

**CHOREOGRAPHED SYNTHETIC
TEMPERAMENTS IN AERIAL ROBOTICS
[IN 3 ACT]**

**DESIGN INTERACTIONS
DRONE BRIEF**

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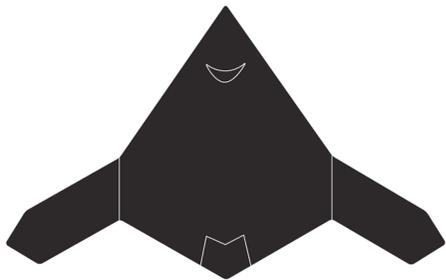
ACT 1

The theatre of war in the auditorium of home

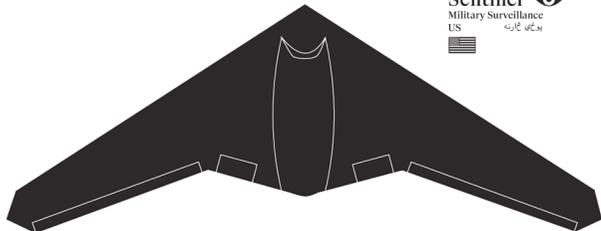
FOR UNOFFICIAL USE ONLY (FUUO)

DRONE SURVIVAL GUIDE

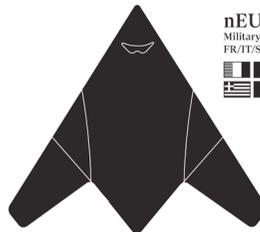
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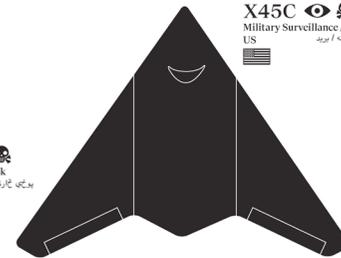
X47C
Military Surveillance / Attack
US
پوښی څارنه / ابرید



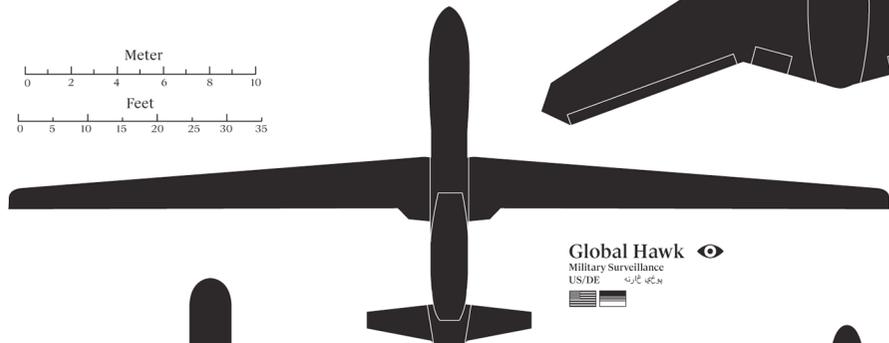
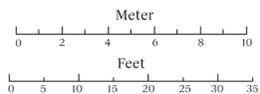
Sentinel
Military Surveillance
US
پوښی څارنه



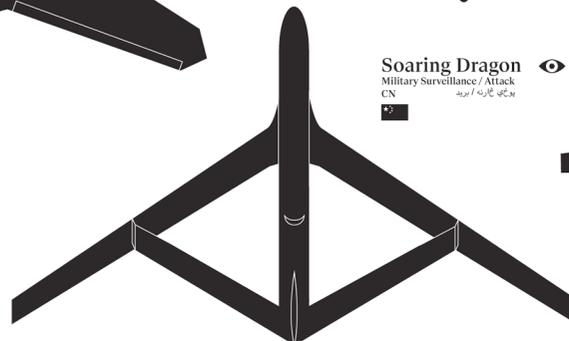
nEUROn
Military Surveillance / Attack
FR/IT/SE/GR/CH/ES
پوښی څارنه / ابرید



