

Intelligent Robotics in Science and Society

Evaluation report

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1 Introduction

1.1 *Event aims*

Intelligent Robotics in Science and Society was a parliamentary reception organised by the Institute of Physics, the Parliamentary Office of Science and Technology and Walking with Robots. It took place on 22 April 2008 at the House of Commons. Twelve robots represented organisations working in various areas of robotics research in the UK and three speakers gave five minute presentations.

The event had the following aims:

1. To brief parliamentarians on current UK robotics research;
2. To discuss the possible future impact of robotics on society;
3. To address public concerns around robotics;
4. To provide opportunity for roboticists to meet policy makers;
5. To raise the profile of the POST, the IOP and Walking with Robots.

1.2 *Event format*

The event took place in the Members' Dining Room in the House of Commons. Following a brief introduction from the chair, it began with three five-minute presentations from roboticists representing different areas of the field:

- Professor Noel Sharkey from the University of Sheffield spoke about some of the ethical pitfalls of robotics that may beset us in the near future if we are unprepared
- Professor Kerstin Dautenhahn from the University of Hertfordshire spoke about "Social and healthcare robotics"
- Dr Dave Barnes from Aberystwyth University spoke about "UK space robotics"

The event exhibitors brought robots to display and were on hand to answer any questions from visitors. Food and drink were provided, which lent the event an informal air. Represented at the event were:

- Imperial College and Acrobot – Medical Professional Service Robots
- Bristol Robotics Lab and Elumotion Ltd – Humanoid Service Robots
- University of Aberystwyth – Robots for Oceanographic Monitoring
- University of Aberystwyth, EADS Astrium and SciSys – Robots in Space
- University of Hertfordshire – Robots as social mediators and home companions
- Open University and University of the West of England 'Walking with Robots' Network – Robots in education
- University of Essex and Swarm Systems Ltd – MOD Grand Challenge: Autonomous flying micro air vehicles
- Shadow Robot Company – Humanoid Robotics Technologies

2 Evaluation methodology

The evaluation captured the opinions of attendees and exhibitors. Attendees were asked to complete a short exit questionnaire. 52 questionnaires were completed which represented a good return rate of approximately 40%.

Exhibitors were sent an e-survey following the event. Two subsequent reminders yielded 21 responses from the 32 exhibitors.

3 Findings

3.1 Event metrics

168 people registered for the event, including 32 MPs and 22 Peers. Several potential attendees registered late but were turned away as the registration list had reached capacity.

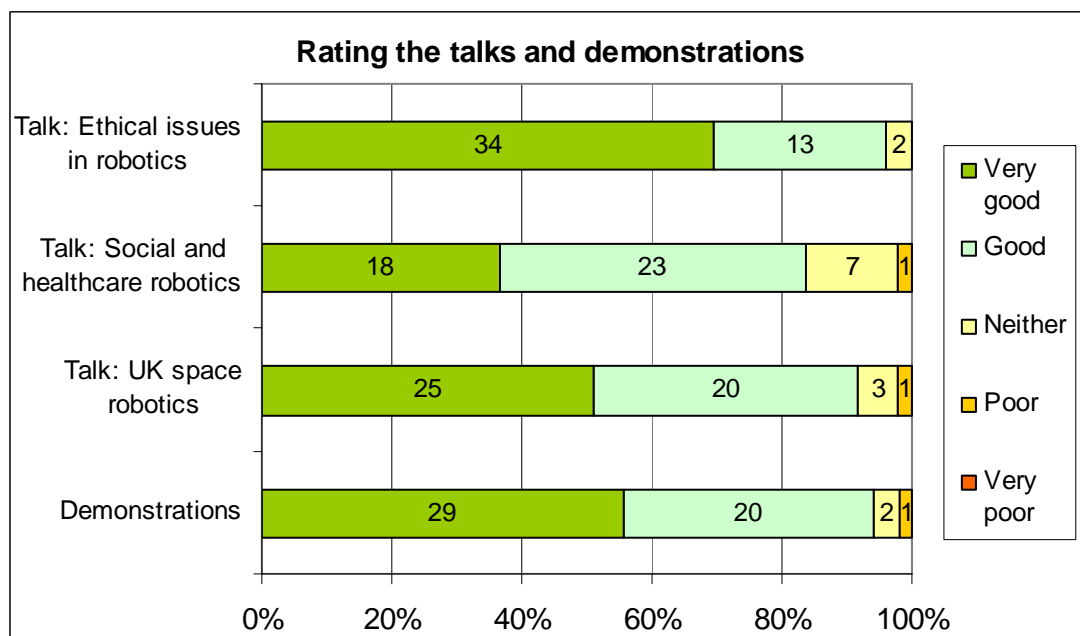
The organisers estimate that approximately 75% of those that registered actually attended, meaning an audience size of 120-130 excluding the exhibitors.

