Session One: Future Vision- responsible innovation

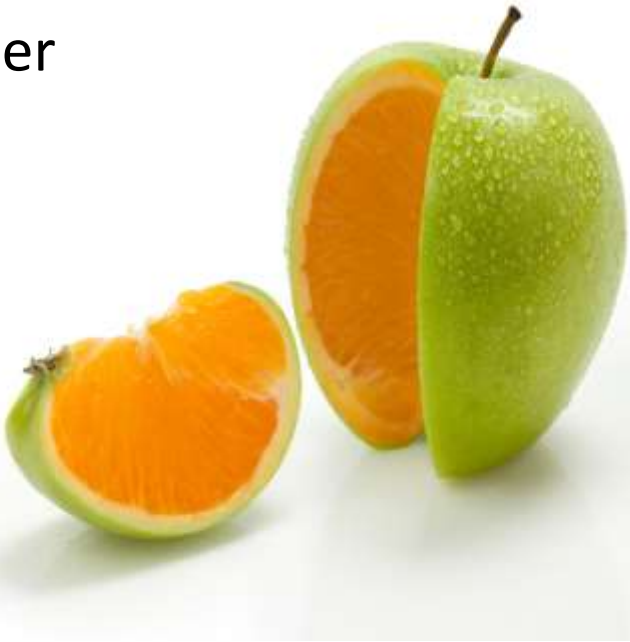
Purpose

- Generate a shared vision for the end point of this project and the reputation you want to gain with some creative stimulus
- Foundation work for the project manifesto
- Talking and sharing ideas with each other

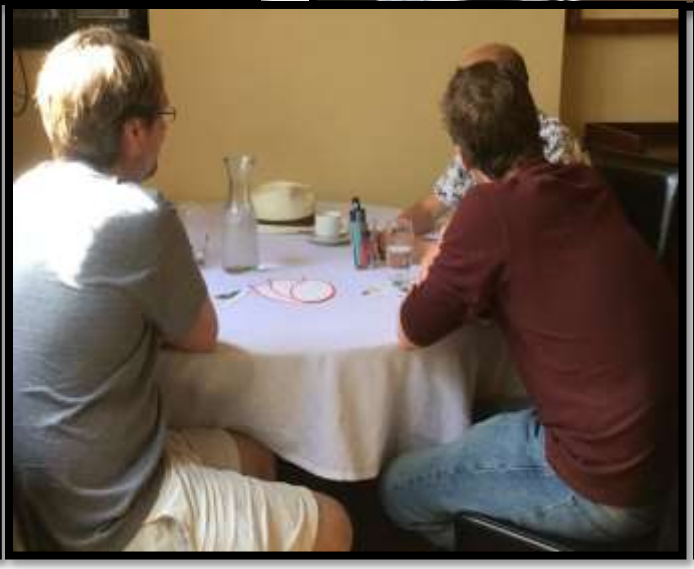
Process

3 activities – dialogue – mixing groups

Reflection and actions



Discussing 2021 - Future Vision/Reputation



Our Shared Vision for 2021

Things to Focus on to achieve vision

- Communication
  - Create and maintain communication channels.
  - Frequent communication between experimentalists and theorists.
- Do my job!
- Robust, flexible problem solving
- Jamie: make tools – tell me what the tools need to do
- Make sure meetings are fun – have access to pubs/social lubrication
- Be collegiate
- Focus on the details and be mindful of the big picture
- Community support for individual careers
- Make time
- Ethical implications – weapons use
- To ensure not a car crash – make sure everyone is signing up to the vision and everyone needs to say if they have a different vision.
- Meta Data – balance of time and effort
- Data Security
- Open Source (always?)

Session 2: Beyond the Lab

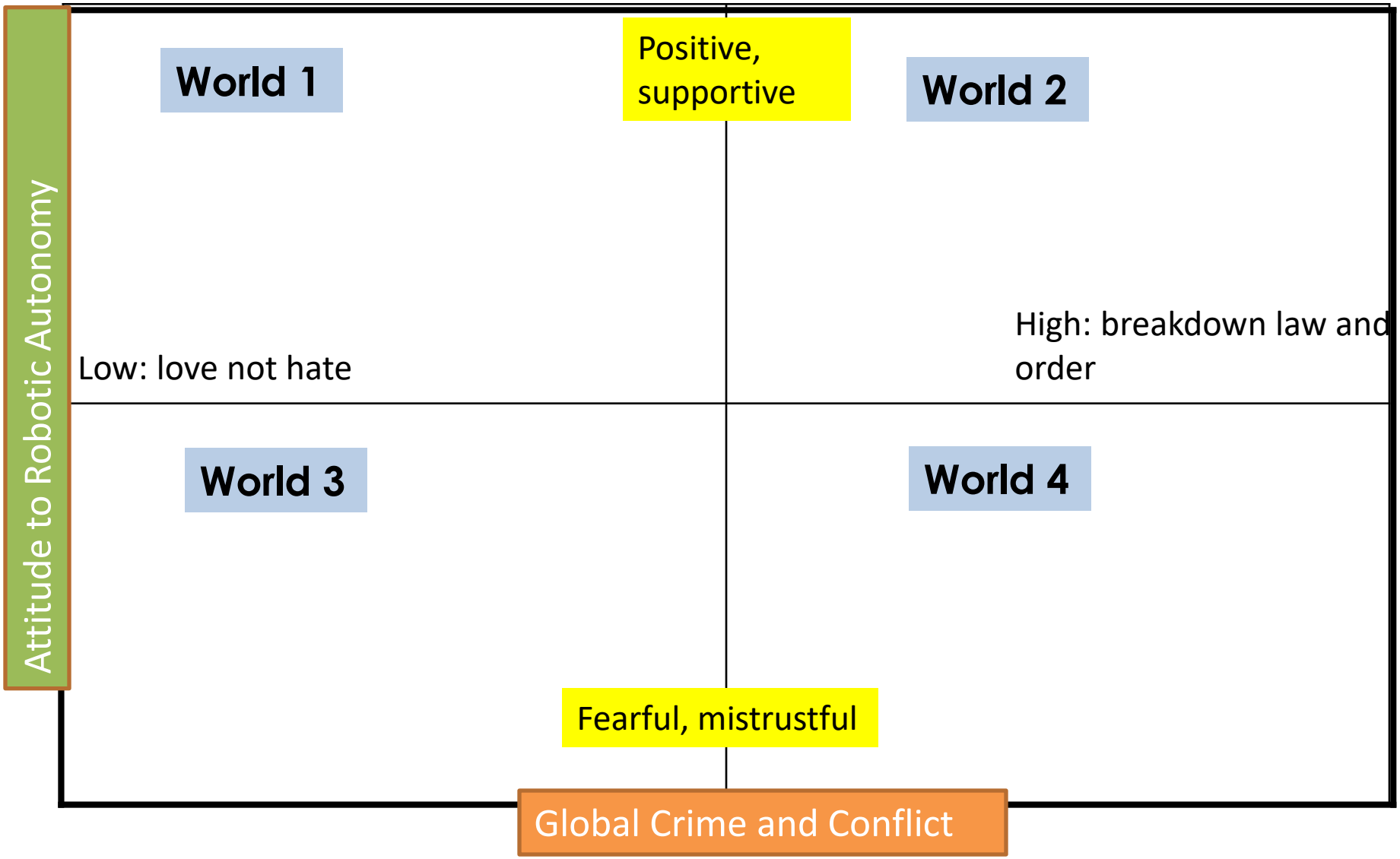
Purpose

To anticipate the future possibilities for our world and the implications for this project

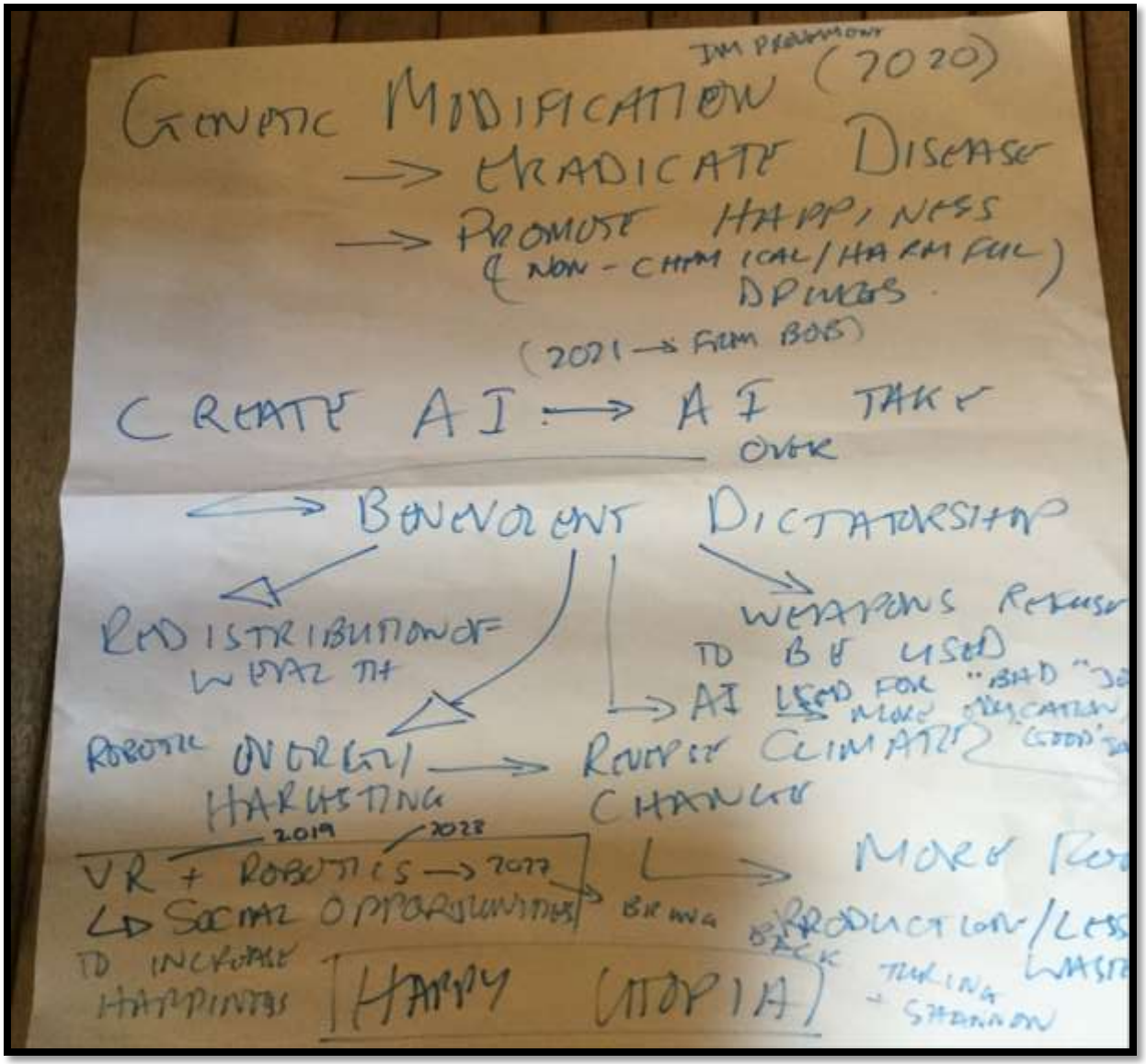
Activity

- Exploring scenarios
- Stimulating discussion about possible implications and risks
- Agree any actions to be taken