X45C
Military Surveillance / Attack
US
پوښی څارنه / ابرید



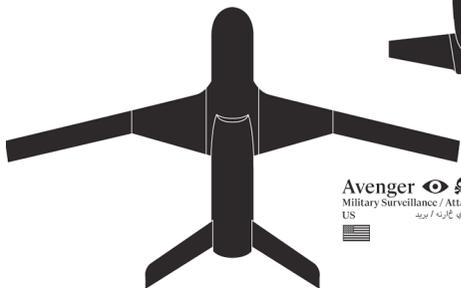
Global Hawk
Military Surveillance
US/DE
پوښی څارنه



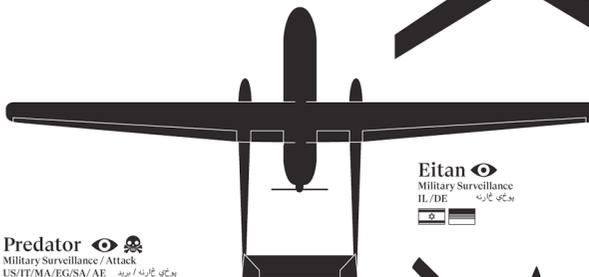
Soaring Dragon
Military Surveillance / Attack
CN
پوښی څارنه / ابرید



Mantis
Military Surveillance / Attack
GB
پوښی څارنه / ابرید



Avenger
Military Surveillance / Attack
US
پوښی څارنه / ابرید



Eitan
Military Surveillance
IL/DE
پوښی څارنه



Reaper
Military Surveillance / Attack
USA/GB/FR/IT/AU/NL
پوښی څارنه / ابرید



Barracuda
Military Surveillance / Attack
DE/ES
پوښی څارنه / ابرید



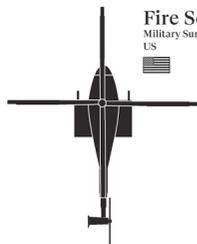
Herti
Surveillance
GB
څارنه یا سترگولاس



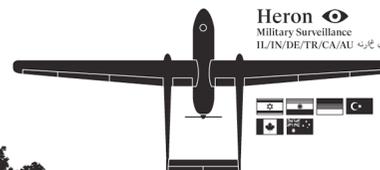
Predator
Military Surveillance / Attack
US/IT/MA/EG/SA/AE
پوښی څارنه / ابرید



