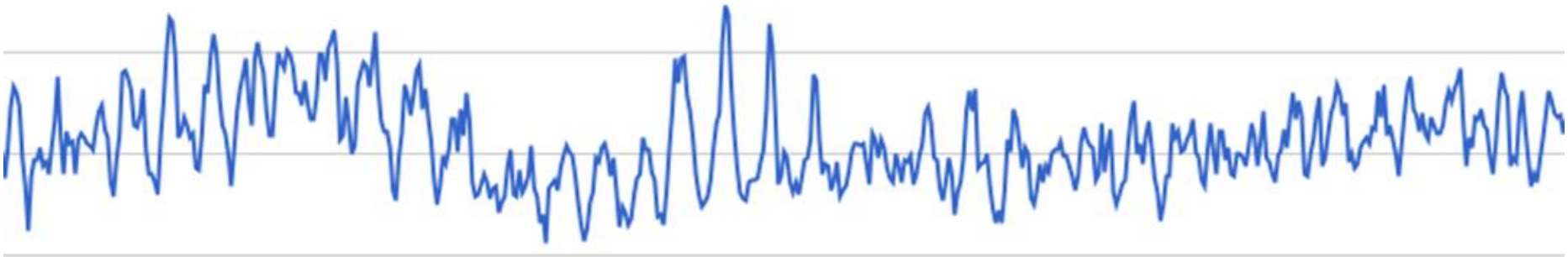
Independent Noise Working Group

# Wind Turbine Amplitude Modulation and Planning Control Study

## Discussion document for DECC meeting at Westminster - 13 October 2015



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# Amplitude Modulation Study

- The main issues
- Background
- Why the INWG
- INWG AM study & findings
- Recommendations

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# Amplitude Modulation Study
# The Main Issues

- **Long–term denial by the wind industry and its acousticians of noise problems including:**
  - **Excess Amplitude Modulation (EAM)**
  - **Need for a planning condition**
  - **Health effects**
  - **That Low Frequency Noise (LFN) is relevant**
- **Continued wind industry defence of the ETSU-R-97 (ETSU) noise assessment guidelines**
- **Similar noise problems in other countries where noise assessment is based on ETSU**
- **No effective protection (legal remedy) against EAM from existing wind turbines**

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# Amplitude Modulation Study Background

- **On 1 Aug 2014 the Institute of Acoustics (IoA) announced the formation of the amplitude modulation (AM) working group (AMWG) reporting through its wind turbine noise working group (NWG)**

- **A long term association of the IoA with the wind industry and its acousticians leading to conflict of interest and ethics concerns**

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# Amplitude Modulation Study Background

- **During 1996 a wind industry & government working group replaced the use of BS4142 with ETSU-R-97 for wind turbines allowing higher noise levels '*so as not to unduly constrain*' wind power deployment**

- **Perversely ETSU allows even higher noise levels at night than daytime. ETSU also fails to take account of EAM or LFN**

- **The same small group of wind industry acousticians have dominated the IoA noise working groups (NWGs), the declared science and official noise guidance ever since**

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# Amplitude Modulation Study
# Why the INWG

- **Our concerns with IoA AMWG include:**
  - **Dominant wind industry bias of group members**
  - **Narrow brief for their AM study ignoring much of the current scientific evidence and wider issues**
  - **Deny and ignore low frequency noise (LFN), concealing evidence, filtering out sound components below 100Hz (Why actively exclude measuring something claimed not to exist?)**
  - **No intention to measure inside homes where the greatest impact is experienced**

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# Amplitude Modulation Study
# Why the INWG

- **The 2012/13 IoA ETSU Good Practice Guide study ignored dissenting scientific input and resulted in permitting even higher noise levels (and reduced separation distances)**

- **The expectation that the IoA will again fail to take a neutral scientific approach, recommending a benign (wind industry friendly) AM control method**

- **Whereas the INWG is taking an holistic approach to AM**

- **Since announcing its AM study, the INWG has already become an effective 'check' on the IoA AMWG**

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# Amplitude Modulation Study
# Why the INWG