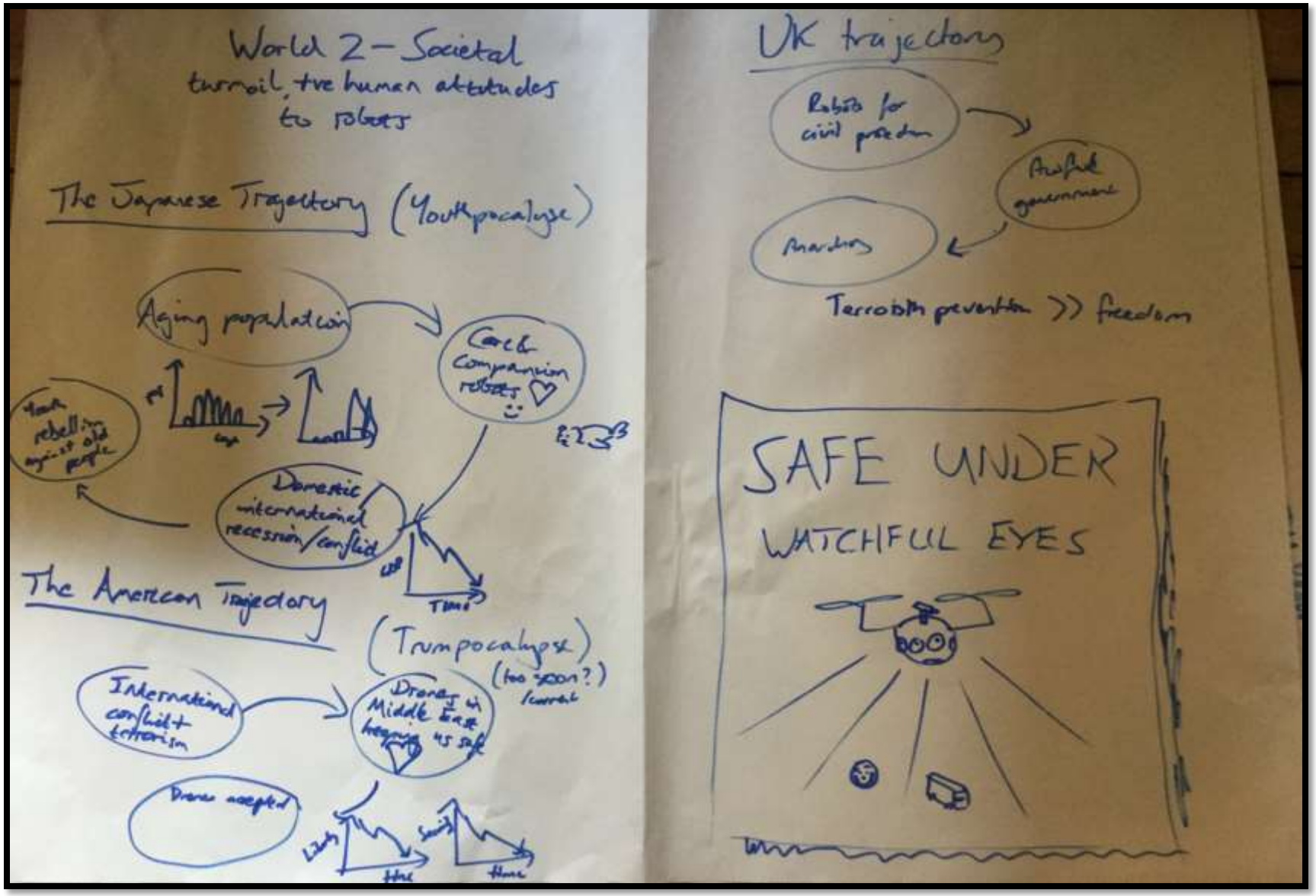
Generate Scenarios 2027



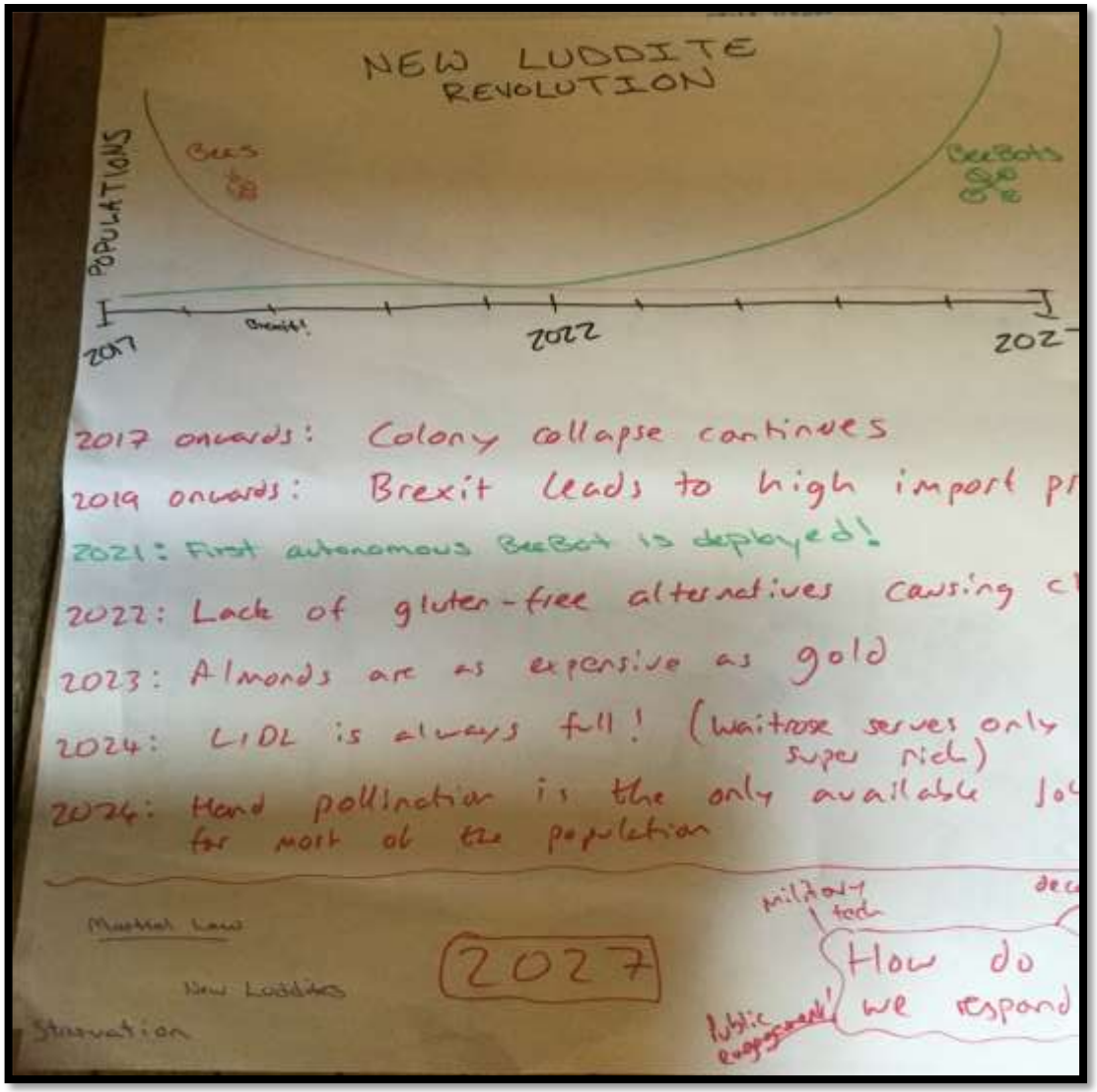
World One– Happy Utopia



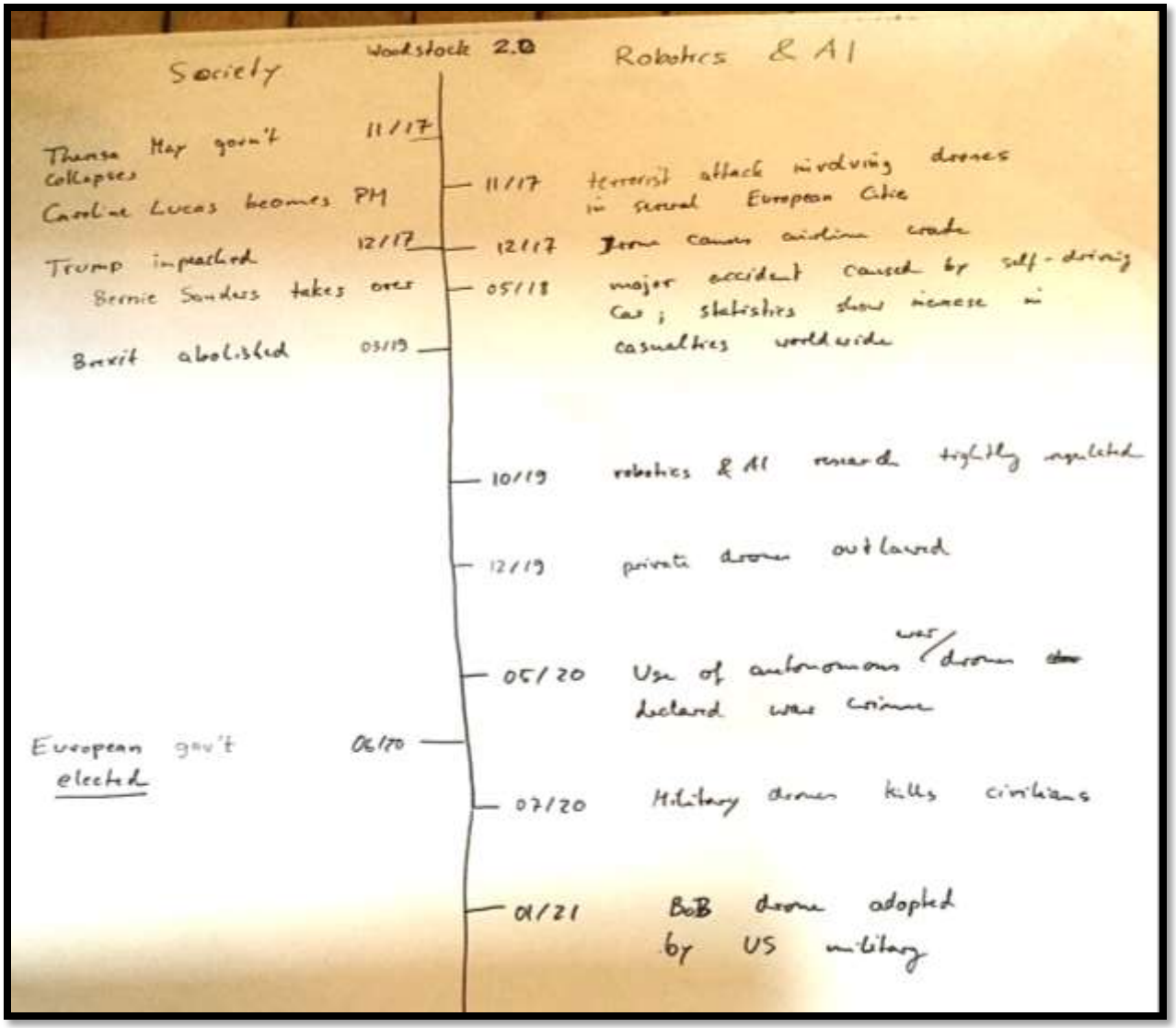
World 2: Safe Under Watchful Eyes



World 3: New Luddite Revolution



World 4: Woodstock 2.0



Reflections and Review

Session 3: Exploring AREA

Purpose

Explore the EPSRC Guidance on Responsible Innovation and relate to this project – demonstrate you have consider it and taken appropriate action