Hummingbird
Military Surveillance / Attack
US
پوښی څارنه / ابرید



Fire Scout
Military Surveillance / Attack
US
پوښی څارنه / ابرید



Heron
Military Surveillance
IL/IN/DE/TR/CA/AU
پوښی څارنه



Hermes
Military Surveillance
IL/US/GB/BR/HR/GE/AZ/
CO/MX/SG/CY
پوښی څارنه



Shadow
Military Surveillance
US/AU/IT/PK/RO/SE/TR
پوښی څارنه



Rustom I
Military Surveillance
IN
پوښی څارنه



WASP III
Military Reconnaissance
US/FR/AU/SE
پوښی څارنه



Scan Eagle
Military Surveillance
US/GB/CA/MY/CO/NL/JP/PL/SG/TN
پوښی څارنه



Harpy
Military Attack
IL/TR
ابرید



Killer Bee
Surveillance
US/TR
څارنه یا سترگولاس



Raven
Military Reconnaissance
+20 countries
پوښی څارنه



Air robot
Domestic Surveillance
UK
کورډی څارنه



Aeryon Scout
Domestic Surveillance
CA/SA/LY
کورډی څارنه



AR Parrot
Consumer photography
US
مصرف کورډی یا کاروونکی

LIVING WITH LETHAL TECHNOLOGY



Air robot

Domestic Surveillance

UK كورنې څارنه



Aeryon Scout

Domestic Surveillance

CA/SA/LY كورنې څارنه



AR Parrot

Consumer photography

US مصرف كوونكي يا كاروونكي



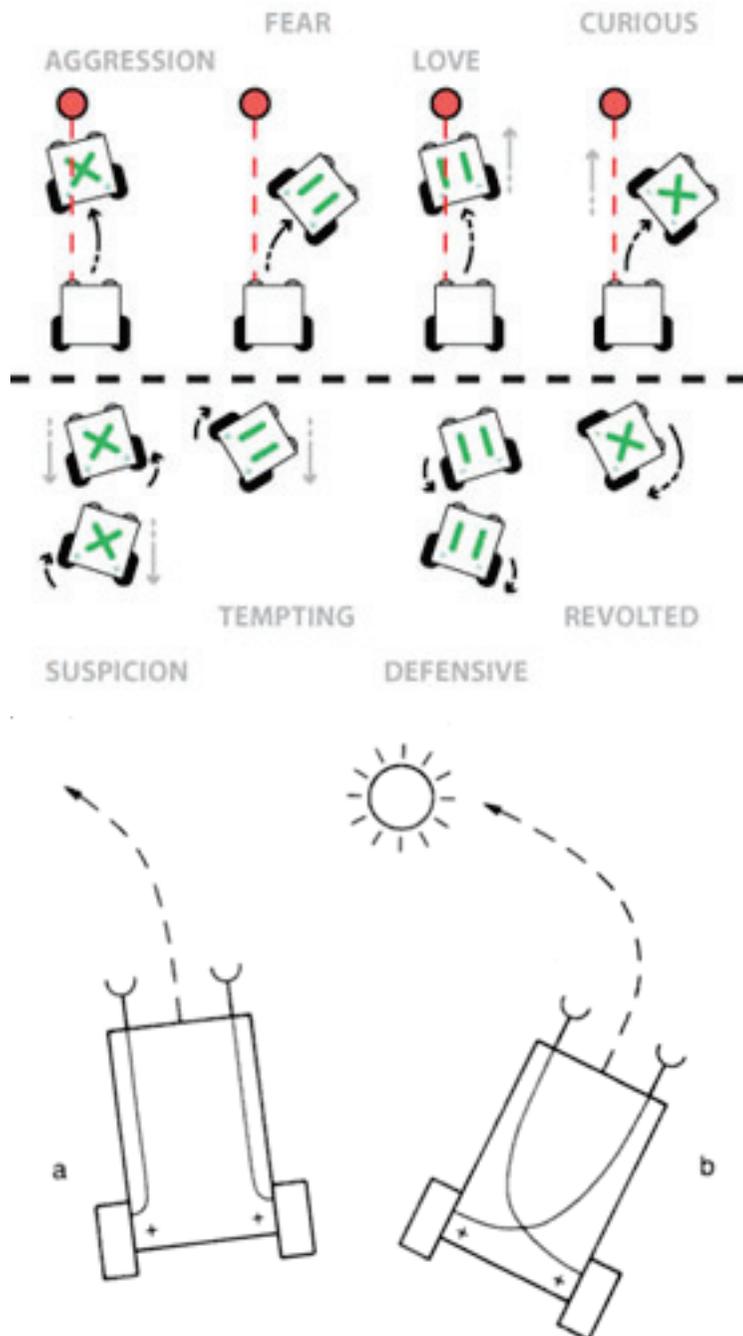
The recent, and much publicised, report into 'The Security Impact of Drones' [1] identified the opportunities, challenges and potential implications of drone technology for the UK Government. The report highlighted two distinct challenges. The first was identified as the need to **gain widespread public understanding and acceptance of drone technology**, given its current associations with military use and uncertainty with the ethical and legal frameworks surrounding this use. A second issue was stated as the '**extraordinarily challenging engineering and programming tasks in order to design autonomous systems able to operate in complex and messy operational environments**'.

It is this need for public acceptance and autonomy of operation in complex and messy environments, specifically the direct engagement with humans (probably one of the most complex and messy environments a technology can face) that we will begin to explore in this project.

[1] SECURITY IMPACT OF DRONES: CHALLENGES AND OPPORTUNITIES FOR THE UK .
Birmingham Policy Commission, Oct 2014
rones/

Fig 1: Lethal Technology, now available in Maplin's and Argos while legislation lasts.

DOMESTICATING TECHNOLOGY THROUGH SYNTHETIC TEMPERAMENTS



Braitenberg vehicles [2], developed as a thought experiment by cyberneticist Valentino Braitenberg, illustrate the abilities of simple intelligent agents.

The vehicles represents the simplest form of behavior based artificial intelligence, and embodied cognition. The following example is one of Braitenberg simplest vehicles. A vehicle has one light-detecting sensor that directly stimulates its single wheel, implementing the following rules:

- More light produces faster movement.
- Less light produces slower movement.
- Darkness produces standstill.

This behavior can see the vehicle interpreted as a creature afraid of the light and that moves fast to get away from it. Its goal is to find a dark spot to hide.

