things drone-related came about when former electrical engineer, Pieter Boomsma had a poor online shopping experience. In an effort to enhance his DJI drone (which he had found "a bit boring"), he wanted to buy some new parts. What he got was abysmal service and shoddy parts. The experience was so bad, that Pieter was forced to threaten legal action to simply get the drone parts for which he had already paid. "Mmmm.... I could do much better myself," thought Pieter. And boom! This was the beginning of Quadcopterenzo - his drone business based in Friesland in the north of the Netherlands.

Team video: https://www.youtube.com/watch?v=wuZzO_aADPc

Spinfast

Team type: drone entrepreneurs and FPV pilots

Country: Germany (with one Dutch pilot)

DroneClash debut? Yes

Team Spokespeople: Martin Bennat (but likely to be absent on the day) or Dennio FPV

Other Members: Tom Bährhold (AKA Torpedo Tom FPV) , Den de Bryn (AKA Dennio FPV) and Kay Hoffmeister

Motivation for entering DroneClash: in it to win it!

Interesting facts: team Spinfast was set up drone entrepreneur, Martin Bennat from Hannover. His company acts as a marketing platform for drone events and FPV racers. This year the team will be using the Graupner DroneBall to take on their opponents in the DroneClash arena.

Team video: <https://www.youtube.com/watch?v=gkViZAWvhok>

Slunse

Team type: FPV racers

Country: Belgium

DroneClash debut? Yes

Team Spokespeople: Bernard Ramault

Other Members: CarbonV Van Der Elst, Free Zillion, Jarno, Mario, Dimmy and Bernard (aka "opa")

Motivation for entering DroneClash: team Slunse is all about the flying fun but these boys from Bruges also have their eyes on the prize!

Interesting facts: team Slunse is coming prepared for battle, with an army of 20-25 fighter drones, mainly recycled from the (many) drones they have crashed over the three years these FPV enthusiasts have been flying. Their team includes Belgium Champion CarbonV Van Der Elst.

Team video: <https://youtu.be/wjXXop6d4NU>

Speeddrones

Team type: drone entrepreneurs and FPV pilots

Country: the Netherlands

DroneClash debut? Yes

Team Spokespeople: Bart van Maarle

Other Members: Bram van Esch and Andreas Klein

Motivation for entering DroneClash: to showcase the brilliant drone development skills of Bart Maarle's business: Speeddrones. If the team wins, Bart plans to invest his share back into further developing his webshop.

Interesting facts: Bart is gaining a reputation for his creative application of drones, having recently orchestrated a fashion show that used drones as the vehicle for modelling shirts and handbags.

Andreas Klein is DroneClash 2019's youngest competitor, aged just 15. Bart van Maarle spotted him at a drone demo in Hilversum a year ago. Andreas' drones were flooring rather than soaring. A year on and Andreas is out-flying Bart with ease.

Team video: <https://www.youtube.com/watch?v=yFs5dUG5DC8>

More detailed stories about each team and visuals of some of their prototype drones can be found on www.droneclash.nl/news

Schedule

11:00	Hangar opens to the public
11:30	Official opening by Prince Pieter-Christiaan of Oranje-Nassau, van Vollenhoven
11:45	DroneClash battles commence
13:15	Break
13:45	DroneClash battles recommence
14:55	Break
15:25	DroneClash battles recommence
16:35	Break
16:55	Final round of battles
17:30	Prize Ceremony
18:00	Close

Please note that timings are approximate.

A more detailed schedule will be made by 15th March following the draw.

Let the battle commence! How DroneClash works

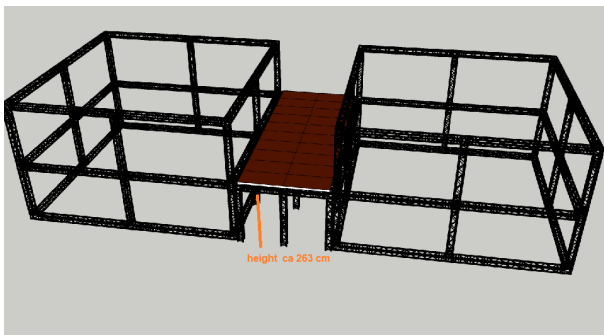
DroneClash will showcase counter-drone mechanisms by testing the technology to the point of destruction in live drone-on-drone battles.

The aim of the game

Two rival teams meet in the DroneClash arena. It's here that their drones will battle it out. To the bitter end.

Each team is allowed to field as many drones as they wish, with a minimum requirement of one *fighter* drone and one *Queen drone*. The aim of the battle is simple: knock out the rival *Queen* by (almost) any means possible. Just like in boxing, a knock out constitutes 10 seconds on the ground.