Activity

- Complete audit questions on product/process and purpose – assess what is in place
- Identify any areas for further work

AREA

Anticipate

Engage

"Responsible Innovation means taking care of the future through collective stewardship of science and innovation in the present"

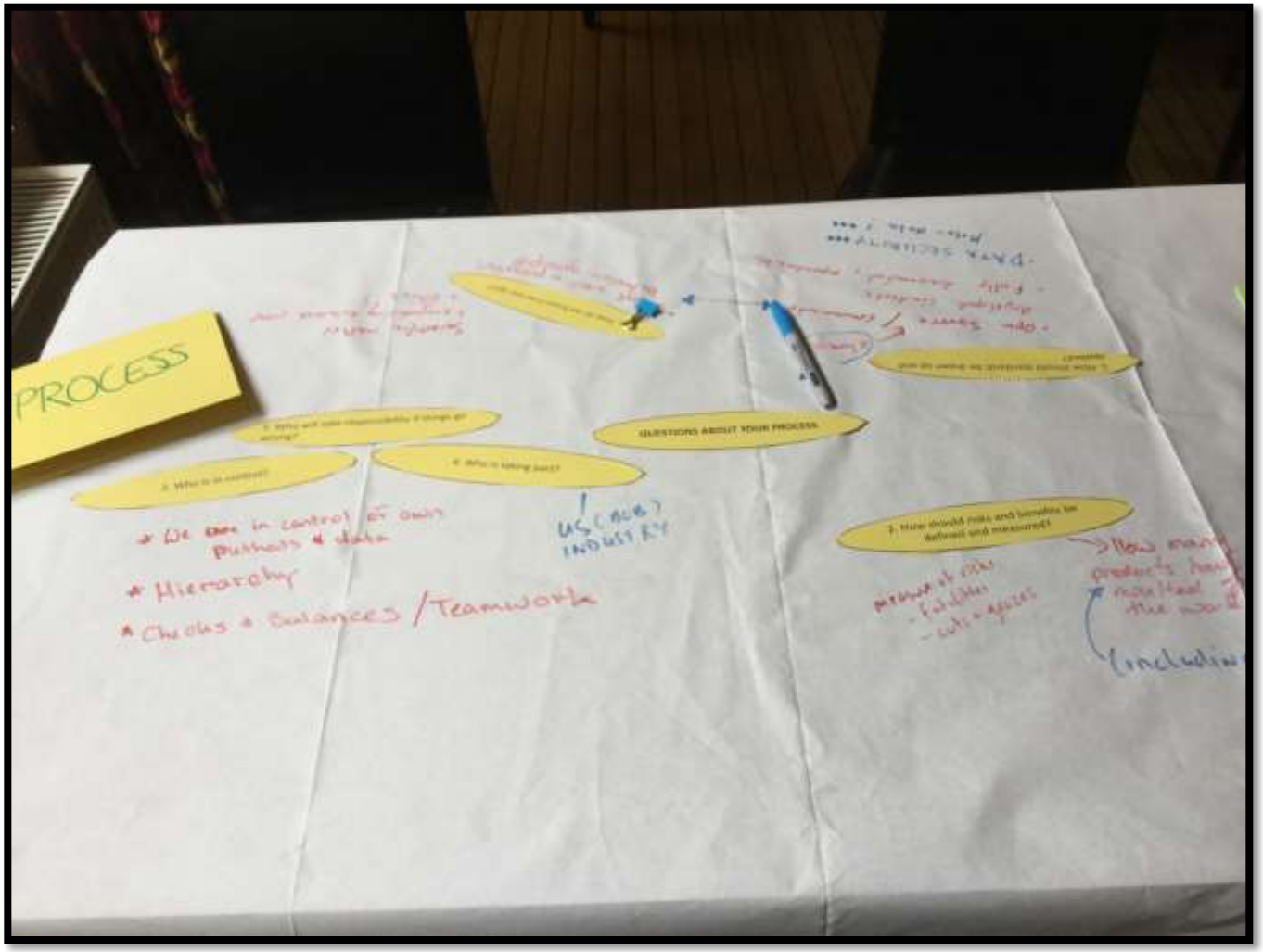
Stilgoe, Owen, Macnaughten – Nov 2013 Research Policy

Reflect

Act

Review of Audit Questions

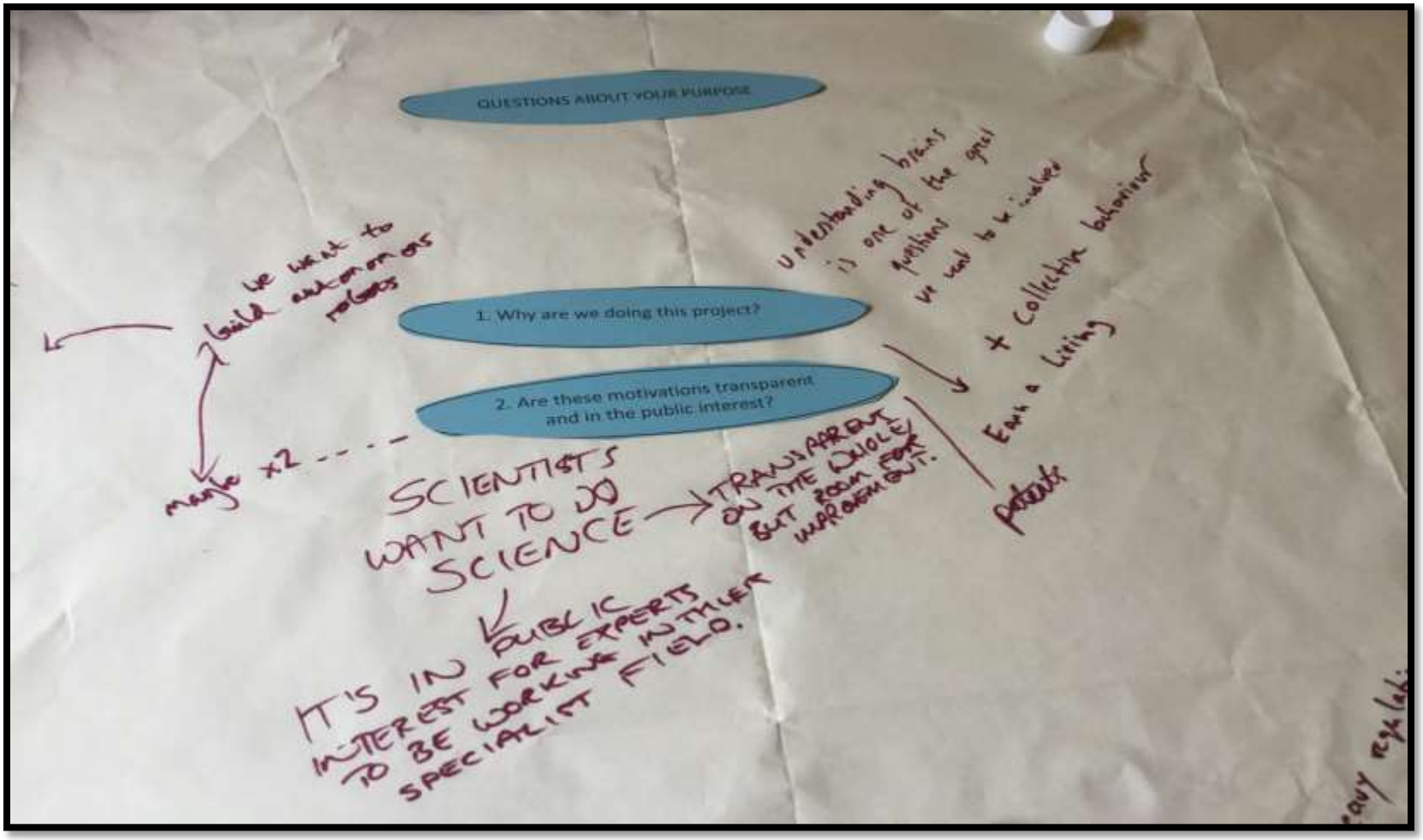
Process


PROCESS
QUESTIONS ABOUT YOUR PROCESS
* We in control of our
* Hierarchy
* Checks & Balances / Teamwork
US (ALL)
INDUSTRY

Process Audit

1. **How should standards be drawn up and applied?**
   - Open Source/Community Developed Standards (always?)
   - Fully documented and reproducible
   - Data Security
   - Meta Data
2. **How should risks and benefits be defined and measured?**
   - Measure of risks – fatalities and cut/grazes
   - How many products have resulted from the work? – including publications
3. **Who is in control?**
   - We are in control of own methods and data
   - Hierarchy
   - Checks and balances/teamwork
4. **Who is taking part?**
   - US (BoB)
   - Industry
5. **Who will take responsibility if things go wrong? – no response**
6. **How do we know if we are right?**
   - **Share work in progress between groups**
   - **Scientific methods and engineering existence**
   - **Ethics??**