Within the paper 'Creating Lifelike, Emergent Behaviour Using a Synthetic Psychology Approach'[3] Micah Rosekind takes the playful and yet plausible theories of Braitenberg further through recreating the experiments described by Braitenberg in the later chapters of this work. Through Rosekind's modeling we can see the formation of what he labels "simple cooperatives", and the very specific projected human behaviours we associate with these cooperatives.

[2] http://en.wikipedia.org/wiki/Braitenberg_vehicle

[3] <http://www.it.bton.ac.uk/Research/CIG/Believable%20Agents/>

Fig 2/3: Basic electronic behaviours interpreted as human understood temperaments

TRANSITIONAL OBJECTS & PROJECTED AGENCY



The English psychoanalyst Donald Winnicott developed the idea of a Transitional Object in the 1970's [4]. He wanted to draw attention to the very important work done by a child's much-loved teddy bear. At first a baby feels fused with the mother. But gradually a child will become independent, able to live successfully alone with ever growing autonomy. How does one manage this transition?

A teddy bear can help by being a bit like the mother – a source of tenderness and sweetness and comfort. And yet, it is really the child who gives the bear these qualities, much like we project human understood behaviours and temperaments onto simple electronic models.

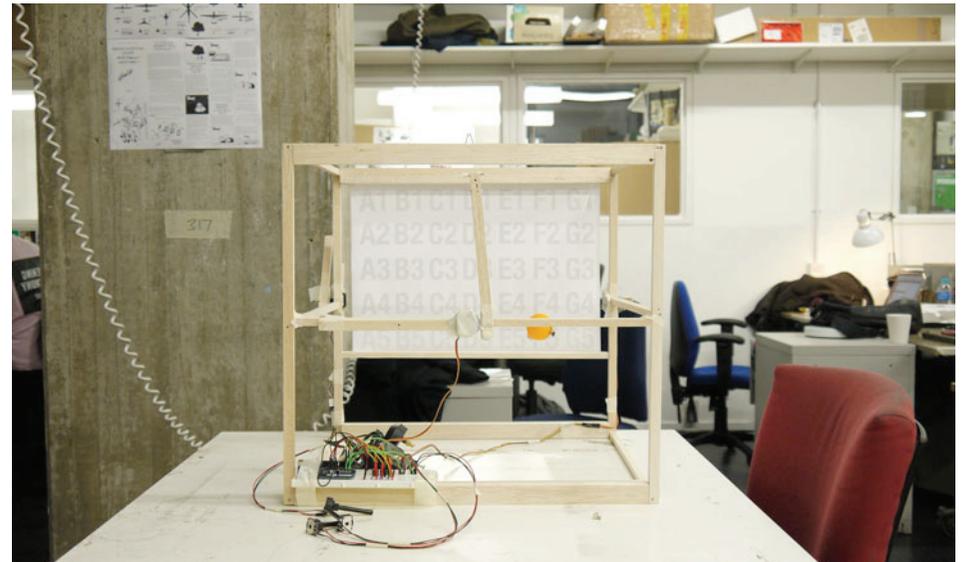
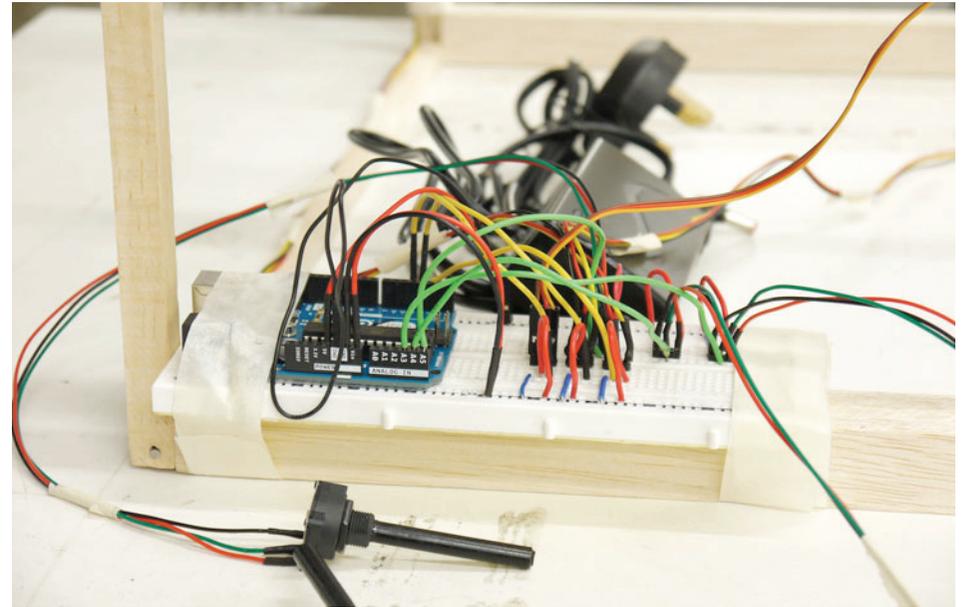
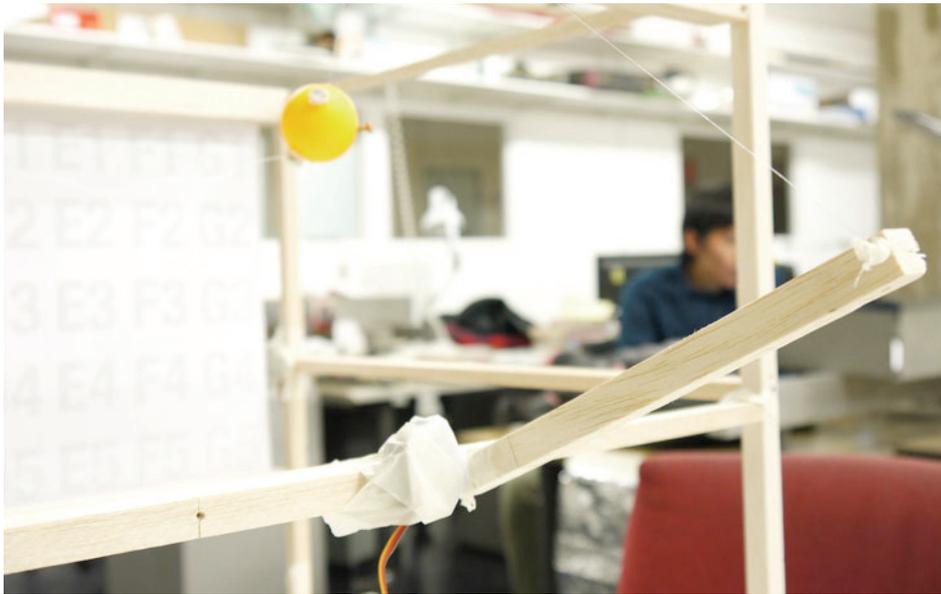
[4] *Playing and Reality*, Donald Winnicott, (Penguin 1971)