Of these, at least 11 MPs and 6 Peers attended, including the Science Minister. However, this is likely to be an underestimate as it was not possible to register all attendees as they arrived at the venue.

3.2 Attendees' feedback

Event rating

Attendees were asked to rate various aspects of the event on a five-point scale. Results are summarised in the chart below:



It is clear from the chart that the event was well received. All elements of the event were rated as 'good' or 'very good' by over 80% of attendees.

Comments on the talks

Respondents were given space to comment on the talks in the questionnaire. Interestingly, different audience members identified different talks as the most interesting, presumably depending on their own personal or professional interests. The key points raised were:

- The talks were a useful starting point for discussions;
- Keeping them short worked well;
- There could have been clearer linkage between the three topics.

Several respondents commented that the talks were a **useful starting point** for the event:

Raised important issues in UK Robotics

Good ranges of issues covered with demonstrations providing more detail on some areas and opportunity to discuss with speakers

Made you think about the bigger picture

Good balance across the area and aspects/ issues of input - showed the relevance of robots clearly

Varied, different perspective, interesting

Some respondents also felt that **keeping the talks short** was appropriate for the nature of the event (although one respondent felt they were too short):

A bit rushed - but appropriate for a standing audience

Good and short

Thought provoking - great idea to limit it to 5 mins

Nice, short and to the point

Not enough time scheduled

Two respondents felt that the talks **didn't link together** particularly coherently:

Didn't follow from each other too well

Shame no integral message

Comments on the exhibition

The questionnaire gave space to comment on the exhibition. The main points raised were:

- The interactive nature of the exhibits was a success factor;
- Attendees were impressed with the wide range of applications exhibited;
- Attendees wished for more time to see the exhibition;
- Some demonstrations would have benefited from more careful pitching.

Many respondents commented on the **interactive** nature of the exhibition:

Staff v friendly eager to explain concepts toward their projects

Some spectacular with 1 2 1 conversations

Excellent - hands on

Well - informed people manning them, more hand outs would have helped

Attendees also commented on the wide **variety of different applications** that were exhibited:

Great range was setup / displayed.

Nice variety of applications

*A great broad range of concept areas, shame it was a small venue
(difficulty seeing)*

A very good variety of systems

The biggest complaint about the exhibition was the **lack of time and space** to be able to engage with all of the exhibits:

More space needed

*All v interesting, it was so busy I didn't get a chance to speak to everyone
though I very much wanted too*

Alas limited time - brilliant venue

Would have liked more time as it was v interesting

Interesting but difficult to elbow my way through!

A couple of respondents felt that the demonstrations could have been **more appropriately pitched**:

Not all demonstrations were aware of their audiences

Some presentations explanations could have been more professional

Some respondents left more **general comments**, most of which were positive:

Very interesting

Innovative and v interesting

Good general info on robotics

Amazing robots - had no idea this was going on in the UK

The most interesting issue raised

Respondents were asked what they felt had been the most interesting point or issue raised during the event. Responses indicated that different audience members had found different aspects of the event useful and interesting. The key points of interest were:

- Ethical issues;
- Applications of robotics;
- Education;
- Funding.