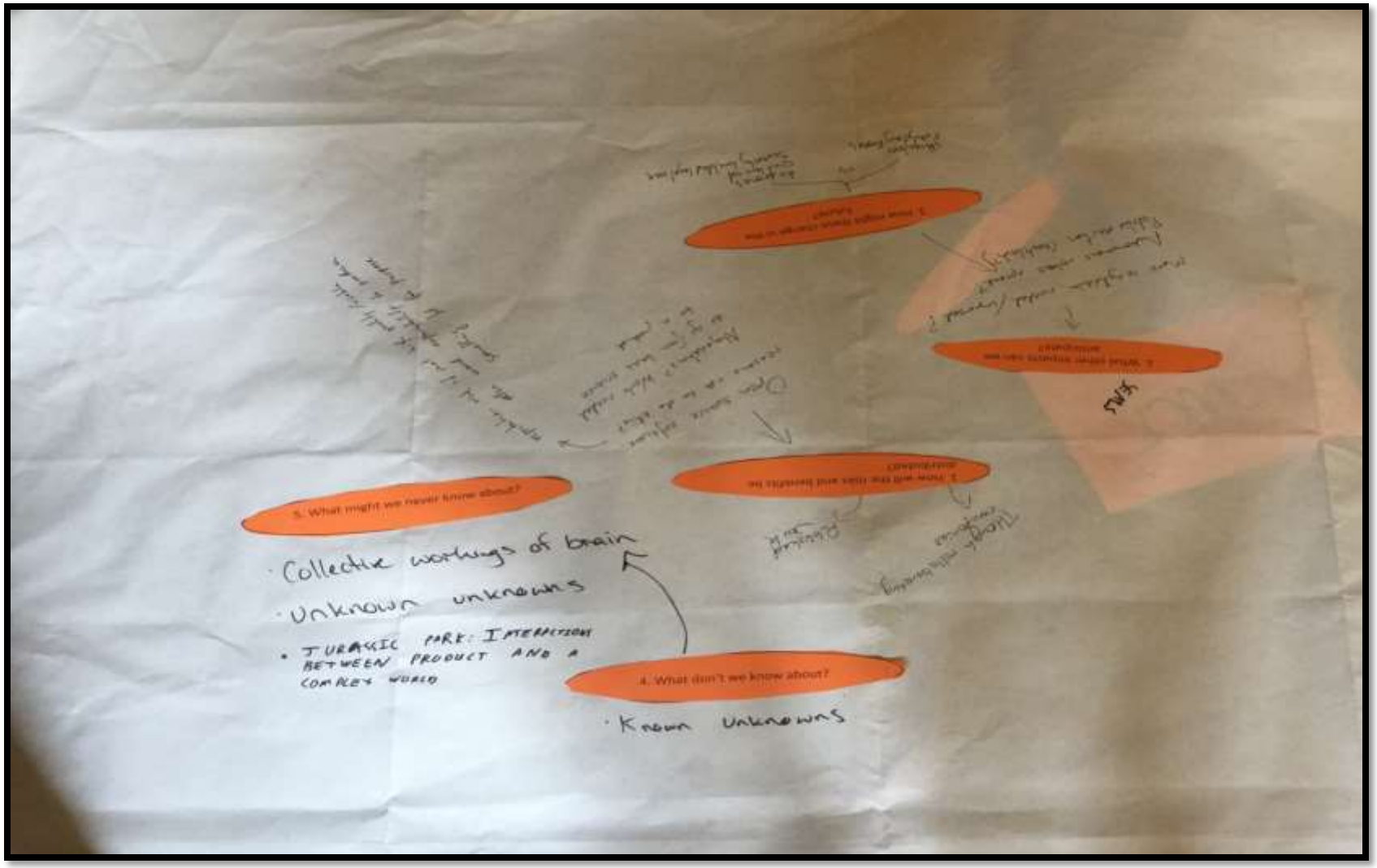
Purpose Audit



Purpose Audit

1. **Why are we doing this project?**
   - Understanding brains and collective behaviour are some of the great questions and we want to be involved in this
   - Earn a living
2. **Are these motivations transparent and in the public interest?**
   - Scientists want to do science - Transparent on the whole but room for improvement - Its in the public interest for experts to be working in their specialist field
   - Patents
   - Maybe x 2……. We want to build autonomous robots to solve real world problems (eventually) – future forming, search and rescue in dangerous conditions (dull, dirty and dangerous)
3. **Who will benefit?**
   - Academics, Neuroscientists, Philosophy
   - General Public
   - UK PLC
4. **What are they going to gain?**
   - New business area
   - Scientific knowledge
5. **What are the alternatives?**
   - Private ownership of tech rather than public
   - Heavy regulations outlaws drones
   - Less robust solutions by someone else
   - Leaving drone tech to the military

Product Audit



Product Audit

1. **How will the risks and benefits be distributed?**
   - Open Source Software – reasons not to do this?
   - Algorithms? Work needed to go from basic science to a product
   - Published Work
   - Through collaborating companies
2. **What other impacts can we anticipate?**
   - SEALS
   - More regulation needed/imposed?
   - Public reaction (backlash?)
3. **How might these change in the future?**
   - Ubiquitous everyday drones
   - Versus no drones, outlawed, severely limited legal use
4. **What don't we know about?**
   - Known Unknowns
5. **What might we never know about?**
   - Collective workings of brain
   - Unknown unknowns
   - Jurassic Park: interaction between the product and a complex world

Session 6: Responsible Advocacy

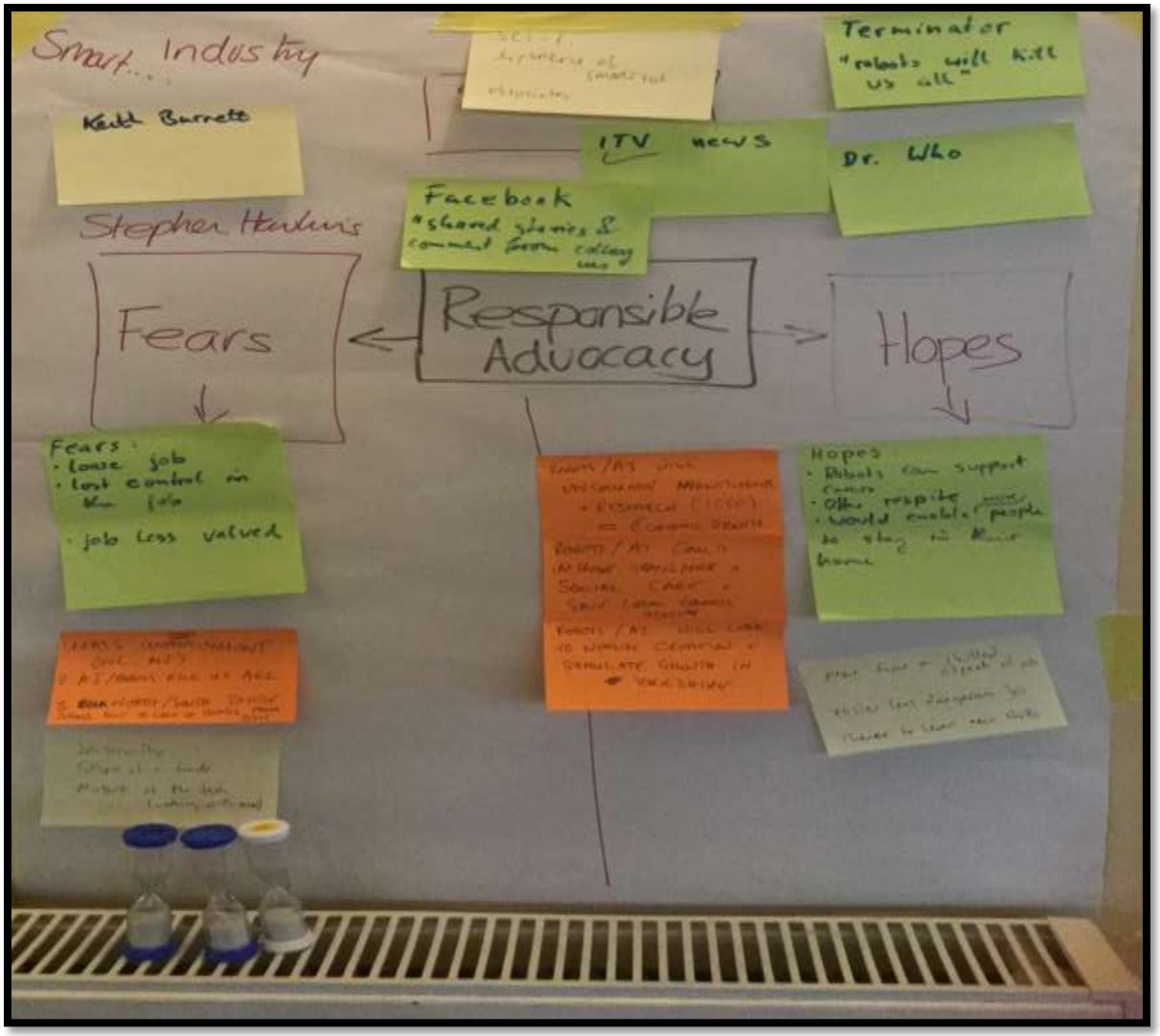
Purpose

To explore the barriers and challenges you face in communicating the risks and rewards of this project and generate some possibilities for future advocacy – anticipate/engage