- **A diverse group committed to a balanced scientific approach and achieving reasonable protection against wind turbine noise**

- **Multi-discipline expertise including: acoustics, physics, health & sleep, data analysis, environmental health, legal and planning, (more academically qualified and experienced than AMWG)**

- **Sponsored by Chris Heaton-Harris MP and the National Alliance of Wind Farm Action Groups (NAWAG)**

- **Total independence from the wind industry**

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# Amplitude Modulation Study Methodology

**12 month duration study work packages**

| Work Package | Work Package Subject | Lead author |
|---|---|---|
| | | |
| 1 | Fundamentals of AM | John Yelland |
| 2.1 | Literature review | Richard Cox |
| 2.2 | AM Evidence review | Sarah Large |
| 3.1 | LPA Survey | Trevor Sherman |
| 3.2 | Health effects | Chris Hanning |
| 4 | Den Brook | Mike Hulme |
| 5 | Draft AM planning condition | Sarah Large |
| 6.1 | Legal remedies | Richard Cowen |
| 6.2 | Community experience of Statutory Nuisance | Bev Gray |
| 7 | Test of the IoA AMWG methodologies | Sarah Large |
| 8 | Review of IoA AM study and methodology | Richard Cox |
| 9 | The Cotton Farm monitor experience | Bev Gray |
| 10 | Report summary | Richard Cox |

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# Amplitude Modulation Study Methodology

## How AM affects people:

- Survey of Local Planning Authorities to determine the extent of the problem
- Expert review of evidence of health effects and sleep deprivation
- Examination of potential legal remedies

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# Amplitude Modulation Study
# Study findings

## How AM affects people:

- **EAM occurs frequently, often for extended periods. All wind turbine types and sizes can be affected creating a regular annoyance for neighbours**

- **Confirmed by Dr Hanning, a recognised sleep specialist there are ill health effects at the noise levels and separation distances permitted by ETSU**

- **Without an AM planning condition there is no effective legal remedy against EAM noise. Local authorities are unable to deal effectively with EAM**

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# Amplitude Modulation Study Methodology

## Science behind AM includes:

- A review of EAM evidence, available literature and knowledge evolution
- Description and root causes of EAM
- Development of control methodologies that could be applied as a planning condition or applied retrospectively
- Testing of IoA AMWG proposed EAM control methodologies

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# Amplitude Modulation Study
# Study findings

## Science behind AM demonstrates:

- **ETSU is not 'fit-for-purpose' (*Northern Ireland Assembly report, Jan 2015 recommends that ETSU be reviewed on an urgent basis)***

- **LFN is a relevant and integral component of EAM – carefully concealed by the wind industry for two decades**

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# Amplitude Modulation Study
# Study findings