Many of the respondents commented on the **ethical issues** that the event raised:

Noel Sharkey's ethical issues, because they are important

Ethical issues - care of elderly and children

Need for ethical debate about robots

Ethics of military applications

Ethics of care and responsibility

Human/robotic ethics

A variety of different **applications for robotics** that were included in the talks and exhibits were mentioned:

South Korea's robot police force!

Medical applications

Number of robots in service already - shocking!

Haptic robots, speech/gesture robot

Two respondents commented on issues related to **education** that the event had raised for them:

Lack of uptake of science education in school or college

Robotics attract school kids into engineering - which must be a good thing

Several respondents commented on **funding** or commercial issues:

Robots need more funding

Funding and how it was targeted

Commercialisation - need to connect research to sales

Importance of UK funding

Comment by Dave Barnes on the importance of not being left behind through lack of funding for research

Some respondents identified **wider issues** about the future of robotics or engagement between scientists and Government:

How do the scientific community put forward [an] area of concern that they are trying to raise with public gov etc

Looking at the bigger picture - robotics in 20yrs

Public acceptance of robots halting their proliferation

Follow-up activities

Respondents were asked whether they intended to follow up after the event in any way. Of the 35 respondents that answered this question, 30 were intending to follow up in some way. For many, this involved contacting people they had met at the event. Some also said they would follow up through further research of their own or by 'keeping up to date' with some of the applications. A few attendees were unsure of how they would follow up.

Contact people I met

Follow up research with notes made

Contact Noel Sharkey and get involved in his efforts of ethics and robotics

However there were some more concrete outcomes even at this early stage: the Shadow Secretary of State for DIUS (Lib Dem) is planning a visit to the Bristol Robotics Lab as a result of the event, and a representative from his office wrote that he intended to raise some innovation questions in Parliament. Two respondents also mentioned a robotics knowledge transfer network as a means of providing a more integral approach to robotics in the UK, although the exact nature of their involvement in this was not clear from their responses.

Visit Bristol / UWE robotics lab

Yes UK needs integral approach - KTN?

A few media representatives at the event planned to include scientists in future activities such as podcasts, and several participants from the education and museums communities wrote that they planned to incorporate robotics into their work in various ways.

Follow developments to determine when media should inform public, make sure scientists get their say

Yes podcast interviews

Contact companies about education / public dialogue projects

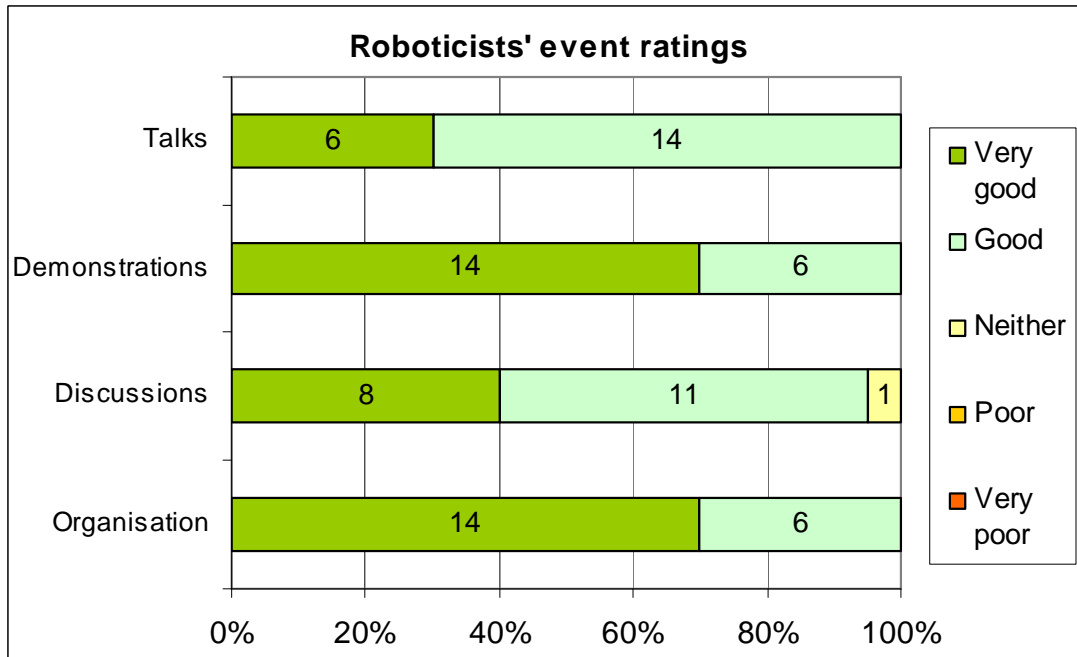
Yes developing ideas for using bots in museums