Process

1. Explore different perspectives
2. Where in the World? Creative thinking
3. Guidelines of responsible advocacy

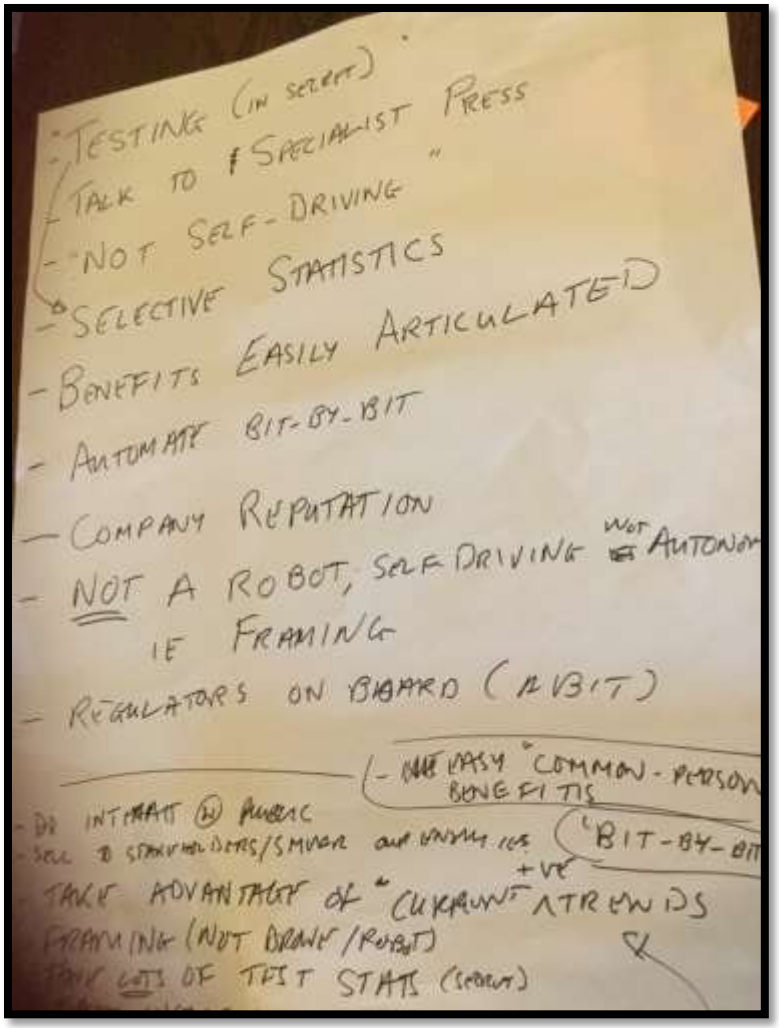
Responsible Advocacy: Public Perception



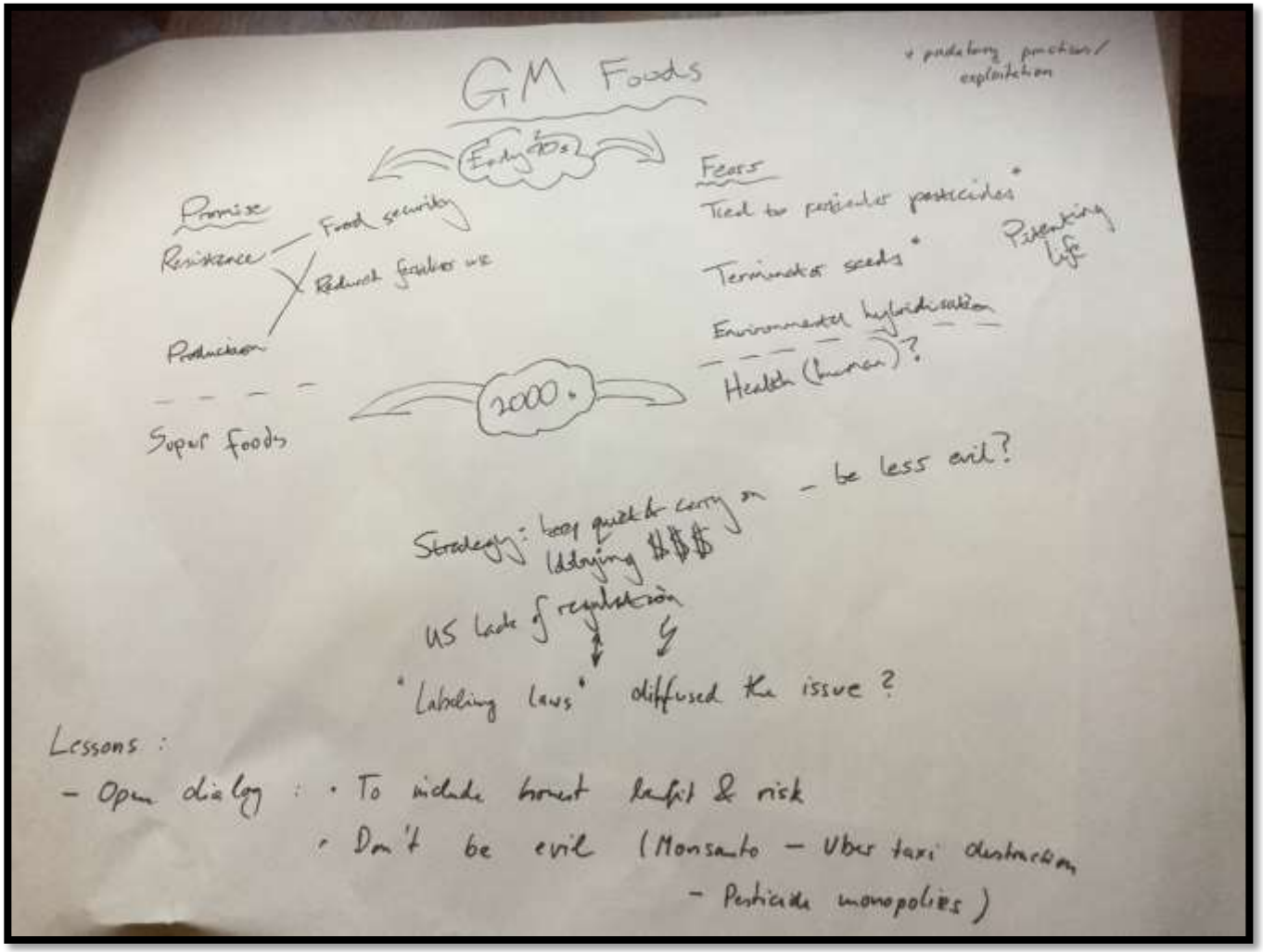
Responsible Innovation: Discussions

Exploring Other Examples Where Similar Challenge Faced

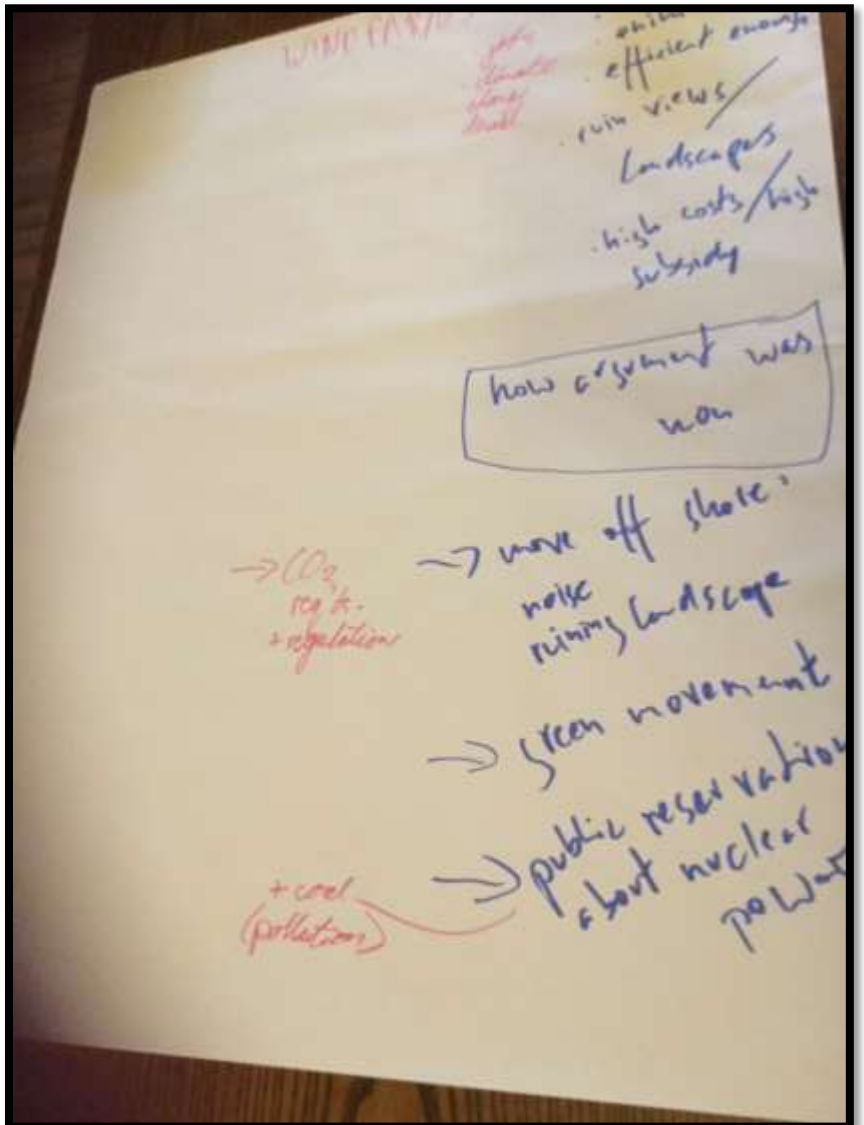
Autonomous Cars



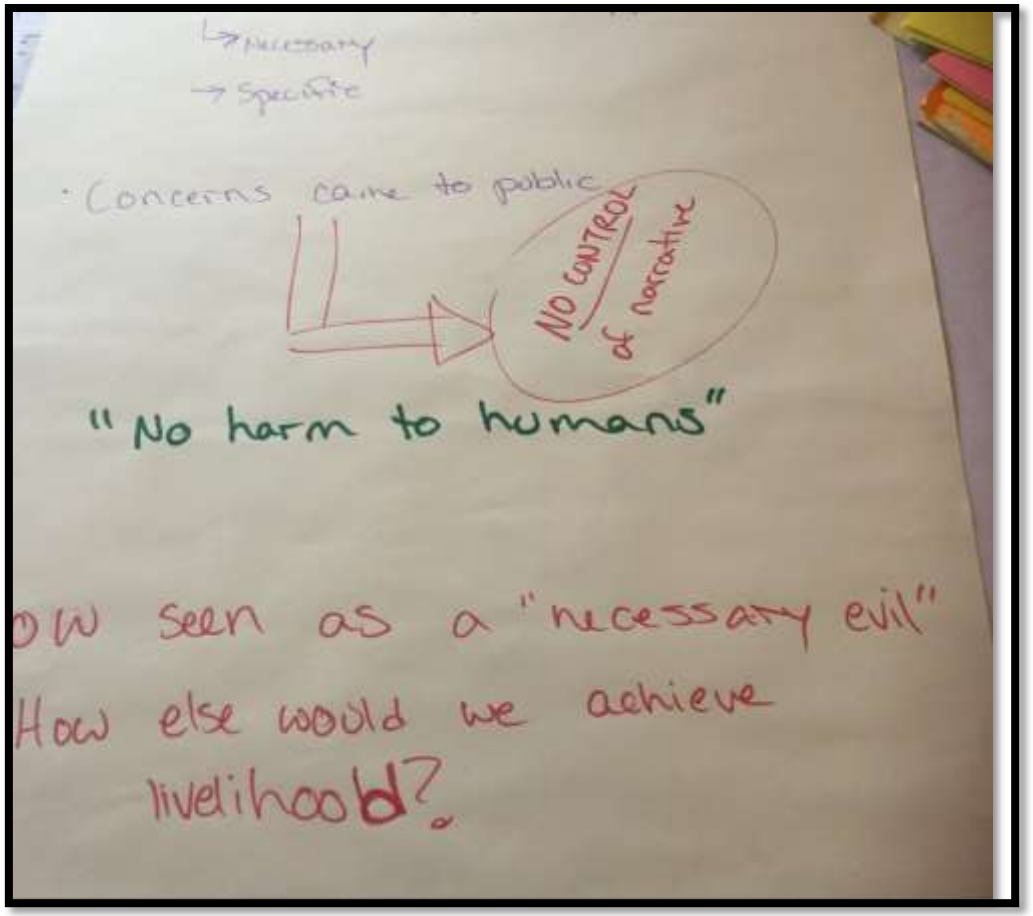
GM Foods


GM Foods
+ predatory practices / exploitation
Early 90s
Promise
Resistance
Food security
Reduced pesticide use
Production
Super foods
2000s
Fears
Tied to pesticides
Terminator seeds
Environmental hybridisation
Health (human)?
Preventing life
Strategy: keep quick to carry on delaying $$$ - be less evil?
US lack of regulation
"Labeling laws" diffused the issue?
Lessons:
- Open dialog: · To include honest benefit & risk
· Don't be evil (Monsanto - Uber taxi destruction - Pesticide monopolies)

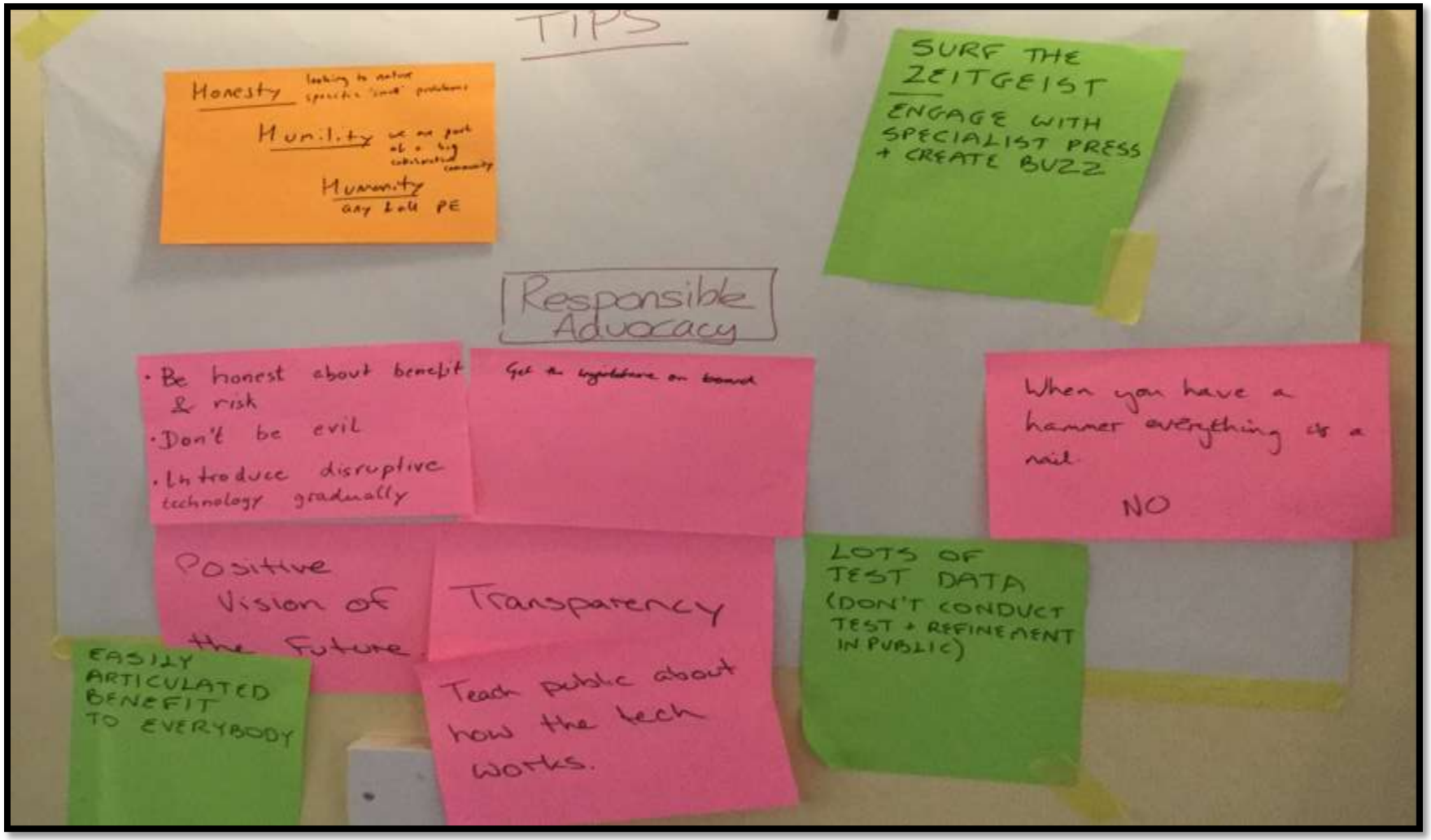
Wind Farms


efficient enough
ruin views
Landscapes
high costs/high subsidy
how argument was won
move off shore
noise
ruining landscape
green movement
public reservation about nuclear
+ coal (pollution)