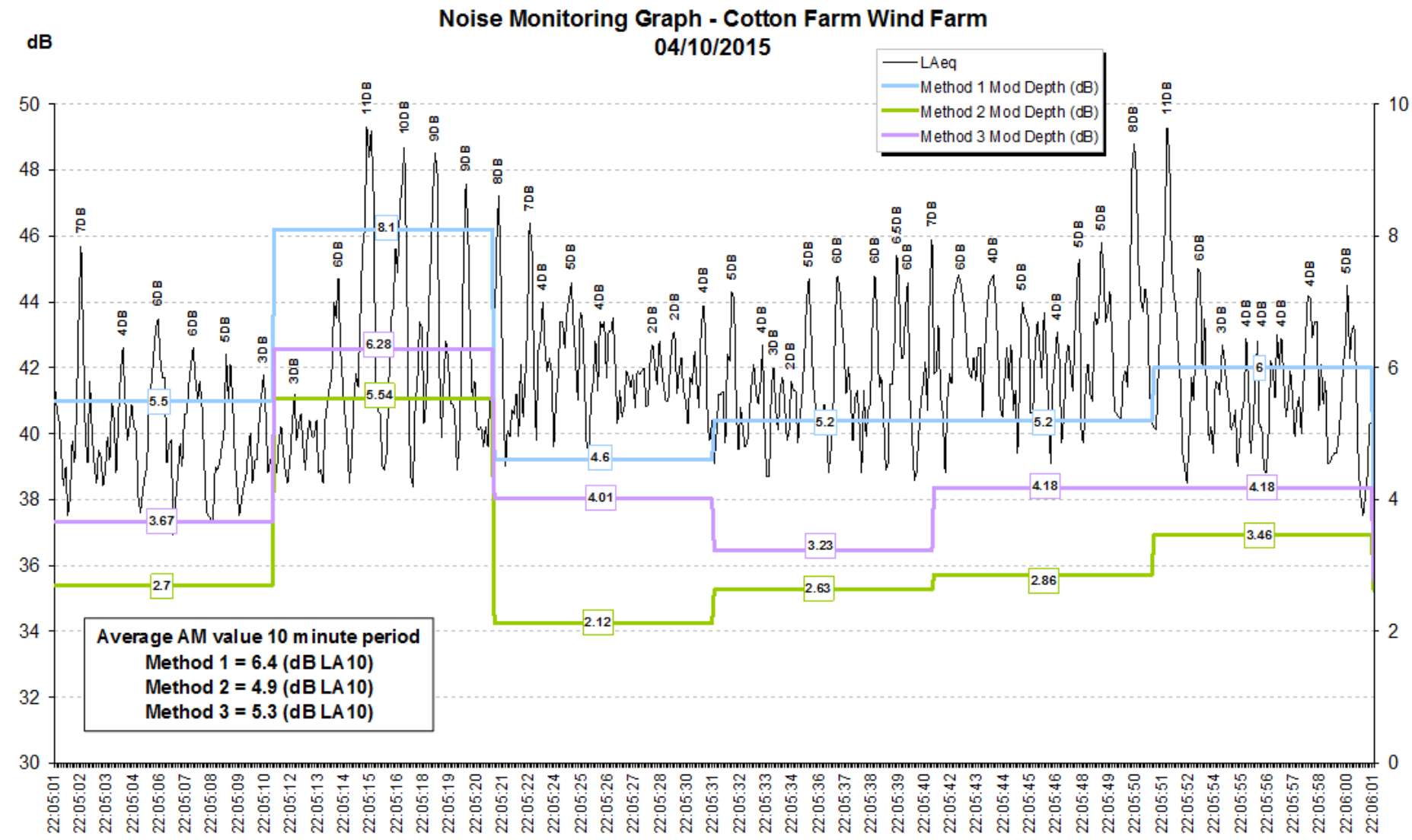
## Science behind AM demonstrates:

- **Provisional testing of IoA AMWG proposed control methodologies identify significant problems and failure to control even the worst cases of EAM**

- **IoA AMWG preferred methodologies involves proprietary (unverifiable) software that does not work with real data (A parallel here with the Volkswagen emissions scam)**

- **BS4142:2014 is demonstrated to provide the most effective method for control of noise level and EAM (BS4142:2014 answers criticisms of earlier versions against its use)**

04/10/2015 22:05



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# Amplitude Modulation Study Methodology

**Community experience in response to AM including:**

- **Review of the Den Brook wind farm and AM planning condition**
- **Control of AM without an AM planning condition, relying upon statutory nuisance**
- **The Cotton Farm community noise monitor**

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# Amplitude Modulation Study
# Study findings

## Community experience regarding EAM includes:

- A documented 'decade of deception' by the Den Brook developer RES charting clear evidence of persistent intent to downplay, misinform and thus mislead both neighbours and decision makers

- The documented struggles by local authorities with hundreds of resident noise complaints from the Cotton Farm turbines for nearly 3 years. Proven ETSU breaches and EAM recorded on over 50% of nights yet still the noise continues

- Cotton Farm community monitor is a proven template for compliance noise monitoring