These findings indicate that the event acted as a starting point for many future collaborations between the robotics, public engagement and policy making communities.

3.3 Exhibitors' feedback

Event rating

Exhibitors were asked to rate various aspects of the event. A graph summarising their responses is given below:



It is clear from the graph that exhibitors rated the event highly. All respondents rated the talks, demonstrations and organisation as 'good' or 'very good'. Over 90% of respondents rated the discussions as 'good' or 'very good', with a single respondent rating them as 'neither' [good nor poor].

The best part of the event

Respondents were asked to describe what they thought was the best part of the event and why. Almost all respondents talked about the **networking opportunity** that the event offered in response to this question. The fact that the audience included people roboticists would 'not normally get to talk to' was a clear success factor:

Getting to talk to people you would not normally get to talk to

The chance for different robotics research, robotics industry and policy makers to meet

Access to new audiences - not the usual attendees for a robotic conference

The discussions with MPs and others, as it gave us an opportunity to make some valuable new contacts

Talking to interested people

Two respondents mentioned the **demonstrations** as the best part of the event:

Exhibitors, they showed very interesting aspects of robotics

The demonstrations; they were simply very interesting

One respondent felt it was not possible to select a favourite element:

I was impressed with the whole thing and find it hard to select any one element as the best

A part of the event that could have been improved

Respondents were also asked to suggest an aspect of the event that could have been improved.

Echoing the responses from the attendees, many exhibitors would have liked **more time** for discussions. One useful suggestion was a 'spill-over' area where discussions could have continued informally after the event had finished. Several respondents also commented on the **lack of space** in the venue:

We needed more time for the discussions!

Given the interesting topics, the talks could have been longer

A longer event would have been ideal

It would have been good to have an official spill-over area after 17:45 to allow mixing and discussions to take place... .. people dissipated more quickly and some opportunities were lost

The room was quite small for the number of people who attended

It was a bit overcrowded

A slightly bigger room would have been nice. I liked the way catering staff walked around offering food, however it would have been nice if they could have brought drink too, as when you're talking non-stop drink is really what you want!

Another useful suggestion was the production of a **brochure** containing information and contact details that MPs could have taken away with them.

Organised illustrated published brochures for MPs and exhibitors to take away, with articles on all the exhibitors and emphasise the need for funding and support for the future

Event expectations

The e-survey explored exhibitors' expectations of the event and asked about how it compared to these in reality.

When asked what they hoped to get out of the event, the main points raised were:

- To raise awareness of robotics generally;
- To raise profile of own organisation;
- To find out how the robotics industry is perceived;
- To emphasise the importance of funding robotics research;
- To emphasise the importance of robotics education;
- To network and gain contacts.

Actual comments included:

To inform MPs and Lords about robotics, and to emphasise the importance of targeted funding

Using it as a platform to show our products and also to find out more about how the robot industry is perceived

To meet MPs and exhibitors to discuss their work and the importance of Robotics for the UK's future

Raising robotics and company profile

Put across the message -explaining the importance of the application side, the need of funding to be able to take the work out from the lab into the benefit of the general public

Making a case for importance of robotics education

Contacts with others in the area

Respondents were asked to rate how much they thought the audience would know about robotics. 18 out of 20 respondents thought they would know 'a little', and two felt they were likely to know 'nothing'. No respondents thought the audience would have 'lots' of prior knowledge about the subject. Respondents expected their audience to be interested in robotics and mostly positive about applications. Some felt that the audience might have unrealistic impressions of robotics, i.e. they might expect robots to be more advanced than they really are.