Pesticides

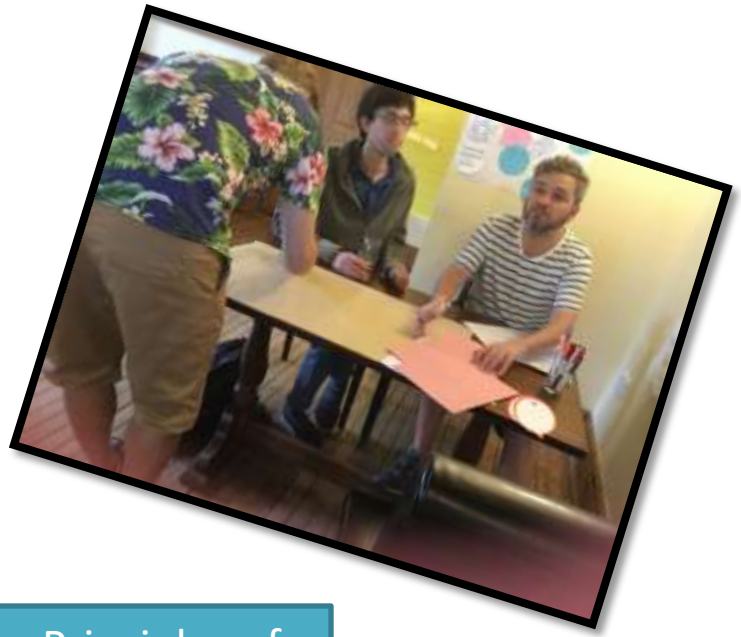

→ Necessary
→ Specific
· Concerns came to public
NO CONTROL of narrative
"No harm to humans"
now seen as a "necessary evil"
How else would we achieve
livelihood?

Tips for Responsible Advocacy



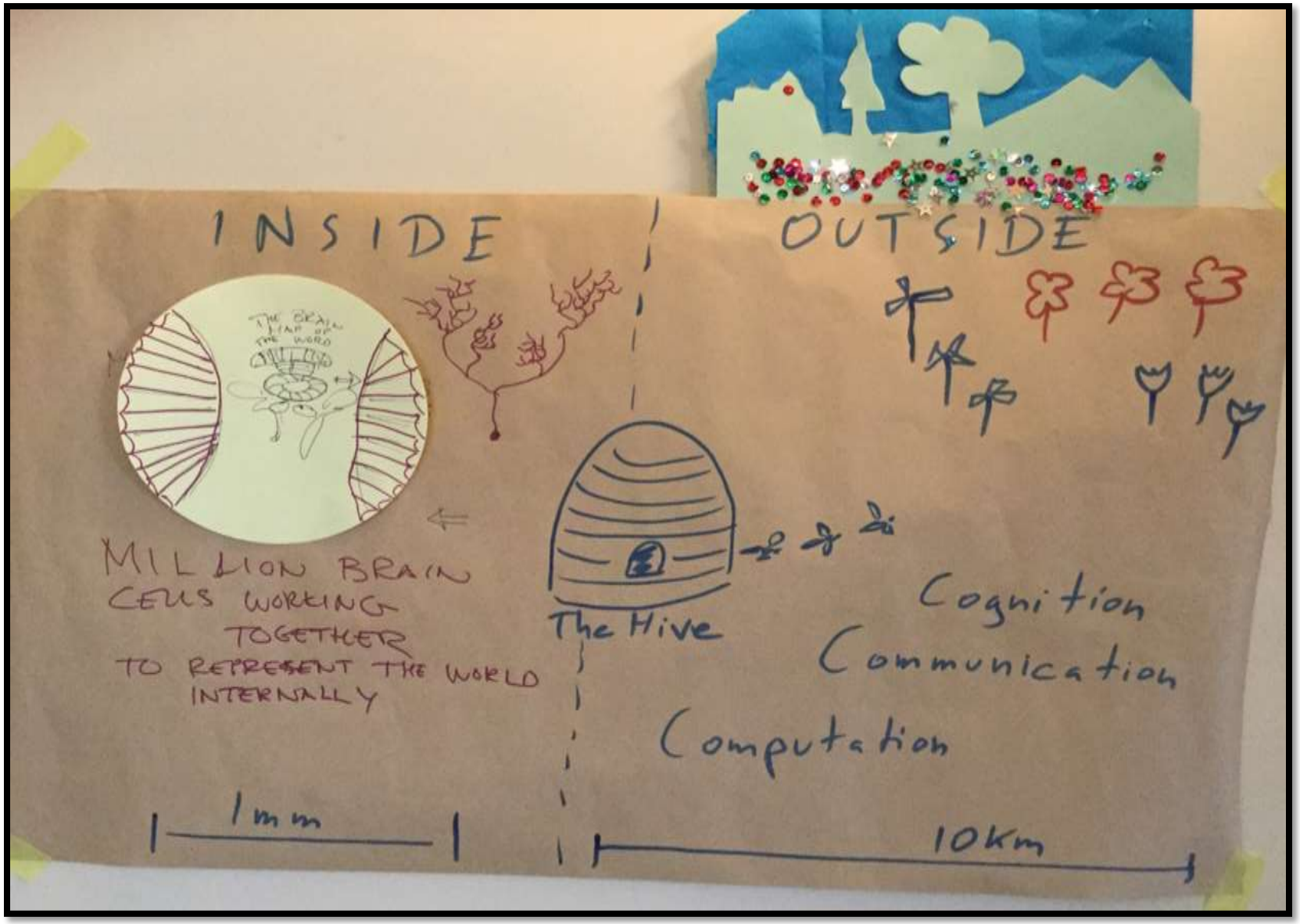
Day Two

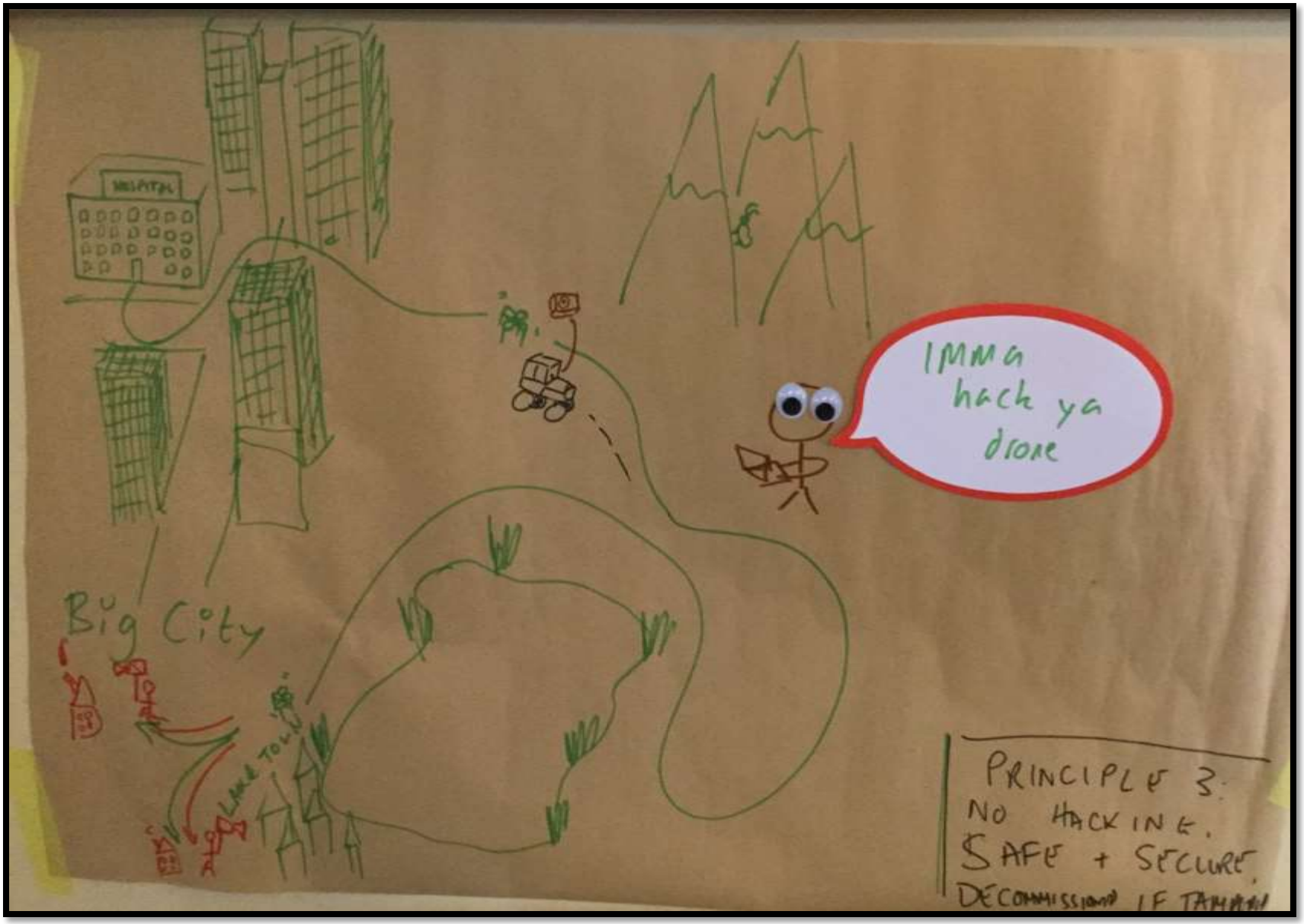
Responsible Robotics – Alan Winfield



Communicating Principles of Responsible Robotics – Creative Presentations

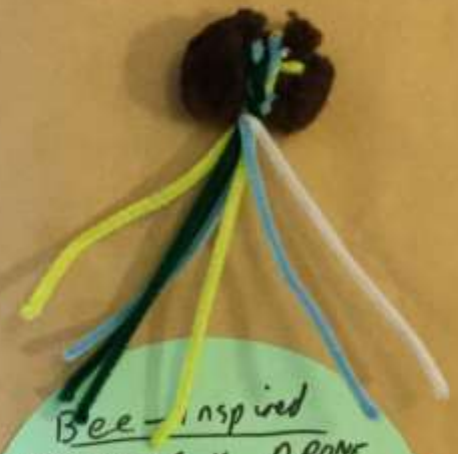
Engaging with the Public


INSIDE
OUTSIDE
MILLION BRAIN CELLS WORKING TOGETHER TO REPRESENT THE WORLD INTERNALLY
The Hive
Cognition
Communication
Computation
1mm
10km


IMMA hack ya drone
Big City
PRINCIPLE 3:
NO HACKING.
SAFE + SECURE.