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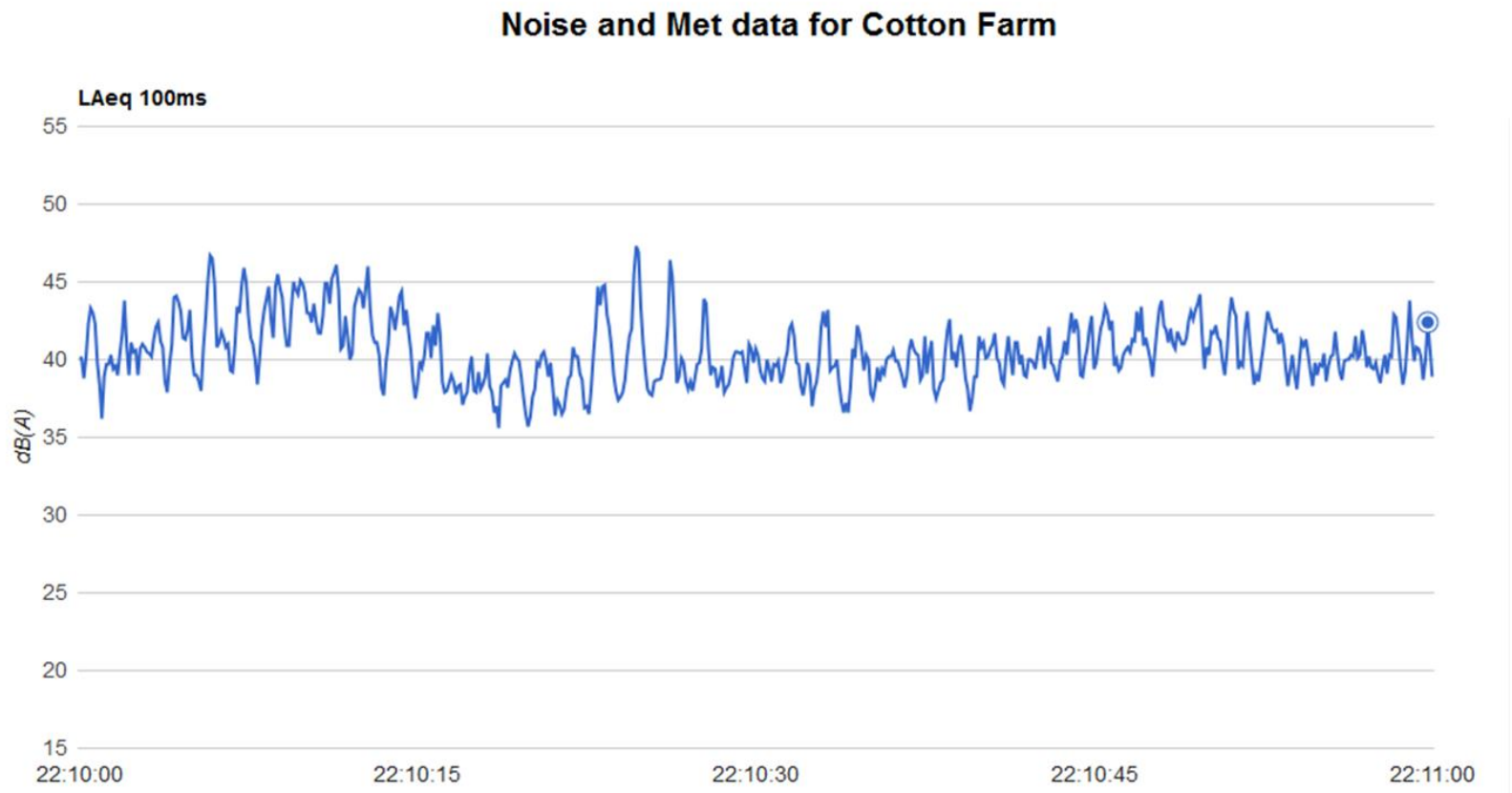
# Amplitude Modulation Study Findings




| Date | Time (end) | Temp | Speed | Direction | Rain | Date | Time (start) | 10 minute LA90 |
|---|---|---|---|---|---|---|---|---|
| 2015-10-04 | 22:20:00 | 11.3 °C | 2.2 m/s | E | 0.00 | 2015-10-04 | 22:10:00 | 38 |