The survey asked how the event compared to expectations. The results were positive: most respondents felt the event met or exceeded their expectations. Respondents were pleased with the interest that was expressed in their work, although a few were not expecting such a wide range of levels of expertise within the audience. A couple of respondents commented that there were fewer parliamentarians than they had expected. Example comments included:

Better than expected in terms of attendance and interest

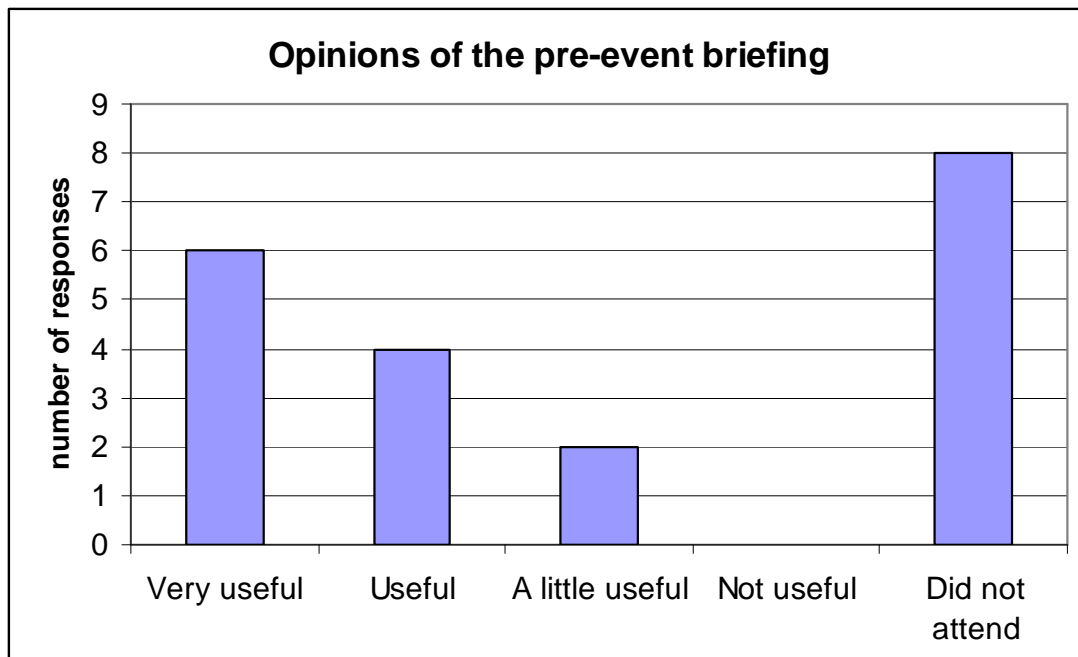
There were many more people who already had a great interest and involvement in robotics, less MPs and other policy makers than expected

I thought it was a great event and met my expectations

Busy. Not clear how many people were 'new' and how many already in the community

Pre-event briefing

Respondents were asked to rate the pre-event briefing. Their responses are summarised in the chart below:



Those that attended the event found it useful, especially in preparing for the logistics of the day:

The logistics of delivering the robot and setting it up were pretty daunting so it was useful to have structured plan for the day

It prepared us very well and allowed the event to run very smoothly. Also gave us an idea of what to expect and focus us on what we might want to say

The organization on the day and the presence of an individual "minder" made it very easy on the day

However one respondent felt that the briefing could have been replaced with a more efficient alternative:

We got the logistics sorted out. But it could have been done much more efficiently by email - it cost me a whole day

Questions about robotics

Respondents were asked to list the questions they were asked most frequently about their exhibits. The main questions could be categorised as follows:

- Questions about the robot's design and purpose;
- Justification and context for the research / development;
- Questions about economic aspects of the work;
- Ethical issues.