BLACK BOX

Current Practice
(in aviation)
- voice recorder
- data recorder



Bee-inspired DELIVERY DRONE
- MOTOR COMMANDS
- ALL BRAIN CELLS?
- WHAT HAS DRONE LEARNT?

"Bee Drones"
inherently ~~safe~~ low risk
- small & light
- no "weapons" or capacity to add them

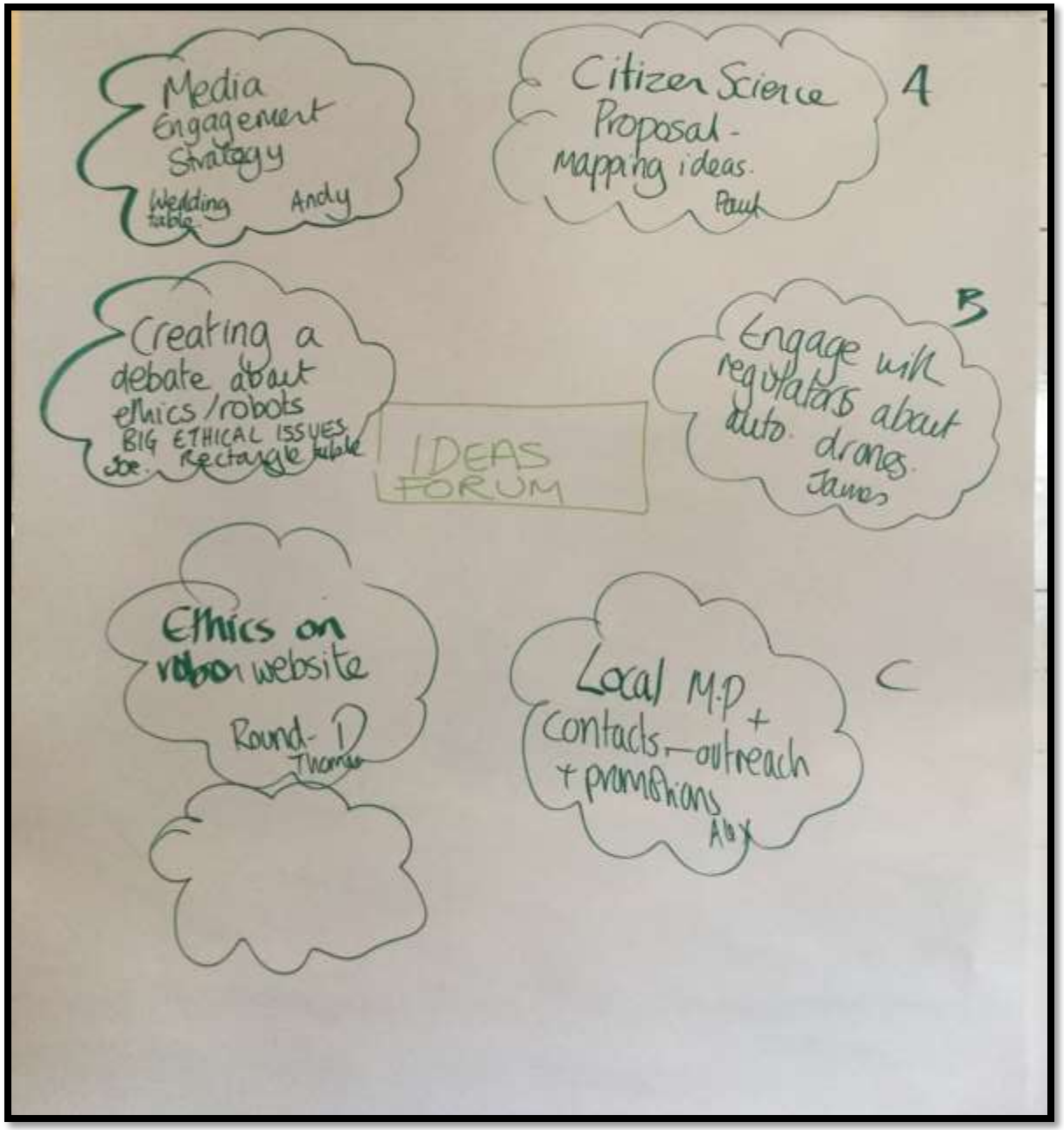
KEY Qs
1) What level of detail?
2) What strategy as robots are developed?

What Helped Engagement in our Presentations

- Use of metaphors – neuron as a tiny oak tree
- Using people as props – interactive
- Interesting scientific facts – using simple terms
- Lack of hyperbole in the presentations
- Using a practical example of how drones can do useful stuff
- Discussion of tech – teach/repeat – simple example
- Highlighted potential problems and offered ideas for solving them
- Honest about limitations – don't just lie about this and gloss over it
- Provided positive examples of a better future with the drones

Responsible Advocacy in Practice

- Reflect on the work we have done today and the emerging action points
- Identify 1-2 specific proposals that will help us to influence policy makers and/or communicate with the public about risks and rewards
  - Outreach
  - Publications
  - Social Media
  - Presentations


Media Engagement Strategy
Wedding table
Andy
Citizen Science Proposal - Mapping ideas.
Paul
4
Creating a debate about ethics/robots
BIG ETHICAL ISSUES
Joe. Rectangle table
IDEAS FORUM
Engage with regulators about auto. drones.
James
B
Ethics on robot website
Round-T
Thomas
Local M.P + contacts - outreach + promotions
Alex
C

Developing Proposals

Proposal: Public Consultation

What is your proposal?

Public consultation with stakeholders about hopes and fears for drone tech
Phase 2 – public forum (Chelsea)

What will the outcomes be?

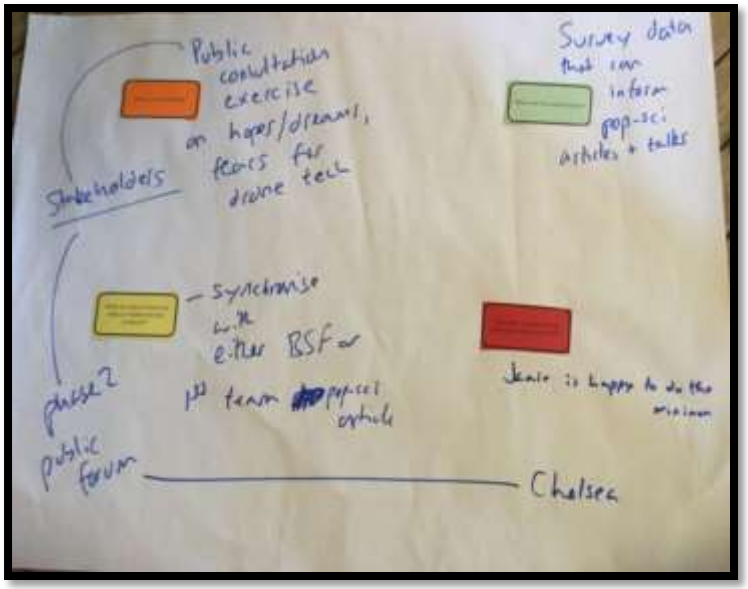
Survey data that can inform pop science articles and talks

What are some of the first steps to implement this proposal?

Synchronise with either BSF or 1st team pop science article

Who else is interested in getting involved with this?

Jamie is happy to do the minimum



Proposal: Team Outreach Strategy

What is your proposal?

Develop a team outreach strategy

What will the outcomes be?

A website

Coherent approach

Sharing resources and opportunities

Data on engagement (impact??)

What are some of the first steps to implement this proposal?

Communicate Twitter/FB/Social Media Strategy to team

Internal website for resources, opportunities, events

External website (fed by internal?)

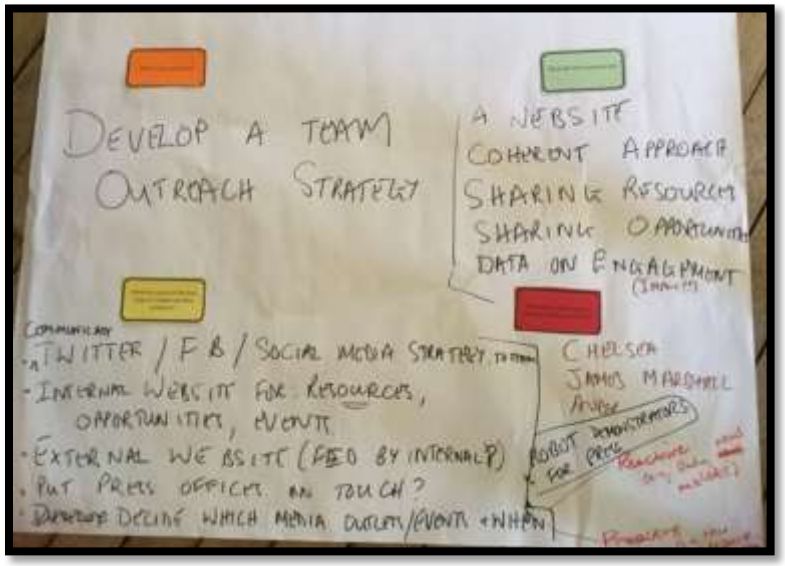
Put press officer in touch?

Decide which media outlets/events and when – proactive(eg New Scientist) and Reactive eg Daily outlooks

Robot demonstrators for press

Who else is interested in getting involved with this?

Chelsea, James Marshall, Andy



Proposal: Influencing Policy Makers

What is your proposal?

Make personal contact with policy makers – MPs, parliamentary bodies, etc

What will the outcomes be?

Ultimately to influence policy

Promotion of project

Better publicity (media engagement) for events etc.

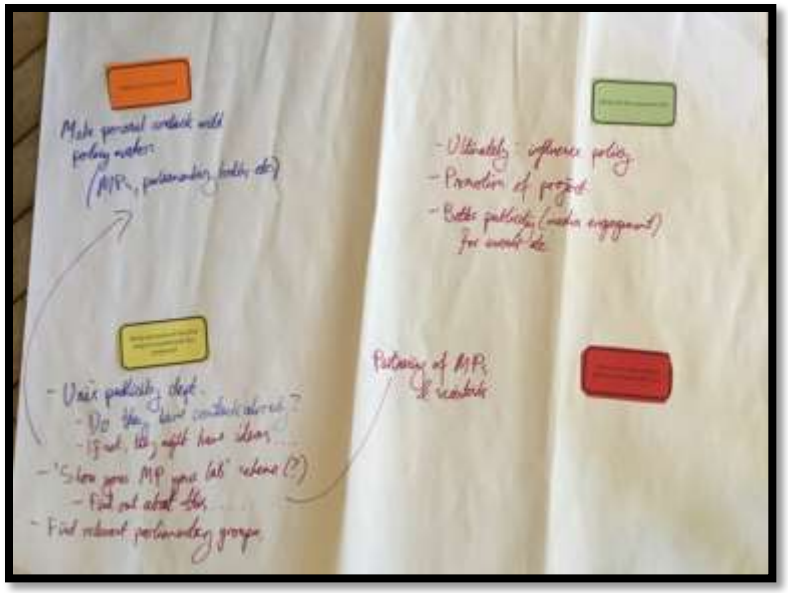
What are some of the first steps to implement this proposal?