**Source: Cotton Farm monitor – 4 Oct 2015**

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# Amplitude Modulation Study Methodology

## Wind industry response to AM includes:

- Flawed IoA ETSU good practice guide consultation 2012/13
- Flawed RenewableUK AM study 2010/13
- Suppressed Den Brook AM condition
- IoA AM study launched Aug 2014
- IoA AM consultation April – June 2015
- DECC AM study awarded to WSP / Parsons Brinckerhoff May 2015

**All controlled by the wind industry and its acousticians**

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# Wind Turbine Noise Committees (Same people for two decades)

| Working Group / Report | | | ETSU Working Group 1997 | Noise Working Group Aug 2006 | Noise Working Group Oct 2006 | Noise Working group Apr 2007 | Salford Report 2007 | Acoustics Bulletin Apr 09 | The Measurement of Low Frequency Noise at Three UK Wind farms 2006 | Wind Farm Statutory Nuisance Methodology Apr 2011 | Analysis of How Noise Impacts are Considered in the Determination of Wind Farm Planning Applications | IoA wind farm Working Group 2011/12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sponsor** | | | ETSU (DECC) | BERR (DECC) | BERR (DECC) | BERR (DECC) | BERR (DECC) | IoA | BERR (DECC) | DEFRA | DECC | IoA |
| **No Groups** | **Name** | **Organisation** | | | | | | | | | | |
| 1 | Dr. Mags Adams | | | | | | x | | | | | |
| 4 | Dr Mike B Anderson | Renewable Energy Systems (RES) | x | x | x | x | | | | | | |
| 1 | Kristian Armstrong | DTI | | | x | | | | | | | |
| 3 | Jeremy Bass | RES | | x | x | x | | | | | | |
| 4 | Mr B Berry | National Physical Laboratory then consultant | x | x | x | x | | | | | | |
| 4 | Dick Bowdler | New Acoustics | | x | x | x | | x | | | | |
| 6 | Dr Andrew Bullmore | Hoare Lea Acoustics | x | x | x | x | | x | | | x | |
| 1 | Douglas Crockett | DCLG | | | x | | | | | | | |
| 5 | Bob Davis | Robert Davis Associates | | x | x | x | | x | | | | x |
| 3 | Mark Dorrington | AEA Energy & Environment then FES | | x | x | x | | | | | | |
| 2 | Sue Ellis | DEFRA | | | x | x | | | | | | |
| 1 | Duarte Figueira | DTI | | | | x | | | | | | |
| 2 | Dani Fiumicelli | AECOM | | | | | | | | x | x | |
| 9 | Mr Malcolm Hayes | Hayes McKenzie Partnership | x | x | x | x | x | x | x | | x | x |
| 3 | Dr. Sabine von Hünerbein | University of Salford | | | | x | x | | | | x | |
| 5 | Mr M Jiggins | Carrick District Council then Hoare Lea Acoustics | x | x | x | x | | x | | | | |
| 2 | Zoë Keeton | RWE Npower then seconded to DTI | | | x | x | | | | | | |
| 1 | Sarah Kydd | DTI | | | x | | | | | | | |
| 1 | Mr E Leeming | The Natural Power Company Ltd | x | | | | | | | | | |
| 4 | Dr Mark L Legerton | ETSU then nPower | x | x | x | x | | | | | | |
| 4 | Geoff Leventhall | Noise consultant | | x | x | x | | x | | | | |
| 3 | Helen Matthews | DEFRA | | x | x | x | | | | | | |
| 6 | Andy McKenzie | Hayes McKenzie Partnership | | x | x | x | | x | x | | x | |
| 1 | Mr R Meir | DTI | x | | | | | | | | | |
| 2 | Dr Andy Moorhouse | University of Salford | | | | x | x | | | | | |
| 1 | Dr P Musgrove | National Wind Power Ltd | x | | | | | | | | | |
| 3 | Jonathan Perks | FES then AEA Energy & Environment | | x | x | x | | | | | | |
| 4 | Richard Perkins | Parsons Brinckerhoff Ltd seconded to DEFRA | | x | x | x | | | | | | x |
| 2 | Ben Piper | University of Salford | | | | x | x | | | | | |
| 3 | Alan Purdue | Castle Morpeth LA | | x | x | x | | | | | | |
| 3 | Mike Raw | Scottish Borders LA | | x | x | x | | | | | | |
| 1 | Mr DJ Spode | North Cornwall District Council | x | | | | | | | | | |
| 1 | Ms E Tomalin | EcoGen Ltd | x | | | | | | | | | |
| 1 | Mr HA Thomas | Isle of Anglesey County Council | x | | | | | | | | | |
| 4 | Mr Marcus Trinick | Bond Pearce Solicitors | x | x | x | x | | | | | | |
| 1 | Alan Smith | RWE Npower then seconded to DTI | | x | | | | | | | | |
| 3 | David Spode | Shrewsbury LA) | | x | x | x | | | | | | |
| 2 | Huw Thomas | Anglesey LA | | | x | x | | | | | | |
| 2 | Chris Tomlinson | BWEA now RenewableUK | | | x | x | | | | | | |
| 1 | Nigel Triner | AECOM | | | | | | | | x | | |
| 2 | Dr J Warrren | National Wind Power Ltd then nPower | x | x | | | | | | | | |
| 1 | Anne Wood | CLG | | | | x | | | | | | |
| 1 | Mathew Cand | Hoare Lea Acoustics | | | | | | | | | | x |
| 1 | Chris Jordan | Northern Group Systems (Env. Health) | | | | | | | | | | x |
| | **Key** | **Frequent Appearance** | | **Most Frequent Appearance** | | | | | | | | |