Fig 4: I can't ever love you, but you're more than welcome to think that I do if you like

ACT 2

Performance

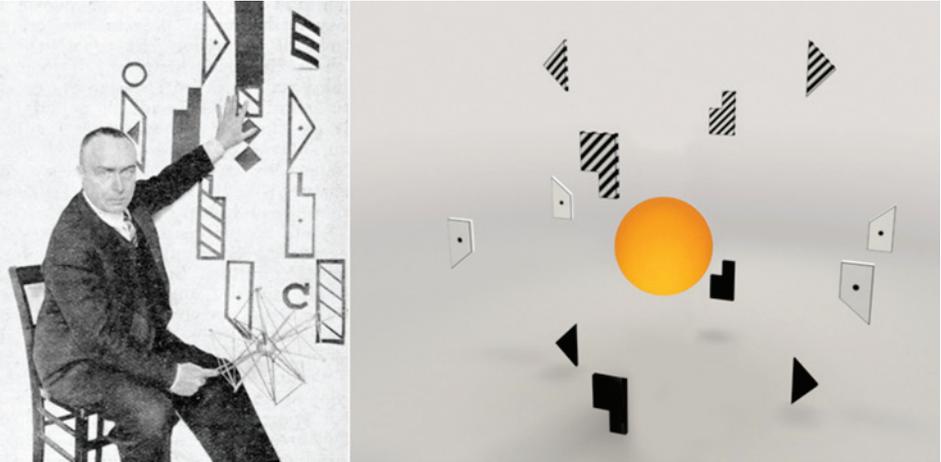
PERFORMANCE PROTOTYPES



CHOREOGRAPHING SYNTHETIC TEMPERAMENTS

Taking our need to accept new technology on our own terms in order for it to begin its process of domestication, we could see an opportunity for domestic drone technology to begin to adopt and evolve the behavioural theories of Braitenberg vehicles. **It is this speculation that we will now explore through a series of electronic sketches. To begin to develop an aerial robotics vocabulary of commonly understood choreographed and replicated movements through simple electronically controlled 'actors'.**