The DroneClash arena

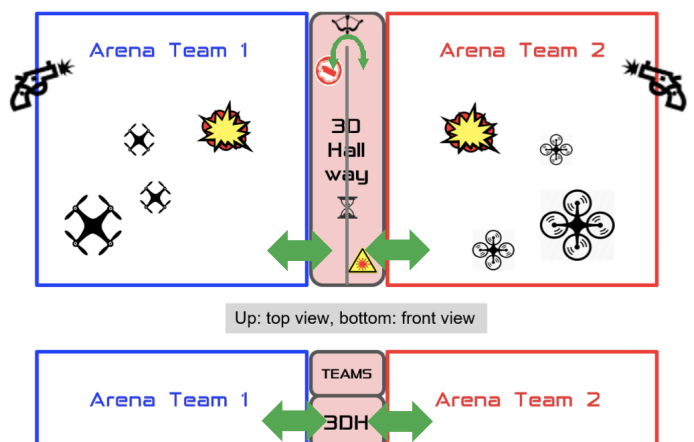


DroneClash takes place in an old aircraft hangar. At the centre of the hangar there is a specially-designed arena, 20 metres square and 6 metres high, constructed from polycarbonate - the same transparent material used in police riot-shields. The battles, which are expected to involve everything from flame throwers to water cannons, will be both spectacular and safe.

The arena is divided into two areas by the Hallway of Doom Death and Destruction, also known as the 3D Hallway (and the pilot platform above).

Each team will start the battle in their own area of the arena (blue on the left, red on the right). In order to reach the rival Queen in their opponent's area of the arena, they will have to navigate the 3D Hallway. Here they will have to deal with a range of counter-drone measures.

In 2018 these included nets and smoke. If the drones are able to get through the Hallway unscathed, they will be able to enter the rival team's arena and attempt to bring down the Queen.



Rules of engagement

Here is a summary of some the most important rules. For a more detailed version of the rules, please follow this [link](#):

- Each team must have at least one *fighter* drone and one *Queen* drone, but more drones are permitted.
- Each team is provided with two First Person View (FPV) video race band frequencies, allowing two teams to battle simultaneously.
- A team is allowed to switch between the FPV video output of their drones, so long as the same channel is maintained and the other teams are not jammed.
- The first team to knock out the opponent *Queen* wins.
- A 'knock out' means that the *Queen* drone is on the ground for more than 10 seconds - like in a boxing match.
- The *Queen* drone can be grounded for a maximum of 10 seconds. The *Queen* drone may be hit to the ground an infinite number of times. So long as the *Queen* drone is off the ground and flying within 10 seconds, the game continues.
- FPV streams will be shown on large screens to the audience. Teams cannot assume they will have the line of sight of their drones in the Hallway of Doom, Death and Destruction (3D Hallway). Drones must therefore be controlled through First Person View, or be autonomous in nature.

Prizes

A total prize pot of €50,000 is available which is divided as follow:

1st Prize - €30.000

2nd Prize - €5.000

3rd Prize - €2.500

Additionally, a number of special awards will be made, namely:

Award for Drone Autonomy - €5.000

Innovation Award - €5.000

These special awards will be decided on by a jury vote.

The Venue

Theater Hangar 2

DroneClash will take place in Hangar 2 in Katwijk, the Netherlands. There is ample room in this 2450 m² old aircraft hangar to accommodate team preparation areas, the DroneClash arena, the ClashExpo exhibition space, food trucks and most importantly, a large and lively audience. Expect a visually spectacular event with an electric atmosphere.

Unmanned Valley, Katwijk

Theater Hangar 2 is located within the municipality of Katwijk, South Holland. It is part of the former Valkenburg Airbase, which is now being developed as The Unmanned Valley.

Unmanned Valley is the European hub for unmanned innovation. It's a space where the integration of drones into our every day lives is being tested. A location where innovative companies can work on the future of urban air mobility.

More information (in Dutch) can now be found here: <http://www.unmannedvalleyvalkenburg.nl>

Clash Expo

For a close-up view of the latest commercially-available counter-drone measures come to the ClashExpo. Cutting-edge technology will be on display, with the following companies having confirmed their attendance:

Companies which have already confirmed their attendance are:

Bavak

Delft Dynamics

Robin Radar Systems

Squarehead

ForcePro

DroneKiller

JST.security (Ctrl+Sky)

Falcon Communications Ltd

Swiss Aerobotics

The ClashExpo which will run in parallel to DroneClash. Both events will take place inside Theater Hangar 2 in Katwijk on Saturday March 16th 2019.

ClashExpo provides a platform for companies and organisations in this rapidly developing field to present their counter-drone technology to an audience which will include policy makers and end users of counter-drone measures.