Source: Where ETSU is Silent, July 2012

INWG

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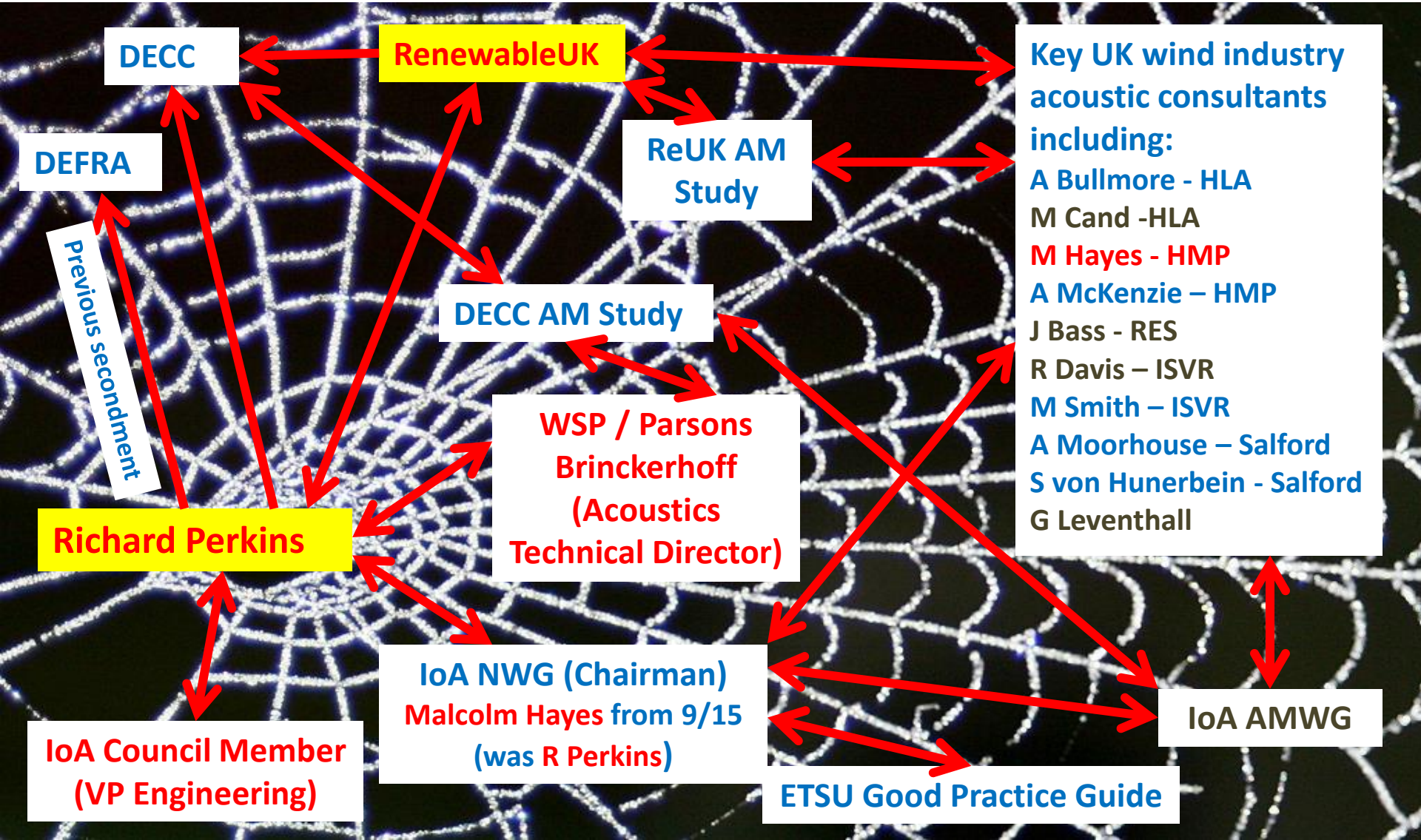
# Amplitude Modulation Study
# Two decades of deception