In exploring this task we first began with the Labanotation system of choreographic notation, developed by Rudolf Laban in the 1920's. In creating a commonly understood system for recording human movement Laban influenced ballet and dance in much the same way that classical musical notation affected music during the Renaissance. The system is so comprehensive that it can record a single facial expression if needed, and so simple that it is easily learned and adopted by young dance students across the world.



Front lift: Man behind woman

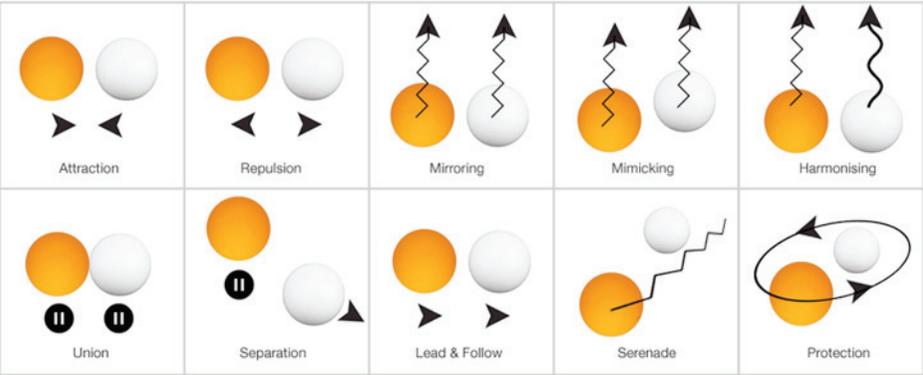
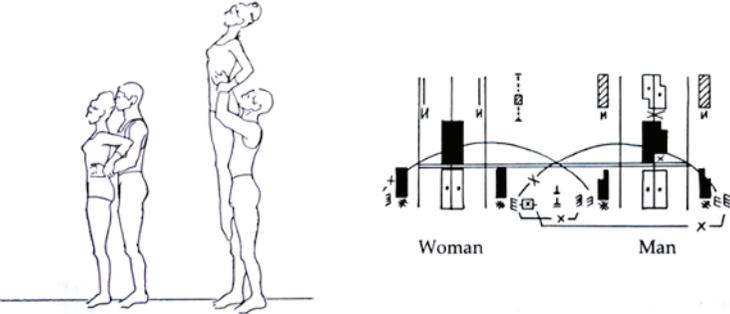


Fig 5/6/7: Labanotation; a notation system for recording and analysing human movement created by Rudolf Laban

HUMAN ACTION

TECHNOLOGY REACTION

GOAL

DEFENSIVE



SUBMISSIVE



OBSERVANT



PLAYFUL



APPLICATIONS

Applications of synthetic temperament technology could see **defensive** temperaments applied in home security where an object or place needs to be protected, **submissive** temperaments applied where childrens or the elderly's considerations need to be accounted for. **Observant** temperaments where the technology needs to become largely transparent and non-invasive. And **playful** where the technology would be playing a entertainment or companionship role.

IMPLICATIONS

TECHNOLOGY

One example implication of the commercial or domestic application of such research might see electronic behaviours and temperaments encapsulated within simple microchips, to be inserted into existing openly adaptable home technologies. **In this way a consumer may choose to embody their toaster with a playful temperament, their phone with a highly cooperative nature, or indeed a drone with a tenacity for protecting a given object or area.**

CONSUMER OBJECTS

The three illustrated artifact prototypes represent a range of nano drones built upon the same frame work but to differing individual aesthetics. Each nano drone could, in speculation, host a behaviour chip that would influence its signature movement and base functions.



Fig 2/3: A speculative consumer product sold in Maplin's

ACT 3

Performance Post Script

IS AUTONOMY TECHNOLOGY EVER AUTONOMOUS?

Autonomy Technology; any kind of technology that can function without being told what to do by a person on Earth.