Example questions about robots' **design and purpose** included:

What is it?

What is it used for?

How difficult is it?

Can it talk (the robot)?

How is your robot powered?

Questions about the **justification and context** of the research included:

Why are you doing this?

What is the relevance of [the] research?

Why haven't you done it all?

There were many questions related to the **UK economy**:

Is the UK good at this kind of thing?

Who buys the robots?

What is your next product?

Is that really the best in the world?

What are the potential spin-outs for UK Space Robotics?

Finally, several questions related to **ethical issues**:

Will it replace surgeons?

Will there be robot wars?

Why should people interact with robots?

Are the robots safe?

This information could be useful for those wishing to engage a similar audience with robotics. Most of the questions were ones that were familiar to the exhibitors.

Impacts on audience and exhibitors

Respondents were asked what impacts (if any) they felt the event had on attendees. The responses varied widely; a few respondents felt there had been little or no impact, while others felt attendees left much better informed about the breadth of UK robotics research and the challenges it faces. Some felt unsure of the outcomes, and one respondent mentioned a specific funding decision that they hoped the event would influence.

They went away better informed

Impressed, enthused and interested

Minimal - as I say, lacked clear outcomes

Note sure, hopefully a few MPs attended and learnt about where the field is and what the challenges are

It informed them about the current status of robotics research and education in the UK

In the context of [specific field] there are a number of key funding meetings occurring later this year. I hope that the impact of the POST event will be remembered during these meetings

I think it was positive and showed the breadth of UK robotics

Responses to the question about whether or not the event had impacts on them were also varied. The main impacts identified were:

- Networking and contacts;
- Raising the profile of robotics;
- Gaining experience in engaging non-specialists in robotics.

Several respondents commented on the **contacts** they had made, although they acknowledged that it is too early to discern what these could lead to:

Hopefully I've gained some useful new contacts, but only time will reveal how useful they'll be!

Knowledge of POST, networking with others in field

Gave us good access to Government decision makers which is usually difficult to obtain

Surprise that MPs and Lords asked questions and listened to answers

Some felt the event was valuable in **raising the profile** of robotics research:

Probably raised awareness for my research

Hopefully raised profile of space robotics and importance to UK

Opened my eyes to other people's research

A few respondents commented on the impact the event had on the way in which they **communicated their research**:

Re-confirm the need and importance in engaging in discussions, putting across the meanings, reasons and vision

It forced me to have a very clear and concise message.

It made me surely more confident about the fact that my work is interesting for a not technical audience.

Two respondents felt that the event had little or no impact on them

Follow-up

Of the nineteen exhibitors that answered this question, nine said that opportunities for further activities or discussions had arisen from the event. Several of these were in the form of contacts, but others included opportunities to display robots in museums or science centres, organising the MP visit to Bristol Robotics Lab, media interest and one business opportunity.

It may be possible to organise a visit from our local MP to the labs

Future business opportunity

Have made potentially useful contact with some interesting people!

I talked with a representative from [science centre] about the possibility of displaying one of our robots and/or displaying some material on their website

Exchange of emails, followed (hopefully) by some face-to-face meetings

Some media interest

Additional comments

Finally, the questionnaire had space for respondents to leave additional comments. As well as reiterating previous points such as lack of time, some respondents used this space to call for further events that will build links within the robotics community, and between the community and potential supporters.

There should be further such events bringing together different robotics research and robotics industry to build on the communication and community and drive for the UKs future involvement

Where is the UK support and how do we access it? How will this event change this situation?

Some respondents also commented on how well-organised the event was:

The organisers did a great job!

The POST people were great. Well organised event

4 Conclusions

An event such as this is difficult to evaluate as it represents the starting point of what the organisers hope will be a much longer process of building links between the robotics, public engagement and policy making communities. However, the feedback left by exhibitors and attendees was very positive. Many commented on the useful networking opportunity and there are plans to follow up on the event from both sides.