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# Amplitude Modulation Study
# Two decades of deception

WSP | PARSONS BRINCKERHOFF

UK

WHO WE ARE | WHAT WE DO | CAREERS

UK > WHAT WE DO > PROJECTS > ONSHORE WIND PROJECTS

‹ PROJECTS

ONSHORE WIND PROJECTS

## ONSHORE WIND PROJECTS

We have a long track record supporting wind developers, utilities, funders and investors throughout the project life cycle. Our clients include Scottish & Southern Energy, Vattenfall Vindkraft, RES, Burcote Wind and Stena Renewable.

**Conflict of Interest!**

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# Exerts from Aug 2006 NWG emails obtained via a FOI request

- Bowdler Aug 2006 – *"I think that it would be a mistake to minute that blade swish might get worse because of bigger turbines. I can see the newspaper headlines already "Wind Turbine noise to get Worse""*

- Leventhall – *"another part which might be used by objectors is the second bullet point near the end, which recommends developers allow a margin below 43dB for the amplitude modulation effect and to reduce number of turbines"*

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# Exerts from Aug 2006 NWG emails obtained via a FOI request

- Bowdler – *"My impression is that the "Oerlemans swish" cannot be the problem that people complain of"* and *"my preliminary conclusion is that the Oerlemans effect is a red herring as far as any complaints are concerned"*

- Matthews DEFRA – *"Would it be possible to add Richard Perkins to the email list as we attended the meeting together? His email address is perkinsr@pbworld.com (he is not in this office much but is wearing his Defra hat)"*

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# Amplitude Modulation Study Recommendations

- **ETSU noise guidance to be replaced with a code of practice based on BS4142:2014**

- **Independent research is required into the health effects of wind turbine noise including EAM and LFN**

- **An effective AM planning condition required for every wind turbine planning approval**

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# Amplitude Modulation Study Recommendations

- **Continuous noise monitoring (with data transparency) should be required for every medium & large wind turbine planning approval**

- **Effective remedy required for retrospectively dealing with noise nuisance including EAM from existing wind turbines**

- **Government should disassociate itself from the IoA until the conflict of interest and ethics issues are resolved and full transparency restored**

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# Wind Turbine Amplitude Modulation and Planning Control Study

**INWG report download:**
**http://www.heatonharris.com/reports-publications**

**INWG contact: wind-noise@tsp-uk.co.uk**