Autonomous; having the freedom to act independently. synonyms: self-governing, independent, sovereign, free, self-ruling, self-determining, autarchic; self-sufficient

What you have just watched has been a mix of manually choreographed and autonomously replicated aerial robotics. In a 'call and repeat' manner similar to ancient song, we have just seen direct human manipulation of technology, and then those same actions repeated back to us like a digitally kinetic echo.

How much of what we know as autonomy within technology is truly autonomous, independent and self-determining however? And how much of it is just an echo of our own previously defined constraints?

CONCLUSIONS AND CONSIDERATIONS

Hopefully, we can now see that aerial robotics can exhibit behaviours and temperaments that we as humans (in constant search of meaning) will interpret as recognisable and familiar characteristics. This is quite simply a case of transferring the work of Braitenberg off of the ground, and into the air. The implications of such development in drone or UAV technology may then indeed lead to a better public acceptance of the technology. And similarly may allow for the technology itself to navigate it's own operational environment more easily through manipulating us into a more certain reaction to their own actions. For example a drone that exhibits a passive observant nature would be largely ignored, where as a drone with an aggressive or protective nature will cause those coming into contact with it to flee to a safe distance.

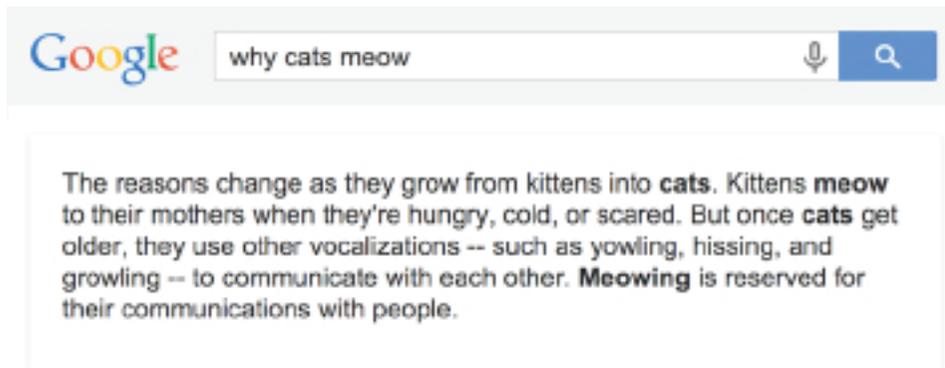
Looking at such human-to-drone interactions more critically we could also argue that we are only ever building upon pre-existing human interpretations. Nothing new has really been 'invented'. The existing aesthetic of over-simple mimicry of human and animal behaviour has already given rise to recognition based interactions rather than perception based engagements. The user experiences something familiar rather than something new, so are conditioned to accept things as they are. Rather than being stimulated to modify their ideas about reality, the users become part of a behavioural 'circuit' [4].

HOW THEY REACT, TO HOW WE REACT, TO HOW THEY ACT

It is this very notion that, in many ways, we find the most interesting. In relating this experiment back to domestication of lethal technology we should think of one of our favourite domestic creatures, the house cat. A domestic house cat has no understanding of human love or affection, yet it very sophisticatedly manipulates us to receive what it needs; a regular diet and a roof over it's head. A cats ability to programing us to become part of their own 'circuit' through their meows is now invisible to us.

**How might we feel if drones became equally adept at such manipulation?
Who would be acting and who reacting in such circumstance?
And what might drones actually need of us in order to begin conducting such manipulations?**

[4] Hertzian Tales. Anthony Dunne. 1999



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The Security Impact of Drones: Challenges and Opportunities for the UK
Experiment on Vertical Perspective. Hito Steyerl Flocking
Algorithm for Autonomous Flying Robots. Csaba Viragh
Creating Lifelike, Emergent Baviour Using a Synthetic Psychology Approach

FILM & TELEVISION

Three Ballets by Wayne McGregor. Chroma/ Infra/ Limen
Romeo & Juliet.
Cat Watch 2014: The lion in your lap

TALKS

James Bridle in conversation with Libby Heaney

CHATS & TUTORIALS

David Chatting
Yuri Suzuki
Mike Vanis
James Auger
Frank Kolkman
Tony Dunne

WEBSITES

All references collated here: <http://www.pinterest.com/lukesturgeon/drones/>