4.1 Evaluation against project aims

Aim	Conclusion
1. To brief parliamentarians on current UK robotics research;	Feedback indicated that this aim had been achieved. Some attendees were surprised at the amount and level of development of the UK field.
2. To discuss the possible future impact of robotics on society;	Ethical issues were raised in the initial presentation by Noel Sharkey. Many one-to-one discussions took place during the event and exhibitors reported frequent questions about ethical issues related to robotics.
3. To address public concerns around robotics;	Parliamentarians are sensitive to issues of public concern, so specifically targeting them and facilitating one-on-one interactions with roboticists met this aim. In addition, some of the follow-up activities involving media or collaborations with museums (for example) could contribute to addressing public concerns in the longer run.
4. To provide opportunity for roboticists to meet policy makers;	This opportunity was certainly provided, although it was disappointing that more of the MPs and Peers that had registered did not attend. However this is typical of such events, so was not unexpected.
5. To raise the profile of the POST, the IOP and Walking with Robots.	The event was regarded by attendees and exhibitors as a success, which will help the organisers' profiles with those that participated. Further sharing of material on partners' websites and through follow-up media and museums activities could further raise partners' profiles.

4.2 *General conclusions*

It is clear that **Walking with Robots played an important role in the event.** The ability to draw together at relatively short notice a wide range of researchers and organisations that represent the diversity of the field in the UK contributed greatly to the success of the event.

Logistically, the event ran very smoothly despite a very short time to setup and take down the exhibits. No doubt this was helped by the pre-event briefing, which was found useful by all that attended it.

Although limited slightly by time and space, **the structure of the event worked well.** The three short presentations at the start were appropriate for the standing audience and gave a useful overview to place the exhibits in context. The informal and interactive nature of the exhibits were ideal for starting discussions; indeed I observed several people that said they were just 'popping in' remain in the room for half an hour or more. While the organisers were disappointed that not all MPs that had expressed an interest attended, it was noted that often attendees spend a very brief time at these types of events, so the fact that the room was still full at the end of the event indicated a high level of interest in the discussions.

The constructive feedback received (mostly from roboticists) related to **extending the impact of the event.** Two main ways to do this were suggested: firstly by providing a spill-over area where discussions could continue after the event, and secondly by preparing a brochure or similar take-away that would provide information on all of the exhibitors. Several attendees regretted not being able to talk to all of the exhibitors, so this could have been a way to overcome the limited time.

Appendix

- Copy of attendee questionnaire (NB the size of response boxes has been reduced here)
- Roboticists e-survey can be viewed at http://www.surveymonkey.com/s.aspx?sm=JnqLC4IVpKgYE8GXorTvmw_3d_3d

We value your feedback

The organisers are keen to find out what you thought about this event. Please take a few moments to answer the following questions about the seminar and demonstrations. Your answers will help us improve future events, so please be as honest as you can!

1. What did you think about the **quality of the talks**?

	Very good	Good	Neither	Poor	Very poor
Noel Sharkey <i>Ethical issues in robotics</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kerstin Dautenhahn <i>Social and healthcare robotics</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dave Barnes <i>UK space robotics</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. Please comment on the talks below:

3. What did you think about the **quality of the demonstrations**?

Very good	Good	Neither	Poor	Very poor
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Please comment on the demonstrations below:

5. What was the **most interesting** point or issue raised and why?

6. Do you intend to **follow up** after this event in any way? If so, in what way?

7. Do you have **any other comments** about the event?

8. How did you hear about this event?

<input type="checkbox"/> Invite	<input type="checkbox"/> POST website	<input type="checkbox"/> Publicity within parliament
<input type="checkbox"/> Other (please state:)		

9. Your name:

10. Your organisation:

11. Your email / phone number:

12. Would you like to hear about future POST events? Yes please No thank-you

Thanks