University's publicity department – do they have contacts already? If not they might have ideas….

"Show your MP your lab" scheme (?) – find out about this- Partnering of MPs and scientists

Find relevant parliamentary groups

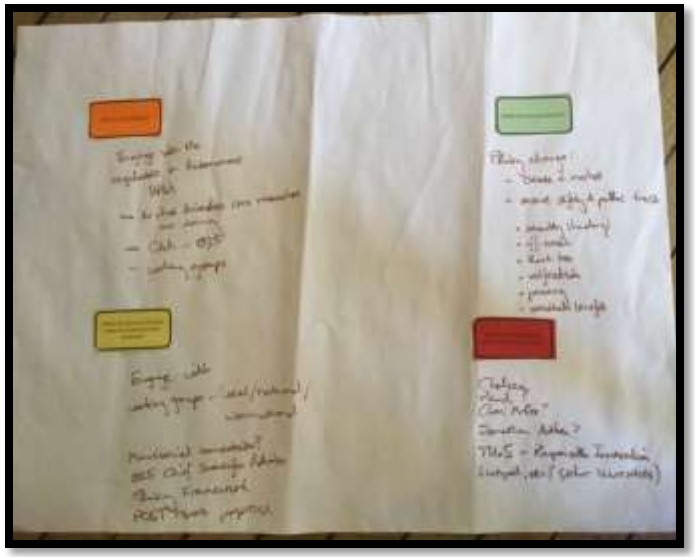
Who else is interested in getting involved with this?



Proposal: Engage with Regulators

What is your proposal?

Engage with regulators on autonomous UAVs
Do what driverless cars researchers are doing
CAA – BIS
Working groups



What will the outcomes be?

Policy change:

- Create a market
- Ensure safety and public trust
- Security (hacking)
- Off switch
- Black box
- Verification
- Privacy
- Societal benefits

What are some of the first steps to implement this proposal?

Engage with working groups (local/national/international)
Ministerial connection?
BIS Chief Scientific Adviser
Policy Framework
POST report proposal

Who else is interested in getting involved with this?

Chelsea, Paul? Owen McRee? Jonathan Aitken? TU.S – responsible innovation, Liverpool etc. (other Universities)

Proposal: Promoting Public Debate

What is your proposal?

Promote public debate on robo-ethics

Work towards public consensus on ethical issues

What will the outcomes be?

Public conversation

Public communicating with MPs

Politicians forced to declare positions of robo-ethics

Public pressure on regulators

What are some of the first steps to implement this proposal?

Contact/Invite MPs

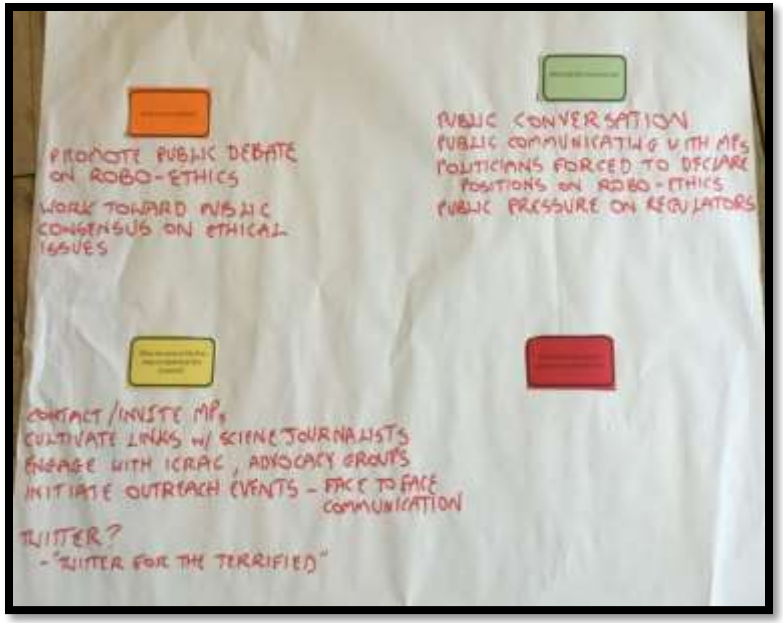
Cultivate links with scientific journalists

Engage with ICRAC, Advocacy Groups

Initiate outreach events – face to face communication

Twitter? – “Twitter for the Terrified”

Who else is interested in getting involved with this?



Proposal: Website Development

What is your proposal?

Create an ethics and advocacy section of the project website

Press coverage page?! – University press officers/tracking services?

“Ask me anything” form

What will the outcomes be?

Visible engagement on the web

Positive publicity

Discoverability

What are some of the first steps to implement this proposal?

Provide first set of links/content for web designer

Put processes in place for updates

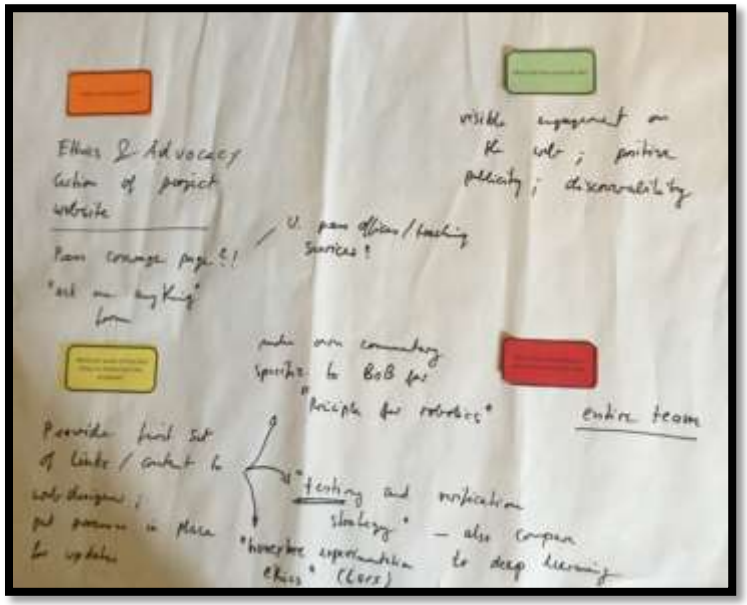
Make own commentary specific to BoB for “principles for robotics”

Testing and Verification strategy – also compare to deep learning

“Honey Bee Experimentation Ethics” - Lars

Who else is interested in getting involved with this?

Entire team



Project Manifesto

Purpose

To articulate how you as a team are going to embody the principles of responsible innovation and advocacy into the way of life of your project.

Activity

- Reflect on AREA, 5 Principles and 7 High level Messages and all our conversations
- Generate draft manifestos
- Share manifesto
- Identify phrases in common
- Use these to be part of your project DNA

Sharing Manifestos

Brains on Board Manifesto

We Believe

In understanding bee brains and adaptive technology, we can use how the honey bee brain uses and gathers information for the designing and building of UAV

Technology serves people and should be beneficial to as many people as possible

Drones/robots can be a positive force in society

In the value of basic research

We Recognise

Technology can be misused and has its limitations and that drone use has risks

The public perceptions of these risks, including accidents, conflict, weapons, surveillance

This project is taxpayer funded

We Commit

To responsible open science where we will always be transparent about goals and practices

Use open source and open data approach whenever practically possible (Git Hub etc)

To mitigate technology use and thus minimising the risks of drone use

The 3 Rs of research – replace, reduce, refinement

We will take the following steps

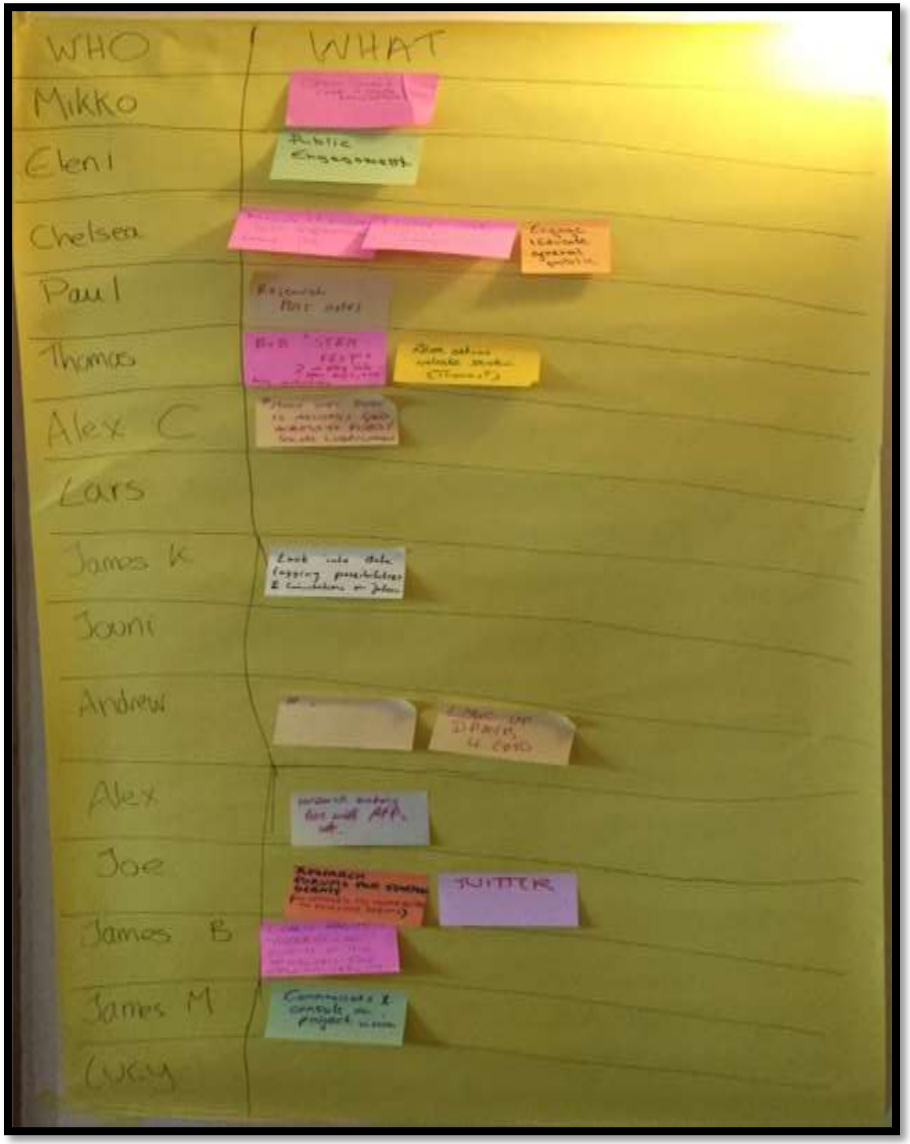
Engage with stakeholders, including government, industry, policy makers, regulators, science community and general public advocating responsible robotics

Share positive vision of “robotics in the future”

Consider the consequences of releasing *algorithm* (misuse)

“First do no harm” but data transparency (not code, data)

Action Plan


WHO
WHAT
Mikko
Eleni
Public Engagement
Chelsea
Paul
Thomas
Alex C
Lars
James K
Joni
Andrew
Alex
Joe
TWITTER
James B
James M
Lucy