Opening Ceremony by Prince Pieter-Christian

DroneClash will be officially opened to the public at 11:00 on Saturday 16th March 2019 by Prince Pieter-Christiaan of Oranje-Nassau, van Vollenhoven. Pieter-Christiaan supports the plans for the Unmanned Valley in Katwijk, a location which will facilitate the development and testing of drone and counter-drone technology.

Commentary by former Gadget Show presenter, Jason Bradbury

Jason Bradbury will be taking on the the important job of commentating. For the uninitiated, the sheer speed of events in the DroneClash arena can take some getting used to. Luckily Jason will be on hand to interpret the ducking, diving, soaring and flooring that can be expected on March 16th and get the audience excited as the day progresses towards the high stakes final clash.

For UK-based followers of DroneClash, Jason Bradbury is a man who needs little in the way of introduction. His bespectacled face was a familiar site on British TV screens for over a decade. Bradbury was not just on Channel 5's "The Gadget Show", he was the "Gadget Show" thanks to his infectious enthusiasm for technology and the engineers and scientists behind it.

Since leaving the show in 2016, Jason has continued to pursue his passion for tech, using the platforms of YouTube and Twitter to share reviews and test out ideas, growing tens of thousands of followers in the process.

Jason says:

"As both a huge fan of drone technology and a drone pilot, I'm really fascinated to see what the innovations in counter-drone tech are capable of. Expect thrills, spills and expert flying action. Hope to see you there!"

DroneClash Sponsors

DroneClash is grateful to have received support from many public and private bodies which share an interest in stimulating developments in counter-drone technology, and enthusiasm for staging a fun and spectacular event.

Head Sponsor 2019 - Ministry of Defence (Netherlands)

The Dutch Ministry of Defence is actively investing in Counter Unmanned Aerial Systems (C-UAS). It is currently working on a number of pilots and experiments in close co-operation with a number of research institutes (for example TNO and NLR) and industry.

The Ministry of Defence views DroneClash as being far more than a fantastic event. Crucially, it is a way of bringing together local Dutch and international engineers with industry and policy makers to help spur on developments in counter-drone technology.

"DroneClash is a great way of spawning much needed innovations in counter-drone tech and we are proud to be lead sponsors." - Lieutenant Colonel Mekes

The Dutch Police

This is the second year the Dutch Police has supported DroneClash.

As a law enforcement agency, the Police has a vested interest in the detection and removal of rogue drones. As such, it is proud to be working in close collaboration with top scientists and engineers, including those at Delft University of Technology, on a range of counter-drone measures.

DroneClash is a clever way of encouraging new ideas and innovations through its competitive format. But additionally, the Police view this fun event as an important way of engaging schoolchildren and young people in a serious societal problem. Namely, how to safely bring down a rogue drone.

"DroneClash 2018 demonstrated some ingenious ideas on how to tackle the problem of drones. By supporting DroneClash again in 2019, we hope to accelerate counter-drone tech." - Mark Wiebes, Innovation Manager

The Municipality of Katwijk

The Municipality of Katwijk is supporting the development of the former Valkenburg Airbase into the Unmanned Valley - a space for the development and testing of drones for integration into our daily lives. DroneClash would like to express its thanks to Katwijk for supporting DroneClash this year.

Delft University of Technology (TU Delft)

The organisation behind DroneClash is one of the world's top engineering and technology universities: the Delft University of Technology (TU Delft). DroneClash would like to express its thanks to the University for its continued support for the competition - a great catalyst for innovations in counter-drone technology.

MAVLab

The Micro Aerial Vehicle Laboratory (MAVLab) is part of the Delft University of Technology's Faculty of Aerospace Engineering. This team of researchers and engineers is focused on taking the latest state of the art theory and improving it until it can solve real world problems. MAVLab has gained international recognition for its work which includes the Delfly Project, which recently featured on the front cover of the journal, Science.

Without the ideas, enthusiasm and expertise of the MAVLab team, DroneClash would not exist. Thank you.

Contacts

If you are interested in attending DroneClash on March 16th 2019 in Katwijk, the Netherlands; or if you need further information about the event, please get in touch:

media@droneclash.nl

+44 7803125547

Or alternatively you can contact Ilona van den Brink from the Technical University of Delft:

I.vandenBrink@tudelft.nl

+3115 278 4259

You can also follow DroneClash on the following social media platforms:

<http://www.youtube.com/channel/UC5tz8pBH3Ed2HVqWkrrV0gw>

<http://www.facebook.com/DroneClash/>

<http://twitter.com/droneclash?lang=en>

<http://www.instagram.com/droneclash/?hl=en>